Construction

Ryan STA

by BURNIS FIELDS JR.

IF YOU'RE looking for a scale giant that features realism, stability, and capability of aerobatic competition, then you should really consider the Ryan STA. When properly built, this model can do no wrong!

I found out many interesting facts about this plane in *The Ryan Guidebook—Book 3, American Aircraft Series,* by Dorr B. Carpenter and Mitch Mayborn, and you might like to check out this book for more information on this classic old plane. Sig Manufacturing* also has a color photo pak available, which really helped me out.

CONSTRUCTION. Begin building with the wing, which is easy for any average modeler. Start with the wing spars, which are 1/16-inch plywood with 1/4x5/16-inch spruce strips. I used a Dremel Table saw to route the spruce strips to the depth shown on the plans. Glue the strips to a 1/16-inch plywood web with aliphatic glue, press them together to proper size (I used a vise), and fasten them to a flat surface to dry. This should assure a straight spar. Make two front and two rear spars, 48 inches long.

Laminate the wing tips with 1/16x1/4-inch spruce strips. Cover the plans with plastic and put in pins along the inside radius. Wet all the spruce strips, apply aliphatic glue, slowly bend all the strips together around the pins, and pin in place. Allow 24 hours for this to dry.

Note that the aileron spars are routed and rounded. I used C.B. Associates* hinges, which are modified as per the plan. They are installed through the spar and then epoxied in place. When the hinges and control horn are installed, cover and install the ailerons to the wing before the wing is covered.

The aileron control system is spelled out on the plans. Use Sig large nylon U-Control bellcranks and cables. You can also obtain the cable from Lou Proctor, or you could use fishing leader. Secure the cable ends with swages and make sure that the bellcranks are parallel and that the cables are snug, *not* fiddle-string tight. If you use turnbuckles for adjustment, don't forget to safety-wire them.

Assemble the wing center section with four 3/32-inch plywood joiners, two for the front spar and two for the rear. For added strength, cap the joiners with carbon fiber before installing them. Fasten carbon fiber to one side of each joiner with cyanoacrylate glue. Next epoxy the joiners into one wing root, making sure they go all the way to the landing gear support rib. When dry, epoxy to the other wing panel. Glue all center joints at this time.

Put the landing and flying wire fittings in at this time, before the sheet balsa is added to the wing. See the plans for patterns and details. Also before covering the wing, make and install basic landing gear wire to the wing spars. Be sure you bend one right and one left. Fasten the wire to the wing spar with maple blocks and regular epoxy. Allow this to dry 24 hours.

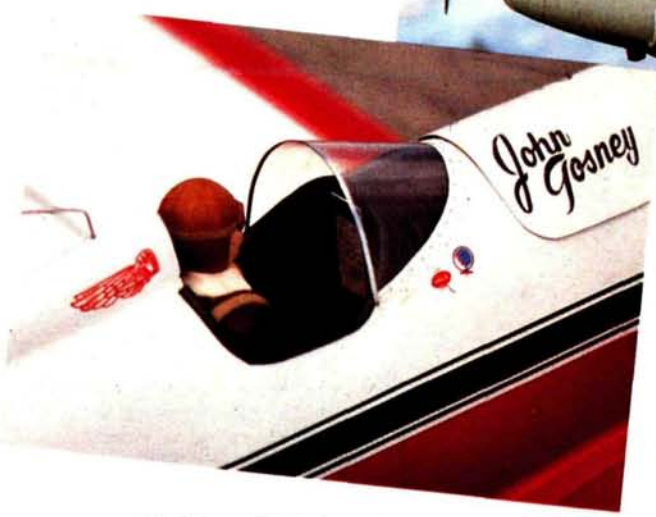
You might want to weld steel support blocks to the landing gear before the gear is installed to the wing spars. The wheel support block that is welded to the landing gear wire is made from soft steel and can be cut with a hacksaw, or maybe you know someone with a milling machine. Mill the top of the block to fit the wire. Drill one hole for a 4-40 bolt and drill and tap two 2-56 holes for a flying wire support bracket. The flying wires help to hold the wheels in alignment.

