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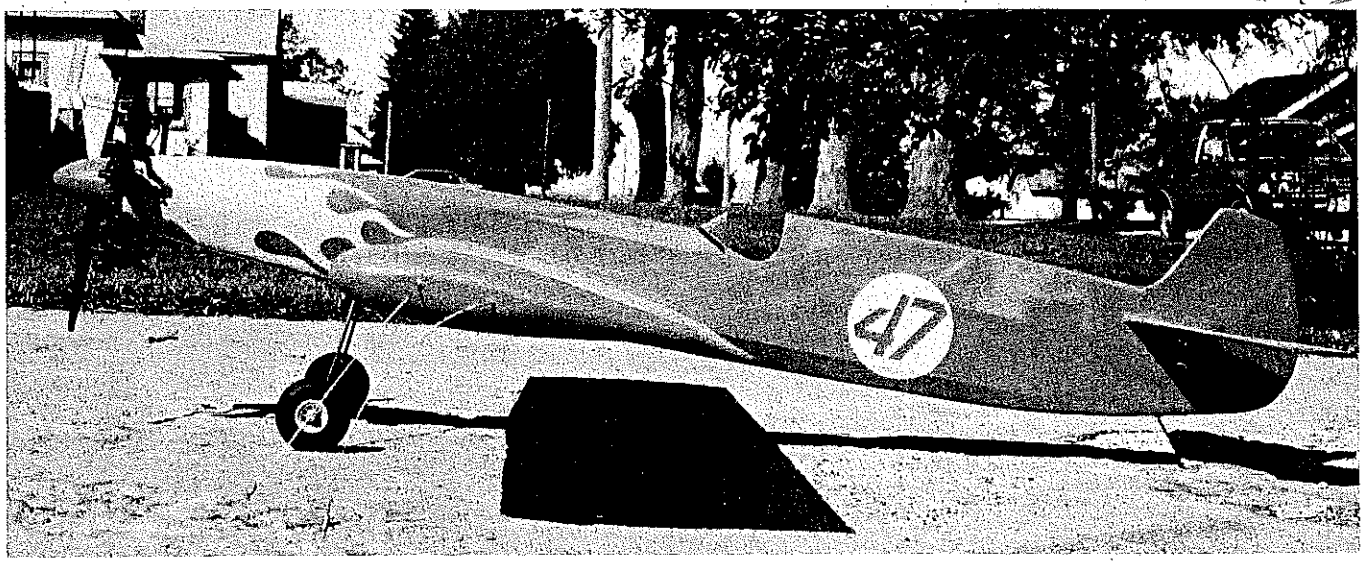


The Cardinal Classic's stringered fuselage gives it the look of a full-fuselage Stunter rather than the profile model it is.

Cardinal Classic

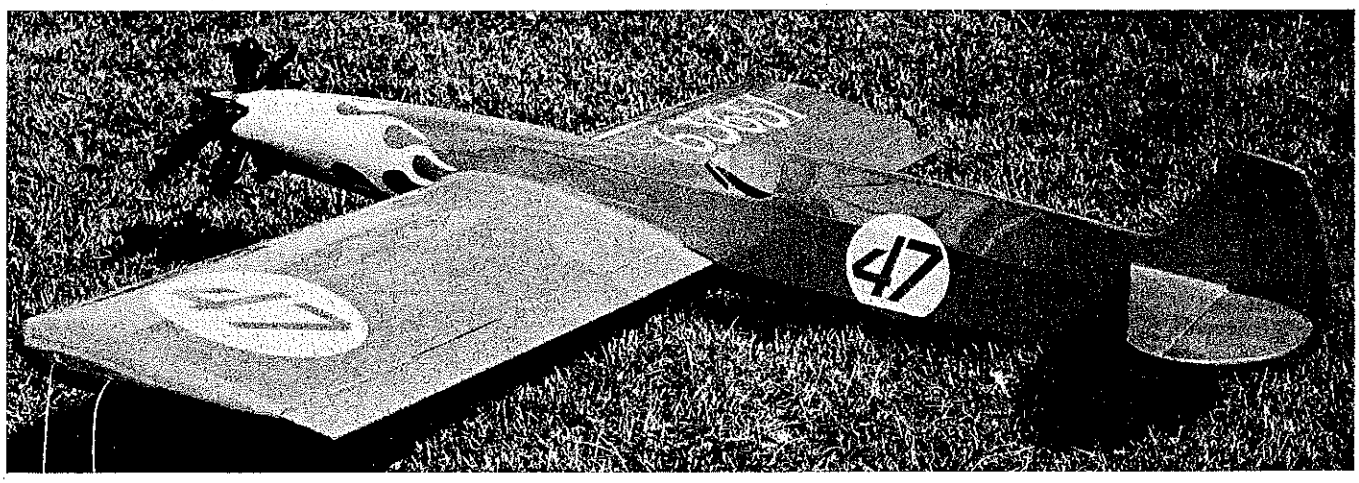
Our author put together a handful of proven designs and came up with an original, great-flying CL practice Stunter. ■Dave Haught

