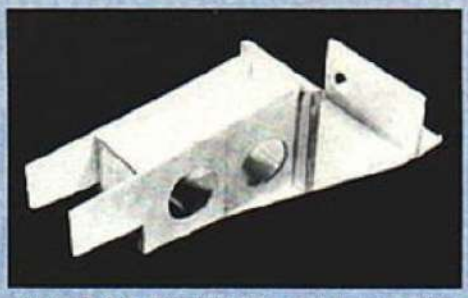
IN THE early recovery years after the stock market crash, Curtiss Wright introduced the Coupe Model CW-2, a two-place low-wing monoplane featuring side-by-side leather covered upholstered seats. The seats were adjustable up, down, fore and aft. The control stick was movable from right to left seat position. It had a lever controlled braking system—a pull into the first indexing position allowed braking with rudder

A seldom modeled type of the 1930 era, this Max 30 powered Coupe for four channels, is well structured with many interesting fine points, yet does not pay a weight penalty to compromise flying.

By Joseph S. Jesse

Like many interesting airplanes of its day, the Coupe was not a sales sensation, but the great Depression must have been a big factor. In the Coupe Curtiss-Wright—a conglomerate that swallowed numerous great manufacturing names—was going beyond the strut-braced high-wing Robin-types. For $3700 fly-away, you got a 110-hp Gypsie-powered 2-seater that got 15 mi./gal.

the Curtiss-Wright Coupe



As on Robin, Fairchild FCs, and various cabin jobs typical of the day, fuselage angles in sharply at cabin front, then straight to engine. This simple, robust structure ties it all together—also see Wischers' column on engine mounts. Makes for solid engine mounting.

pedals—and a left-hand elevator trim for pitch adjustment.

The snugly enclosed cabin had excellent visibility in all directions except straight down and to the rear. A widely spaced landing gear and tail wheel provided good ground handling qualities.

It was powered by their 110 hp 6-cylinder in-line Gypsie engine. At 1700 rpm it cruised at 110 mph and delivered 15 sure miles to the gallon. Rate of climb was 600 feet per minute.

It was introduced at the Detroit Air Show in 1931 with a fly-away price of $3700.

The Coupe was never a great success although later versions attained some measure of success. One interesting similarity in later Coupe versions and the RC version: Laminated skin was used on experimental structural concepts. The strange part about the similarity is that my plans were 90% complete before I received any background data.

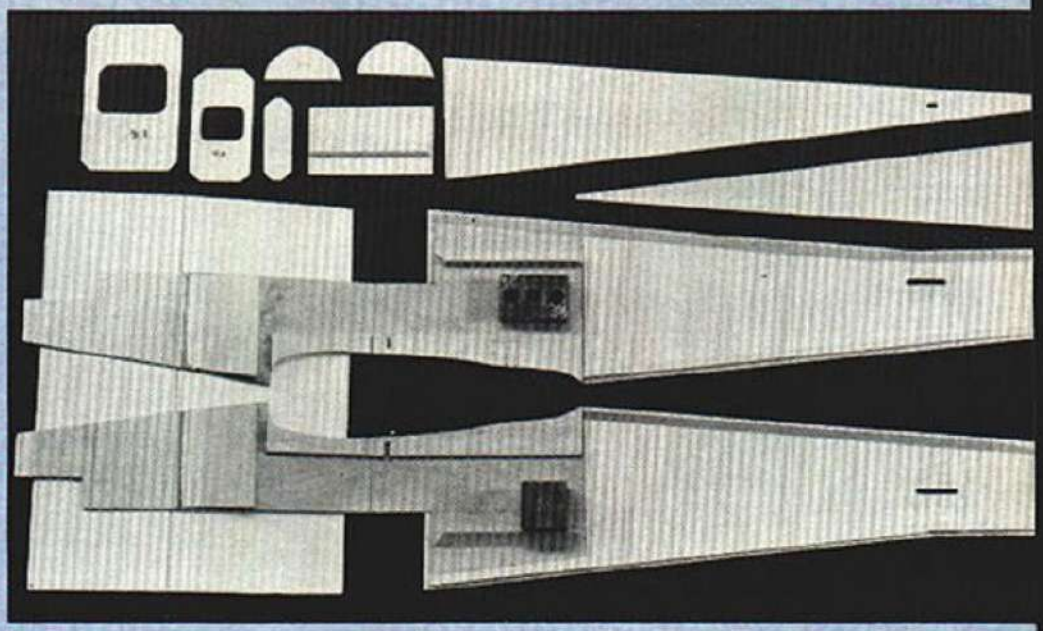
As designed, this model is an attempt to achieve above-average structural strength while keeping the weight to a minimum. While some people say anything made strong is heavy, that's a relative matter. It can be heavy relative to its area and size, yet weak from a structural approach. For instance, the same model can be designed and built by different people. One will end up strong enough to perform as it should, taking the normal handling, like rough flying areas, transporting and stress of flying maneuvers, and still be in good shape. The other model will break up hitting a bump or break in the runway, or have the wing break at the center section when the plane is rolled inverted and a little down elevator is applied to keep the nose up.

Therefore, there must be compromise between weight and strength. Like power to weight ratios, there is a strength-to-weight ratio factor. Many designs carry extra weight that add nothing to strength. Heavy or light, all of us know there is hardly anything that is unbreakable.

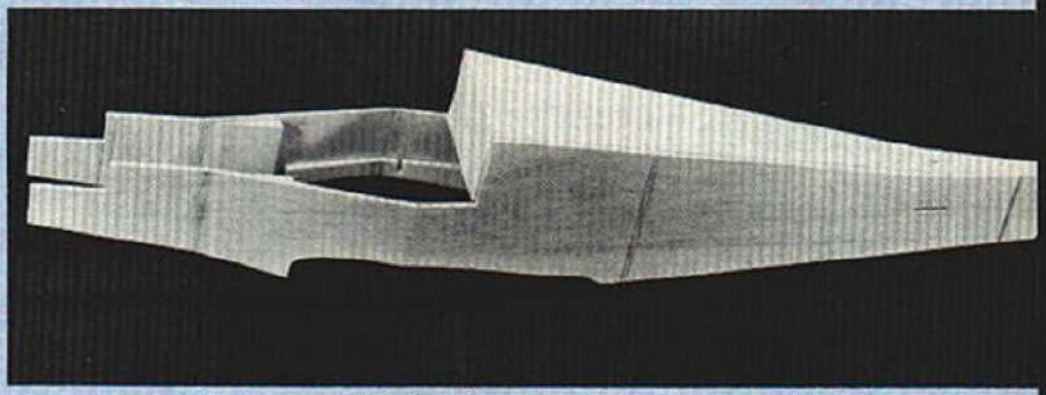
The materials used in the structure of the Coupe are selected to best serve their application. (This does not mean substitutes could not be made.) Size also plays a part. The .015 (1/64) plywood is very light, yet very strong. Also, its thickness gives it flexibility and formability.

When notched (to ½-hinge size) and laminated into a surface it becomes a spacer, stiffener, or bonding member. Its use allows lighter material to be used (as a filler for shape) and still perform functionally. Everyone will see things they don't agree with in any design.

