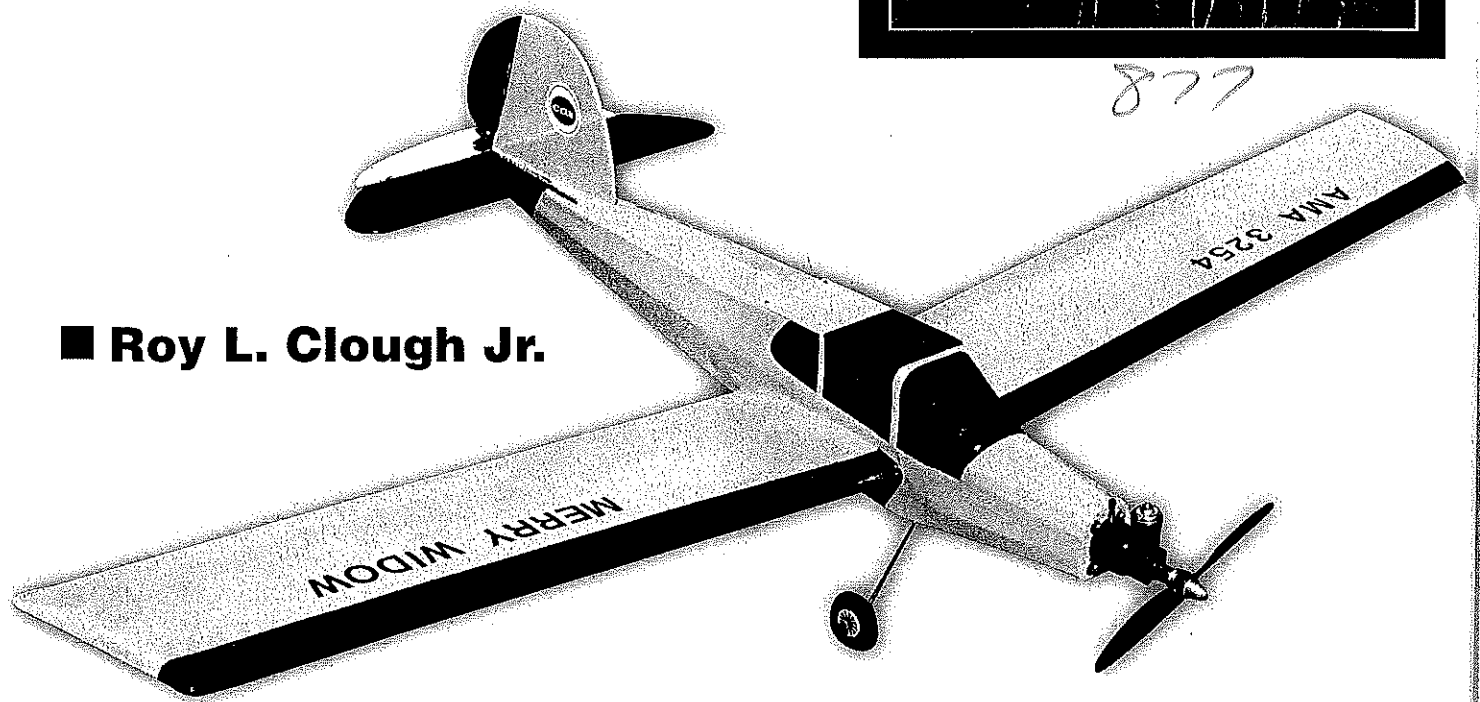


MERRY WIDOW



■ Roy L. Clough Jr.

Fast, stable design for 1/2A reed-valve engines



Armand Cote looks over the Merry Widow prior to flight testing.

The Merry Widow is fast, and is stable enough to be easy to fly, but it's also lively enough to perform a wide range of dazzling two-channel maneuvers in the hands of any moderately proficient pilot. Glide is unusually good. It allows comfortable landing options despite the two-channel flier's lack of throttle control.

Unlike many tail-draggers, the Widow is not "rabbity" on the ground. The rigidly mounted tail wheel, and a bit of back pressure on the stick, ensures arrow-straight takeoff runs.

The Merry Widow was designed around the popular .049 Black Widow engine. This is one of the Cox engines taken over by Estes that seems to have an assured future. Actually, the airplane should fly well with any of the Cox tank-mount reed-valve engines.

A one-piece fun-time flier, Merry Widow needs no field assembly. It's ready to fuel-up and fly, just as it comes out of your car's trunk.