MAYBE IT'S happened to you, too. You get an idea for a model, and before long it's claimed a place in your mind. You sketch it on napkins during boring business meetings, maybe even contemplate its flying the pattern and winning the Nationals. Such dreams are tenacious; they linger on, until—usually years later—you eventually make them real.

So it was with the Cardinal Classic. A singular mix of proven designs—the Miss Los Angeles, Spiezo Sport Tu-holer, Kinner Sportster, and my favorite classic Stunter, the Oriental—this bright red beauty with the flame-licked nose inhabited my imagination for years before I finally got round to building it. Seven years, in fact, and a few false starts.

The Classic borrows from existing designs, yet manages to be fresh—proof that you don't have to start from the ground up to be original. And its uniqueness goes beyond surface appearances. Basically, this is a profile airplane with a thick nose section a la Dick Mathis. Rather than simply being cut short at the wing juncture, the nose is faired in with a series of ⅛ x ¾-in. stringers for a full-fuselage look. The stringers also make the rear fuselage very rigid.

Painted bright red to befit its name, the Cardinal Classic sports a Williams Bros. five-cylinder dummy engine. The



Showing off the Classic in pilot's view. The model's lines were borrowed from various classic aircraft, then blended into the expression of grace, speed, and sport you see here. The flame design is made with bright yellow stick-on trim film, poster board, and heavy paper.

functional engine is an O.S. .35.

The Classic hasn't won the Nationals yet, but it certainly flies great. I like a practice Stunter that resembles a full-scale airplane, and in inching my way toward future Nationals glory I had to start somewhere. Practice, practice, practice!

Construction

Construction is conventional and straightforward. I like to start with the wing.

Wing. Begin by making a kit of parts. All the ribs have the same airfoil. Trim the center section ribs to allow for the planking and for a few cutouts that will be made for the bellcrank assembly.

The main wing spar is key to the rigidity of this design. Make the spar from a sheet of hard but straight ⅛-in. sheet balsa. Slip the wing ribs into the precut slots, and position the unit on the plans. Block the trailing edge up off the plan so that the wing spar sits squarely on your workbench. Begin pinning the rear of each rib to the trailing edge strip. Pin the leading edge in place, trimming the ribs to fit as necessary.

Check that the wing is straight with no warping, and block it flat. I use Elmer's carpenter's glue for wood joints. With a small artist's paintbrush, I lightly but carefully coat each joint on both sides of the rib to achieve a strong bond. Allow the wing to dry overnight.

Unpin the wing, turn it over, and again brush each rib-and-leading-edge joint with a coat of glue.

