THE B-25 has had a long and varied career, spanning the years from 1940 to the present. During World War II, it was the most widely used medium bomber and saw action in all theaters, most extensively in the Far East. It is best remembered for the raid on Tokyo led by then Lt. Col. James H. Doolittle in February 1942. Fortunately, a sizeable number of B-25's escaped the smelting furnaces at the end of the war. It was used extensively as a twin-engine trainer during the 1950's, and as utility aircraft throughout the USAF. About a dozen or so B-25's survive in private hands, and three appeared in a recent episode of the TV program Black Sheep Squadron. Every year three or four B-25's are flown at the EAA fly-in in Oshkosh, Wisconsin.

Over the years, I have built a large number of multi-engined scale and stand-off scale RC models. These have ranged from a 40-in. B-17 with .020's to a 78-in. B-25 with .049's, including a 76-in. AVRO Lancaster powered by four OS MAX .10's. In each of these projects, I selected a real aircraft that flew very well on modest power. Typically, aircraft designed just before or during the early years of WW II had to fly on their aerodynamics, not by brute force, hence make better scale projects. These aircraft also tend to have large wings, long tail moments, and relatively small engine nacelles. Consequently, for this project I chose the A model, which was the first production B-25. This version has clean lines and is not cluttered with all the turrets, gun pods, blisters, etc., that characterized later models. The lack of all that detail also makes for a simpler model and quicker building.

At first glance, it may seem that a model having a 48-in. span will be underpowered with two Cox TD .040/.051 engines. Such is not the case; those engines have a surprising amount of power, and those I used were well worn. You will also notice that the B-25 is flown two-channel—ailerons and elevator. I have used rudder on occasion and found it to be of little value and not worth the weight of the servo, push-rods, and other mechanisms. A properly designed twin doesn't need the rudder for single-engine control.

My basic philosophy for all scale models is to build them big and keep them light. By making a ½A scale plane as large as practical, you maximize the ratio of wing span to propeller diameter. A large ratio significantly improves single-engine performance. A large airplane also makes for a somewhat slower and more stable aircraft.

I once had a rather small B-26 with two .049's that could beat most .60-powered ships across the field. Excessive speed in a ½A scale is not a virtue. A big airplane that is also light is the best of all combinations. The light wing loading improves all aspects of performance, especially the takeoff and glide. As a result of applying these principles, the B-25 takes off quickly from our grass field and is very realistic in flight.

Construction: While the construction of

THE B-25

this model is straightforward [illegible] [illegible] thus, [illegible] doing things [illegible] the small details. The wings are based upon the use of the ACE ½A foam wings. Cut the straight section to the proper length (17 [illegible]) and lightly glue the two outer sections on to form one 48-in. wing. Next, trim the trailing edge along the line shown on the plans and install the ¼ × 3/16 × 24 T.E. spar on both panels. Cut out the leading edge of the straight section and install a balsa block that is about 1/16" thicker than the foam wing. [illegible] carve the balsa to an airfoil shape and using 120 grit sandpaper, smooth the whole wing.

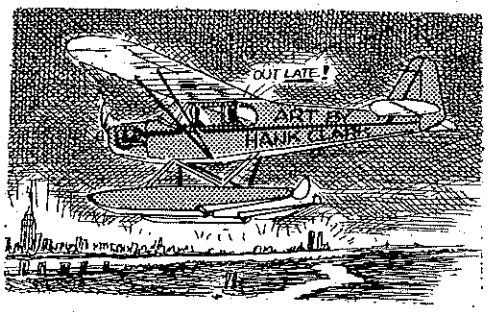
Due to adding the balsa leading edge, the airfoil at the outboard and inboard ends of the center wing panels are different. The plans reflect this difference. While the wing is in one piece, cut the ⅛ × ¼ wing spar grooves on the top and bottom. I use three brass gears mounted on a mandrel in my Dremel tool. This will do a nice job if you draw a line down the wing with a straight edge and follow it.