This is a good second project for entry level scratch-builders. The rugged stick fuselage, with its unusual overlay framing and simple formers, fleshes out to sleek lines for anybody with a skill level that is one small notch above beginner-simple.

CONSTRUCTION

Wing: Key to this model's performance is a foam wing, and there

are two choices of how to make it. Lack of a hot-wire cutter is no reason to eschew the advantages of foam wings.

If you do have access to a cutter, cut the wing as rectangular, then cut the tips to shape and skive off the underside washout, using the wooden leading and trailing edges as a guide.

If you don't have a cutter, start with a rectangular blank, a kitchen knife with at least a six-inch blade, and carve and sand it to shape—which is how we made the original Black Widow wing. Hand-carving the wing is fairly easy if you go about it right—certainly easier than cutting out a lot of wing ribs, gluing them to spars, sheathing with sheet, and covering with whatever.

First, you need an old kitchen carving knife—something with a blade six or eight inches long.

Second, you need one of those draw-through knife sharpeners that are made from a couple of stacks of hardened steel disks. No chef with a decent respect for the tools of his art would be caught using one of these things, but they produce the perfect micro-raggedy edge for cutting pink or blue-gray foam.

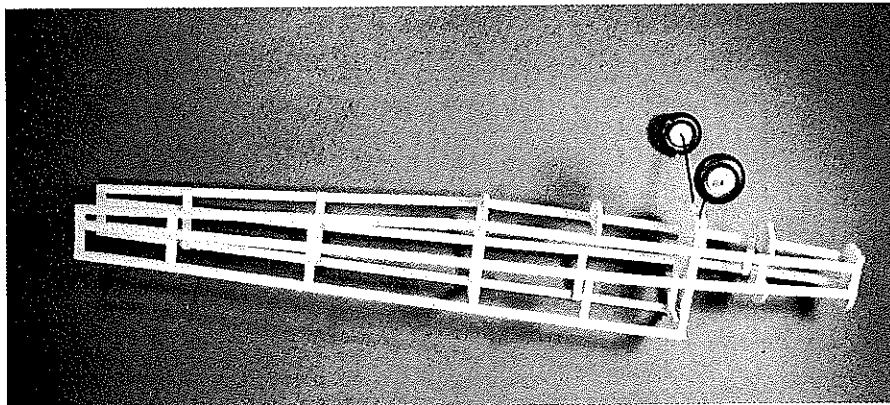
Glue the shaped leading edge and the dowel trailing edge to your rectangular blank before starting to carve. They make good carving guides for the flat of the knife.

Take long, smooth slices to approximate shape, and bring to final curvature with long strokes of a hard-backed 100-grit sanding block. Don't use a flexible block—it can produce a wavy surface. Take easy swipes until you get the hang of it. Do not use scouring motions or back-and-forth scrubbing; just a smooth draw over the parts you wish to bring into airfoil profile. Check frequently with a cardboard template, and by all means wear a mask for the sanding operations.

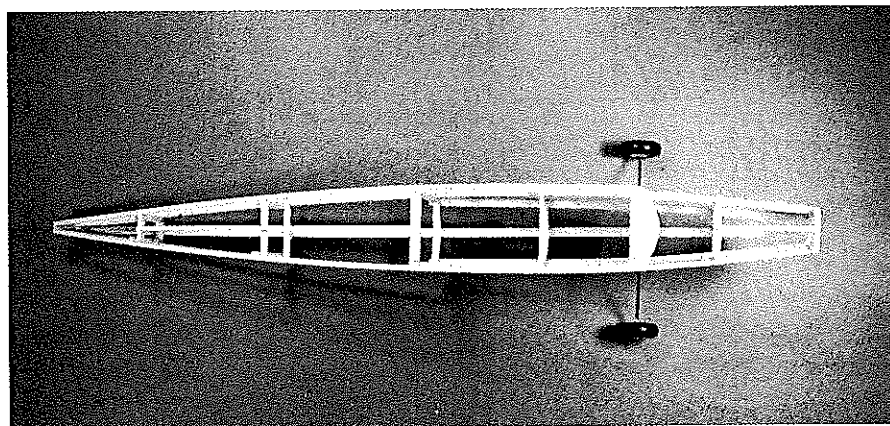
When the rectangular blank has been brought to the airfoil section, lay it flat and trim it to the taper and tip rake shown on the plan. This will, of course, slice the dowel trailing edge about halfway. Splice and glue on a piece of trailing edge dowel so that the tip end is flush with the new upper camber

line. Skive off the foam wedge beneath it, and presto! There is your washout, without making any changes in the upper camber.

