

The BOEING F4B-2

■ John Tanzer

750

"One of the most maneuverable airplanes ever built" is the accolade given by service pilots to the Boeing F4B Navy and P-12 Army series. These airplanes reigned supreme until the biplane fighter was gradually phased out, just prior to World War II. The Boeing F4Bs and P-12s were the first single-seat fighters capable of executing all fighting maneuvers, including outside loops, when fully loaded.

The Boeing was a favorite with pilots, and was described as a dream to fly. It responded quickly to a pilot's every wish; it was easy to take off and land, and had wonderful handling characteristics. Navy pilots loved to stand the Boeing on its tail and "fly its wings off"—for the pure enjoyment of flying.

The Navy made extensive use of the F4B-2 version of this airplane. These fighters were carrier-based a good part of the time and were flown from coast to coast. They were one of the most colorfully marked Navy aircraft in the world, and many will no doubt recall Felix the Cat and High Hat squadrons participating in the colorful airshows of the 1930s.

I have been flying my version of the



F4B-2 for about eight years, and the flight description of the full-scale plane fits my model to a tee. With a 1.20 four-stroke engine it will fly in a scalelike manner, but with an O.S. 160 or ST 3000 it will give a Laser or Ultimate Bipe a run for its money.

WINGS

Cut two W-1 ribs from $\frac{1}{8}$ plywood. They will be used as a pattern to make 28 W-1 ribs from $\frac{3}{32}$ balsa sheet, and will later be used in the lower wing. Cut four W-2 ribs from $\frac{1}{8}$ plywood; these ribs have notches to receive the $\frac{1}{4}$ plywood cabane mounts. Cut four W-3 tip ribs, cut all vertical-grain shear webs, and cut four wingtips from $\frac{1}{8}$ Lite Ply. Cut the rest of the wing parts as per the plan.

Begin with the upper wing. Cover the plan with clear plastic or waxed paper, and pin down the front spar. Using a rib as a gauge, pin down the rear spar with a $\frac{1}{4}$ -inch-square shim under it to level the rib.

Starting with the first W-1 rib at the tip, CyA (cyanoacrylate glue) the rib and web to the spar at same time. Add the rear web and move on to the next rib and web into the center of the wing. The webbing will keep the ribs square with the spars. Do the same to the other side of wing.

Glue in the four plywood ribs for the cabane mounts. Now add the top spars and $\frac{3}{32}$ balsa sub-leading edge. The top wing has no dihedral, so glue in the $\frac{1}{8}$ plywood spar joiners. Glue in the $\frac{1}{4}$ -inch balsa center rib. Slide the W-3 tip rib onto the $\frac{1}{8}$ Lite Ply tip. Glue to the leading edge and rib W-1, keeping the the tip level.

With the wing removed from the building board, bring the spars together to meet the tip. Use coarse sandpaper to taper the bottom of the spar to fit the tip. Glue in the $\frac{1}{4}$ plywood cabane mounts with balsa tri-stock, using slow epoxy. These mounts are above the surface by $\frac{1}{16}$ to compensate for sheeting.

Bevel the sub-leading edge flush with the ribs and sand the tips to accept the $\frac{1}{16}$ balsa sheeting. Place the wing upside down on the $\frac{1}{4}$ -inch shim and apply weights to hold everything straight. Glue the $\frac{1}{16}$ balsa



"The Navy pilots loved to take the Boeing and stand it on its tail and fly the wings off it..."

sheeting to the front of the wing and the tip. Glue $\frac{1}{16}$ sheet to the rear of the wing, then fill in the wing center. The $\frac{1}{16} \times \frac{1}{4}$ capstrips can be added now.

Remove the wing, trim the tip sheeting, and bevel the sheeting at the rear of the ribs to accept the top sheeting. Place the wing right-side-up using the $\frac{1}{4}$ -inch-square shim on the plan, then add weights to hold everything straight. Glue on the $\frac{1}{16}$ sheeting and capstrips; the wing will now be warp-proof.