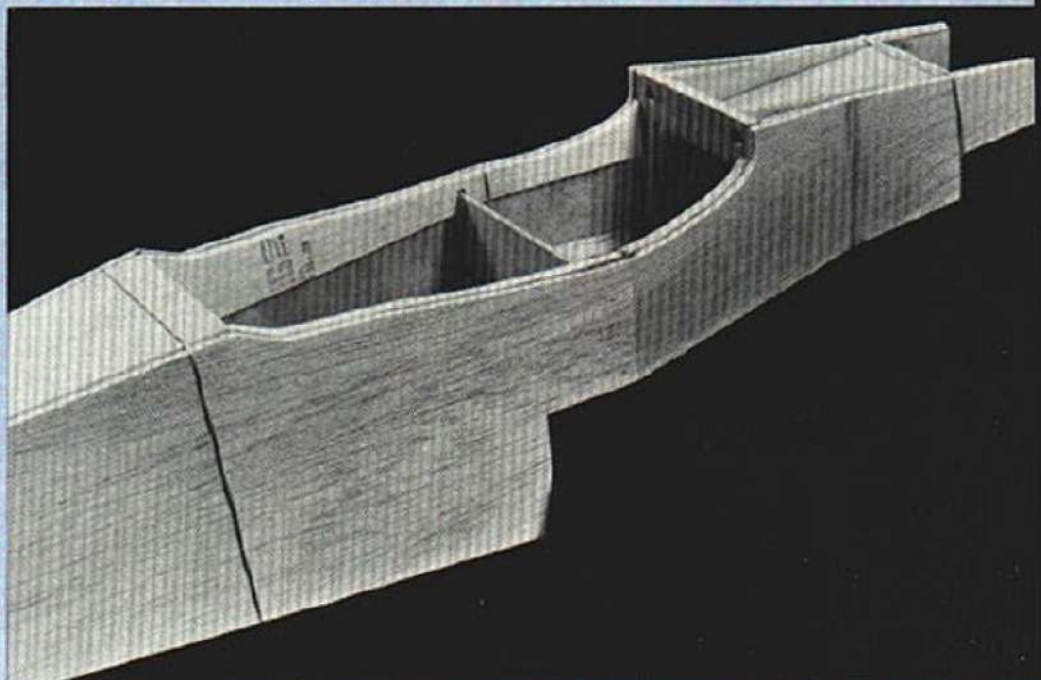
In my opinion, considering the present state of the model building art, the laminated hinge slot is the most reliable way to obtain true hinge alignment. Many tools and meth-



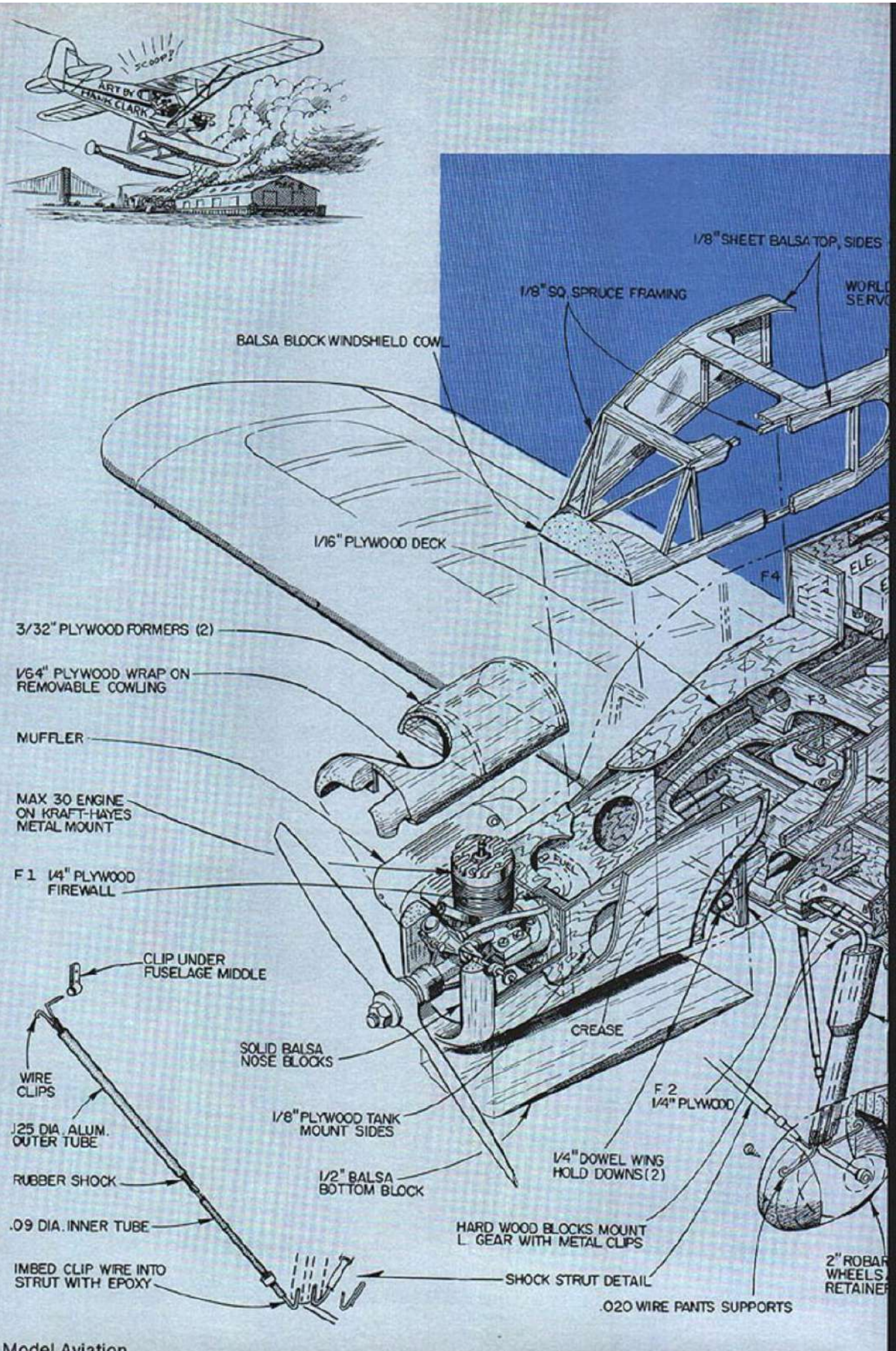
The structural engineering is impressive, in its use and placement of materials. Note laminations of sides aft of wing position and, at top, the sharp true-to-scale break in the side.