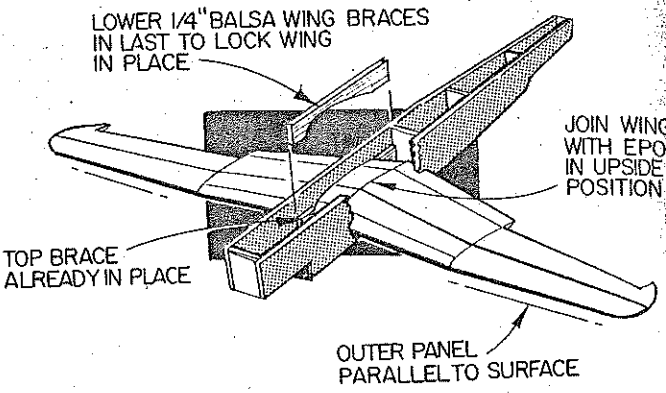
Use a razor saw to cut the wing apart at the dihedral joints and at the center section. Block up the inner panels ½ inch and sand the proper angle to the inboard and outboard ends of each panel. Lay the outboard wing panels top down on the table, block up the inner panel ½ inch and glue [illegible] epoxy glue. This puts the gull [illegible] wing. At this point, install the aileron torque rods, the balsa trailing edges, and cut out the hole for the aileron servo. The ⅛ square spruce top and bottom spars are glued in each wing panel with white glue. Do not cut or crack these spars at the dihedral break. They will bend around these curves easily on their own. Set the completed wing panels aside.

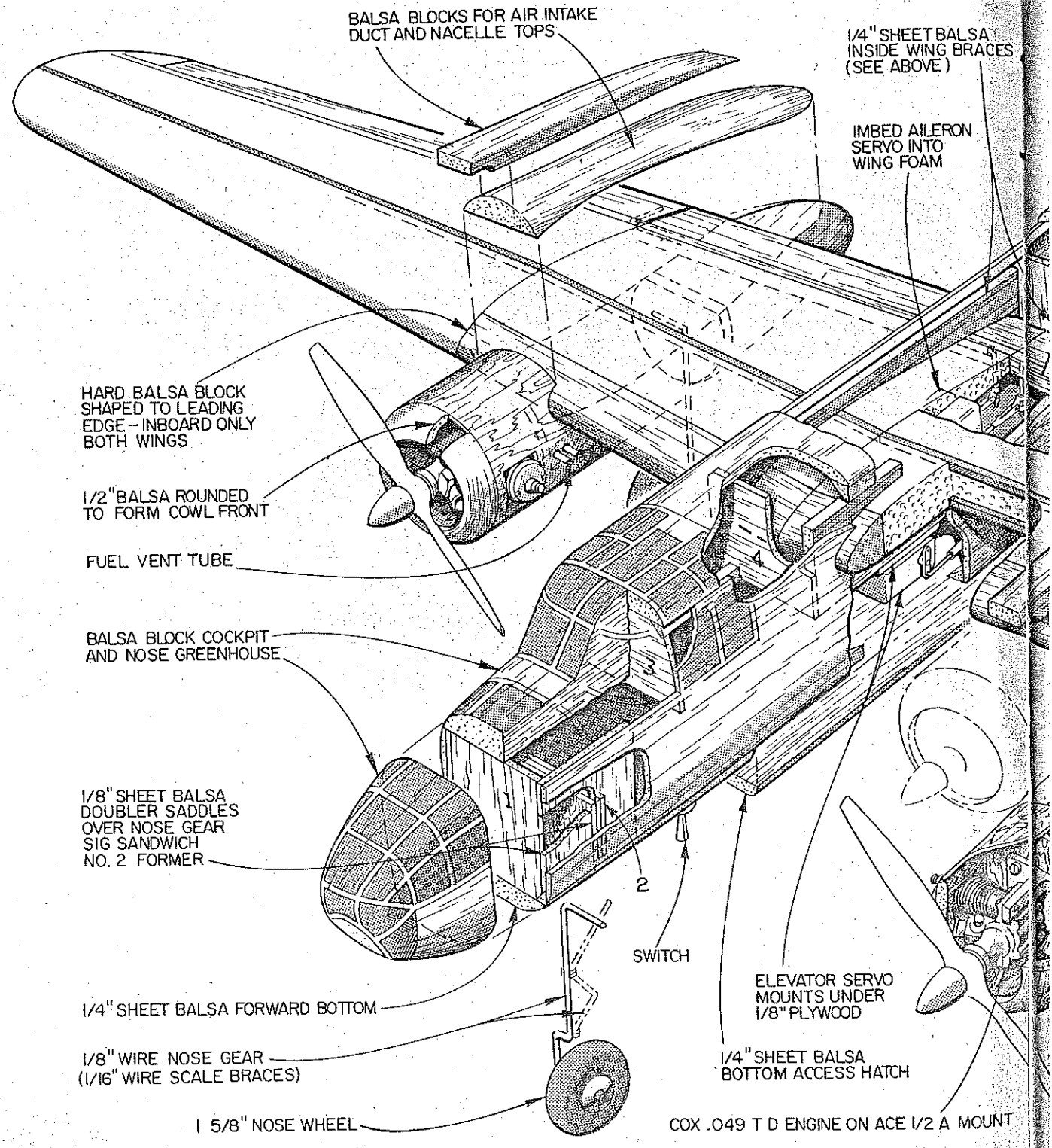
Cut the body sides from 4 in. wide 3/32" sheet and install the triangle stock and doublers where shown on the plan. Once the sides are done, cut out the wing slots. To do this, lay the plans over the body side and use a ball point pen to trace the airfoil onto the wood. Cut out the airfoil section through the body side and the doubler using an Xacto or similar knife. The body is constructed from the bottom up. Pin the bottom of the fuselage sides to the work table and install formers F3-F5. Notice that F3, F4 are made full height and will have their lower portions removed later. The fuselage sides have a slight top to bottom curve to them which is no problem. Once F3-5 are glued in place, install F1, F6-8, being sure to keep the center line true. Sight lines on the formers and work bench help here. When the glue is dry, install the one piece ¼" fuselage top from F3 to F7. The balsa nose and cabin blocks are separate blocks and are glued in place and carved to rough shape.