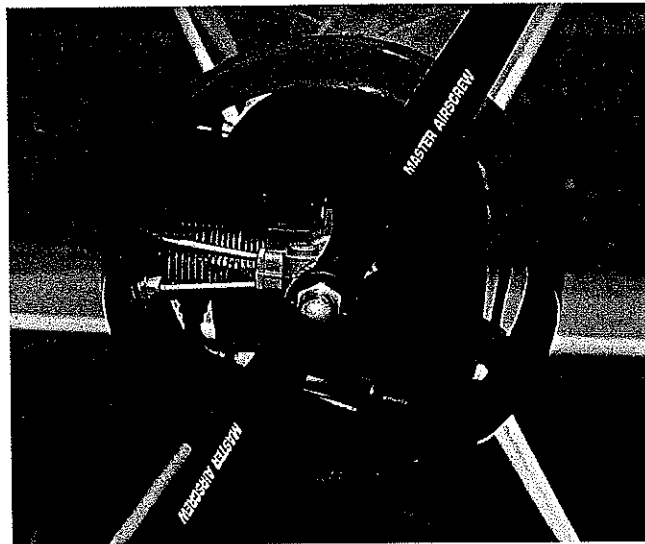
Remove the wing from the board, trim the tips, and use a sanding block to sand the sheet at the sub-leading edge to accept the $\frac{3}{8} \times \frac{3}{8}$ balsa leading edge. Using tri-stock and epoxy glue, add the $\frac{1}{4}$ -inch plywood interplane strut mounts, keeping them flush with the wing skin. Sand the wing to your satisfaction.

The lower wing is built the same way, except that one panel is raised one inch, then $\frac{1}{8}$ plywood dihedral brackets are epoxied in place. The center ribs and balsa blocks are then added. Sheeting is applied to one side at a time while that panel is weighted down.

When the wing has been sheeted and sanded, carefully cut out the ailerons. Glue $\frac{3}{32}$ balsa sheet to the rear spars. Cut as much as needed from the front of the aileron to accept the $\frac{3}{8} \times \frac{7}{8}$ balsa aileron leading edge.

If optional upper ailerons are desired, use the same procedure, but make them shorter. The full-scale F4B-2 had ailerons on the upper wing only. I have found these to be inefficient—too much adverse yaw, even with aileron differential.

I use full-length ailerons on the lower wing, and the model rolls and banks like a monoplane. If a faster roll rate is desired, then go with both lower and upper ailerons. I use one servo and torque rods, but a servo in each wing would be better.



Boeing F4B-2

Type: RC Sport Scale

Wingspan: 68 inches

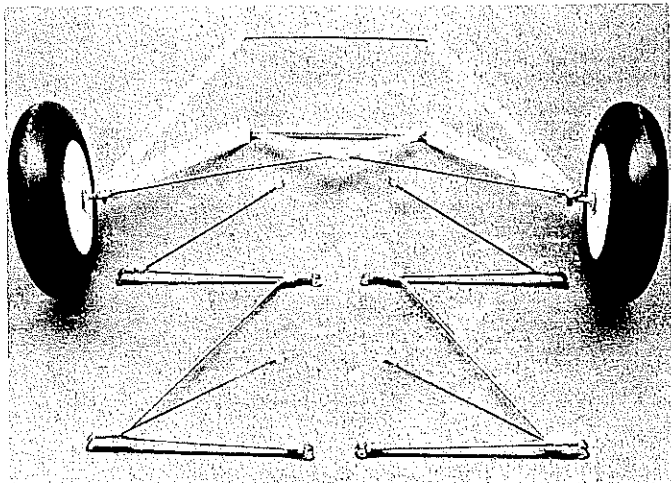
Recommended motor size and type: .90 and up