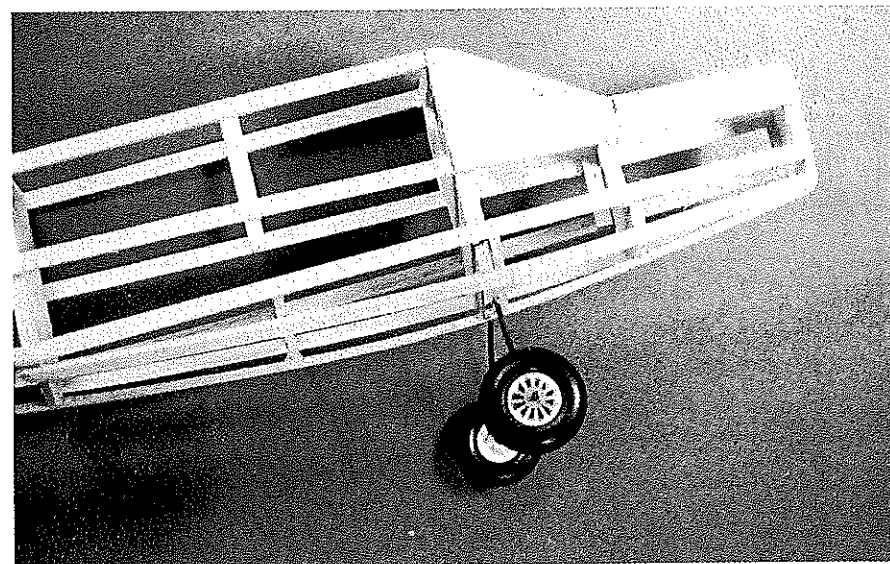
Note that the wing is made in halves, joined at the middle to get the proper dihedral angle. Use a hard balsa rib in the joint and stick the finished halves together



Begin fuselage assembly with sandwiched landing gear bulkhead and nose formers.



Fuselage side frames, built directly over wax-paper-covered plan, ensure exact alignment of balance of construction.



Nose sheathing is manila file folder stock; grain of paper runs with the bend.