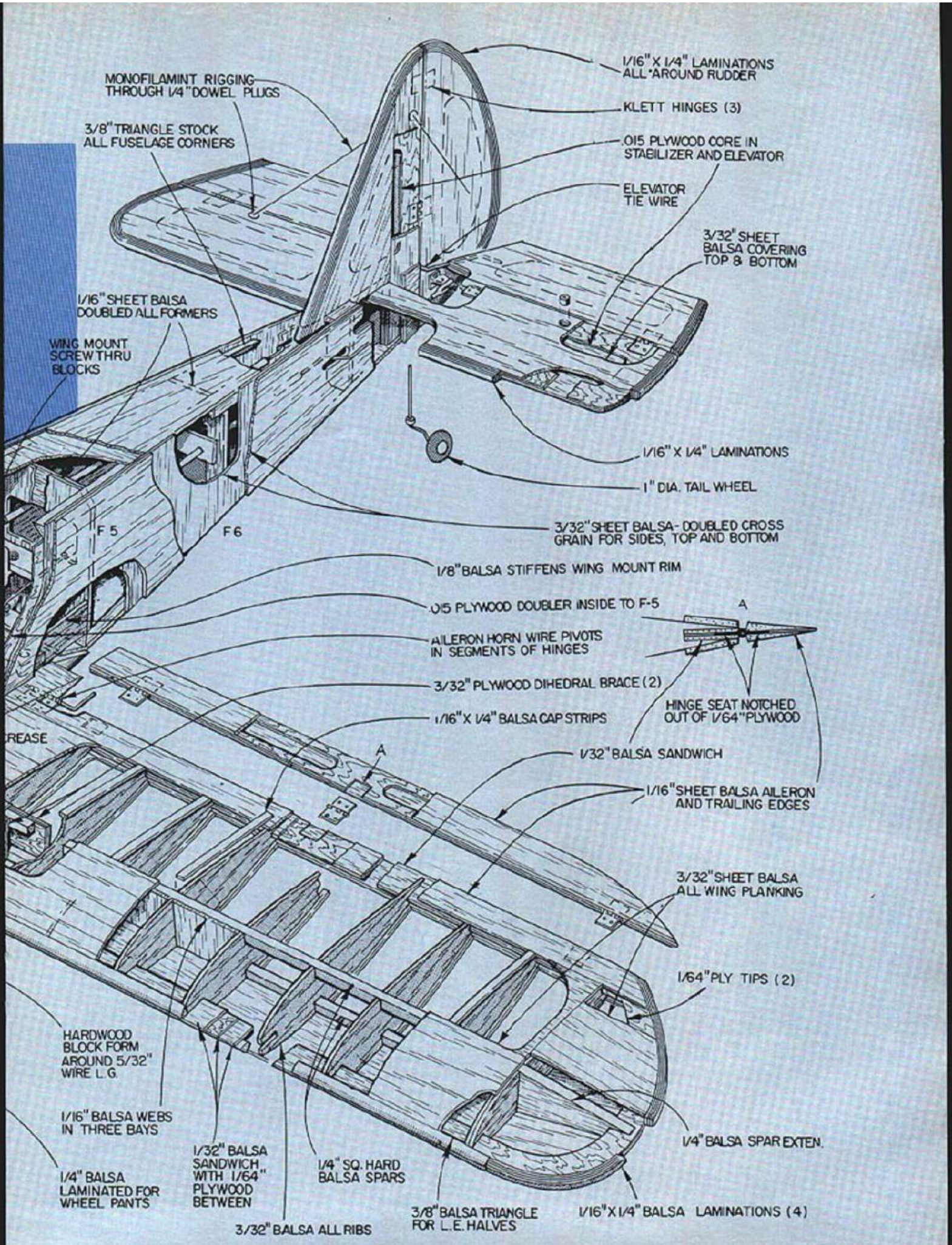


In spite of its geometry, the rough finished fuselage resembles familiar modeling box shape.

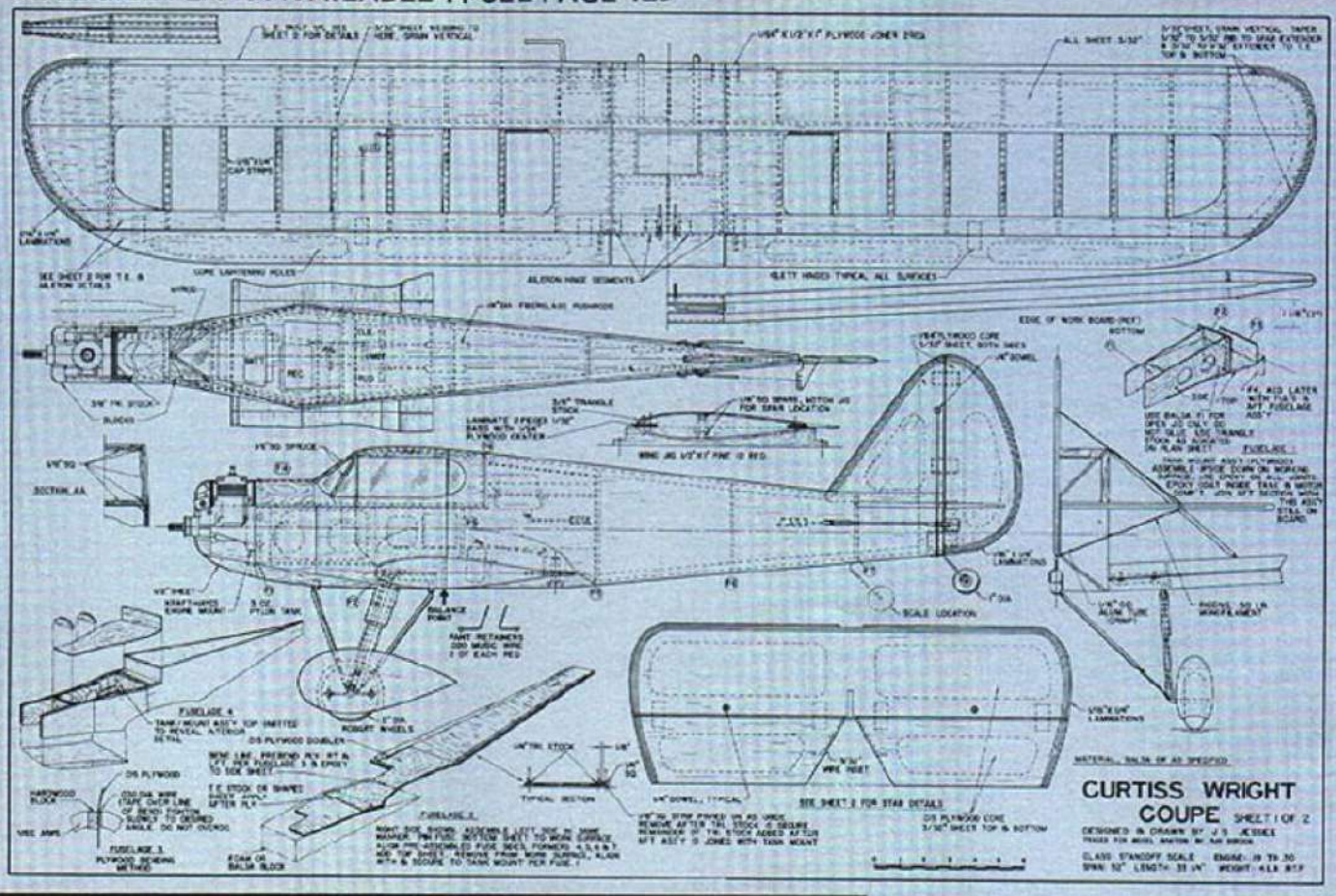


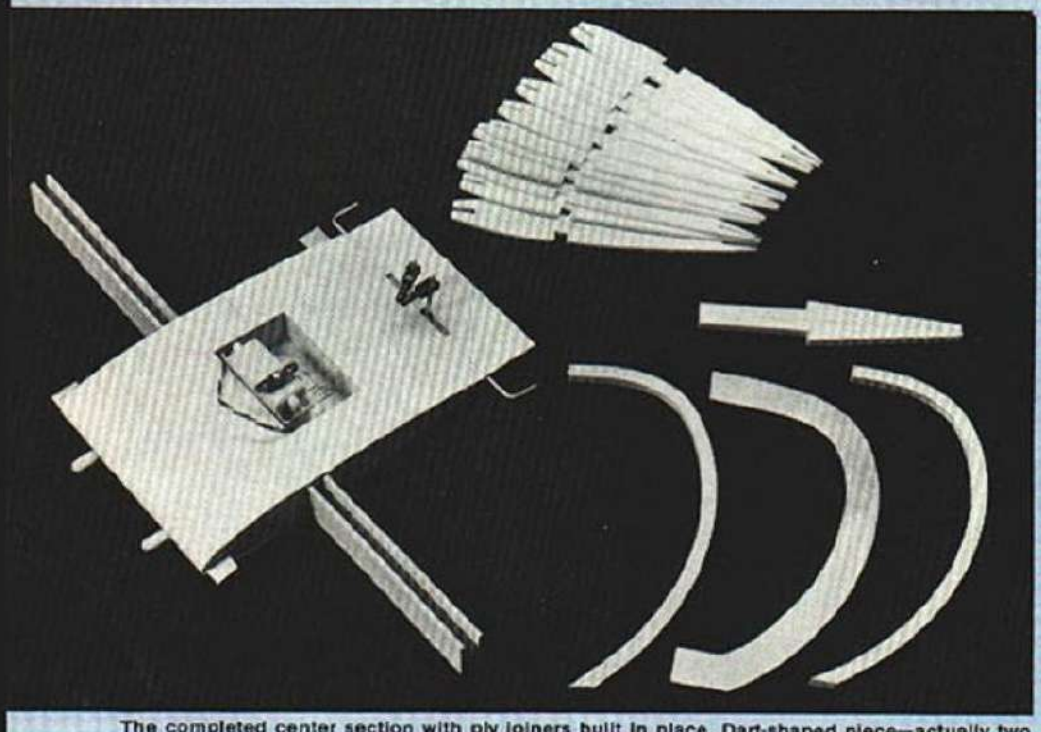
Another view of that fuselage configuration—note holes in ply bulkhead for the wing dowels.


