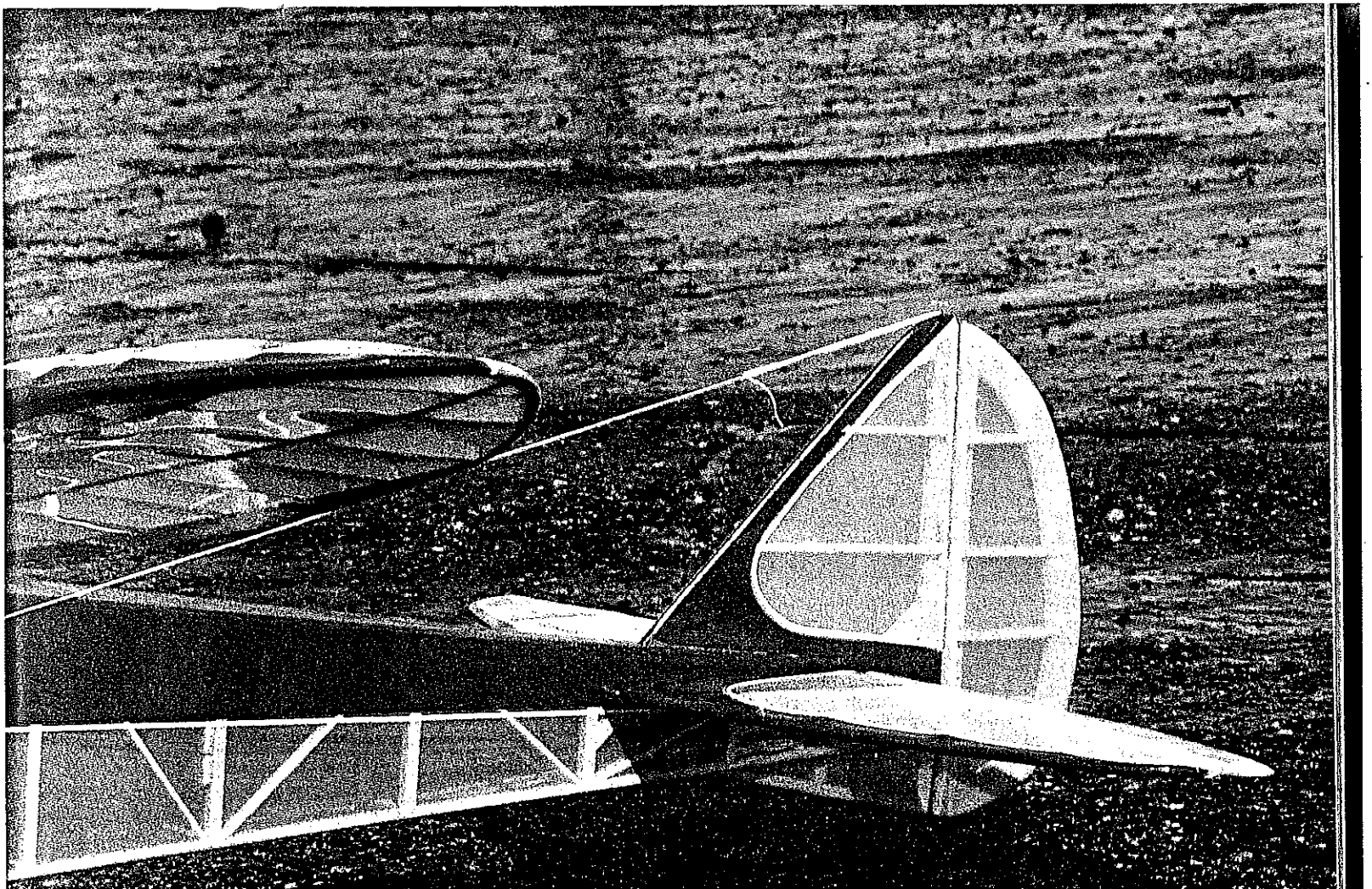
Long before Pete Bowers designed his single-place full-scale home-built Fly Baby, he used the same surface outlines in a small Free Flight model by the same name. Long overlooked, the Fly Baby makes a delightful RC model when enlarged 50%, as can readily be seen in the accompanying photograph.

The Model: FLY BABY

When home-builder Pete Bowers first took a liking to the name "Fly Baby" in the 1940s, he used it for a little Free Flight design that was also water worthy. Enlarged and modernized for RC gear and .25 to .40 power, it's still great fun to fly. ■Dr. D.B. Mathews



HERE'S AN OLD-TIMER that causes its share of head scratching among Scale buffs. "I didn't know there was ever a high-winged Fly Baby," or, "Why did you put a Fly Baby tail on that thing?" are the sort of comments it's been drawing at the flying field.

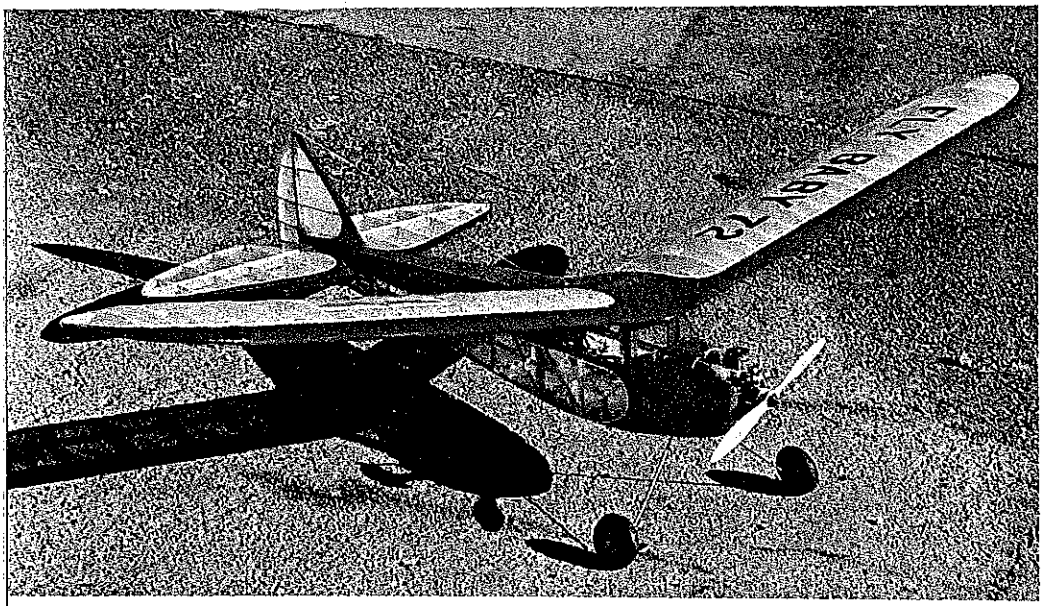
No wonder the Scale mavens are baffled. Long before designing the full-size Fly Baby that secured his niche in aviation history, Pete Bowers tried out the same name on a cute little Free Flight model with water flying capabilities. The earlier Free Flight Fly Baby shared not only its name but also its surface outlines with the later home-built. Though long forgotten, the Fly Baby model did have its moment of fame. It was a National ROW (rise-off-water) record holder in 1941, and it was later published in *Model Airplane News*.