Number of RC channels recommended: Four

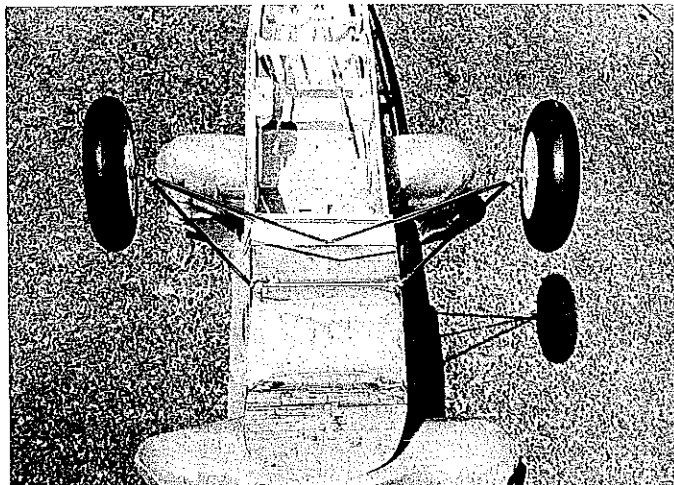
Expected flying weight: 64 ounces

Type of construction: Built up

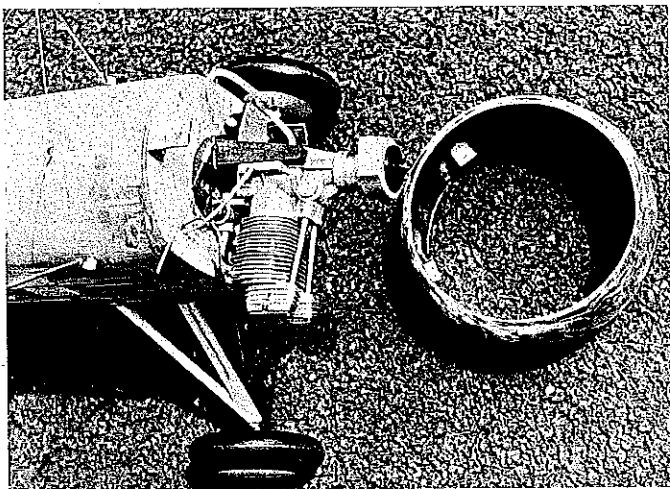
Type of covering/finish recommended: Iron-on film



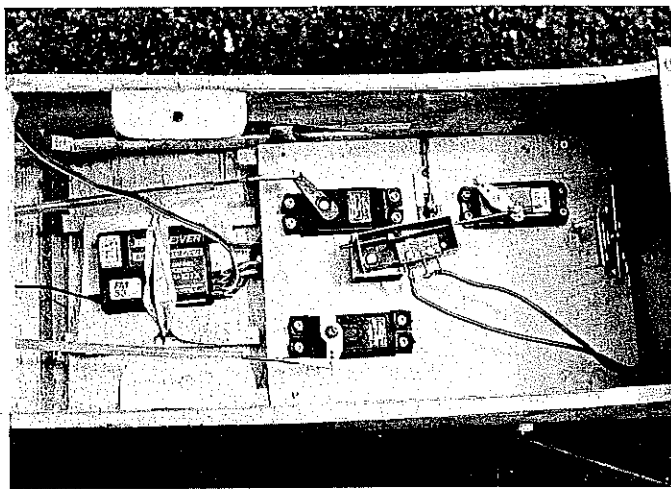
Cabane and landing gear are $\frac{1}{8}$ wire. Balsa fairings, shown here on gear legs, were eventually added to cabane wires as well.



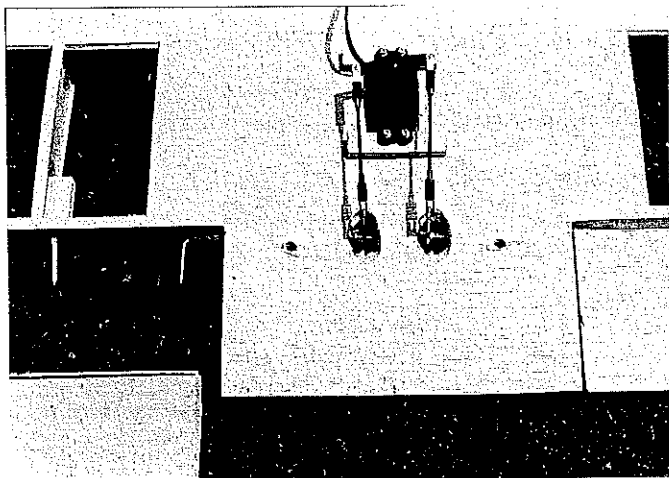
Landing gear has been trial-fit to the fuselage. Wheels are $\frac{5}{16}$ -inch Williams Brothers smooth contour.