SCOOP!
ART BY HANK CLARK
1/8" SHEET BALSA TOP, SIDES
1/8" SQ. SPRUCE FRAMING
BALSA BLOCK WINDSHIELD COWL
1/16" PLYWOOD DECK
F4
F3
3/32" PLYWOOD FORMERS (2)
1/64" PLYWOOD WRAP ON REMOVABLE COWLING
MUFFLER
MAX 30 ENGINE ON KRAFT-HAYES METAL MOUNT
F1 1/4" PLYWOOD FIREWALL
CLIP UNDER FUSELAGE MIDDLE
CREASE
SOLID BALSA NOSE BLOCKS
WIRE CLIPS
1/8" PLYWOOD TANK MOUNT SIDES
F2 1/4" PLYWOOD
.125 DIA. ALUM. OUTER TUBE
1/4" DOWEL WING HOLD DOWNS (2)
RUBBER SHOCK
1/2" BALSA BOTTOM BLOCK
.09 DIA. INNER TUBE
HARD WOOD BLOCKS MOUNT L. GEAR WITH METAL CLIPS
IMBED CLIP WIRE INTO STRUT WITH EPOXY
SHOCK STRUT DETAIL
.020 WIRE PANTS SUPPORTS


1/16" X 1/4" LAMINATIONS ALL AROUND RUDDER
MONOFILAMINT RIGGING THROUGH 1/4" DOWEL PLUGS
KLETT HINGES (3)
3/8" TRIANGLE STOCK ALL FUSELAGE CORNERS
.015 PLYWOOD CORE IN STABILIZER AND ELEVATOR
ELEVATOR TIE WIRE
3/32" SHEET BALSA COVERING TOP & BOTTOM
1/16" SHEET BALSA DOUBLED ALL FORMERS
WING MOUNT SCREW THRU BLOCKS
1/16" X 1/4" LAMINATIONS
1" DIA. TAIL WHEEL
F 5
F 6
3/32" SHEET BALSA- DOUBLED CROSS GRAIN FOR SIDES, TOP AND BOTTOM
1/8" BALSA STIFFENS WING MOUNT RIM
.015 PLYWOOD DOUBLER INSIDE TO F-5
A
AILERON HORN WIRE PIVOTS IN SEGMENTS OF HINGES
3/32" PLYWOOD DIHEDRAL BRACE (2)
HINGE SEAT NOTCHED OUT OF 1/64" PLYWOOD
1/16" X 1/4" BALSA CAP STRIPS
REASE
A
1/32" BALSA SANDWICH
1/16" SHEET BALSA AILERON AND TRAILING EDGES
3/32" SHEET BALSA ALL WING PLANKING
1/64" PLY TIPS (2)
HARDWOOD BLOCK FORM AROUND 5/32" WIRE L.G.
1/16" BALSA WEBS IN THREE BAYS
1/4" BALSA SPAR EXTEN.
1/32" BALSA SANDWICH WITH 1/64" PLYWOOD BETWEEN
1/4" SQ. HARD BALSA SPARS
1/4" BALSA LAMINATED FOR WHEEL PANTS
3/8" BALSA TRIANGLE FOR L.E. HALVES
1/16" X 1/4" BALSA LAMINATIONS (4)
3/32" BALSA ALL RIBS

FULL SIZE PLANS AVAILABLE . . SEE PAGE 128





The completed center section with ply joiners built in place. Dart-shaped piece—actually two pieces—is the spar tip taper. The cut-out sheet tip pieces are used in conjunction with laminated outlines, now popular for their inherent strength and ability to provide neat shaping.

For wing assembly, the edges are accurately blocked up to the proper height from the working surface. At this point, the wing sheet pieces are located, ready for wrap-around laminations.

ods are in use today. Some of the latest tools look very good. But skill is required using any tool and when procedures are not followed, the results are less than favorable. The laminated slot is created, you have to want truer alignment, freer surfaces, and better performance. When you consider the time involved in tooling out the openings for 17 hinges you have 34 slots. And unless great care and precise methods are employed you are lucky if 10% are the same.

The Coupe's construction methods employed will be old stuff to many and perhaps new and different to others. And since construction articles are mainly the interest of scratch builders, I will not attempt to explain in detail all the steps necessary in construction.

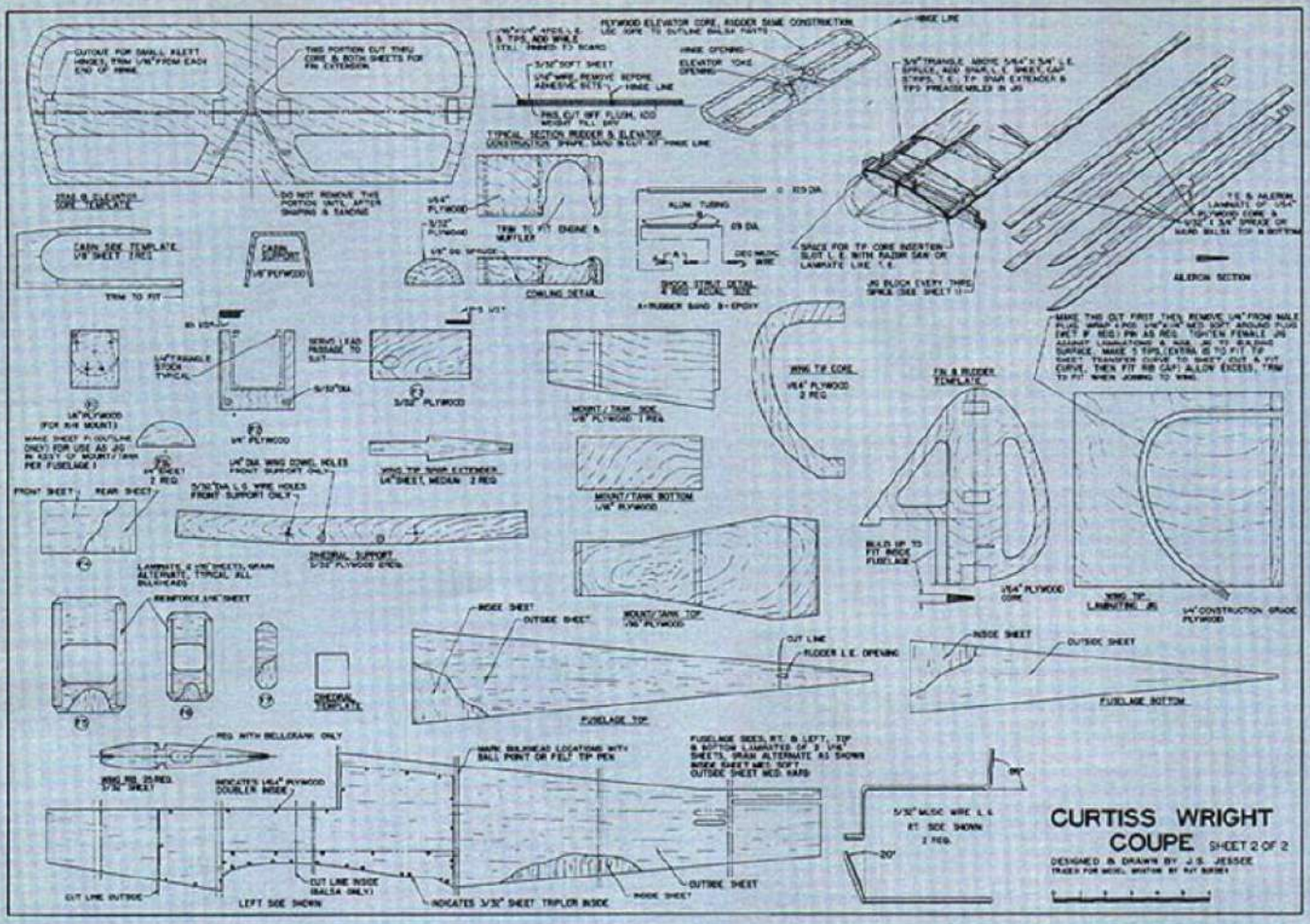
The Coupe is simple of line with no complex shapes involved. The plane displays good moments and unique fuselage shape. Note how the muffler clears.

After some study, most scratch builders could build without any written procedures. The plans as worked up favor those that like descriptive views showing how things are done, rather than written "How-to-Do."