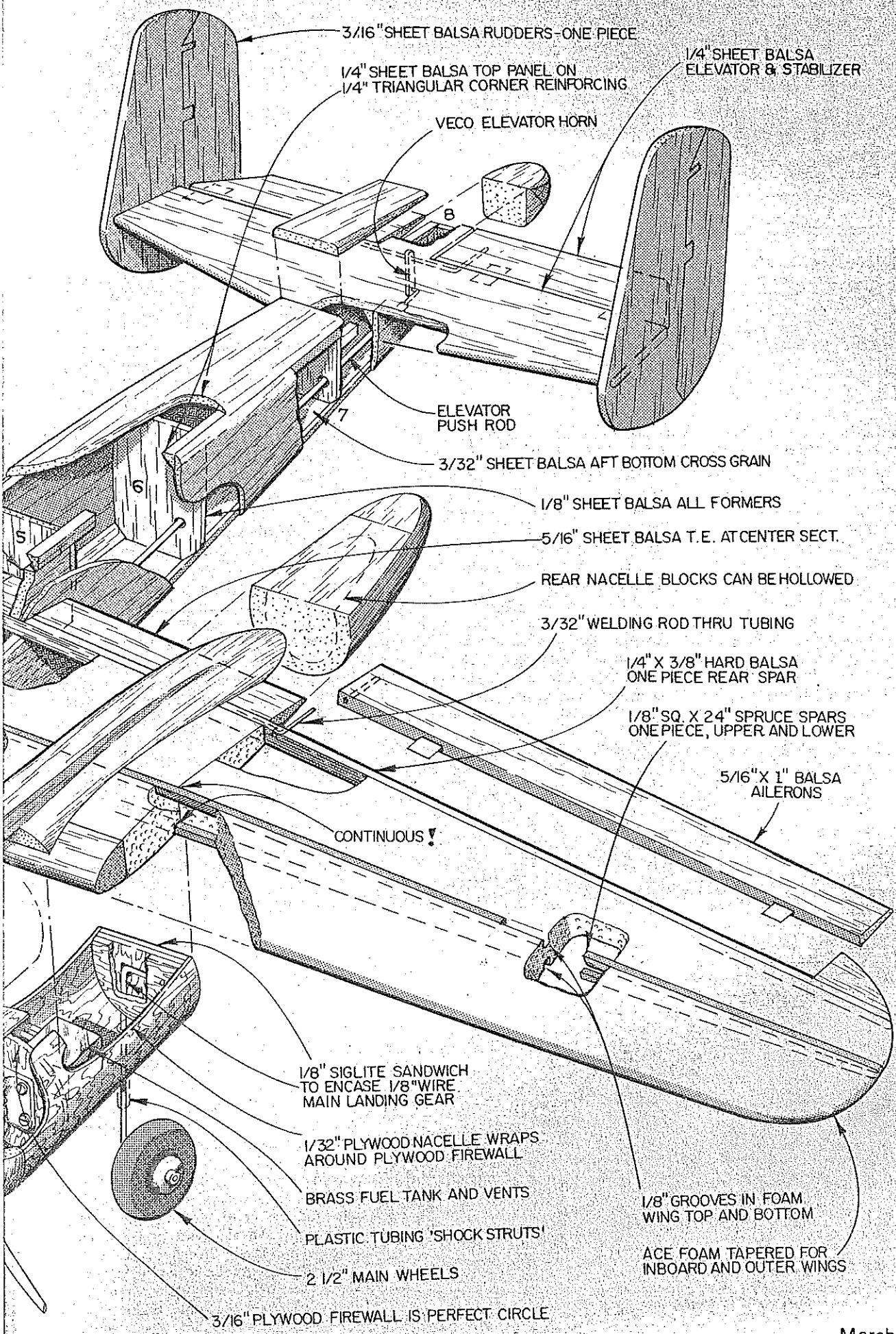
Check the wing panels to insure that when they meet at the center line the joint is a close fit and the outer panels have no dihedral. Insert each wing panel through the wing slot in the fuselage side and epoxy glue the wing together at the center, but not to the fuselage sides. I held the panels