Except that it's enlarged by 50% and converted to Radio Control, the model presented here is basically a faithful copy of Bowers' original Fly Baby. The 50% gain in size makes the airplane more adaptable to today's versatile technology. Due to the National ROW Record status of the prototype in 1941, the design is legal for SAM (Society of Antique Modelers) events.

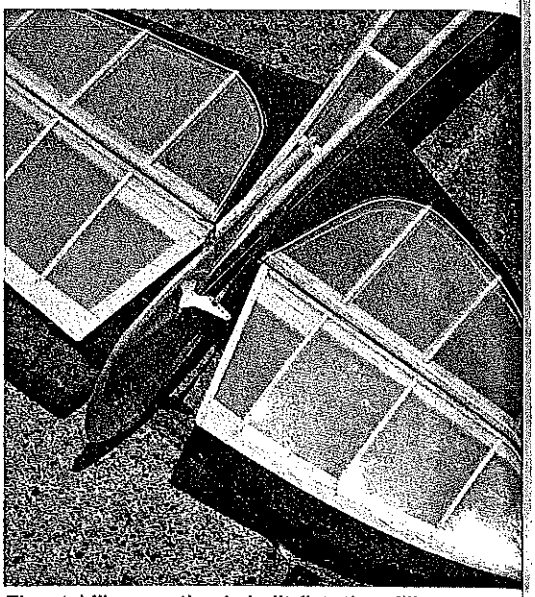
Though his fame rests on the home-builts, aviation books, and articles that he produced after the war, Pete Bowers became prominent in modeling circles many years earlier. A glance through the popular modeling publications of the Forties will turn up a variety of his designs. Bowers published the Fly Baby model while serving in the Army Air Corps during the war (a well-known article in *Air Trails* noted the temporary loss to modeling when he enlisted) under the by-line *Lieutenant* Pete Bowers. The April 1945 *Model Airplane News* construction article informed the reader:

"Record-setting Gas models that look like real ships are rare enough these days, but when they are seaplanes, they're almost miraculous. Fly Baby was not designed to be a record breaker, but rather to be a simple plane to build and one that would be a consistent flier."

A smallish airplane with a 48-in. wingspan, the Fly Baby model was customarily powered by a Madewell-Mite, though it was also flown with an old-style M&M and an O&R .23. Since Californian Paul Forrete, among others, has flown the original-size model in ½A Texaco with considerable success, we were convinced—correctly—that a 72-in.-wingspan version would be a



Based on the color and trim scheme that Bowers used on his original full-scale home-built Fly Baby, this RC model generates quite a large head turning quotient dressed in its bright yellow-and-red transparent polyurethane covering. The covering technique is discussed in the text.



The stabilizer section is built flat, then filler sheets are added and sanded to a symmetrical section. This is a tried-and-true method of constructing a truly warp-free structure. Also shown here is the rudder control horn.

delight. Just as we had thought, enlarging the design seems to strengthen its inherent esthetics. Little wonder that Bowers plagiarized his earlier design, using the same surface outlines, when the time came to develop an entry into the EAA home-built market.

The outlines and dimensions of this totally SAM legal model were blown up by a commercial blueprinter using a photo enlarger. The requirements of modern RC gear dictated several structural changes. Also, we developed an unusual but much simpler system of building the symmetrical sectioned tail surfaces.

Two-stroke power is more than adequate for the Fly Baby. The prototype has been flown with both a Fox .19BB and an O.S. .25 FSR, though the model could also be legally powered with a .30. An O.S. .40 four-cycle engine proved to be a delight. The .40 four-stroke is still legal, since SAM rules count 60% of four-stroke displacement when compared to two-stroke.

Though our Fly Baby has yet to be flown with the floats illustrated in the 1945 *Model Airplane News* article, we plan to try that approach. Should this 72-in. version prove to be as delightful flying off water as it is in the air, we will very likely publish enlarged float plans at a later date.

Even without the floats, the model is an absolute doll. Slow speed flight characteristics are outstanding—it'll almost fly backwards in the wind. Thermaling ability is excellent; the Fly Baby will ride very light lift with ease. Because of its steep dihedral, it will turn tightly in a strong thermal with no tendency to spin out.

Fly Baby 72 also excels in a sport role. It has an incredibly short takeoff roll with good control. The model flies as docilely as you please at 35% power yet will climb like a bandit when you firewall it. Landings are so slow and controlled that even a bad pilot looks good. The model does loops, spins, and lovely stall turns, making flying a relaxed and fun experience.

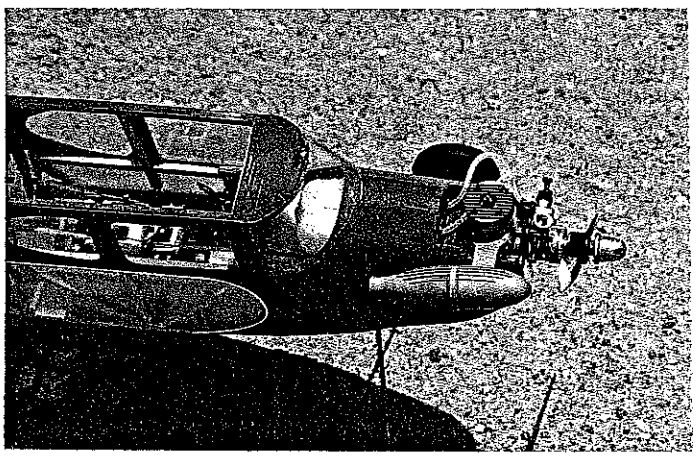
When a model is as good as Pete Bowers' Fly Baby, it can only get better in translation. Larger and easier to track than the original, radio controlled for greater versatility and utility, and offering new and easier construction techniques, this updated model makes a hard-to-beat choice in Old-Timer flying. Whether you're going in for all-out competition or just plain old fun-flying, run—don't walk—to your workbench.