Beginning Construction: In drawing this set of plans I have attempted to reduce the prep work involved prior to starting the actual building. The choices: 1) Cut out all the templates and transfer to material. 2) Transfer by dimension directly to the material. Very little transfer will be required.

Step 1—Pin or tape the main plan sheet to an open wall where it can be referred to. No building over the plans is required.

FULL SIZE PLANS AVAILABLE . . SEE PAGE 128



Step 2—Cut out all parts and rubber band, pin, or tape them together in groups.

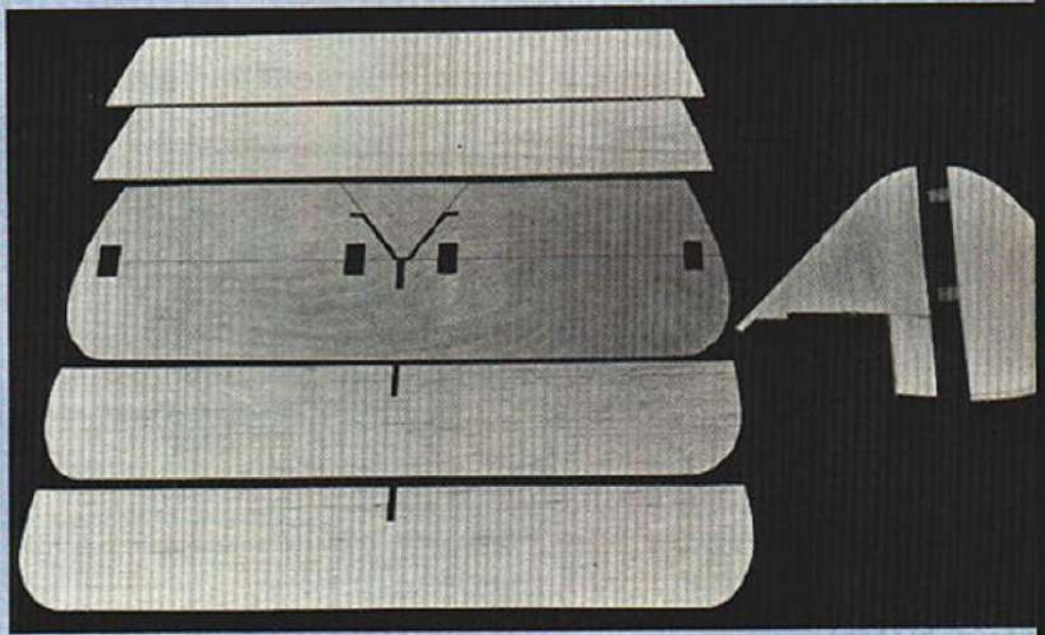
Step 3—Work on a group at a time; work until a drying period is reached, then move along working on each until all sub-assemblies are finished. This method of building reduces loss of motion and time. You should end up each work period with all of your work drying overnight or until your next worktime starts.

Fuselage: Start this assembly by construction of right and left sides. By use of the jig shown on the plans, the correct angles are built in. The cross-grain method used in the fuselage structure takes a little longer but the resulting strength and flatness is worth the effort.

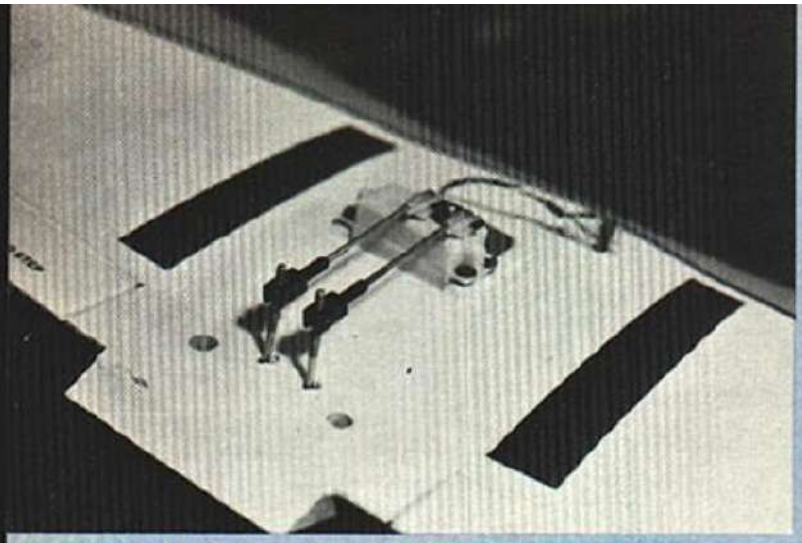
Start by tack gluing together the two sheets you have selected for the outer sides. Now draw the fuselage outline on the wood and saw out. The results are two exact sides. Apply the cross-grain to the inside of the right and left sides, and the 1/64 ply doubler and wing seat doublers; lay sides over template sheet and transfer (by ball-point or felt-tip pen) the bulkhead positions. Add the triangle stock. Make the necessary cuts, inside and out, required at the break points. Use 1/32 aluminum or brass to control the cut depth. (A strip ½" wide on each side of the cut line.) Pin the (R and L) side to your building surface and add the jig to control the angles. Add weights to hold the sides flat to the surface of the board and jig.

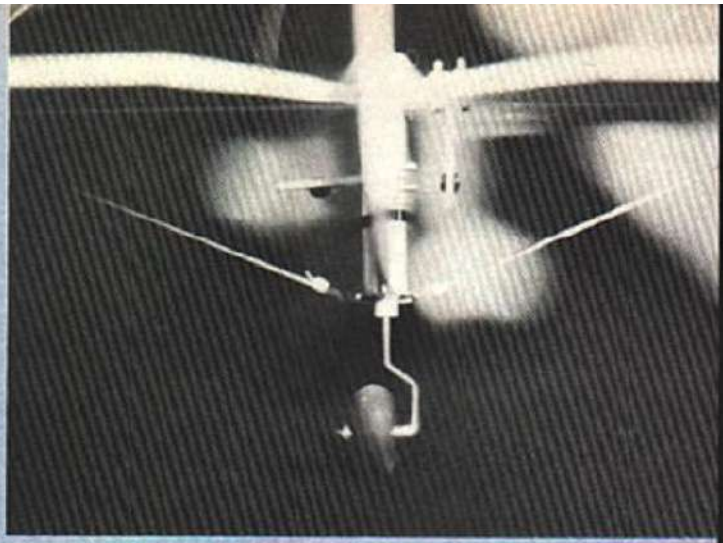
While the sides are drying construct the tank mount using epoxy. Work carefully to insure squareness and joint contact. Build, over waxed paper, the tank mount top (rear cabin edge), flush with the edge of the work surface. When this assembly is dry the fuselage sub-assembly can be attached to the tank mount.

The top and bottom fuselage parts are made using the same cross-grain method. With the sides now dry and removed from the jig, pin the fuselage bottom (over waxed paper) to the building surface. Add the sides and pin to the building surface. Assemble the bulkheads and complete this portion of the fuselage by adding the top after removing from work surface. Add the front cowl formers and sheeting. Add the nose block

