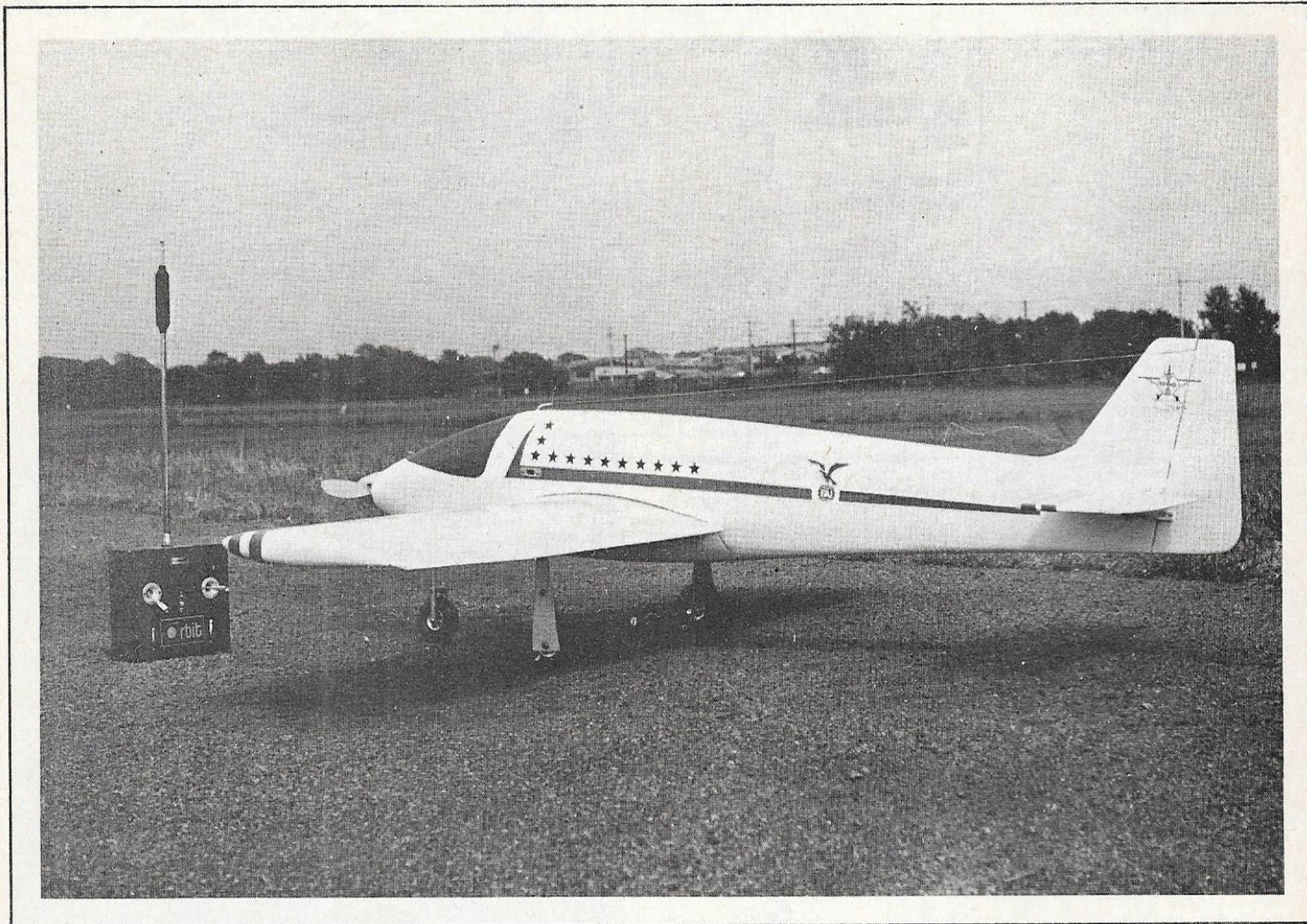


DISTINCTIVE-LOOKING AMERICAN-DESIGNED
PLANE CREATED FOR THE FAI PATTERN MANEUVERS.