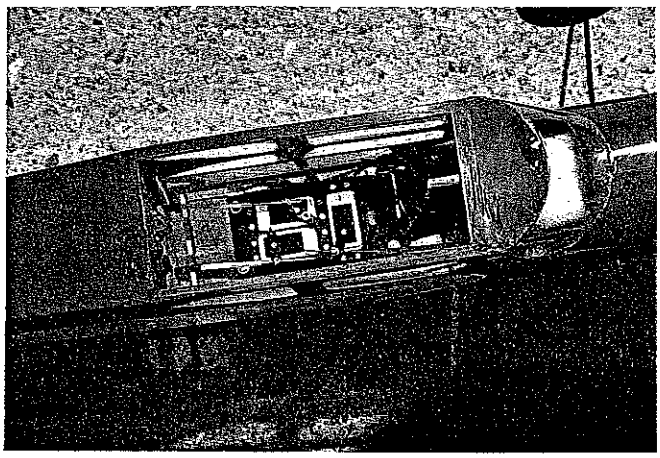
Construction. As drawn, this Fly Baby is about the minimum for weight and strength. If you'll be using the model exclusively for sport flying, consider strengthening it by substituting spruce for the wing spars and fuselage longerons. The increased weight would, however, somewhat reduce the model's slow speed performance characteristics.

For novice RC fliers with a tendency to fly into solid objects, a single dowel at the front and a double post at the rear of the cabin for rubberbanding the wing would be advisable. The grabber system shown on the plans is sufficiently strong under normal use, but damage to the cabin roof could occur if the wing tip were to strike anything solid.

I recommend using thick-grade Hot Stuff cyanoacrylate (CyA) as the adhesive for this project. Five-minute epoxy works best for the ply-to-balsa joints.

All wood sizes are standard stock. Lightweight C-grain sheet is ideal. Beware of un-