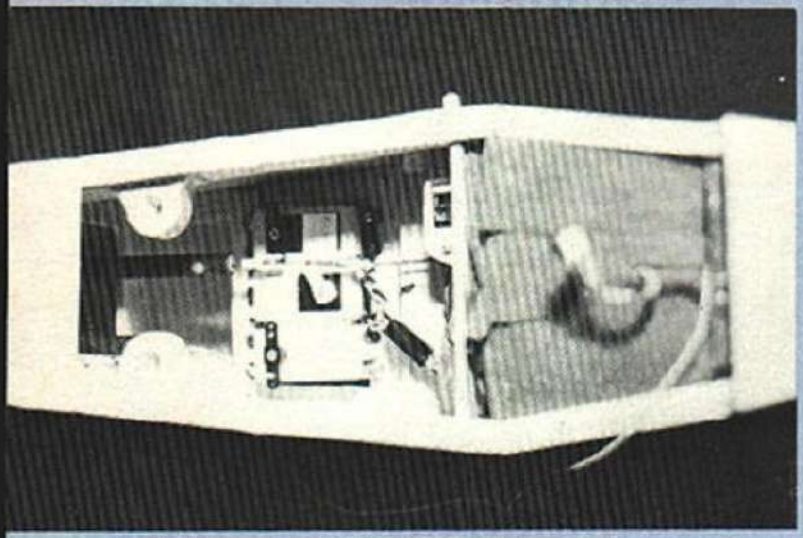


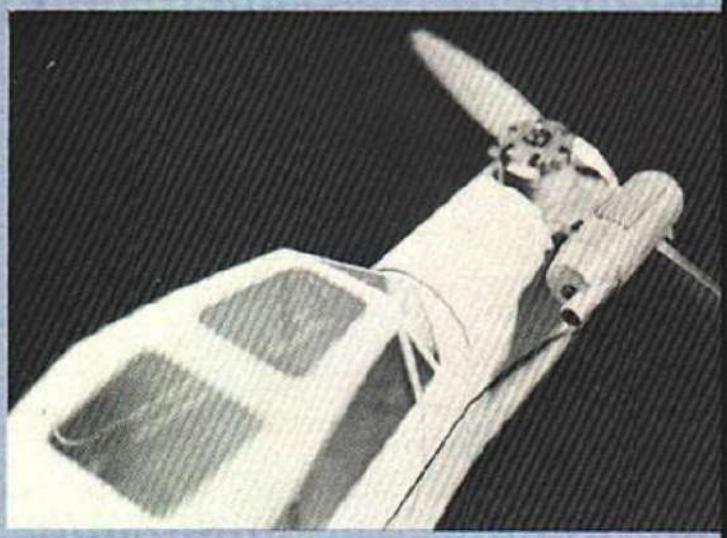
Some people like to "kit" the entire model before beginning construction—a tedious stage on a big, complex ship. Jessee appears to kit each assembly first—as was done here with the tail surfaces. Actually, the parts are almost completed, sanded, and with the hinges in place.





Left: Finished wing bolts on in exactly the same way as on a typical pattern-type aircraft. Wing walks are black sandpaper. Right: Tail wheel assembly showing method of attaching the stabilizer bracing wires. The horns, of course, are not scale—but this is not AMA Scale type.



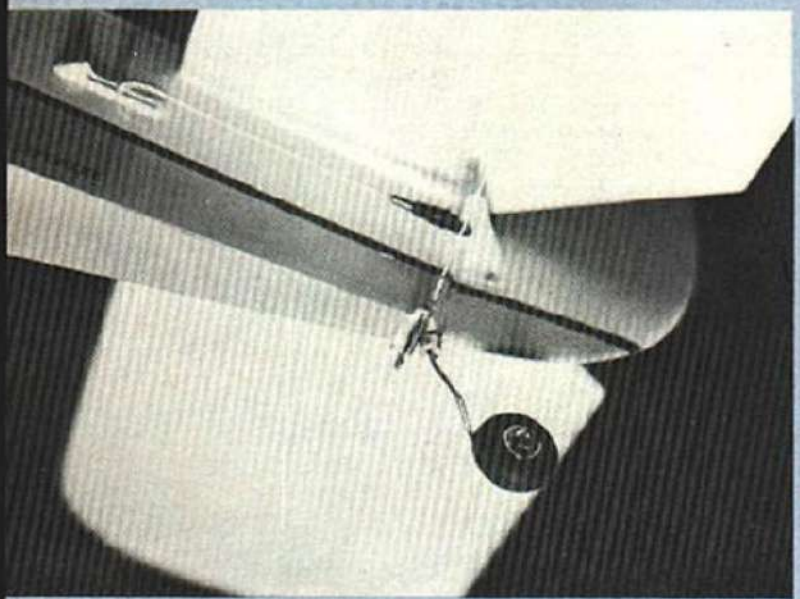


Left: Plenty of room for three side-by-side servos and loose receiver protection. Right: The interesting cabin shape and extensive windows distinguish the finished plane. But it would be impossible task to completely hide a muffled OS 30 in the Coupe's very compact nose.

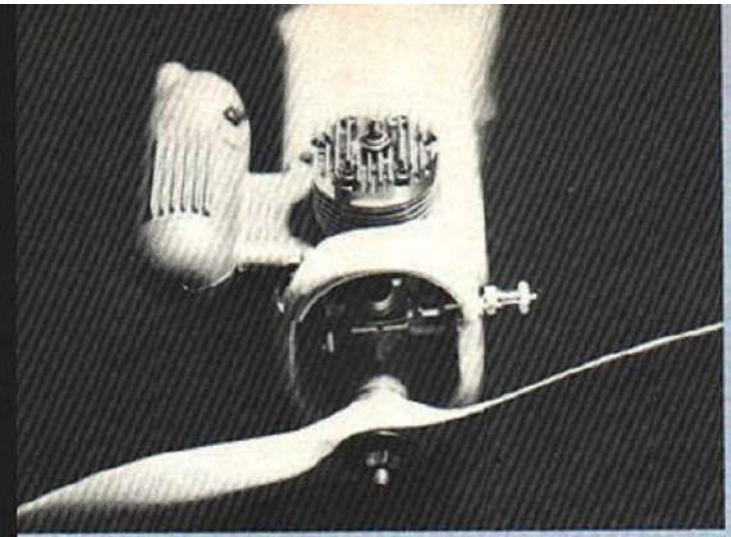
(rough saw-cut shape) and carve and sand-blend. The lower nose block is (saw-cut, profiles top and side) added and blended into the fuselage. Cut, fit, and add servo rails and receiver/battery compartment bulkhead. Add the wing retaining blocks or the molded nylon type retainers. Add the tubing through the (top right) tank mount for the engine control pushrod. Prepare the exits for the tank tubing.

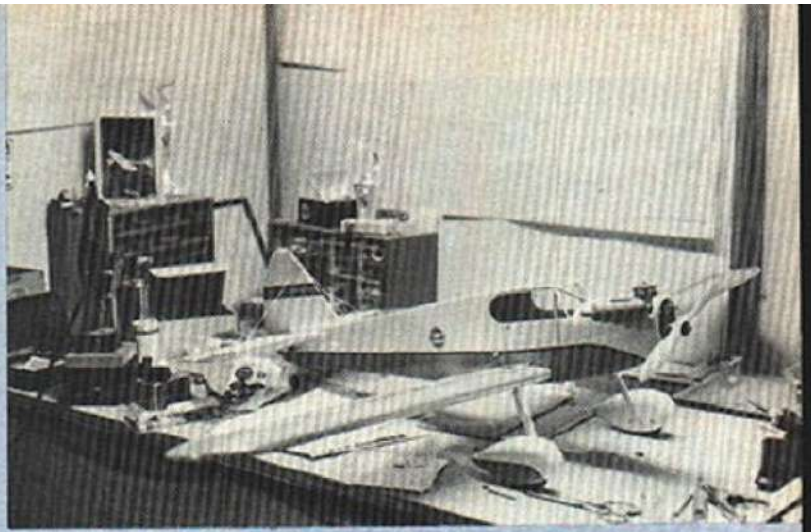
Cabin Area: Assuming the fuselage has been completed up to the cabin portion. Begin by cementing the back up strips (1/8 sq.) to the front side of cabin bulkhead. Locate these strips to allow the sheeting (3/32) to extend beyond the fuselage sides for sanding allowance.

Back-up strips are run along the fuselage sides (from strips on bulkhead forward) to contact the block shaped to blend into the cowl portion of the cabin. Cut the cabin



Left: Another view of the tailwheel assembly clarifies its attachment. The use of a commercial pushrod exit enhances neat appearance. Right: the simulated shock strut and wheel-pant attachment with simple wire retainers which are detailed on the plan.





With the cooling provided by the big nose opening and the exposed head, the OS would run well even in Death Valley. Note the tap for muffler pressure (see Kilsdonk's comments on 18). Right: The end of the trail, a catchy scale job that, strangely, has seldom been publicized.