MERRY WIDOW

Type: RC Sport

Wingspan: 44 inches

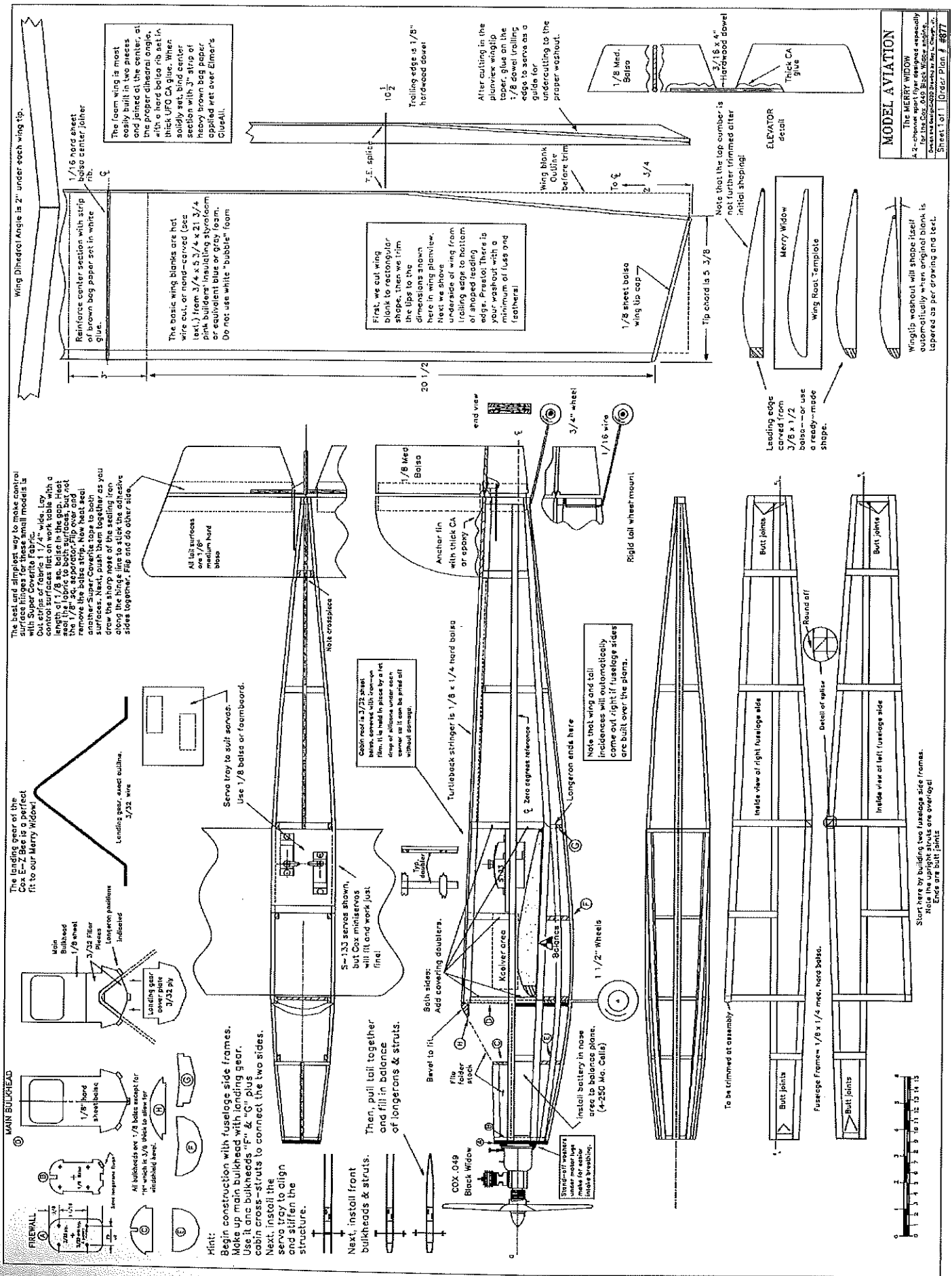
Engine: Cox .049 Black Widow

Functions: Rudder, elevator

Weight: 21 ounces

Construction: Balsa and foam

Covering/finish: Film



The best and simplest way to make control surface hinges for these small models is with Super Coverite fabric. Cut strips of fabric 1 1/4" wide. Lay them on a flat surface. Lay a ruler with a length of 1/8" between the strips. Do not use the 1/8" separator. Flip over and add another strip. Lay next seal another Super Coverite strip. Now draw the sharp nose of the sealing iron along the hinge line to stick the adhesive sides together. Flip and do other side.

The landing gear of the Cox-Z Base is a perfect fit to our Merry Widow. Main Bulkhead, Bulkhead, 1/8 wheel, Longeron pieces, Landing gear, Servo tray, Turtleback stringer, Zero degree reference, Longeron ends, 1 1/2 inch wheels, and COX .049 Block Widow motor.

All left surfaces medium hard balsa. Another fin with thick CA or epoxy. Note crosspieces. Servo tray to stiff servos. Use 1/8 balsa or foamboard. Note crosspieces. Turtleback stringer is 1/8 x 1/4 hard balsa. Zero degree reference. Longeron ends here. Note that wing and tail incidences will automatically come out right if fuselage struts are built over the plans.

Bevel to fit. Filigree for stack. Both sides: Add covering doublers. Kevlar area. 1 1/2" wheels. Install battery in nose area to balance plane. (4-250 Mg. Cells). Stand-off washer under motor legs inside bracketing. Note that wing and tail incidences will automatically come out right if fuselage struts are built over the plans.

Hint: Begin construction with fuselage side frames. Make up main bulkhead with landing gear. Use it and bulkheads "F" & "G" plus cabin cross-struts to connect the two sides. Next, install the servo tray to align and stiffen the structure. Next, install front bulkheads & struts. Then, pull tail together and fill in balance of longerons & struts.

First, we cut wing blank to rectangular shape, then we trim the tips to the dimensions shown here in wing planview. Next we shave underside of wing from trailing edge to bottom edge. Final! There is a minimum of 1/8" and 1/16" (total).

Wing Dihedral Angle is 2" under each wing tip. Reinforce center section with strip of brown bag paper set in white glue. The foam wing is most easily built in two pieces and joined at the center, at the proper dihedral angle, with a hard balsa rib set in thick UPO CA glue. When solidly set, bind center section with 3" strip of heavy brown bag paper, clipped wet over Elmer's glue.