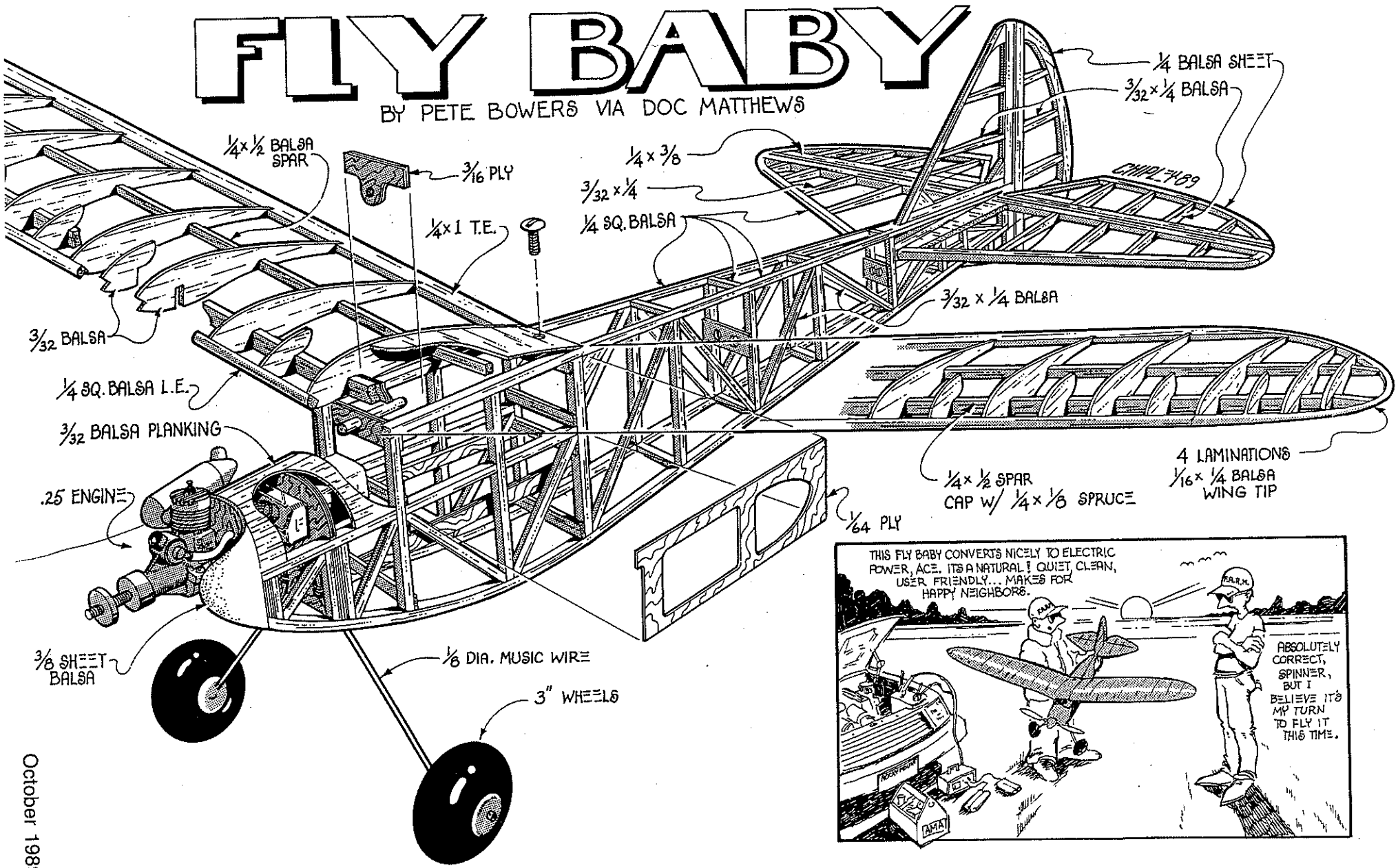


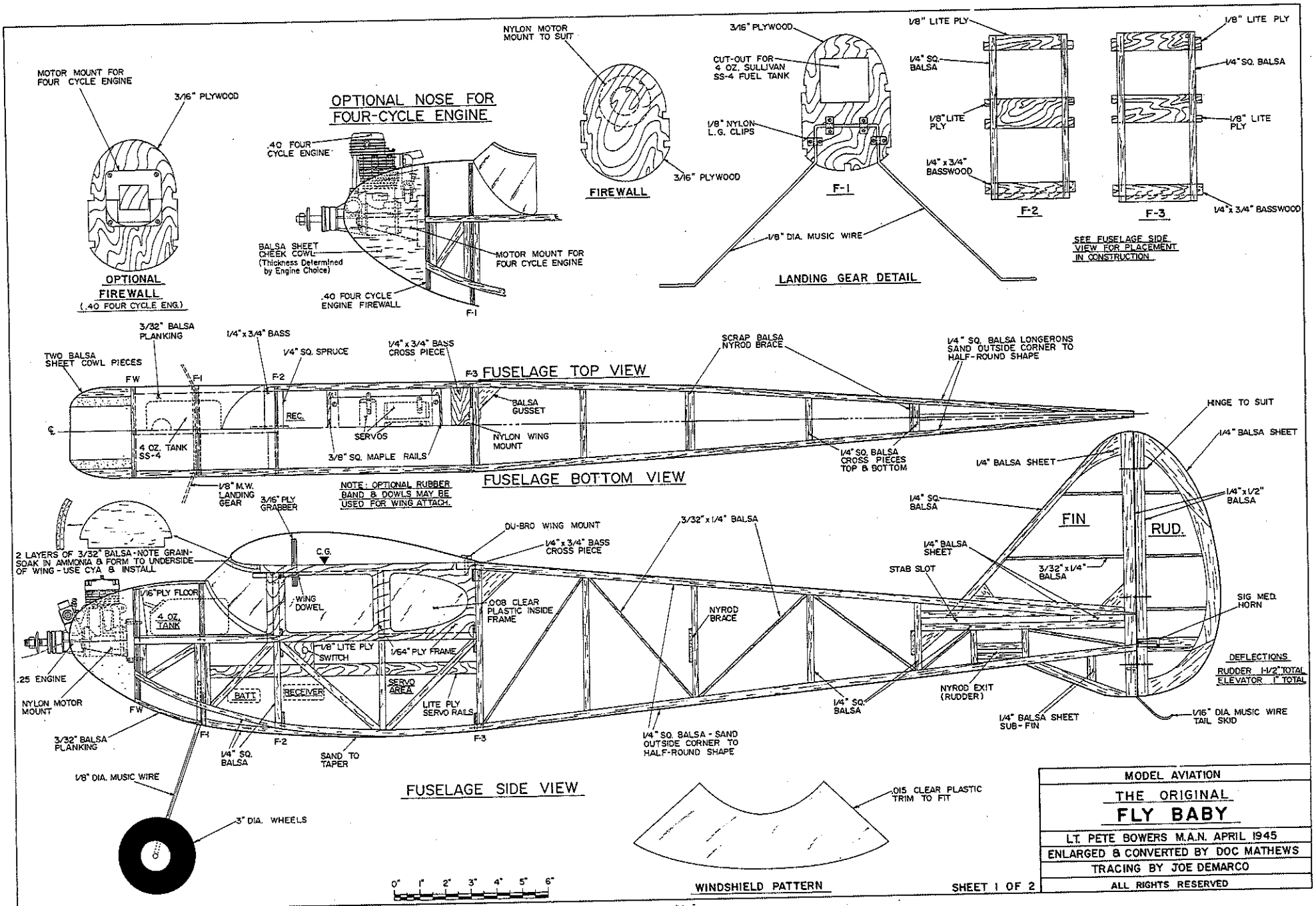


Left: A wide range of power from .20 to .40 can be used in this model with minor modifications. The Fox .19 engine shown here proved to be an ideal choice, with a very smooth idle and more than adequate power. Right: Close-up of the servo mounting arrangement—Ace Bantam servos on a tray. Note the dowel in the cabin front, part of the wing attachment setup. The dowel slides into a "grabber" arrangement on the wing leading edge. A single nylon bolt through the trailing edge screws into a Du-Bro fitting to secure the wing in position. Very simple and strong.

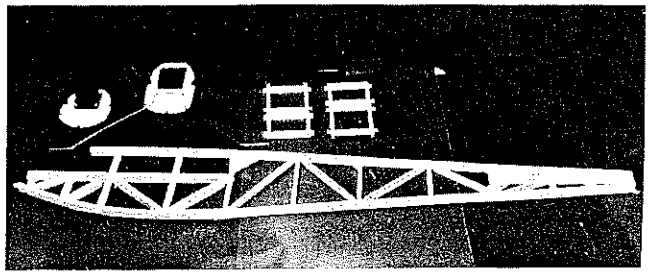
FLY BABY

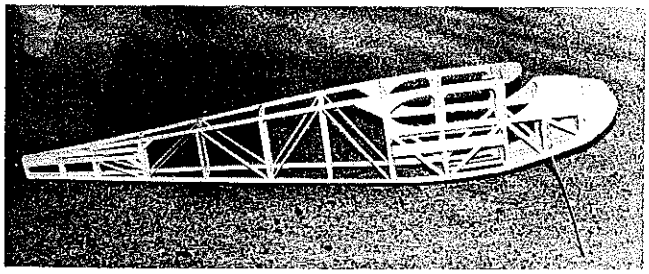
BY PETE BOWERS VIA DOC MATTHEWS



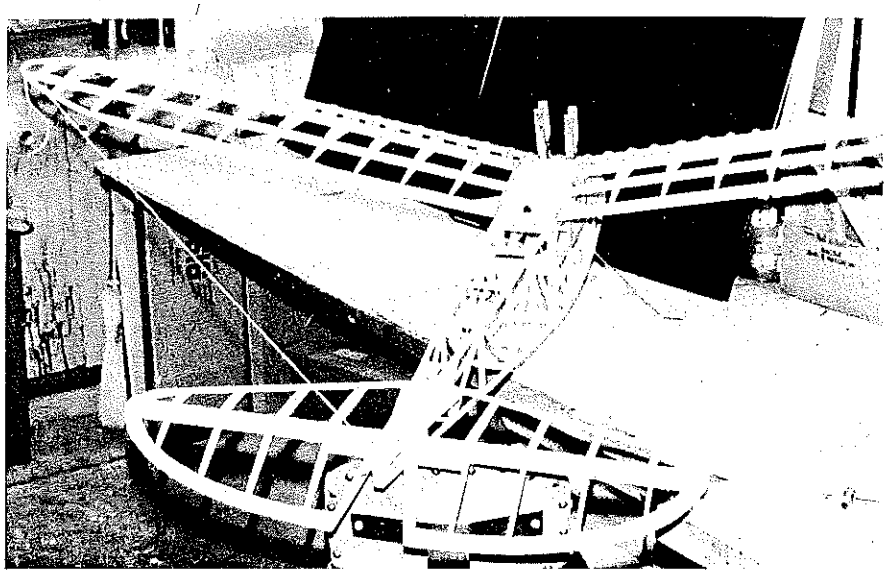


Full-Size Plans Available . . . See Page 196





Left: The two fuselage sides built one-over-the-other with barrier strips of masking tape substituted for the classic waxed paper. The "ladder" and formers (one with landing gear installed) are notched to assist in alignment. Right: The assembled fuselage is graced with a beauty peculiar to stick-and-strip structures. With modern adhesives and construction methods, these assemblies are no longer as difficult to build.