When the landing gear, the wire

One of the most beautiful designs from the Golden Age.

SPECIFICATIONS

Type: Giant-scale
Scale: 3 inches equals 1 foot (¼-scale)
Wingspan: 91 inches
Wing Area: 1,296.75 square inches
Fuselage Length: 67½ inches



If this beautiful airplane does not get top static points, nothing will. Field's rendition shows what can be done.

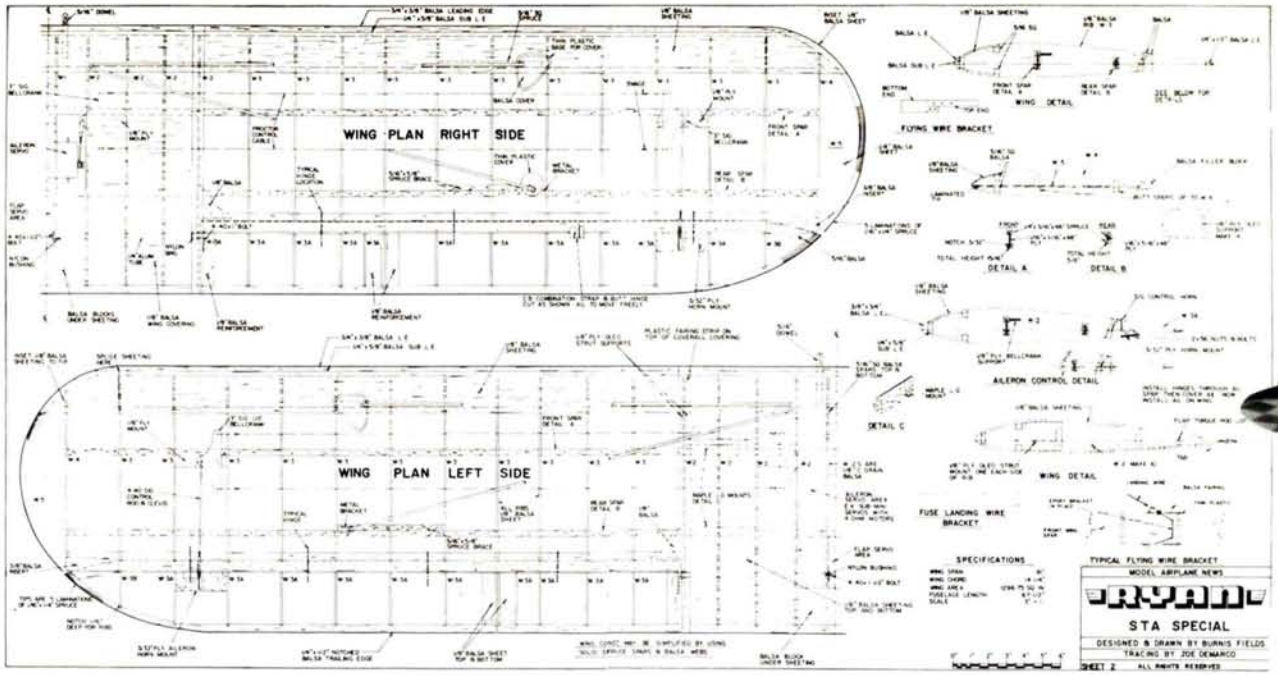
fittings, and the ailerons are installed, cover the wing with sheet balsa and finish sanding. When you're satisfied that everything is in and working, cover the frame with Sig Koverall. I used Stix-it to fasten the fabric, which is quick and easy.