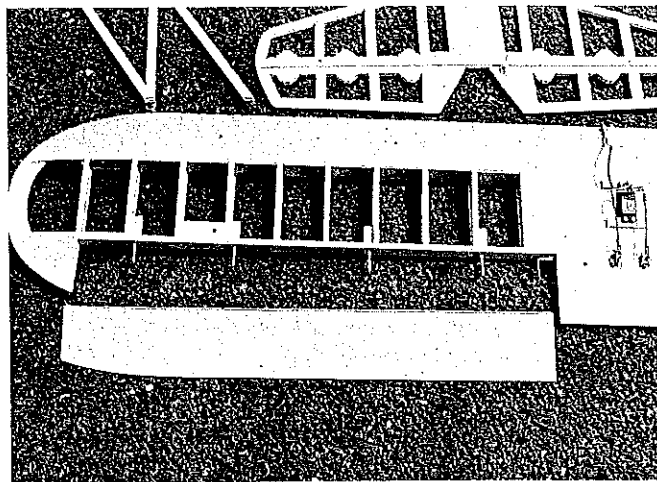
O.S. 120 four-stroke engine shown. Note remote choke and needle valve. Cowl is retained with three screws.



The $\frac{1}{8}$ plywood servo mounting plate is removable. Onboard glow switch pivots as servo arm moves.



Aileron servo and torque rod detail. Brass plate is soldered to a wheel collar to form tiller arm for torque rod.



Lower wing with aileron removed. Balsa blocks on wing and elevator increase gluing area for Robart hinge pins.

FUSELAGE

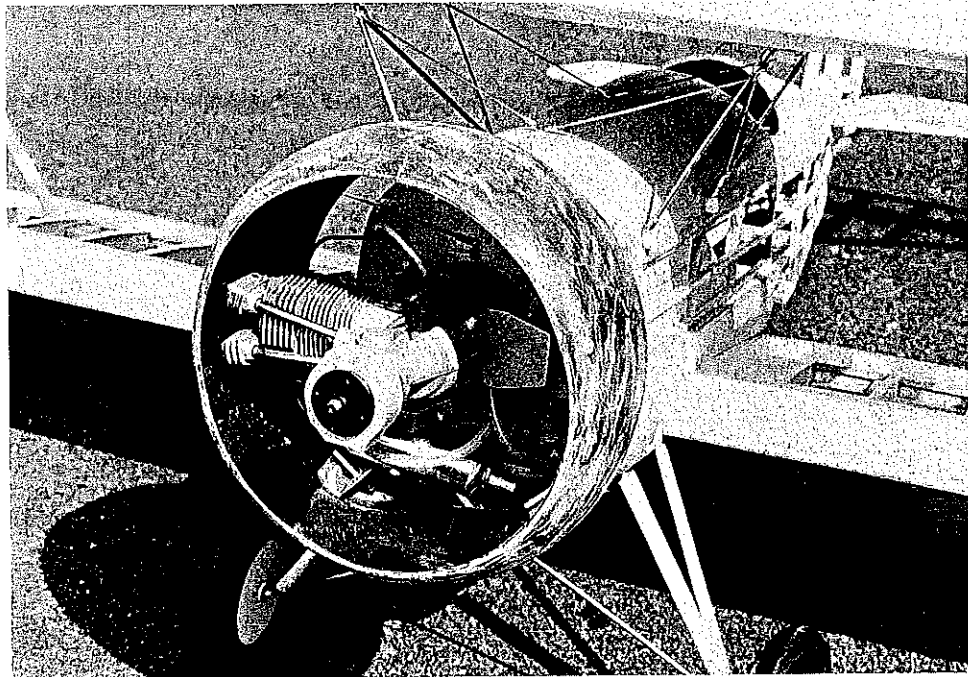
Cut 11 fuselage parts using the wood sizes indicated on the plan. Cover the plan and pin down the $\frac{1}{4}$ -inch balsa side pieces, then $\frac{1}{4}$ -inch-square longerons and crosspieces. Glue as you go. Using small pieces of plastic film, cover all glue joints

and build the second fuselage side on top of the first one. Remove from the plan and glue $\frac{1}{32}$ doubler and $\frac{1}{64}$ plywood gussets to the inside of the fuselage sides, one left and one right.