The structure of the airplane completed to the point of wing alignment. A simple piece of string is used to assure proper alignment of the wing prior to drilling the hole for the trailing edge bolt. Equal distance from the center of the fuselage tail to the same point at each wing tip will square the wing to the fuselage. Clamp securely when drilling the mounting hole.

plans to position the notches, then cut them out with a jigsaw with the blade reversed for visual reference.

Since ¼ x ⅜-in. balsa stock invariably seems to be warped, it's best to laminate the front wing spar with spruce and balsa. Position the spruce on top, since the bottom will be flared into the tips.

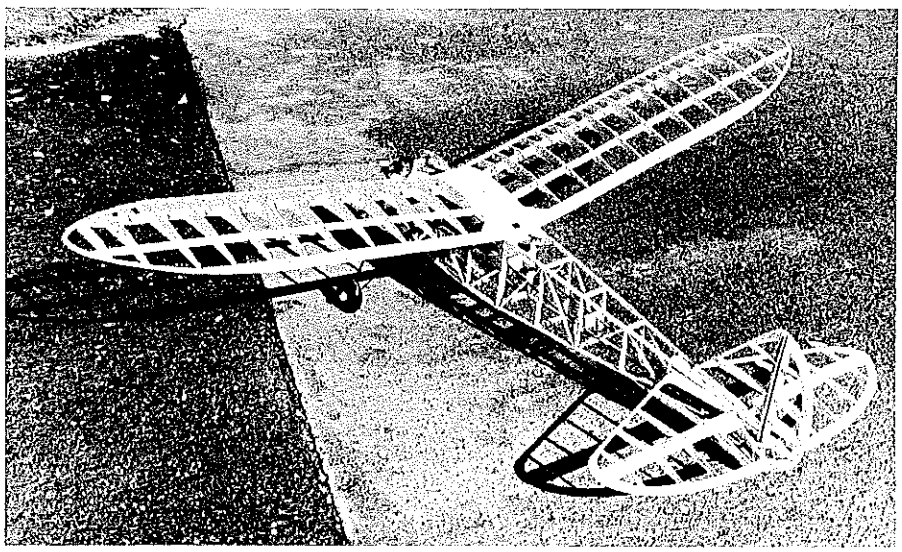
The wing tips are laminated over a foam board or cardboard form. Moisten the balsa with diluted ammonia water, coat with an aliphatic resin such as Sig Bond, and then slowly pull the sandwich from one end of the form to the other. Use masking tape to hold the strips in place while they set. You'll find that this technique will result in a strong, lightweight structure.

Once the laminated wing tips are dry, pin them into the slot cut in the trailing edge and onto the shaped spar faces. Bevel the bottom of the tip lamination to fair into the trailing edge. The wing tips can also be installed with the wing off the board, but be wary of warping.

The center section is built as an integral part of the left wing panel. Use the center section rib pattern on the plan to trim down these three ribs before adding the sheeting. Use the tilt jig on the plans to establish the dihedral angle of the right and left wing panel base ribs. The sheeting will be installed after the wing is fitted to the fuselage. The grabber is also added later.

If the tilt jig was used properly to set the center wing joint rib, all that's required is to block up the wing tips and carefully sand in the final dihedral angle. Make sure the three center section ribs are absolutely vertical. Join the panel to the center section with epoxy along the rib faces and on the spar joints. Clamp in place until the epoxy sets with spring-type clothespins. Repeat the process for the other wing panel.

Using a razor saw, cut the necessary slots in the ribs for the 3/32 ply dihedral brace (wing joiner). Epoxy it in place against the back of the main spar. Sand the leading edge to the shape shown on the plan. After a final sanding, check the wing alignment and set it aside.



The model temporarily assembled in its bare bones to give an idea of its general arrangement. Notice the antiflex brace for the pushrods and the position of the single wing bolt.