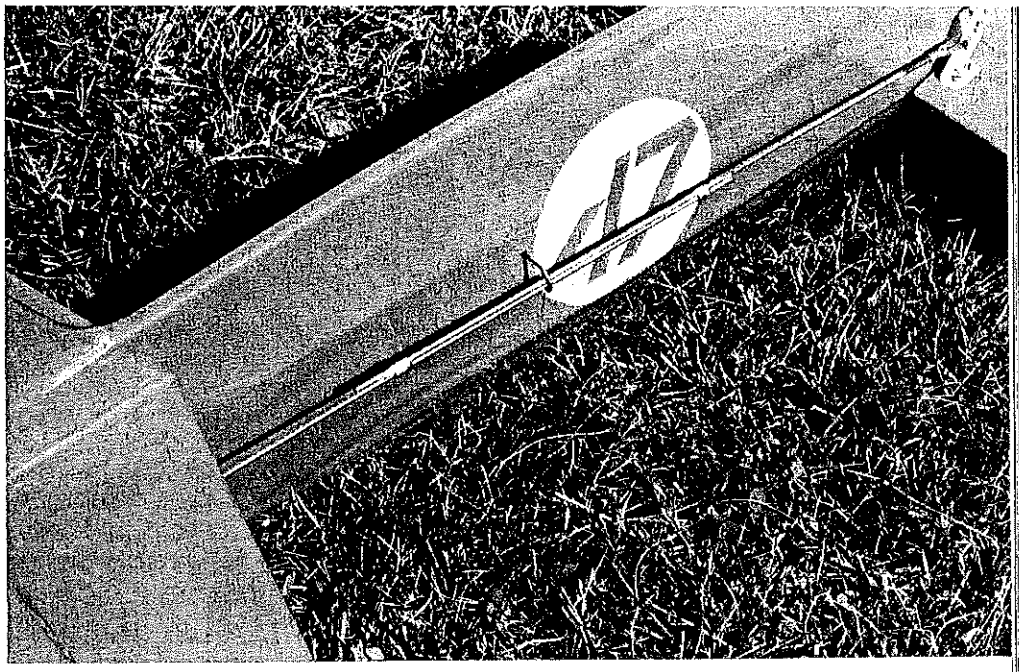
Install the bellcrank and lead-outs. Trim the ribs to allow the lead-outs free passage through the wing. Bend and install the pushrod.

Select two matched sheets of 1/16 x 3 x 48-in.-long balsa for the leading edge planking. Fill a spray bottle with warm water, and wet one side of each sheet. When the sheets begin to curl slightly, they're ready to use. Brush a layer of carpenter's glue on all the ribs, the spar, and the leading edge, and pin the sheeting in place. Repeat for the other side, and then plank the center section.

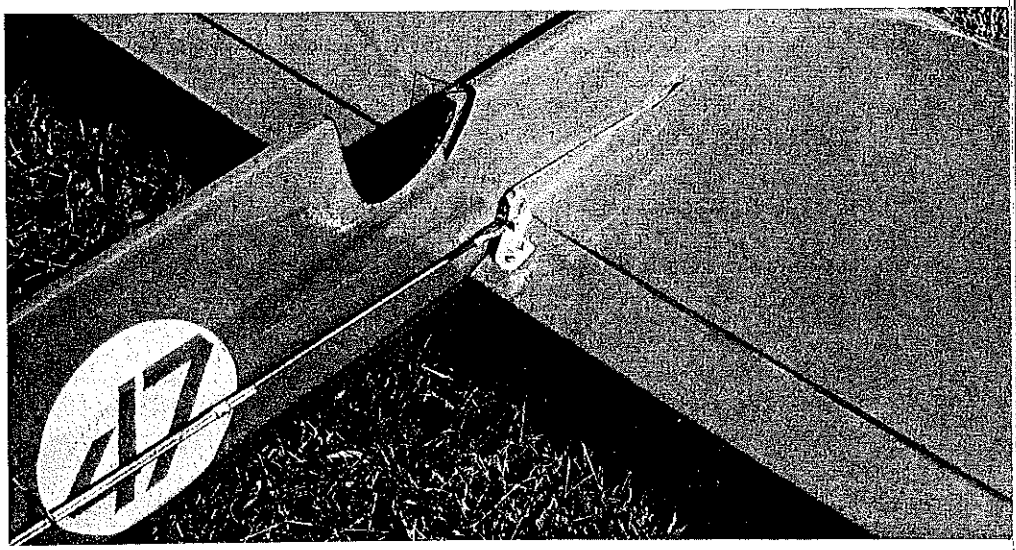
Rough shape the wing tip blocks. Install the lead-out guides on the inboard one, and add the tip weight to the outboard one. If you're planning to use adjustable line guides and tip weights, now's the time to install them.

Installing cap strips seems to be a lost art. While once you saw them practically everywhere, today they turn up in only a few designs. Yet modern CyAs make it easier than ever to attach cap strips to your model. Simply cut a sheet of 1/16 wood into long strips of ¼-in. width, then start cutting them to length as you go. Don't forget the wing tip ribs.