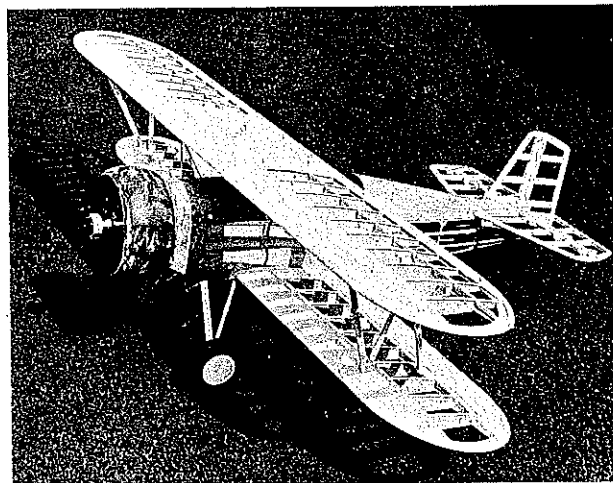
Pin $\frac{1}{4}$ -inch-square crosspieces to the top view of the plan from F-2 back to F-5. Pin fuselage sides upside down on the top

view. Glue to cross pieces keeping the sides square with the work surface. Glue in the landing gear plate and $\frac{1}{4} \times \frac{3}{4}$ balsa crosspiece at rear of wing saddle. Use triangular stock at both locations.

Now pull the rear of the fuselage together. Bevel mating surfaces for a good fit. Clamp together and glue in $\frac{1}{4}$ -inch-



Cowl is large enough to fully enclose most engines. Fueling is accomplished through the cowl front. Perry oscillating pump mounted to rear of engine.



Completed framework prior to covering. Robart incidence meter is used to accurately align the wings.

square crosspieces to the rear, keeping the rear of the fuselage square with the work surface. Glue in the 1/4-inch plywood tailwheel plate. Glue in the 1/8 plywood wing dowel plate and wing bolt plates.

With the fuselage still flat on the bench, lay the lower wing in the saddle. Align it perfectly, then drill the front of the wing to accept a 1/4-inch dowel. Take the wing off and glue in the dowel. Now return the wing to the fuselage, drill two mounting holes, and tap the hold-down plates for 1/4-20 bolts. Remove the wing from the fuselage and put aside for now.

Remove the fuselage from the plan. Glue the firewall and all formers in their proper locations. Glue 1/4-inch balsa fuselage outside doublers, then 1/4-inch-square stringers. Fair in the stringers at the rear of the fuselage. Using tri-stock, epoxy in 1/4-inch ply cabane mounts and the 1/8 ply cabane brace bolt plate to top of

fuselage.

Glue in the 1/8 balsa sheet cockpit floor, then sheet the top of the fuselage and the lower front of the nose. Fair in the sides at the nose and wing saddle. Glue two balsa blocks to former F-8 using a 3/8 balsa spacer to form a slot for the fin. Spot-glue a 3/8 spacer at the rear for the stab slot. Note: 3/32 shim under the front of the stab, for 1 1/2° positive incidence. Plane and sand the block to shape, then remove the 3/8 spacer at the rear.

The tail can now be built using 3/8 x 1/2 hard balsa and some 3/8 balsa sheet parts. Round off the edges and cut the hinge slots.

A 1/8 music wire elevator joiner can be used, or a Y pushrod or two pushrods and two servos. Trial-fit the stab and fin in the fuselage slots. I did not glue the tail in until the fuselage and tail were covered

and finished.

To make the 1/8 music wire cabane, cut four pieces of 1/8 music wire five inches long. Using a piece of plywood as a jig, mark solder lug locations, then screw them down to hold in alignment for soldering. Bend the diagonal brace, wrap with copper wire and solder. Make one left and one right. I use steel soldering lugs from Balsa USA, large and small. They last a lot longer than copper lugs.