Cardinal

by DAN SANTICH



Someone once said, "What this country needs is a good five-cent cigar." Well, there is a new saying that goes, "What this country needs is a good FAI Pattern ship." Who said it? Just about everyone after the FAI Championships two years ago when this model was designed. We do not have a ship capable of the precision and grace required by the FAI Pattern. Don't get me wrong, we have plenty of airplanes that will *perform* the FAI Pattern, but there is quite a big difference between simply doing the maneuver and doing it correctly. Let's use the takeoff as an example. Just about anyone can perform this to one degree or another. You just aim it, pour on the coal and unglue it from earth when it has flying speed. It's simple, right? **WRONG!**

A good precision takeoff is a difficult maneuver, but a beautiful one if done correctly. It must track absolutely straight and lift smoothly from the ground in a fairly

flat attitude. It takes a good pilot to do this, but more importantly, a good airplane. If a ship is not set up correctly one will have problems, even if he is the world's greatest pilot. Let's take another one on the spin. Get some altitude, head into the wind and cut the power. Bring the nose up, and as it stalls, hold up elevator and right or left rudder and aileron. It is at this point that the airplane takes over. All the pilot can do is watch as it rotates. It will either spiral or spin. If it does spin, how fast does it rotate? I have seen some pattern ships that would spin so fast it was hard to even count the turns.

Stopping it is something else. If the spin is rapid, the chances that you will stop it right on heading are remote. So, it follows that the slower the ship spins, the easier it is to stop it when you want to—not a half turn after you neutralize the sticks. Again, it is the airplane dictating the maneuver, not the pilot.

The Cardinal is the result of countless

hours of research and study, as well as trial and error. Every aspect of the ship has a planned purpose. Each maneuver in both the AMA and FAI pattern was analyzed and the ship designed accordingly. It will actually climb while knife edging with full top rudder. It does not wiggle even the slightest on the double stall turn and will tail slide better than any ship I have seen. Wind has no adverse effects on it—in fact, it even helps you track straight in the loops and eights. Takeoffs are absolutely beautiful; it is almost impossible to tell exactly when the ship leaves the ground, it is that smooth. The spin rate is quite slow and it stops immediately when the sticks are neutralized. To achieve a faster spin rate and to do the loop with one and one-half snap, just move the clevis for more elevator throw. It will slow-fly at near walking speed, which enables you to put it right smack in the center of the circle every time.

(Continued on page 82)

Universal Basic Engine Kits

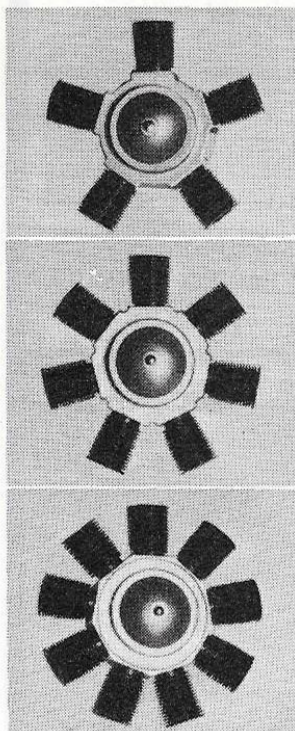
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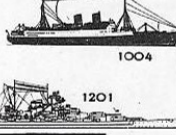
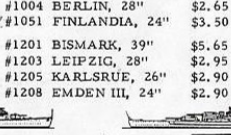
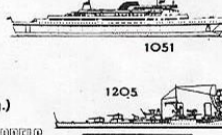


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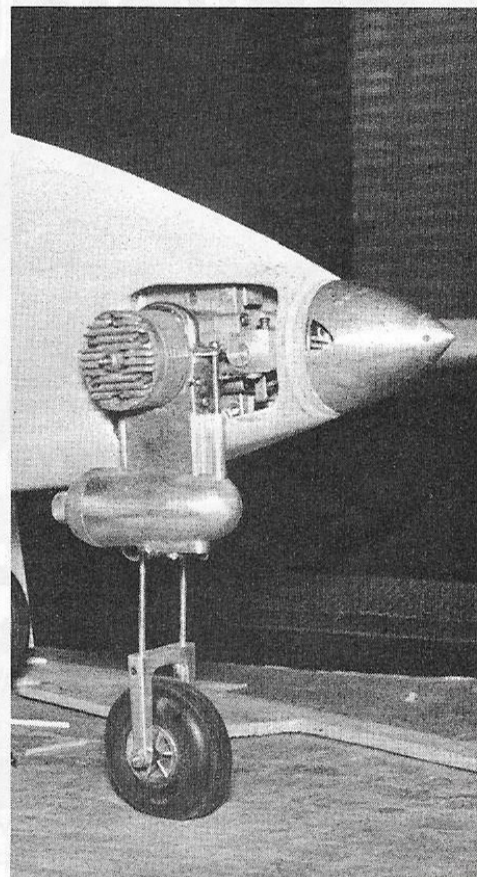
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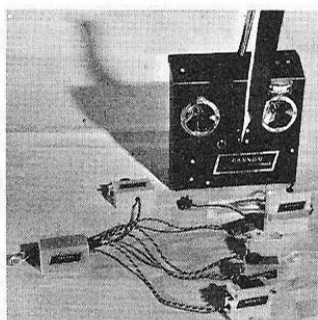
Cardinal (continued from page 28) Construction