Wing blank Outline before trim. 1/8 sheet balsa wing tip cap. Tip chord is 5 3/8. Note that the top number is not further trimmed after initial shaping. 1/8 Med. Salsa. 3/16 x 4" Hardwood Dowel. Thick CA glue. ELEVATOR detail. Merry Widow Wing Root Template. Winglip washout will shape itself automatically when original blank is tapered as per drawing and text.

MODEL AVIATION The MERRY WIDOW 4-2—built by the author for the Cox .049 Block Widow motor. Order Plan # #877

Start here by building two fuselage side frames. Note the upright struts are overlaid. Show the Butt joints.

To be trimmed at assembly. Butt joints. Inside view of right fuselage side. Round off. Detail of spar. Inside view of left fuselage side. Fuselage Frames 1/8 x 1/4 med. hard balsa.

Scale bar: 0 1 2 3 4 5 6 7 8 9 10 11 12 13

COX .049 Block Widow motor. Stand-off washer under motor legs inside bracketing.

Right tail wheel mount. 3/4" wheel. 1/16 wire.

Leading edge carved from 3/8 x 1/2 balsa—or use a ready-made shape.

Wing blank Outline before trim. 1/8 sheet balsa wing tip cap. Tip chord is 5 3/8. Note that the top number is not further trimmed after initial shaping. 1/8 Med. Salsa. 3/16 x 4" Hardwood Dowel. Thick CA glue. ELEVATOR detail. Merry Widow Wing Root Template. Winglip washout will shape itself automatically when original blank is tapered as per drawing and text.

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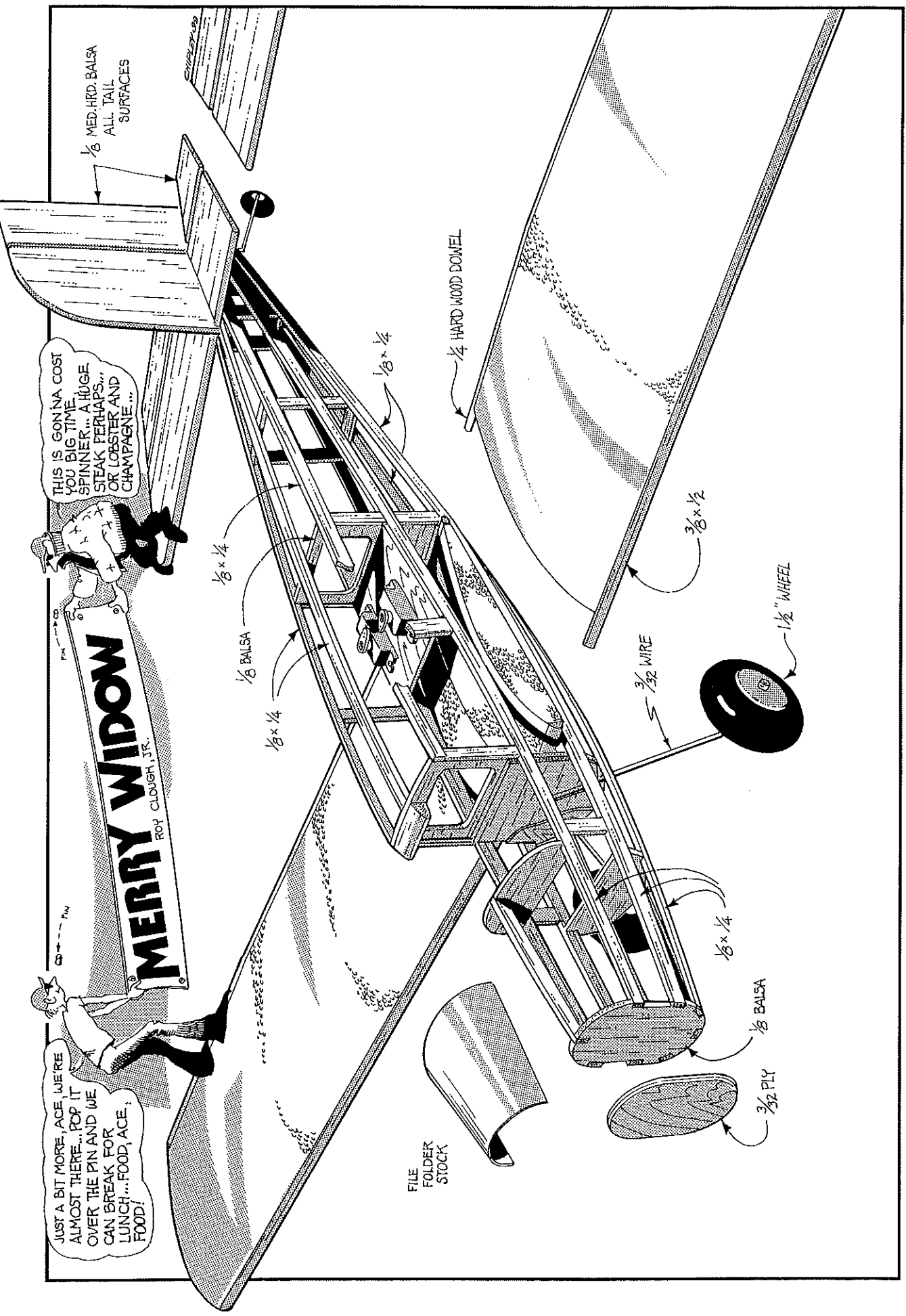
JUST A BIT MORE, ACE, WE'RE ALMOST THERE... POP IT OVER THE PIN AND WE CAN BREAK FOR LUNCH... FOOD, ACE, FOOD!