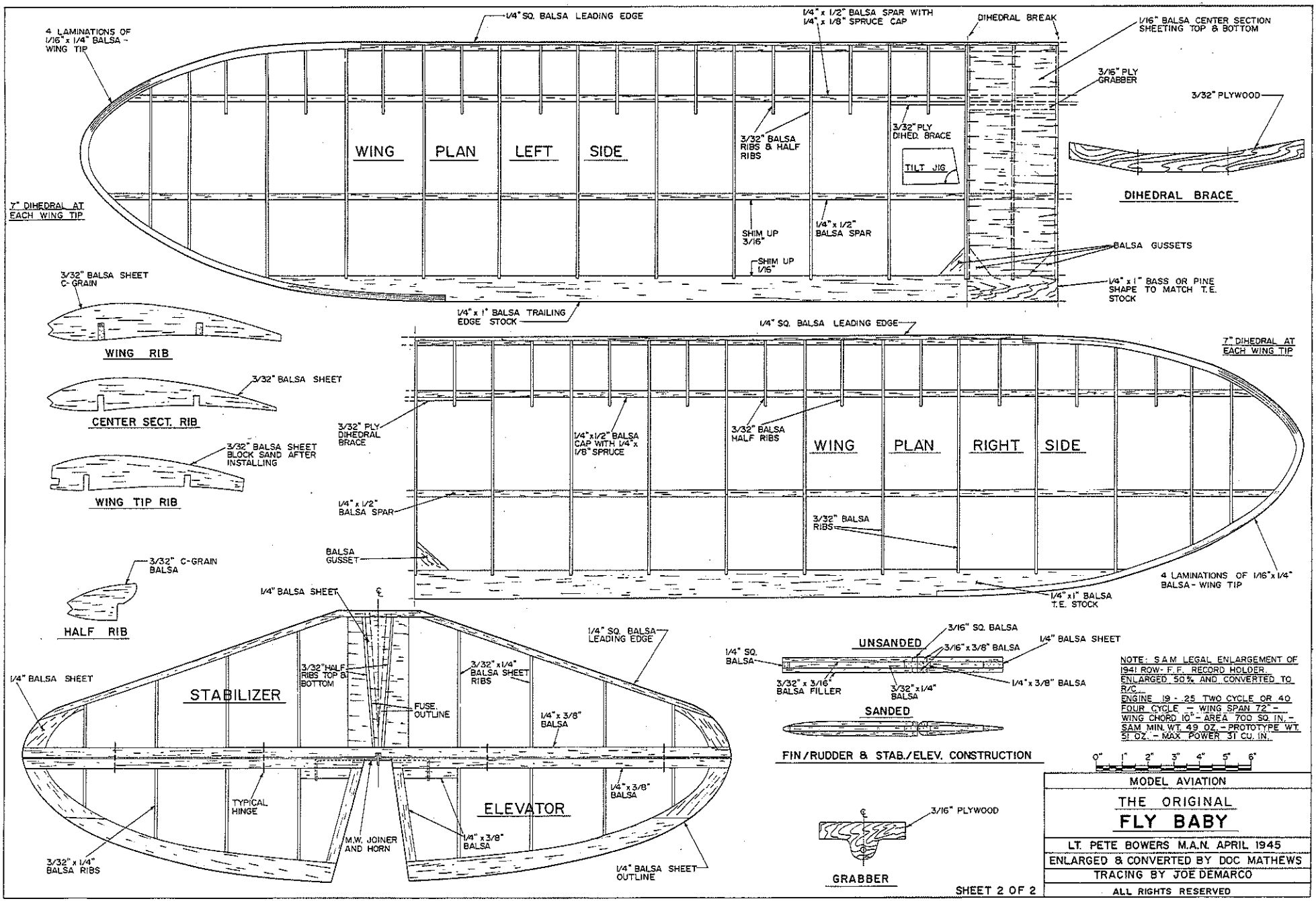
Fuselage. Build one side over the other directly on the plans. Use scraps of masking tape at the glue joints to prevent sticking. Note that the longerons extend into the firewall. Don't cut off the stubs.

While the glue is curing, cut out the jig bulkheads, F-2 and F-3. Lite Ply is preferable for the bulkheads due to its ease of cutting, but regular ply may be substituted. Lay the bulkheads directly over the plans, and glue with CyA.

Trace off patterns for the firewall and the F-1 bulkhead using carbon paper. Cut the notches to fit as precisely as possible. Prebend the landing gear wire and drill the strap screw holes, but don't install the gear permanently at this time.

Separate the two side units by popping them apart with a table knife. Trim and sand smooth. Replace the right side on the building surface and weight it down securely. Trial fit the four bulkhead units for good joints, then place them into the appropriate slots in the fuselage side. Use a carpenter's square or a 90° triangle to ensure perfect alignment. When you're satisfied, glue them in place.

Place the left side over the bulkheads, repeat the alignment process, and glue the side into the slots. You should now have a



Full-Size Plans Available . . . See Page 196

box which is perfectly square fore and aft as well as top and bottom.

The preferred method of finishing the rear section of the fuselage is to leave it on the building board and jack up the tail post so that the centerline is exactly one-half the fuselage width. Using the plan top view, cut the cross braces in pairs and install them.

An alternate, and more conventional, technique is to position the box wing saddle on the top view, and pull the tail section together over the plan. Regardless of the method used, ensure that the fuselage is straight along the centerline.

Planking the hatch area over the fuel tank is best accomplished with stringy sheet balsa soaked in ammonia water. Using thick Hot Stuff, attach the sheet at the base, then curl it up over the bulkheads with a bead of CyA. The opposite side is installed in the same manner, making the joint at the top by slicing through both halves with a straightedge. Several cuts may be required for a nice seam.

The window frames are cut from 1/64 ply, the thickness commonly used to cover foam wings. Using the plan as a guide, trace the patterns, then carefully cut them out and glue them into the fuselage. These frames provide a hidden seam for installing the clear plastic windows on the inside, which will be done later using R.C. 56.

An extra filler piece of basswood or pine is now epoxied into the top of F-3, as is the crosspiece at the wing-seat front. These pieces will reinforce the bracket and grabber. The tank is seated on a Lite Ply floor with plumbing running through the engine mount cutout. Standard throttle control cable is used.

The bottom sheeting is sanded to an inside taper before it's installed with thick Hot Stuff. Several narrow strips can be used in lieu of a single sheet.

When the fuselage is finished and ready for covering, round the longerons to a pleasing shape and sand the nose blocks to final shape. The thickness of the cheek blocks will vary depending on engine installation. Notice that the .25 two-stroke installation shown has thicker ones. Of course, the thicker the cheek blocks, the greater the nose weight—and the narrower the mount will necessarily be.

Finally, epoxy the front dowel to the cabin roof.

Wing-fuselage assembly. Drill a 3/16-dia. hole in the exact center of the hardwood center section trailing edge. Its fore/aft location in the trailing edge is based on the center of the hole in the Du-Bro bracket, which is mounted in the exact center of F-3. Bolt the wing onto the fuselage.

Clamp the 3/16 ply grabber against the face of the dihedral brace. After pinning one end of a piece of heavy string to the center of the rearmost fuselage, use the string to check that the wing tips are precisely equidistant. Adjust the grabber accordingly, and, when you're completely satisfied with the alignment, epoxy it permanently in place.

The concept of the grabber is not unique to the Fly Baby 72. We have used it successfully on 12 different designs thus far—and have yet to see one fail even in wild spins. The beginner, however, is advised to consider using old-fashioned rubberbands for fastening on the wing.

Once the wing-fuselage assembly is completed, build the forward cabin roof. Tracing the outlines from the plan, cut two pieces of 3/32 balsa, noticing the grain direction. These are soaked in ammonia water, laminated using thick Hot Stuff, and molded to fit the leading edge wing contour. Make sure it doesn't stick to the wing. Reinstall the wing on the fuselage, adjust the roof piece for a perfect fit, and glue it permanently to the fuselage.

Covering. The preferred method is to cover the smallest pieces first. MonoKote works well. Cover the fin, rudder, stabilizer, and elevator separately, then cut slots for the hinges. Cover the entire fuselage, then cut out the stabilizer slot and fin mounting area. Similarly, cover over the windows, and then cut away the material when installing the clear plastic later.