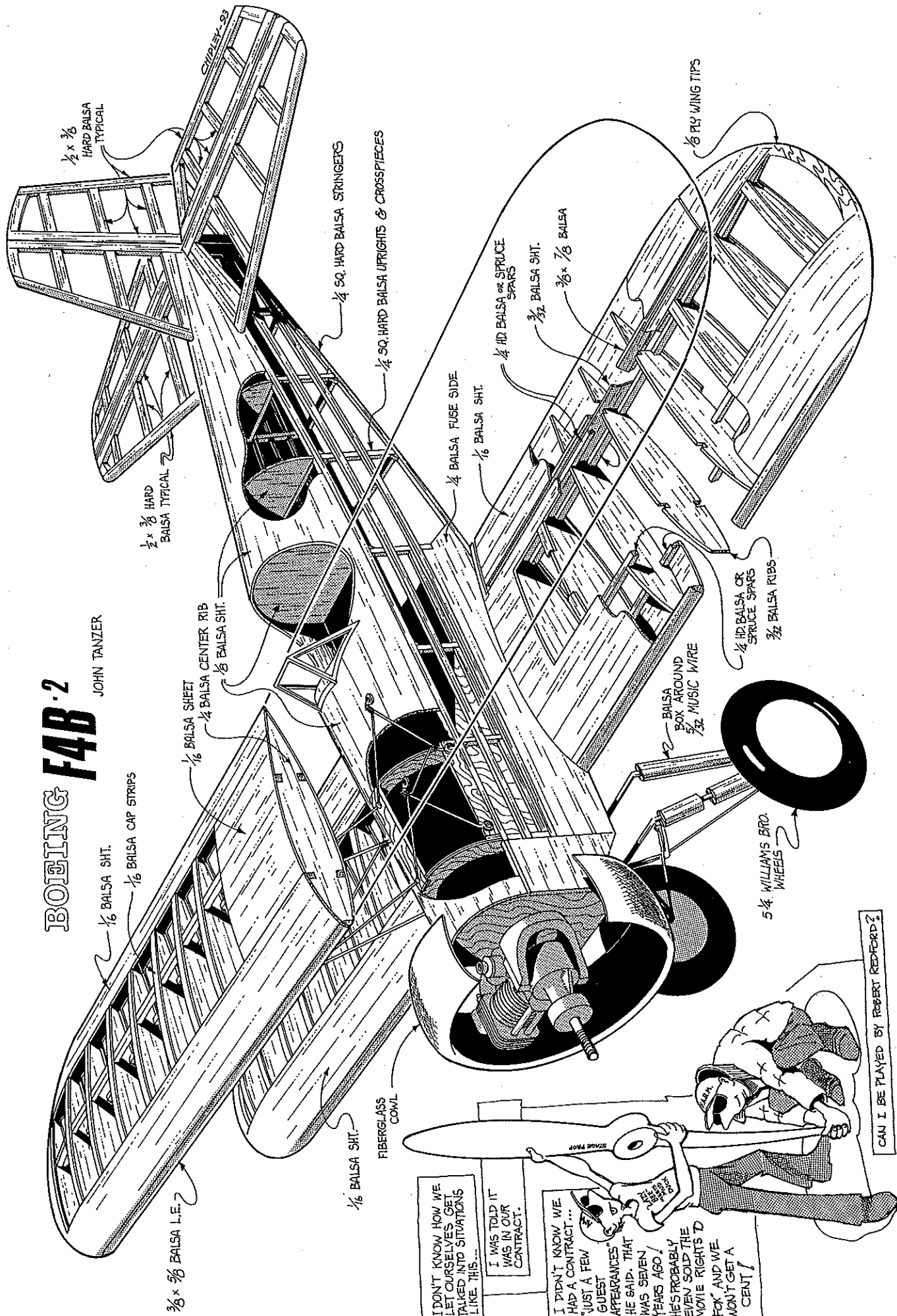
Mount the cabanes to the fuselage. Now make the 1/16 music wire cabane braces. Using measurements from the plan, solder on small lug to ends at center. Mount at center with 4-40 bolts and blind nuts. Wrap and solder at the top of the cabane.

Place the upper wing flat on the bench with the fuselage upside down and in alignment with the wing. Drill and tap

Continued on page 58

BOEING FAB-2

JOHN TANZER



$\frac{1}{2} \times \frac{3}{8}$
HARD Balsa
TYPICAL

$\frac{1}{2} \times \frac{3}{8}$ HARD
Balsa TYPICAL

$\frac{1}{16}$ Balsa SHEET
 $\frac{1}{4}$ Balsa CENTER RIB
 $\frac{1}{8}$ Balsa SHIT.