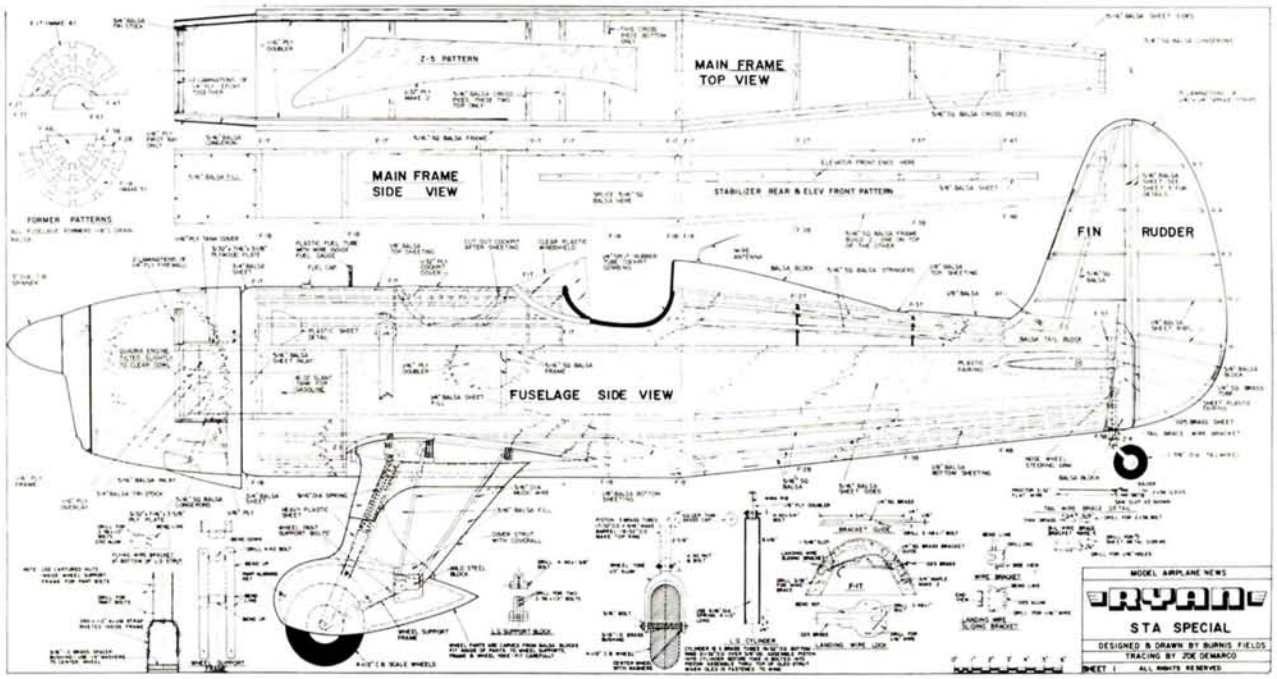
The landing gear is fairly simple, but does require some work. The oleos are made from five sizes of brass tubing. (Be careful when soldering the tubing together. The piston must slip *smoothly* inside the cylinder.) The springs can be procured at your local hardware store. The lower yoke is made from .025 aluminum as per the pattern and is reinforced as shown. I used captured lock nuts for wheelpant support screws. Fasten the wheelpants to the lower wheel support with 6/32 screws, two on each side.