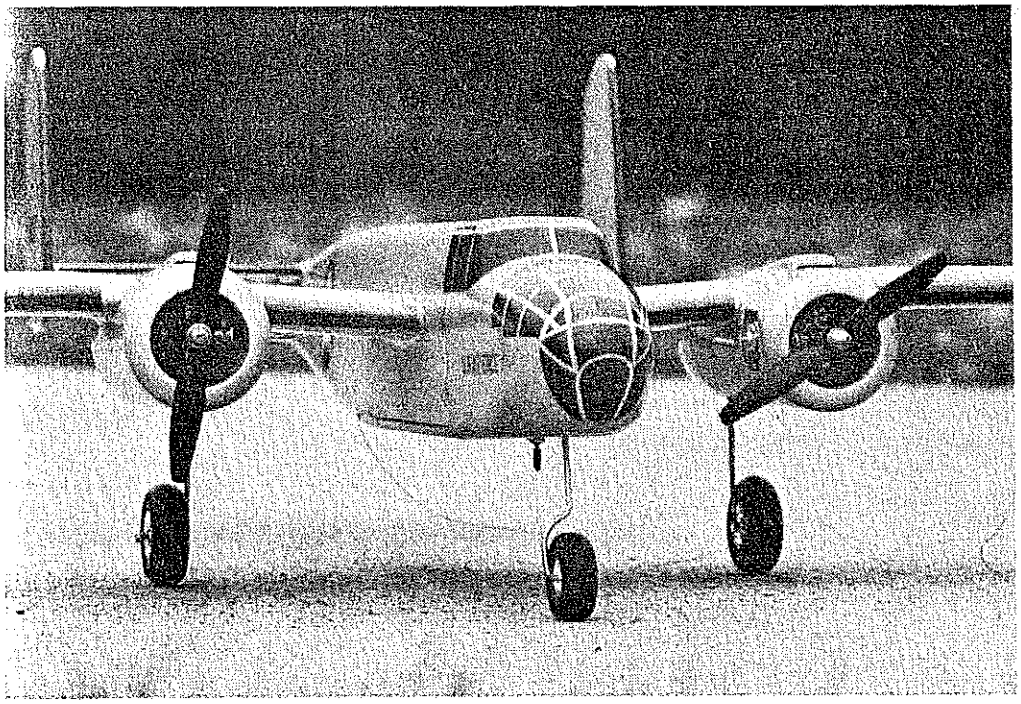
Here's the scan: The Mitchell, one of the earlier twins with just right proportions for a model that "likes to fly," is perfectly safe with an engine out; our designer specializes in twins and offers much "first-time" info; you need only two-channels for aileron and elevator. And at 48 inches, its performance is right on with two TD's. ■ Frank Baker


OUT LATE!
ART BY
HANK CLARK


LOWER 1/4" BALSA WING BRACES IN LAST TO LOCK WING IN PLACE
JOIN WING WITH EPOXY IN UPSIDE DOWN POSITION
TOP BRACE ALREADY IN PLACE
OUTER PANEL PARALLEL TO SURFACE