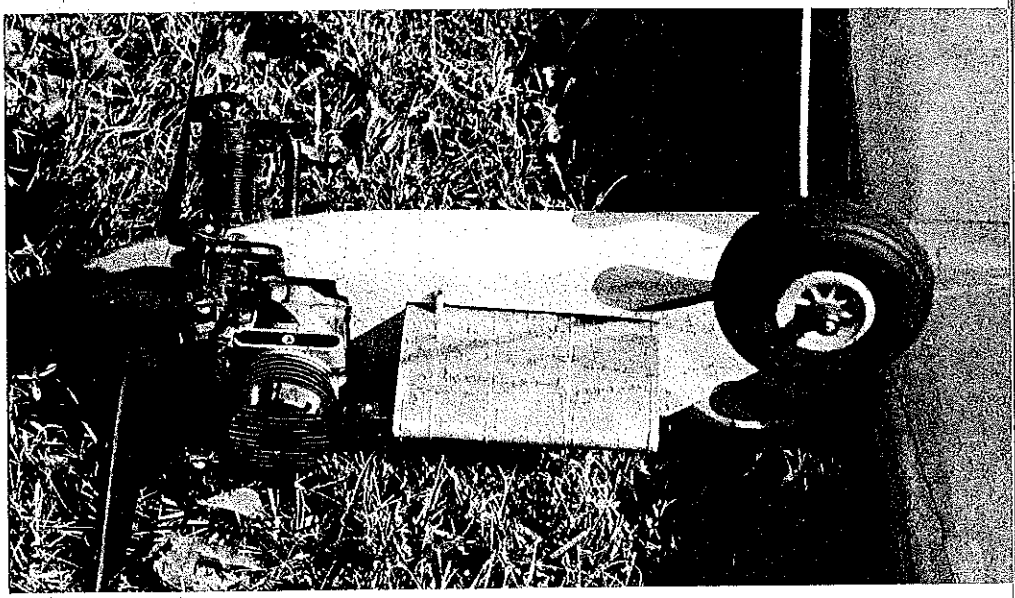
When the cap strips are set, begin the final carving adventure. Taper the trailing edge to meet the ¼-in. sheet flaps, and sand the tips to their final shape. Gently



The pushrod that connects the flaps to the elevator must be kept from flexing under flight loads. Here a wire guide and doubled wire pushrods work together to that end.



Just out of the pilot's reach, the flap horn is a busy place. The pushrod from the bellcrank fits into its upper hole, and the elevator pushrod hole is just beneath.



The engine is well recessed into the deep fuselage sides along with the fuel tank. The dummy engine has since been trimmed to make room for a muffler and keep the neighbors happy.

round the leading edge sheets to a smooth radius.

Cut the flaps from medium-weight ¼-in. sheet that is straight and true. Sand in whatever taper you desire, and round the leading and trailing edges.

Bend a flap joiner wire from 3/32 music wire. Slip on a short piece of brass tubing for a bushing before making the final bend. Hinge the flaps to the wing, and wrap the bushing with a length of fiberglass tape to secure it to the trailing edge. Fit the flap horn. Bend the pushrod to final length, and attach it.

Stabilizer, rudder, and elevator. Cut the stabilizer from medium-stiff balsa, the rudder from fairly lightweight sheet. Sand all the edges appropriately, tapering the control surfaces and rounding the hinge edges and leading edges. Glue in the rudder offset, and set the rudder assembly aside.

Bend and install the wire elevator joiner.