Cut out all fuselage parts and mark with a ball point pen. Epoxy doublers to fuselage sides. Do not use white glue as it will warp the balsa. Glue stringers to rear half and, when dry, epoxy bulkheads F3 and F5 in place. Drill F2 for Tatone side nose gear mount, install blind nuts, and epoxy in place. Wet the nose section forward of F2 and use a 2-in. dia. bottle or can to form the rounded nose



Tatone engine/nose gear mount used and recommended for balance and heat sink effect.

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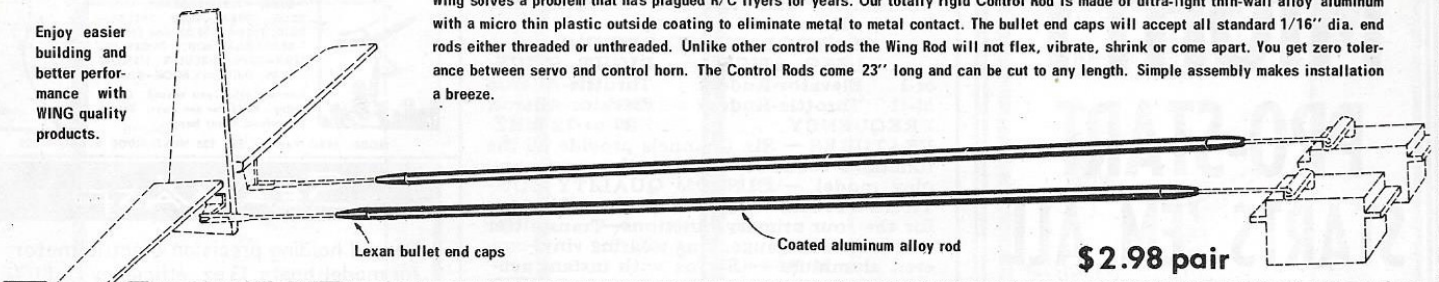
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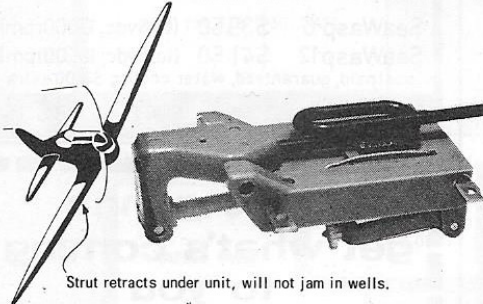
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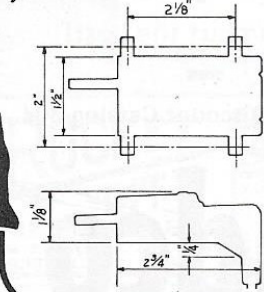
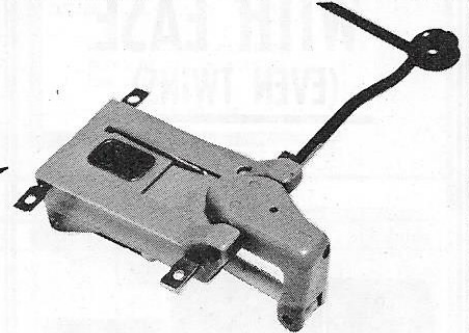
the new "SUPER OLYMPIC" retract units



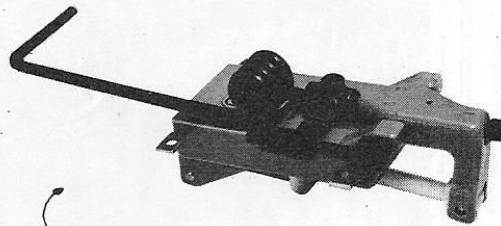
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section by sticking the bottle between the wetted sides and wrapping with rubber bands. When dry, add F1A and epoxy vertical triangle braces to the front and rear of F2. Glue remaining bulkheads in place making absolutely sure it is aligned properly—the fuselage must be true.