BALSA BLOCKS FOR AIR INTAKE DUCT AND NACELLE TOPS
1/4" SHEET BALSA INSIDE WING BRACES (SEE ABOVE)
IMBED AILERON SERVO INTO WING FOAM
HARD BALSA BLOCK SHAPED TO LEADING EDGE – INBOARD ONLY BOTH WINGS
1/2" BALSA ROUNDED TO FORM COWL FRONT
FUEL VENT TUBE
BALSA BLOCK COCKPIT AND NOSE GREENHOUSE
1/8" SHEET BALSA DOUBLER SADDLES OVER NOSE GEAR SIG SANDWICH NO. 2 FORMER
1/4" SHEET BALSA FORWARD BOTTOM
1/8" WIRE NOSE GEAR (1/16" WIRE SCALE BRACES)
1 5/8" NOSE WHEEL
SWITCH
ELEVATOR SERVO MOUNTS UNDER 1/8" PLYWOOD
1/4" SHEET BALSA BOTTOM ACCESS HATCH
COX .049 T D ENGINE ON ACE 1/2 A MOUNT
1
2
3
4


3/16" SHEET BALSA RUDDERS - ONE PIECE
1/4" SHEET BALSA TOP PANEL ON
1/4" TRIANGULAR CORNER REINFORCING
1/4" SHEET BALSA
ELEVATOR & STABILIZER
VECO ELEVATOR HORN
8
7
ELEVATOR
PUSH ROD
3/32" SHEET BALSA AFT BOTTOM CROSS GRAIN
6
1/8" SHEET BALSA ALL FORMERS
5
5/16" SHEET BALSA T.E. AT CENTER SECT.
REAR NACELLE BLOCKS CAN BE HOLLOWED
3/32" WELDING ROD THRU TUBING
1/4" X 3/8" HARD BALSA
ONE PIECE REAR SPAR
1/8" SQ. X 24" SPRUCE SPARS
ONE PIECE, UPPER AND LOWER
5/16" X 1" BALSA
AILERONS
CONTINUOUS
1/8" SIGLITE SANDWICH
TO ENCASE 1/8" WIRE
MAIN LANDING GEAR
1/32" PLYWOOD NACELLE WRAPS
AROUND PLYWOOD FIREWALL
BRASS FUEL TANK AND VENTS
PLASTIC TUBING 'SHOCK STRUTS'
2 1/2" MAIN WHEELS
3/16" PLYWOOD FIREWALL IS PERFECT CIRCLE
1/8" GROOVES IN FOAM
WING TOP AND BOTTOM
ACE FOAM TAPERED FOR
INBOARD AND OUTER WINGS



Pilots who flew the real B-25 all attest to its performance and handling qualities. The author's gull-winged twin is a respectable copy with surprising performance on its 48-inch foam wing.

together and let the fuselage fall where it may. Next, lay the fuselage on its top and glue the wing to the fuselage sides. The plans show 0 degrees incidence but a degree or so of positive incidence won't hurt (remember the ship is upside down at this point!). The crucial issues are to get the wings level and perpendicular to the center line. The elevator pushrod is installed before covering the rear of the fuselage. Do not put in the nose gear at this time.

It will be necessary to build up the main landing gear assembly from the three pieces of ⅛ Sig-lite with the L.G. wire in the slot of the center sheet. I use this sandwich technique on all my models as it is strong and light; the music wire will break before the plywood. The engine nacelles are basically a tube of 1/32 plywood. These can be rolled dry around the firewall and the landing gear mount.

Cut the nacelle body from a sheet of 1/32 plywood using the pattern given on the plans. Draw a vertical centerline on the firewall and install the ACE ½A motor mount. Also draw a vertical centerline on the main landing gear assembly. Now lay a strip of 1" masking tape on the outside of the 1/32 plywood at the front and rear. Leave about 3 inches excess to hold things while the glue dries. Lay a bead of 15-minute epoxy glue along the firewall line and along the rear of the nacelle. Now wrap the plywood around the firewall and hold in place with the masking tape. Wrap the rear of the nacelle around the main landing gear assembly with the music wire in the knotch. Note that the axle portion faces outboard. The plywood wrapped around the firewall should overlap about ¼ inch and is glued in place. Use the sight lines on the firewall and the landing gear assembly to line up these two parts.