$\frac{1}{16}$ Balsa SHIT.
 $\frac{1}{16}$ Balsa CAP STRIPS

$\frac{3}{8} \times \frac{3}{8}$ Balsa L.E.

$\frac{1}{8}$ Balsa SHIT.

$\frac{1}{4}$ SQ. HARD Balsa STRINGERS

$\frac{1}{4}$ SQ. HARD Balsa UPRIGHTS & CROSSPIECES

$\frac{1}{4}$ Balsa FUSE SIDE

$\frac{1}{8}$ Balsa SHIT.

$\frac{1}{4}$ HD Balsa OR SPRUCE
SPARS

$\frac{3}{32}$ Balsa SHIT.

$\frac{3}{8} \times \frac{1}{8}$ Balsa

$\frac{1}{8}$ Ply WING TIPS

$\frac{1}{4}$ HD Balsa OR
SPRUCE SPARS
 $\frac{3}{32}$ Balsa RIBS

Balsa
BOX AROUND
 $\frac{5}{32}$ MUSIC WIRE

$5 \frac{1}{4}$ WILLIAMS BRO.
WHEELS

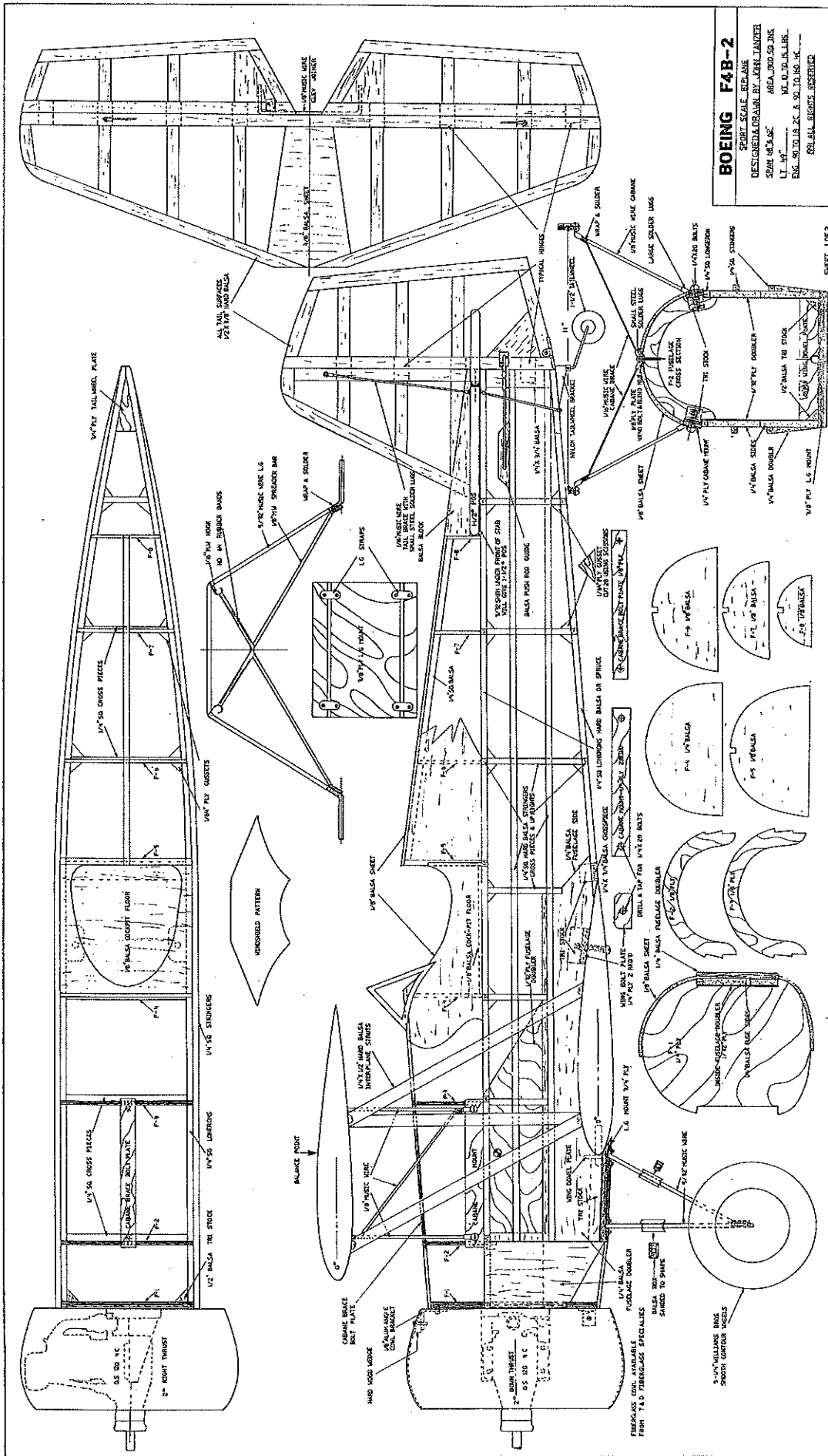
FIBERGLASS
CONE

I DON'T KNOW HOW WE
LET OURSELVES GET
TALKED INTO SITUATIONS
LIKE THIS...

I WAS TOLD IT
WAS IN OUR
CONTRACT.

I DIDN'T KNOW WE
HAD A CONTRACT...
JUST A FEW
GUEST
APPEARANCES.
HE SAID, THAT
HE WAS SEVEN
YEARS AGO!
HE'S PROBABLY
EVEN SOLD THE
MOVIE RIGHTS TO
"FOX" AND WE
WON'T GET A
CENT!

CAN I BE PLAYED BY ROBERT REDFORD?



BOEING F4B-2
 SPORT SCALE - REAR
 DESIGNED BY JOHN JANKO
 AREA .200 SQ IN
 WT. 0.10 OZ. LRS.
 ENG. 90 TO 18 CC. & 90 TO 160 MC.
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Boeing F4B-2/Tanzer

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mounts for 1/4-20 bolts. Mount the lower wing. Turn the plane over, and using a Robart incidence meter on the lower wing, block the fuselage for a reading of 0°. Now check the top wing. If it does not read 0°, use plywood washers to bring it to that point. Glue the washers to the bottom of the top wing to make them permanent.

With the wings still mounted, cut and fit the interplane struts. Slit the ends for .032 aluminum brackets, then glue and pin in place. Drill and tap the mounting plates in the wing. Make the 1/8 music wire landing gear and mount it to the fuselage with landing gear straps. A spreader bar and rubber bands work very well. I used balsa to fair in the landing gear and cabane wire for a scale appearance.