I built mine on a small card table in our apartment here in Japan, and I got it straight, so you lucky fellows with fabulous workshops and building jigs should have no excuse. Epoxy top nose block in place (after it has been hollowed out) and glue on upper and lower portion of fuselage. Use a razor plane to shape after everything has dried. Add F1 and lower nose block with epoxy after hole is drilled for nose gear to go through. Sand to shape and make cutout for engine. Shape and glue vertical and horizontal stabs in place,

again being very careful of alignment.

Since a foam wing is used, not much explanation is necessary. Select the lightest possible foam and make sure you epoxy gauze tape on after the wing is sheeted. Add lower portion of fuselage to bottom of wing. Fit wing to fuselage and add fillets. You will have to form your own main gear due to its unusual shape and length. Make sure you use good hard wire. The wheel fairings are made from aluminum stock, but 1/32 plywood could also be used. Strip ailerons are used; however, perhaps the puritan would prefer the center-hinged, barn-door type. Take your pick. I have found that the rolls are cleaner by using very large strip-type ailerons, since very little throw is required. They also make the wing easier to construct.

(continued on page 86)

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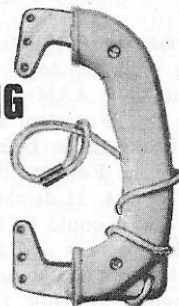
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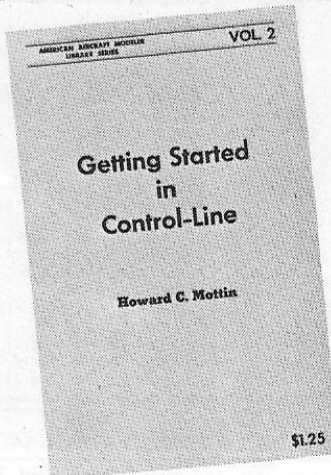
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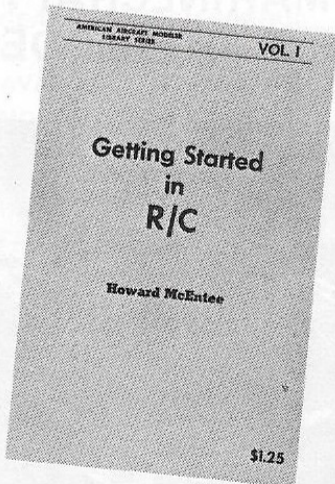
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Cardinal

(continued from page 83)

A word about the "funny airfoil." It is the NACA 64 A215 and although it is a laminar-flow, low-drag airfoil, it has excellent slow flight characteristics. It has been used on such successful ships as the Orion, Thunderstorm, and Twister. If you prefer, go ahead and use a fully symmetrical one.

The "easy does it" method of finishing is my favorite and that is how this one is done. It is light, quick, and very attractive. "What is the 'easy does it' method?" you ask. Send off to Hobbyoxy and they will send you all the poop on how it is done correctly. Here is my "easy does it" method: I use Sig epoxy because it cures fast. Mix about three oz. each of resin and hardener, thin to a vodka consistency and brush on the bare wood. Let cure Repeat the same procedure only not so thin this time. The reason for the very thin first coat is to let it soak into the wood to increase the strength of the balsa. After the second coat has cured, sand down with coarse sandpaper and remove all bumps and fuzz. Sand it once again using a finer grade paper this time. Fill all nicks, cracks, and dents with Epoxolite and after it is cured, scrape it down using a double-edge razor blade. Do not use stainless steel blades, as the edge goes off almost immediately. At this point the grain should not show. If it does, add another coat of thinned glue and scrape down again. Wet sand it and spray on a coat of gray Hobbyoxy (black and white mixed). Wet sand any rough spots and spray on your color.

Since I have gone into so much detail, there is not much left to say, except try to be selective in your choice of wood and keep the weight down. Do not try to "beef it up." I learned a long time ago not to sacrifice weight for strength. Mine tips the scale at just over 6 1/2 pounds.