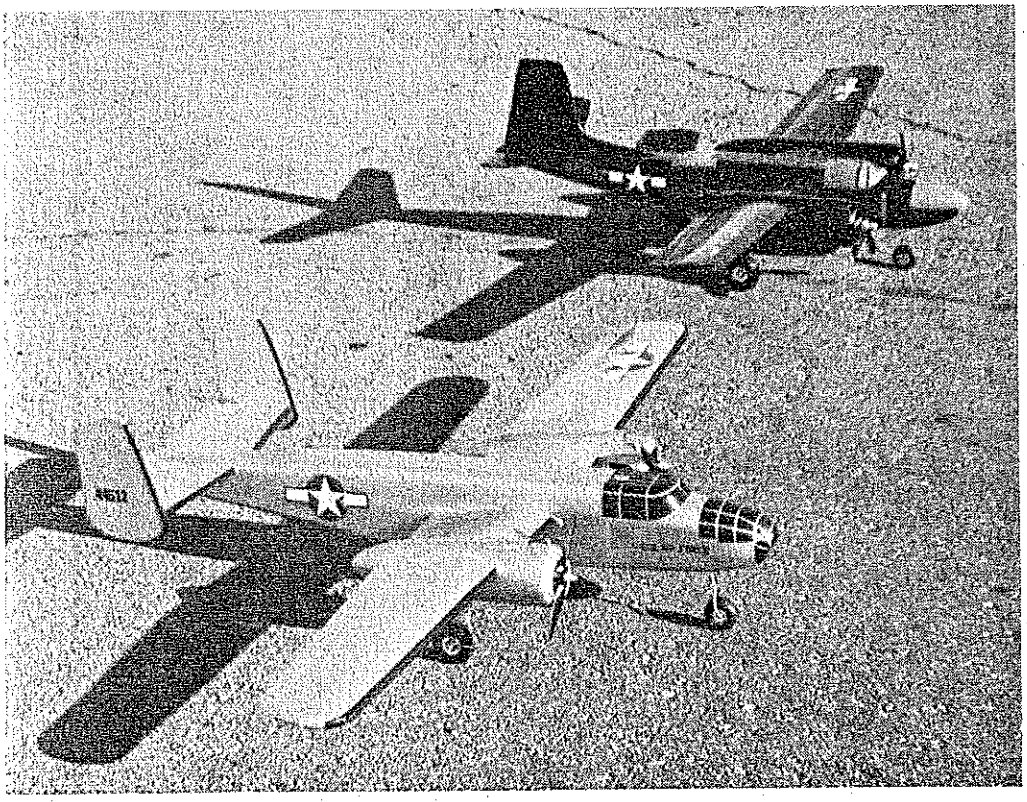
Before the glue is dry, push the outside edge of the firewall in about 1/16" to obtain the 1½ degree out-thrust in each engine. Also check to see that the firewall has 0 down- or up-thrust. When the body of the nacelle has dried, lightly glue the balsa blocks in place that form the top and rear of the nacelle. Carve these to shape using the top and side views as your guide. Smooth sand the whole assembly and then remove only the top block.

Construct the metal fuel tanks from an old fuel can or brass shim stock. There needs to be a right- and left-handed tank. Leave the filler pipes a bit long so they can be trimmed after installation. Next, install the metal gas tanks in the nacelles. Cut the cowl rings out of ½ balsa (can laminate from ¼) and sand so they just fit into the front of the plywood nacelle tubes. They should go in about 1/16 inch. After gluing them in, use a knife and sandpaper to obtain the proper contour. The plywood feathers into the balsa. Cut out the hole for engine in the plywood and install the engines before mounting the nacelles on the wing.