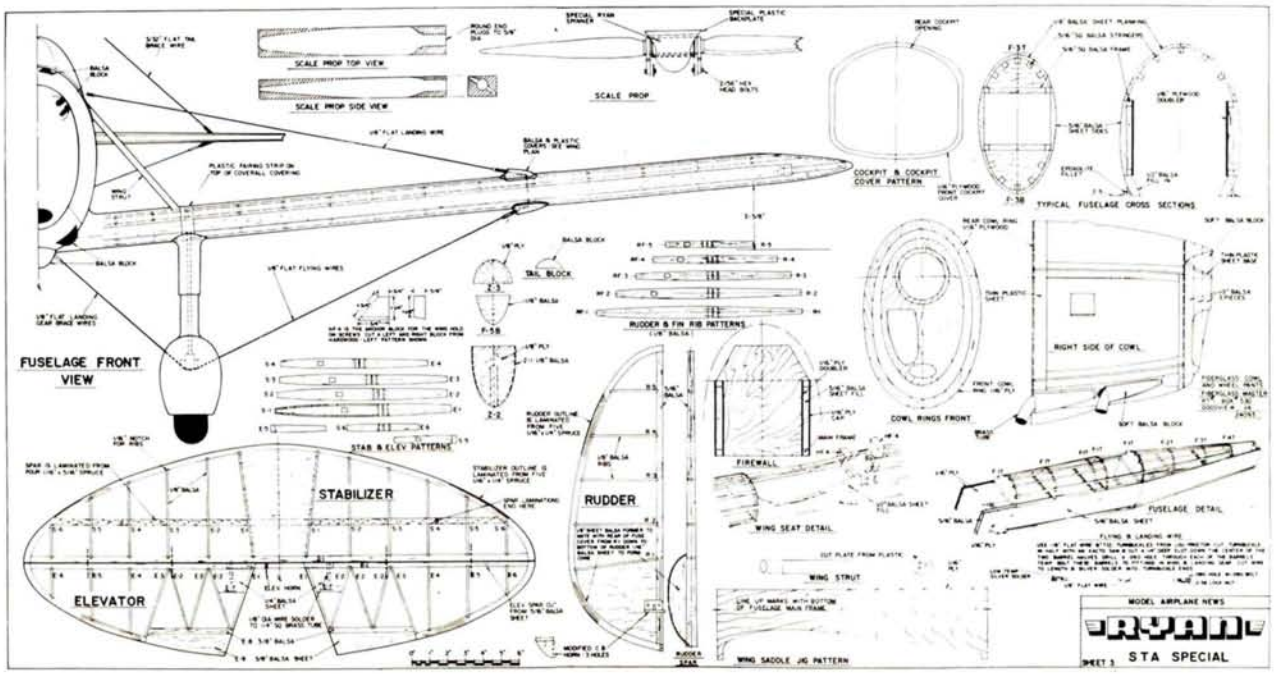
Make the upper yoke from soft ½-inch sheet aluminum. I cut the basic yoke with a bandsaw and then filed the top piece to fit inside the piston of the oleo. Screw and axle sizes are noted on the plans.

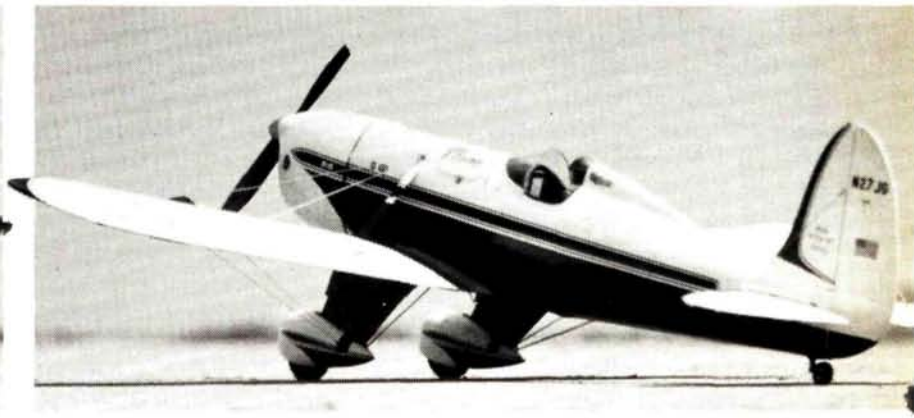
Carve the wheelpants from balsa blocks. Be sure that when you carve the inside of the wheelpants that you make a pad to fit against the lower wheel support, as this aligns and supports the wheelpants. There is also a 1/16-inch plywood key in front of the pant. The entire wheelpant moves up and down with the wheel.