Slide the stabilizer into its slot, and epoxy it in place after assuring proper midline and horizontal-plane alignment. Slip the fin into its slots, adjust for vertical alignment, and epoxy in place. Hinge the rudder and elevator by sliding the molded hinges into the precut slots and securing them with toothpick segments and Hot Stuff.

The color trim on the model was accomplished by spraying red Poly-U onto the MonoKote covering, then lightly buffing with No. 400 steel wool. Sig Stripe-Rite makes excellent masking tape, since the 3/32 and 1/8-in. tape will flex around curves quite easily. Seal the edges against fuel seepage by brushing on clear Sig Skybrite. The spray is misted on with the can held 12 in. or more from the surface. Try for a smooth but thin coat, which gives a semitransparent effect.

The contrasting trim was done with Stripe-Rite tape sealed with clear Skybrite. The vinyl numbers were purchased at an office supply store. The nose area and tank compartment were fuel-proofed with clear Skybrite before painting.

Radio installation. The control Ny-Rod was stiffened along its length with cross members made up from scrap balsa. The connector at the servo end is a soldered clevis; an adjustable clevis is attached to the horn at the control surfaces.

The servos were installed on a pair of hardwood beams glued to the Lite Ply with Hot Stuff. The battery was installed in the bay between F-1 and F-2, as the first bay behind the firewall is not easily accessed. The model balanced quite well with the RC components positioned as drawn.

Flying. Do your preflight testing at home, away from the added pressure of the flying

Continued on page 146

Letters to the Editor

Continued from page 12

other 357th alumnus is Chuck Yeager. He is alive and well on TV again and again!

I think a single-seat Dornier-335 is at the Air and Space Museum in Washington, DC—possibly the same one.

My wife Helen and I are beginning to push 70 pretty hard, but we are both still active licensed pilots. I have been dabbling with RC for several years.

I am enclosing a picture of my freehand scratch-builts. The little one is a .50 Saito-powered 5¼-pounder—referred to as The Round One. The big one is a 13-lb., 8+-footer named Mr. Big; It's powered by a Zenoah 23. Both fly very well.

Harvey Mace
Ft. Bragg, CA

Safety/Preston

Continued from page 22

letter, stated that this story apparently first surfaced in 1967. So, if you happen to prefer assembling your model's components by arc welding rather than by gluing, and you also wear contact lenses, don't be alarmed if you saw the warning in the *National Newsletter*. It's just not true.

Have another safe one.

Fly Baby/Mathews

Continued from page 33

site. Test for range, free surface movement, deflections as per the plans, engine carburetor needle settings, and engine-on radio operation. Finally, and most important, make sure the model balances at, or slightly forward of, the center-of-gravity as shown on the plans. Add ballast if needed. Don't fly this model tail-heavy.

If everything checks out OK, your Fly Baby is ready for the big try. At the field, head into the wind, add a little right rudder, and advance the throttle. If you're not airborne in 12 ft. without adding *up* elevator, you're taking off downwind.

Remember that climb rate is more a function of engine speed than elevator. Don't horse this airplane around heavy-handedly; gentle caresses are all that's needed. Take the model up a bit and throttle down to dead slow. Still isn't sinking much, is it? Find a little thermal, and shut the engine off . . . Now, isn't that something?

If that kind of flying is too sedate for your taste, try some slow-speed touch-and-bumps. How's that for easy? Did you ever do a prettier one?

Whatever your style of flying, you'll find that this Old-Timer will oblige. Versatile, brisk, smooth, and responsive, the Fly Baby will do exactly what you want it to. See for yourself if this isn't as up to date an Old-Timer as you could ask for.

dB Facts/Abbott

Continued from page 35

erates them:

Quiet whisper, 20 dB
Conversation, 65 dB
Loud orchestra, 80 dB
Start of danger, 90 dB
Amplified rock band, 110 dB
Threshold of pain, 130 dB

Federal agencies have established recommended standards for safe noise exposure of eight hours per day at 90 dB, two hours per day at 100 dB, and less than one-quarter hour per day at 115 dB.

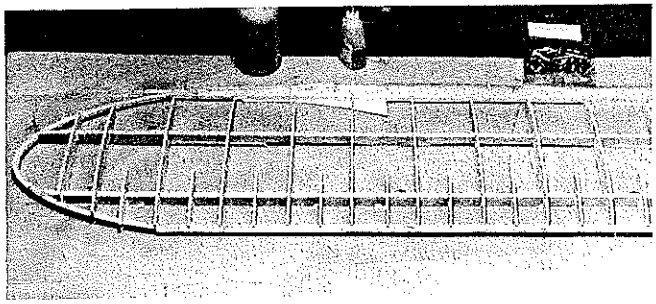
Let's reexamine the AMA and FAI criteria:

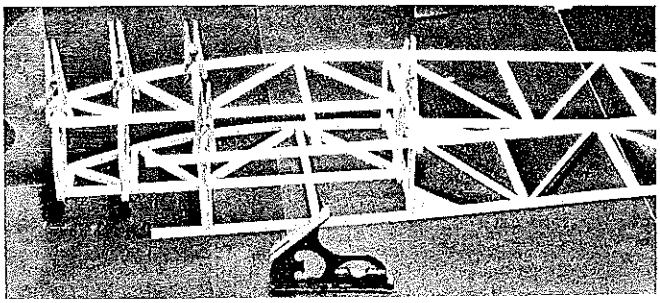
Current AMA—90 dB at 9 ft.
Old FAI—100 dB at one meter
Current FAI—98 dB at three meters

In order to compare these recommendations we need to convert them all to a single distance—in this case, 9 ft. That's easy enough to do. It involves converting meters to feet (one meter = 3.28 ft.), and applying the inverse square law discussed above. The results are:

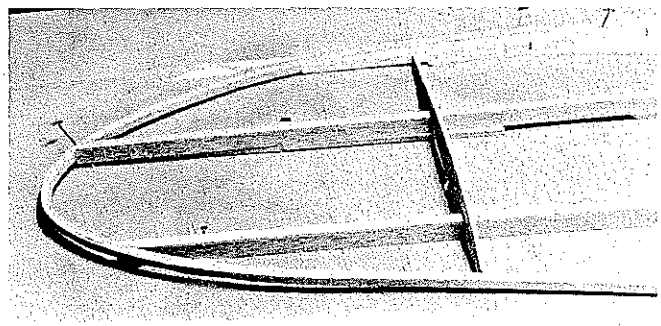
Current AMA—90 dB at 9 ft.
Old FAI—91.2 dB at 9 ft.
Current FAI—98.8 dB at 9 ft.