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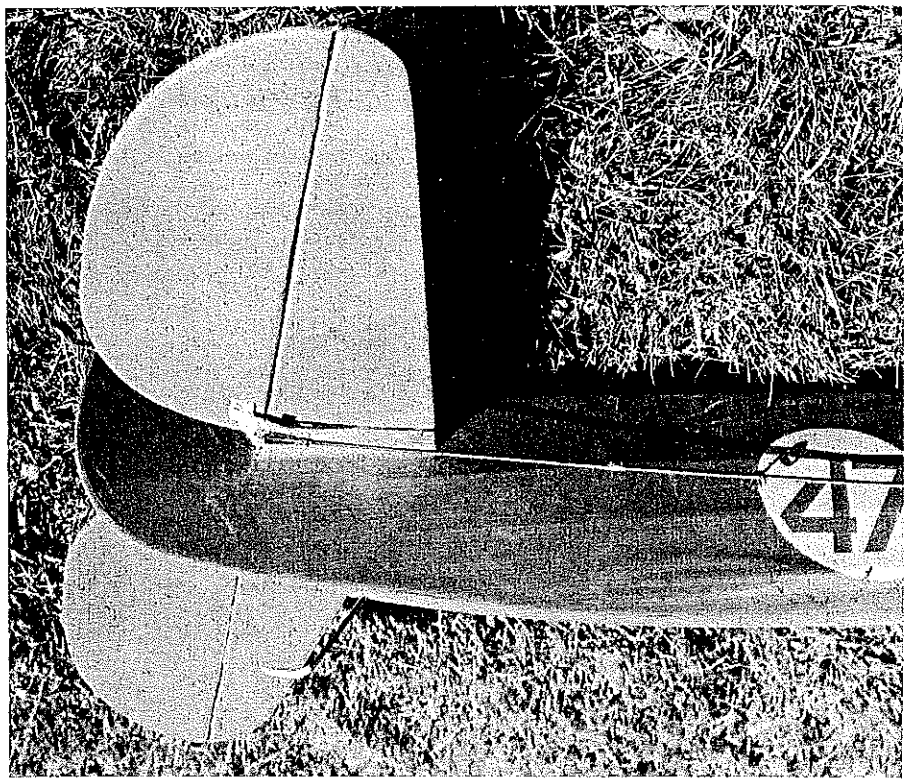
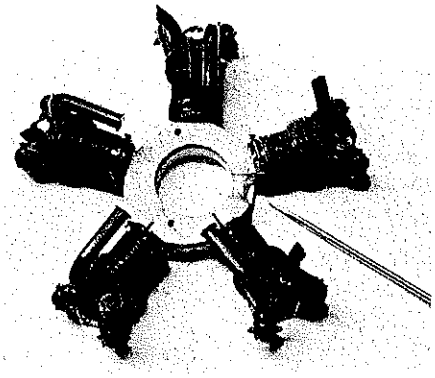


Both ends of the pushrods are equipped with RC-style fittings to allow for fine adjustments of the control linkages. The nylon horn is rugged and easily adjusted as well.



The screwdriver points to the cutout needed to clear the engine intake and needle valve. A Dremel tool works great for trimming the plastic and plywood as necessary.

Conversion/Kopski

Continued from page 175

rubberbands do a much nicer job of strapping on the wing than tied-together No. 64s—they're long enough to easily cross the large wing chord. The longer bands are not, however, as wide as 64s, so you'll need to use more of them. I use seven or eight on each side.

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Cardinal/Haught

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Don't forget to bush it with a length of brass tube as you did the flap joiner. Install the hinges, and join the elevator to the stabilizer. Wrap the tube bushing with a layer of glass cloth as reinforcement. Give the assembly a final sanding.

Fuselage. This phase goes quickly. Cut the core profile from a medium-lightweight sheet of ½-in. balsa. Cut out the engine mount, fuel tank, stabilizer, and wing locations. Make the two plywood nose doublers, and fit them on the fuselage core with the hardwood engine mounts. Once you have a good fit, glue the works together with wood glue and clamp it overnight.

While this assembly is drying, bend the landing gear and the tail skid. Wrap the tail skid wire to a length of hardwood dowel, and drill a hole in the rear fuselage to accommodate the skid and its dowel. Make the hole slightly larger in diameter than the dowel. Attach the skid-and-dowel with epoxy or wood glue.

When the fuselage is dry, trim the plywood as necessary in order to set the engine in place. Drill the mounting holes, and install the blind mounting nuts in the rear. At the same time, drill the holes for the landing gear mounting straps and install the straps and gear. Secure the nuts with a drop of solder. If you've ever been caught with your face red because the nuts backed out, you'll know why I suggest that.

Make the thick fuselage doublers from lightweight ¾-in. sheet. Cut them to shape, and glue them in place. Carve them to a pleasing contour when dry. Taper can be kept to a minimum as the doublers approach the trailing edge of the wing, since the stringers take over the job at that point.

Select several fairly firm strips of ⅛ x ¾-in. balsa for the stringers. Begin with the top stringer. This forms the top of the stabilizer's home slot, so make sure it's properly aligned. Fit a short length of stringer under the stabilizer slot to anchor the covering, and fit a small piece at the leading edge of the stabilizer.