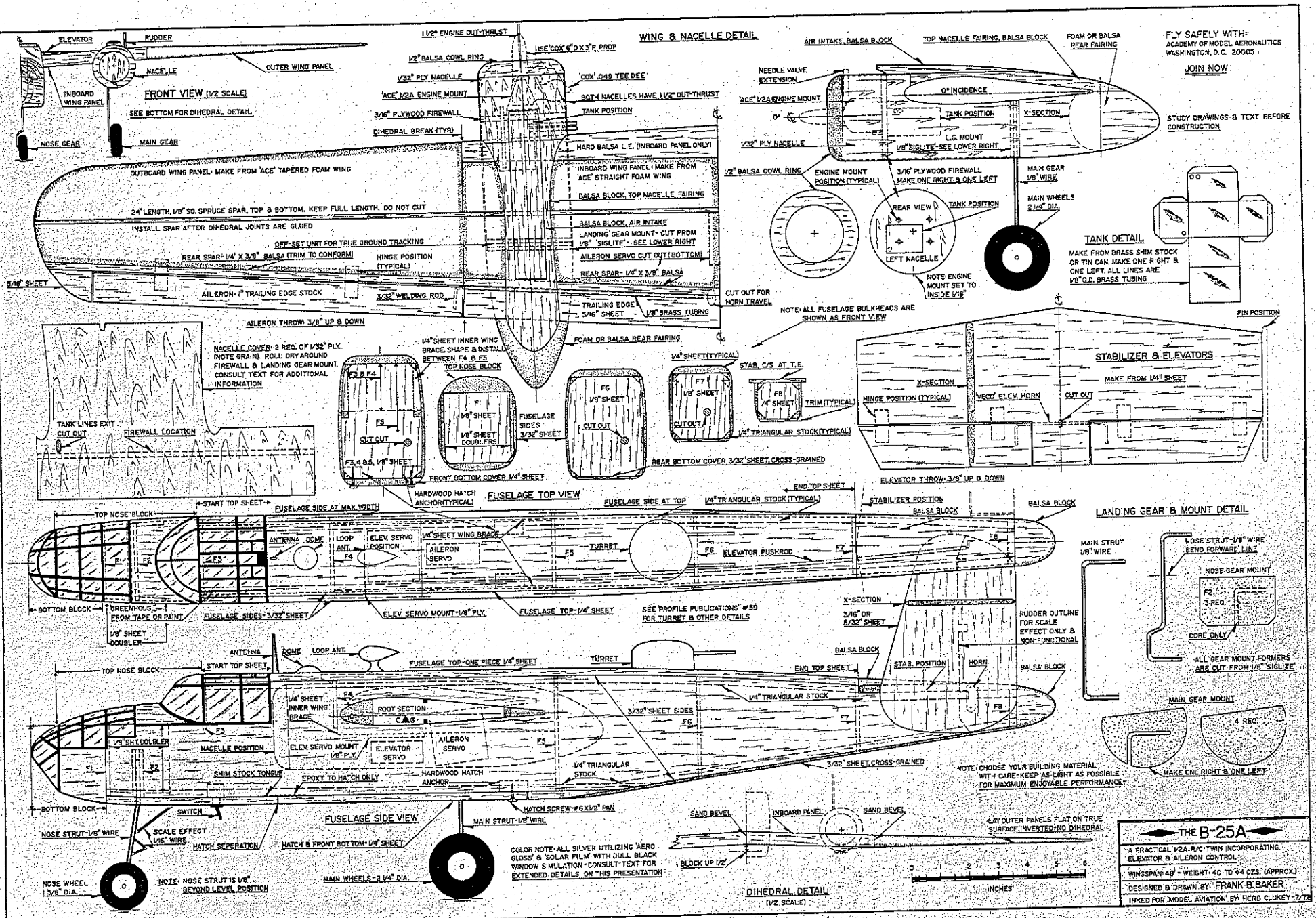
Be sure to make the engine hole large enough to get a screw driver to the mounting screws. On my B-25, I install the engines from the front and use a short screw driver to tighten the mounting screws in the motor bearers. Be sure you can mount and demount the engines. Trim the lower airfoil shape on the top of the engine nacelles to fit the wing. Check to see that the landing gear legs are vertical.

When gluing the nacelles to the wing, check carefully to obtain an engine thrust line of 0 degrees down-thrust and that the whole engine nacelle is canted out 1½ degrees. The combination of the canted nacelle and the tipped firewall yields 3° out-thrust in each engine without the propeller being at a rakish angle relative to the cowl. This may seem to be a bit fussy, but the secret to multi-engined airplanes is to have enough engine out-thrust to obtain good single-engine performance. The technique just described gives the out-thrust in an unobtrusive manner. Carve and sand the bottom of the top nacelle blocks until the block fits properly onto the wing and cacelle, then glue in place.

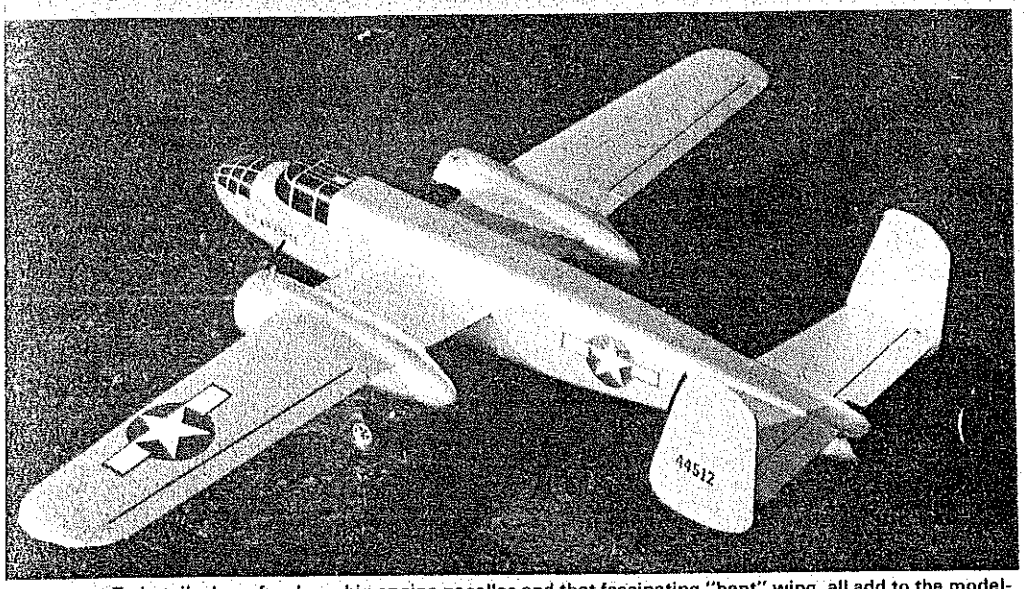
Set the airplane on a flat surface and insert the front landing gear, in its F-2 sandwich, into the fuselage. Slide it up or