(bridge type) support from 3/32 ply. Locate and epoxy into position. While these back-up strips are drying; contruct the cabin sides.

Spot cement sheets of 3/32 balsa together, then transfer outline of cabin sides onto the wood, using template. Cut the sides to outline shape and carefully separate them using a dull knife blade.

Pin these sides (make right and left) to your working surface. Apply backup strips (1/8 sq.) to the top curved portion of the sides. These back-up strips support the sides and top window area of the cabin. Sand these parts to blend when all parts are in place. A portion of each window side is removed after sanding. Add fill pieces of 1/8 sq. balsa to the sides of the cabin support to fill this area, sand flush to blend with sides.

Using 1/8 sq. spruce, cut and fit front windshield supports. These are then sanded to flow smoothly into the cabin. The cabin window area parts are cut and fit into the top side and rear backing strip support area. Sand smooth to blend.

Finish the cabin interior black (all surface) using a flat black paint or ink. The floor area and bulkhead were covered with black construction paper; this reduced the area that remained to be blackened considerably—the remaining exposed area was colored with a black felt tip marker.

Wheel Pants, and Retainers: Bend four pant attaching wires, two front and two rear to outline shown. These are not too difficult and require only close approximation in construction (spring steel music wire .020/.025 dia.). Start with the required approximate length (if long they can be cut short) and form eye in each part.

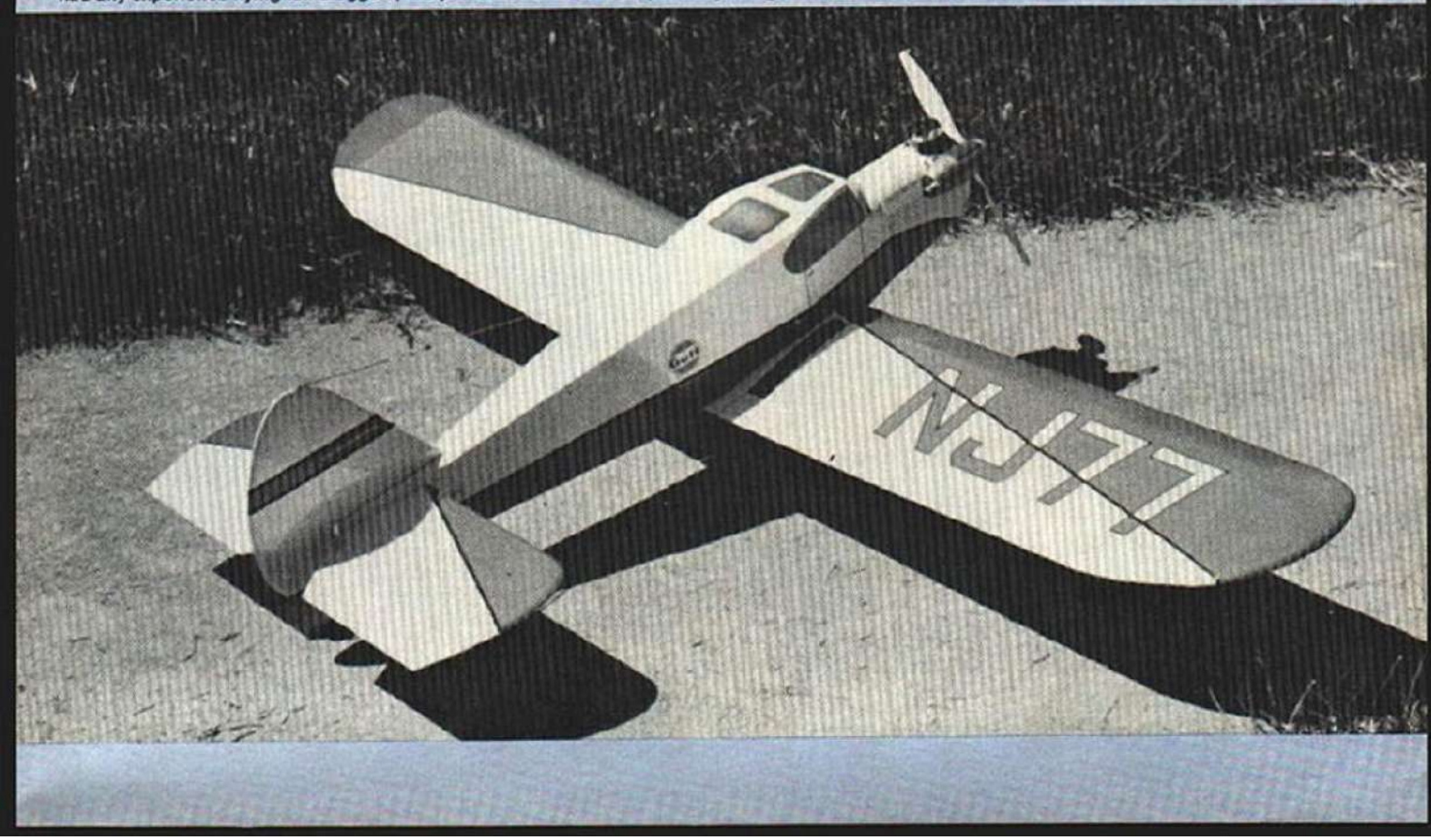
Clamp a piece of 3/32 music wire into a vise and pre-form the eye by bending around the wire approximately 200 degrees. Finish forming with needle-nose pliers. When forming is completed, sand the area of the wire that runs vertically along the landing gear wire; sand the landing gear wire in the area intended for soldering.

Using small dia. copper wire, wrap the support and retainer wires to the landing gear wires.

Solder these smoothly, by flowing solder into the windings; knock off any excess. Keep the outside free of build-up and protrusions of solder. Lay wing assembly (with wires attached) aside and start pant construction. The wire attachment method is intended for use with the built-up pant version. The method could be applied to other versions with adapting considerations.

Continued on page 108

A flier's split-second reaction to this rear-quarter view is that the proportions and areas are about the same as any good-flying sport airplane. If you have had any experience flying tail-draggers, the performance should be perfectly straight-forward—nice for a scale aircraft.



The four flight controls can be reversed by reversing plugs inside the transmitter . . . . Pro-line reports a new servo underway (PLS–15–3) which will work with *either* positive or negative pulse systems. Waterproof, will have a ballbearing output and use the Geisendanner pot.

Logictrol International Corp. has an FM set under development, to use new Signetics IC encoder and decoder chips. They are producing the XM servo for large models, using a 2.4 ohm motor and glass-filled nylon gears. Output is 6 pounds of thrust . . . . Cannon Electronics is delighted to join the "Under $200 club" with the model 825 system. All nicad system, Bantam Servos, Tini transmitter . . . . Charlie R/C is featuring the Bantam Midget servo with a new IC servo-amp.

One of the largest crowds in the show gathered around Eastcraft Specialty Products, Inc. to watch Fred Eastman push a button on his transmitter to start the engines of his boats and planes, using the Lectra-Start system . . . . Midwest Model Products is importing the Hirtenberger HP120 for Tournament of Champions sized models. This alternate-firing inline twin is made up from parts of two .60 engines, with a special interstructure that contains the carburetor and valve mechanism; 3 hp, $350.

George Meyers, 70 Froehlich Farm Rd., Hicksville, NY 11801.

Curtiss Coupe/Jessee

continued from page 28

By laminating balsa stock together (using spot cementing) cut the four outer pant parts and the two inner core parts.

Epoxy the parts together, using thin coats on each contacting surface, and pins to insure alignment of parts. Clamp or use weights until parts are dry. From template of pant, mark axle hole location on the now dry rough paint build-up. If you have a Dremmel drill stand, O.K. (or get with someone that has). Drill ¼-dia. holes all the way through. I used some nylon bushings in the pant axle holes (inside) and cemented in a balsa cap to the outside, sanded smooth. The axle should not extend through. The ¼-dia. dowel is drilled for bushings, or use plywood washers centered over the axle holes inside. By this time, the fuselage and tail should be complete. Attach the wing to the fuselage and set up on a cleared area of your work bench. Slip on the tailwheel, pants and main wheels.