Install the remaining stingers. Make a block to support the pushrod guide, and install it between the second and third stringers. Allow the stringers to dry, then trim them to taper back to the rudder post as shown in the plan top view. At the other end of the fuselage, carve the fuel tank well and install the fuel tank. Because of the thickness of the doublers, the filler and vent tubes on the tank may need either to be relocated or to be extended to clear the fuselage.

If you're using the dummy five-cylinder engine, build it now. I used the Williams Bros. kit cylinders, mounting them to the plywood cylinder mount as shown on the plan. This mount is then screwed to the engine mounts at the nose with long wood screws, so that the entire engine can be removed if desired.

Cardinal/Haught

Continued from page 182

So far the mounting system has worked fine. During an unexpected inverted landing, the top cylinder popped off but the plywood mounting tab stayed intact. The dummy engine has presented no other problems during two seasons of practice flying. In fitting the cylinders, don't forget to trim away access to the needle valve and fuel lines for the functional engine. To get just a bit more prop clearance, I eliminated the forward-facing spark plug wires and the spark plugs from the dummy engine.

Slip the elevator and stabilizer into the slot at the rear of the fuselage. Make sure it's properly aligned with the fuselage, and glue it on. Add the rudder.

Take your time fitting the wing to the fuselage. When you're happy with it, glue it securely with slow-drying epoxy.

Go over the entire model with a final sanding, checking for areas that need to be filled or adjusted. Once that's done, the airplane is ready for covering.

Covering and finishing. Since the Cardinal was intended as a practice ship, I wanted a low-investment finish. I selected bright red MonoKote and enhanced it with an even brighter yellow trim sheet.

I wiped a light coat of epoxy into the wood around the engine area, then sanded it later to make it fuelproof. The engine cylinder mount was painted red to match the covering.

I made the flame design as follows: After drawing the pattern on a sheet of heavy paper, I cut two sheets of stick-on trim film to rough size. Placing a sheet of poster board on the building board, I taped down the first sheet of trim film color side up, taped the second sheet color side down on top of the first, then taped the pattern over all. I used a sharp new #11 X-Acto blade to cut the design out. By pressing down hard, I was able to cut all three layers (the pattern and both films) at once. I placed the flames carefully on the fuselage, then rubbed out all the bubbles and wrinkles. The effect is stunning.

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Cardinal/Haught

Continued from page 187

Adding the details. Mount the elevator horn to the elevator, and make the connecting pushrod. Make the pushrod guide either from 1/16 wire or from a cotter key. Hook up the pushrod, and adjust it for the amount of control surface movement you prefer.

Mount the engine with the fuel line and filter. Attach the dummy engine unit.

Install the wheels and retainers. Use a fairly heavy piece of clear plastic for the windshield. Bend it to fit, and glue it on with epoxy. Finish off the lead-outs, check the balance point, and you're ready to go flying.

Let the winds blow! Equipped with an O.S. .35 engine, the Cardinal Classic has plenty of power even in turbulent air. It's a consistent, reliable flier. So what are you waiting for? Let's get cracking on that Nationals dream! □

RC Pylon Racing/Hager

Continued from page 47

2. Throttle shut-off will be visually inspected, and may be functionally tested during the contest.

3. All screws holding the engine to the mount and the mount to the firewall must be in place and be secure.

4. Receiver and battery pack should be protected against vibration in accordance with the radio manufacturer's recommendations.

5. Washers will be used on all screws holding the servos to mounting trays and also on screws holding the tray to the rails. (All washers will be approximately the same diameter as the grommets.) Servos mounted directly to rails will also have washers on the mounting screws. In addition, all servo trays, if used, will have at least one extra safety screw (not necessarily turned down tightly) placed between the grommets on the rear of the tray to prevent the tray from slipping out of the grommets in flight.

6. A keeper, or collar, will be on all pushrods that have a right angle bend connecting them to the servos. S-bends are acceptable. If a clevis is used at both ends of a pushrod, one of the clevises will be secured so that it will not turn.

7. All control surfaces will be firm on the hinge line without excess slop (at the discretion of the safety inspector.)

8. Positive, thread-type wing bolts or screws will secure the wing in place on all two-piece aircraft.

9. A positive method of holding the wheel on the axle will be used, and the wheel shall not bind.

10. The entire aircraft shall be inspected for any stress cracks.

If an aircraft fails any of the above items, it must be repaired before it can be entered.

Continued next month