Back off a few feet and the ultra simple B-25 model assumes Stand Off Scale qualities. Baker specializes in multi engines, from twins to fours—note the jazzy looking A-26 in background.



FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 112



Twin tails, boxy fuselage, big engine nacelles and that fascinating "bent" wing, all add to the modeling allure of the Mitchell. Most famous for the 1942 Doolittle raid from a lone aircraft carrier, the B-25 saw service as a trainer during the 1950's and quite a few examples still fly.

down until the nose gear is about ⅛ inch longer than the main gear. This positive angle of attack aids in getting better takeoffs. At this point remove the bottom two-thirds of F3 and F4. Once the engine nacelles are mounted, the rest of the model can be completed. The front lower fuselage is installed along with the hatch and its hold-downs. The cockpit and nose area are final sanded. Use a draftman's triangle to insure the rudders are perpendicular to the stabilizer. On my model, I carved the rear of the engine nacelles from balsa, but I have recently been using 2" thick styrofoam. It works easily and is very light.

Finishing: The fuselage and nacelles are given several coats of filler and sanded smooth between each coat. For color coat I used silver Aero Gloss. The wings, elevator, and rudders are covered with silver Solar Film. The color match between the Aero Gloss and Solar Film is perfect and one can hardly tell where the change-over occurs. The cabin windows are painted on with black dope. Insignia and deicer boots are cut from MonoKote Trim Film. (For greater detail on finishes and markings, see Profile Publications Number 59.) The plans show the turret and radio direction finder, but as you can see from the pictures, I did not install them. They are shown on the plans for those that have a greater love of detail than I do.

Flying: After installing the radio, check all surfaces for ⅜ in. up and down throw. The aileron throw may seem excessive but it is needed. Be sure to check to see that the CG is as shown on the plans, 2¼ inches from the leading edge at the wing root. The weight should be in the 40-44 oz. range, the lighter the better. Takeoffs are normal and, as with all small planes, do not haul it off and head up at 45 degrees. Your high-powered bomb techniques will not work here. Let it climb out gradually and pick up speed at the same time.

Once airborne the B-25 will roll almost in its own length and it does a very nice large round loop. My normal practice is to get up high about the time the engines quit, and when they do, set up a flat fast glide. So far, every landing I have made with this model has been a "greaser."

I also have a standard starting procedure for multi-engined models. Fill the tanks, and then start one of the engines. Set the needle valve for maximum rpms but not lean. Shut the engine off by tossing a rag in the propeller. Repeat the procedure with the remaining engine. Now, restart the first engine (usually will go at the first flip), then the second. Do not attempt to synchronize the engines, if both are at high rpm. They will run smoothly.

A few final words about single-engine performance. When either engine quits, you can make turns into and away from the dead engine with no problems. My model will lose altitude slowly on one engine. Consequently, with one engine dead, I set up a wide pattern and come in to land. Such landings are a piece of cake. The worst case is when one engine sags and the slowly turning propeller creates drag. The large throw ailerons are enough to maintain a slow turn away from the sick engine. About all one can do is make large circles until the engine dies.

The moral of this is to check to see that both engines are running well before launch. Finally try to keep the model as light as you can by careful wood selection and avoid using epoxy glue except where specified. I hope you will enjoy the model as much as I have.

Carrying a bit of up elevator and trailing a tell-tale antenna that reveals it as a model, the B-25 is slightly flared late on the final, and in a few seconds will wheel along the runway as pretty as you please. It uses only two channels, for elevators and the ailerons.