Use a wheel collar (inside the pants) to lock them on temporarily. Use a block to jack up the rear portion of the pant off the working surface to the position shown on the plans. Or make a cardboard jig (using side profile) from the lower wing surface to the top profile of the pant.

With the pant position established (you may need a friendly extra hand) move the pant support wires inward, as close as possible to the inside surface and mark the pant through the wire eye (four places) to locate the attachment screw holes. When the marks have been added, remove the pants from the axles. With the drill stand, make four ¼-dia. holes approximately 3/8 deep. Now transfer the top outline shape of the pant onto the rough pants.

Saw out the profiles, carve, file and sand to finished shape. Prepare four pieces of ¼ X½ hardwood dowel, by drilling a .040/.060 hole through all four parts. Slip-fit these into the holes in the pants. Mark around these, while they are bottomed, to indicate the cutoff line. Match the plugs to the holes. Sand them flush or slightly below the pant surface. When the pants are to be primed sanded and finished the holes will line up with the eyes of the pant retainers.

When pants are in position, the hardwood plugs (with holes) should be 1/8 to 3/16 from the eye. When assembled the screws will impart a drawing function, pulling the pants inward. The pant is assembled by inserting the axle through the pant sidewall, enough to add a shim washer (plastic if possible), then the wheel, then the outer shim, and finally the retaining wheel-collar. The pants are rotated until the holes line up and the retaining screws added. The spring wires are adjusted to insure proper pant alignment—not too high, not too low, but as shown for proper appearance. Finish this landing gear detail by adding shock struts.

Wing: Construction presents nothing new, except the jig method, leading- and trailing-edge structure.

Start by (stack and saw method) preparing the necessary ribs. If you do not have access to a bandsaw, the one-at-a-time template method will do. Outline from template sheet the wing tip curve (1/64 ply) parts. Construct the wing tip curve jig. Foam-core was very useful for making quick jigs. The laminated ply sandwich tips take about an hour total time to assemble. The final shaping, sanding, and blending are finished when each panel (top surface structure) is dry; by notching two jig pieces to clear the plywood dihedral reinforcement parts—the center section can be jig built also. Pin down the outer panels and allow to dry while the center section is being prepared.

With a T-square (or carpenter's square) draw a line to be used to align the jig blocks. The jig blocks are (½ X ¼) pine or similar material from your lumber supply. Drive small, thin nails through the short step notch into your building surface. After jig blocks are pinned down, draw another line with square across the top of all the blocks. They will be used to line up the leading edge. Assuming you have all parts ready, pin the leading edge and trailing edge parts to the jig. Slide the ribs onto the leading edge at an angle and rotate until the marked rib spacing is correct. Glue and pin into position. Add the triangle stock (top only) and the spar—out to where the double rib is located. Add leading edge and trailing edge sheeting and cap strips.

When the drying time is over notch out the rib to allow tip alignment extension to be added. Use some small pieces (jig block material 2" long) to re-jig the wing, and small weights to keep the structure flat at all times. Glue (5-min. epoxy) up a right and left tip sub-assembly—curve on top side only for now; the bottom curves are added later. When these are dry, slide the tips plywood extensions into the leading edge and trailing edge slots, check, cut and fit into position before gluing in place.

With tip in place cut (razor saw) the tip sheeting support strips, cut cross grain so they will bend easily inside the tip curve. These strips, starting at the leading edge, are about 1/8 wide and finish at about 1/32. This will allow proper taper of tip and

sheeting—if an extra tip was made to be used as a drawing curve, the tip sheeting blending is fun to do.

The construction of wing and tip on the jig and spacer blocks gives good alignment and will support some trimming and sand blending. With both panels finished (top only) saw cut the rib webbing that will allow center section plywood gussets to be installed. Trim the spars for proper dihedral angles; line up the root rib (wing upside down) with the edge of working surface and block up leading edge and trailing edge, and weigh down. Slide the plywood extensions down and inward. Check and adjust fit before adding glue.

When the alignment and fit check out, add thin coats of adhesive and slide into position. Repeat the process on the other panel. Clamp and pin until dry. Add the landing gear blocks and support ribs. Drill small holes for landing gear hold-down straps. Install gear and clamps, coat with epoxy. Finish wing by adding the lower-tips, spar webbing, sheeting and cap strips. Carve, plane, file, and sand-blend to finish. The joining of the wing sections requires some careful attention and step planning.

Tail Surfaces: The rudder/fin, stabilizer/-elevator are sandwich balsa/plywood core structures. The laminated outlines add stiffness and resist denting better than horizontal single-grained structure. It is also easier to sand and shape. The outline allows use of soft balsa for filler shape. The lightened plywood core carries the hinge and fin extension slot that improves alignment and strength.

Refer to the instruction sheet on how the structure is accomplished. I suggest you prepare these assemblies so that the outline profile can be sawed out after the glue-up is finished, insuring perimeter edge squareness. A length of 1/16 dia. music wire works very good as a hinge gap spacer tool. The tail brace (¼ dowel) holes are pre-drilled and used as alignment keys. Also, drawn (ballpoint) center lines for alignment. The prefinished, saw cut outline is used as the template to wrap around the laminated part of the structure. All the sandwiching and laminating are completed before the shaping, and sand-blending are started. Try to pick at least medium hard (1/16 × 1/4) straight grained balsa for all laminating. Wet pieces only in the areas that require tight radius bends. Use of soft-light 3/32 sheets on each side of the 1/64 plywood core is a nice allowance for sanding.

Prior to hinging and assembly to the fuselage separate the surfaces at the hinge line, using a small saw or straightedge with several passes of a knife blade. Sand the edges and round where required. Add the brace wire ¼ dia. hardwood dowels. Slip these in and out, sanding them until they are flush before gluing them into place. The 1/16 holes are pre-drilled through the dowels, or just prior to final sanding.

Finishing: My plane was covered with MonoKote, including clear over cabin—all-over-white, with orange as the secondary color, and black trim tape separating the colors. Cabin doors are outlined with 1/32 black tape. Spray over color and tapes with clear enamel.

My model (dry) weighs just under 4 lbs., the bare airframe (with L.G. wires) near 2 lbs. The 4- or 6-ounce pylon tank can be used. However, the 6 ounce must be rotated 90° and is a slide fit. Engine is a Max 30 with muffler, Robart wheels are narrow enough to fit the pants well.

I used the World Engines Expert radio with S10 servos. No servo relocation was required to adjust the center of gravity from the plan location. Using similar-size equipment and power should not require any shifting of components. Make sure the nose does not balance above the horizontal, when plane is supported at the CG position.

Adjust the control surfaces as follows: Ailerons 3/16 up and down, rudder 40 degrees right and left, elevator 30 to 40 degrees.

I used the heavy monofilament for the tail brace with a spring to retain the tension. The landing gear shock struts and the wing struts add to the appearance and should not be overlooked. Since they are removable, they will be easy to add for show and remove for flying.

CREDITS

I wish to give credit and thanks to the following people for responding with helpful background information: Mr. Louis S. Casey, Curator of Aircraft National Air and Space Museum, Smithsonian Institution, Washington, D.C.; Patti Schaft, Wright-Patterson Air Force Base, Air Force Museum; Photography by: Tim Miskell, P. Jessee. Outdoor pictures by Bob Jolly.

I surely hope you enjoy building the Coupe. The construction, in places though a little different, are worthy of your best craftsmanship. If you have some particular problem and wish to correspond send inquiry to J. Jessee, 890 Fairview Ave., D202, Bowling Green, KY 42101.

RC Scale/Wischers

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After a day's flying the tank needs to be drained and this usually means removal of the cowl so that the carburetor line can be disconnected. Unquestionably a nuisance, it is one problem for which we have not found an easy answer. The vexation can be minimized by using a single, easily accessible machine screw to hold the cowl in place, with dowels or a snug fit in other locations for alignment when assembling.

Fuel Tanks: When scaling down prototypes to model size, panel and cowl lines for the engine compartment are often found to be in the wrong position, due to our model engines being disproportionately smaller than full size. The firewall, located as on the prototype, is too far rearward and the