(Continued on page 26)

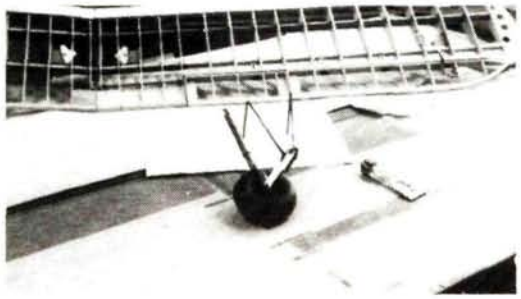








(Continued from page 21)



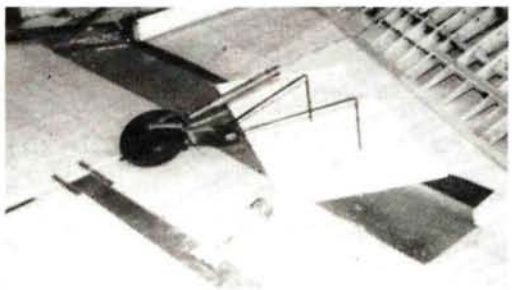
covered, and would be almost unseen.

Pay attention to the way the balsa and plywood parts go together at the nose. They give plenty of beef to the nose, but you don't want any unnecessary nose weight.

Laminate the fuselage sides with one sheet of ¼-inch balsa and one of 1/16-inch balsa. You'll want to use light quarter-grain balsa for this. I used Sigment to build the fuselage, except for the firewall and landing gear support, which I epoxied in. Keep the structure light. Sand the completed fuselage to shape, and cover with Koverall or similar fabric.

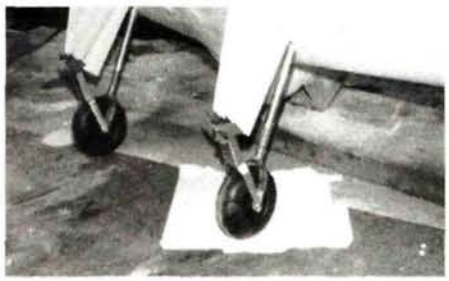
You'll notice that the Quadra .35 engine is tilted slightly to clear the cowl. The plastic piece on the carburetor is removed and a couple of washers put in its place. *Don't forget* the washers or you could dimple the cylinder.

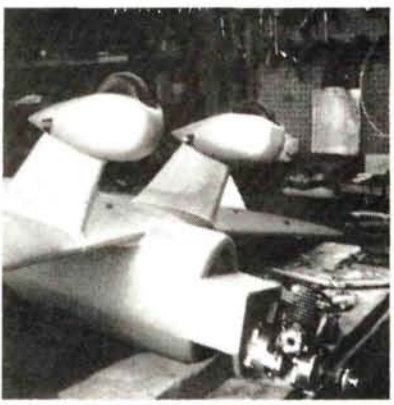
Carve the cowl from balsa. Start with a balsa support egg-crated together and fitted between the front and rear 1/16-inch plywood guide rings. Cut the balsa support to the shape of the side view and the top view at the centerline of the fuselage. Once these four pieces have been assembled and aligned, fill in around the outside with 2½x¾-inch strips of sheet balsa. Taper the strips to fit together and set in ¼-inch from the edge of the plywood. Add a block to the front of the assembly, and carve and sand to shape. Cut the inside of the cowl to slide over the fuselage sides, as this cutout holds the cowl in position.



Left and below, shock absorbing landing gear setup.

The fuselage is quite easy to build, but pay close attention to the firewall and landing wire support. I started to use spruce for the longerons, but, due to the construction method, spruce is not needed. You might like to build in a tunnel in the lower front of the fuselage to help cool the engine. This would be very simple to do before the lower nose is





Fiberglass parts for the STA can either be formed as described in text or obtained from Fiberglass Master.