Mount the engine with two degrees right thrust and two degrees downthrust. The fiberglass cowl is being made by T & D Fiberglass Specialties, 3624 Kisco Drive, Sterling Heights, Michigan 48310.

FINISH

I covered my F4B with plastic film using the top hat, red tail, and cowl from the aircraft carrier Yorktown. The top of the upper wing is yellow and the rest is white. Other carrier colors are Enterprise blue tail, Wasp black tail, Ranger green tail, Lexington yellow tail, and Saratoga white tail—a lot of color combinations to pick from. If you want to finish yours as a P-12, the Army has some good combinations, too. The

U.S. stars are Major Decal's water transfers applied to plastic film. It works!

Hobbyoxy H65 red matches MonoKote and EconoKote red. The only painted parts are the cowl, the struts and the landing gear.

U.S. Navy in large letters on the bottom of the lower wing was cut from a Presto Trim sheet. The red band around the fuselage is EconoKote, put on at low heat. The numbers and top hat were cut from a Trim Sheet. The small letters and numbers are the pressure-sensitive type—available at any art store.

I glued in the tail after the fuselage was covered in white and the tail in red. Makes for a neat job. Install the tail wire, braces, tail wheel, windshield, and 5/4-inch Williams Brothers smooth contour wheels. Use your favorite control system. That should do it.

FLYING

You are going to like this! Add power—it will come up on the mains—a little right rudder—a little up elevator and it's off! Now you're a Navy pilot and can do all the things described in the beginning.

Then it is time to land—no sweat. A piece of cake. Line up with the runway, a slow descent to a perfect three-point landing.

If you don't like to build from plans and can wait, the F4B is going to be kitted in the near future by Balsa Products Engineering, Iselin, New Jersey.

If you can't wait—send for a set of plans and make your own kit. It's not too difficult—I do it all the time. Happy Landings! →

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