MERRY WIDOW

ROY CLOUGH, JR.

THIS IS GONNA COST YOU BIG TIME, SPINNER... A HUGE STEAK PERHAPS... OR LOBSTER AND CHAMPAGNE...

1/8 MED. HED. BALSA ALL TAIL SURFACES



FILE FOLDER STOCK

1/8 Balsa

3/32 PLY

1/8 x 1/4

3/32 WIRE

1/2 WHEEL

3/8 x 1/2

1/4 HARD WOOD DOWEL

1/8 x 1/4

1/8 x 1/4

1/8 Balsa

1/8 x 1/4

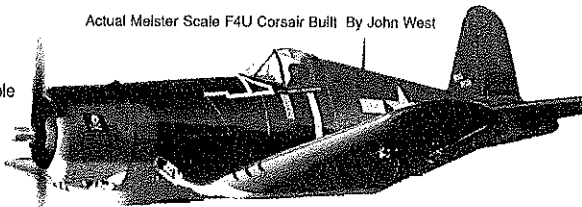
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with thick, odorless cyanoacrylate (CyA) glue, Weldbond™, or epoxy.

By either method, join the wing halves and when solidly set, brush on a 50-50 thinned mix of aliphatic (carpenter's) glue and water. When thoroughly dry, sand lightly and wipe down with a tack cloth before covering with any low-temp iron-on film. Note that you should leave the mid-section that passes through the fuselage in its plain brown wrapper. This will accept a wide range of assembly glues better than the film covering. (See plan.)

Tail: The surfaces are 1/8 sheet balsa. See the plan note for the simplest and most durable hinges you can use on small models. Tail surfaces are covered with iron-on film. Leave gaps where the stabilizer, rudder, and top longeron gluing takes place.

Servo hookup is indicated; use your favorite method. For small models, I use 1/8 dowel pushrods with lashed-and-glued wire ends. Note how the tail wheel is attached to the relatively heavy rear fuselage post.

Fuselage: Build the basic fuselage frames right over the (wax-papered) plan sheet. Make up the bulkhead formers, including the main bulkhead (D) with its built-in sandwiched landing gear. The salvaged wheel assembly from a Cox E-Z Bee was a perfect fit for the original Merry Widow.

See the sketches at the left of the plan sheet for the fuselage assembly order. Cross-struts and filler pieces are 1/8 x 1/4 balsa. Note that around the cabin and wing areas, covering doublers are used. The wing is not filleted. Use a couple of triangular patches of film to fill the open areas before covering the balance of the fuselage.

A trick I've been using on recent reed-valve engine installations is to mount them with washers under the tank lugs. Spacing the tank's intake 1/16 to 1/8 away from the firewall seems to make these engines perform better. Varying the number of washers under each lug makes it easy to fine-tune the thrustline.

Flying: Reed-valve engines seem to work best if you run a tankful of fuel through them to get them loosened up (and most of your needle-valve twiddling over and done with) before attempting serious flying.

Because of the shallow angle of the model at rest, and the built-in wing incidence, model will take off "flat-footed" when released. It's not necessary to raise the tail for takeoff. A small amount of back stick, to hold the tail wheel down for arrow-straight tracking, lifts it easily into the air. Once you get there, take it up and wing it out! When the engine starts making bleating noises, 100 feet of altitude will let you land it just about anywhere you choose. →

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royce6@juno.com

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