The cowl is held to the fuselage with one bicycle spoke and thimble. Make a brass bracket that will fasten to the coil screw and solder the bicycle spoke to the bracket. The spoke sticks through the cowl just below the crankshaft. If you've done the job right, the cowl will fit very snugly and will not vibrate.

Carve the air scoops from scrap balsa. The scale metal overlay is made from thin heat-forming plastic obtained from Sig. The exhaust stacks are brass tubing.

The tail is very basic. Cut the ribs and the spars from light C-grain balsa. Laminate all outlines the same as on the wing tips and allow to dry thoroughly. Cut all notches. Fasten the spars flat on a table with the notches up. Install the ribs in the notches with Sigment or an equivalent. Add the leading edge and check for alignment. Allow to dry and sand to finished shape. Cover the tail surfaces with Koverall or similar material. I use Koverall because it is light and strong, and, above all, holds paint very well. It also fills quickly.

Make the tail fairings from heat-forming plastic and install them with #0 wood screws, which do the job well and look scale.

For covering I used Sig's aluminum fabric with silver dope and then painted the model red, white, and black after a Ryan I had seen in Sig's photo pak. It had a lot of color a eye appeal.

My Ryan STA was a little nose-heavy, so I added 8 ounces of lead to the tail post. Be sure the model balances properly. It won't hurt if it's a little nose-heavy at first. The prototype weighed in at only 15 pounds ready to fly.

Ryan STA Special

RYAN AERONAUTICAL COMPANY located at Lindbergh Field in San Diego, California, first developed the Ryan ST. Although it was a beautiful classic airplane, and even though crowds were drawn to its beauty and performance, not everyone wanted to own it. Because of this, Ryan came up with a new version with more horsepower and a supercharged Menasco C4S engine and called it the Ryan "STA Special."

The Ryan STA was a low-wing open-cockpit monoplane, which was specially custom-crafted for high performance at higher altitudes. This airplane was one of the handsomest in the sky: slender, sleek, trim, and very perky.

As the STM (an export version of the military), it served on training and tactical missions. With the Menasco C4S engine of 150 hp, the performance increased as it went higher.

The STA was an all-around eye-opener with a personality of its own. It was easy to fly, predictable, and highly maneuverable. Maintenance was minimal and operating costs were fairly low. The Ryan STA Special received its type certificate retroactively to October 30, 1937.

I had been researching for a ¼-scale aerobatic plane to build and ran across some photos of the Ryan STA Special. (I'm very interested in both ¼-scale and IMAC aerobatics and this plane would do both.) Many STA planes were silver or chrome, but then I saw photos of the one owned by John Gosney, which has a 200-hp Menasco engine. It was red, white, and black and just jumped out at me. I wrote to Maxey Hester of Sig who had built a smaller version some years ago and he sent me a photo pak of the actual plane. The full-scale airplane had an overall length of 21 feet, 6 inches; a wingspan of 19 feet, 11 inches; a wing chord of 56 inches, and a total wing area of 124 square feet. The Special had an empty weight of 1,058 pounds and a gross weight of 1,600 pounds. It looked better and better as a potential model for both scale and aerobatics, which I like to combine. This was the deciding factor in my going with the Ryan STA Special. ■

The Ryan STA on the wing is a beautiful sight to behold.

FLYING. The model flew right off the board and was very smooth handling. A little back pressure on the stick and a little right rudder, and she was airborne—a real sight to see!

I've done loops, rolls, snap rolls, Cuban 8s, and humpty bumps.

When you come in for a landing, keep a little power on. Practice will show you how much.

You'll really be proud of this plane. It is sheer pleasure to fly and a winner on the contest trail!

**The following are the addresses of the companies mentioned in this article:*

Sig Mfg. Co., Montezuma, IA 50171.

C.B. Associates, Inc., 21658 Cloud Way, Hayward, CA 94545. ■