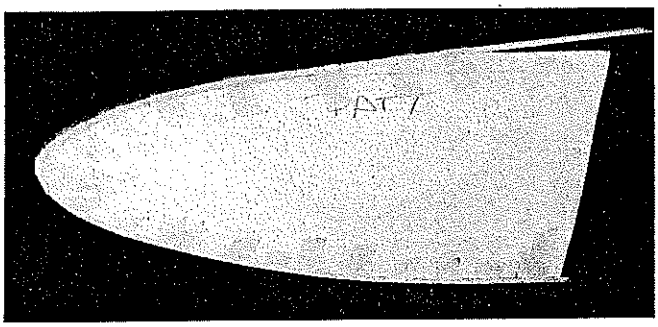
As you can see, the new FAI regulation is considerably less stringent than the old. The



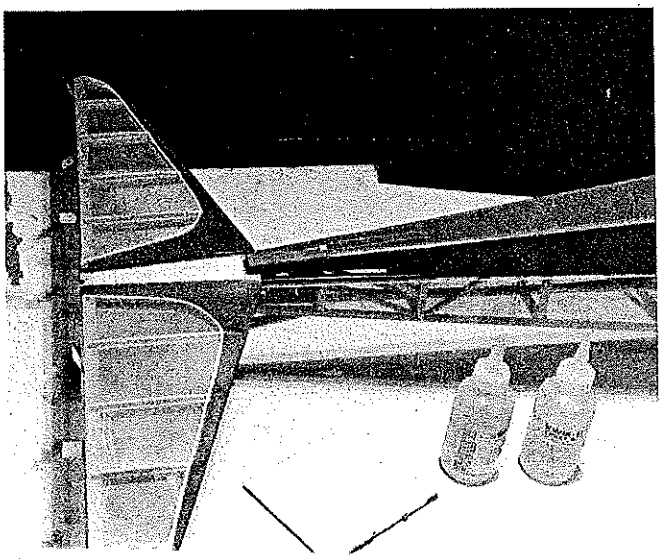


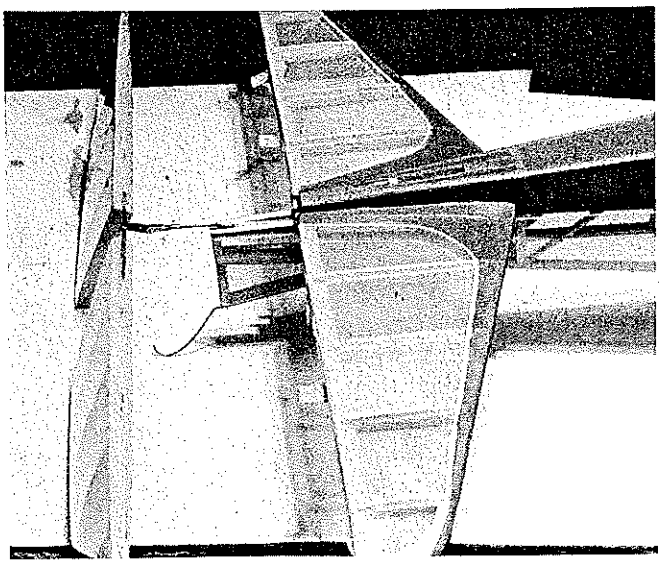
Left: Partially finished wing showing the half-ribs in the leading edge. The rib outline drawings clarify how the laminated tips are positioned in slots to create an accurate tip assembly. Half-ribs are novel for an Old-Timer. In this case they re-create the system Bowers used in his home-built, and they also allow a smoother covering by avoiding a tendency to sag. Right: "Universal" clamps (clothespins) are being used to hold three formers and the fuselage sides in alignment before final cementing. Use of triangles, squares, and a flat surface ensures a true fuselage.





Left: Early stage of wing construction. Note how the laminated wing tip structure fits against the spar ends to accommodate the upward taper of the wing. Right: This photo shows a simple foam board pattern used to laminate the wing tips. The author prefers this laminating technique to the use of bamboo or dural wire. Balsa or basswood can be used with ease. The technique can be used in many laminating applications.





Left: The fuselage, rudder, and stabilizer are covered and painted prior to assembly. The covering is then carefully cut away where epoxy will be applied for final assembly. This photo of the tail section shows the stabilizer ready to be positioned in the slot provided for it in the fuselage. The elevator and rudder are yet to be installed. Right: The stabilizer is in place with the hinges attached. The elevator linkage is hooked up and then the elevator assembly is installed on the stabilizer. This technique provides a neat buried elevator horn with minimum hassle.

graded bundles, as there can be a lot of wastage. Hardware and fittings are all standard hobby shop stock items. The 1/64 ply used for the window frames is common stock often used for skinning foam wings. If you can't beg scraps from the Pattern fliers in your club, and your hobby shop doesn't carry it, order the thin ply from Sig.

Tail surfaces. Since the empennage is the only structure involving out-of-the-ordinary construction methods, we'll tackle it first. The symmetrical tail surface sections employed on the original design must be duplicated for the model to be SAM legal. If your plane will be purely for sport, however, you can ignore the SAM requirement. In that case build the surfaces with 1/4 x 1/4-in. stock using conventional techniques.

Since we believe in building either on a flat surface or on jigs, we developed the following method for this project. Build on a flat work surface. Trace the outlines onto appropriately sized wood by slipping carbon paper between the plans and the wood. From that point on, follow standard building techniques.

Pin down and glue together the 1/4-in. stabilizer and elevator center sections. Remove them when dry, and add 3/32 x 3/16 strips on both sides of the original ribs. These strips butt against the 3/16-sq. strips which are added to the top and bottom of the hinge spars as per the plans. Once all of these pieces have been glued in place, use a sanding block to create a symmetrical airfoil. This technique, which is shown in the plan side view, is much easier than shimming the outlines and cutting out the ribs. It's also stronger and lighter, and the structure looks exactly the same when covered.

Wing. As with the tail surfaces, trace the rib patterns on balsa stock using carbon paper. Stack cut with a knife or jigsaw, then carefully sand to final shape. Notching the trailing edge at each rib interface adds strength. Pin the trailing edge over the