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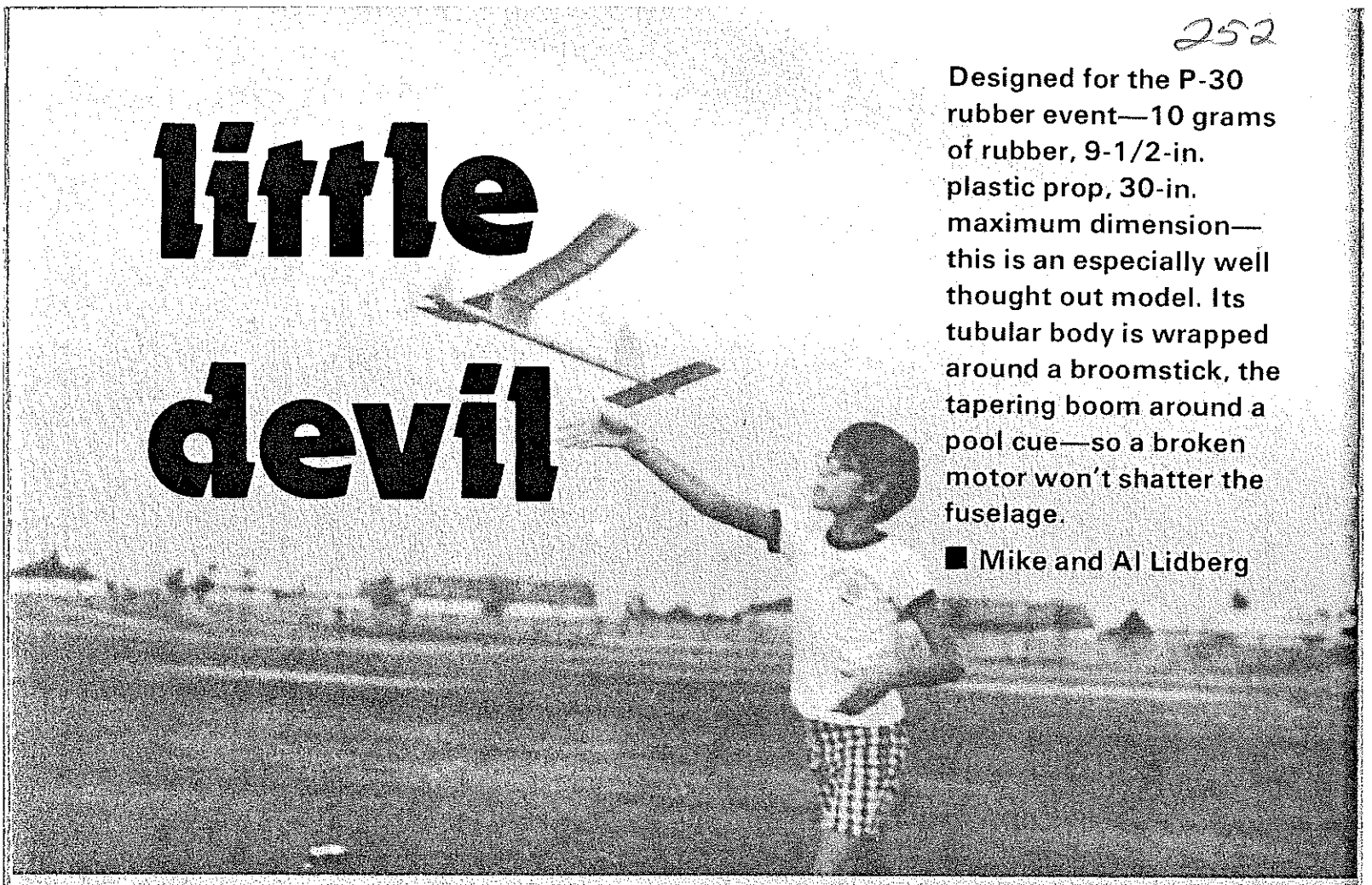
little devil

Designed for the P-30 rubber event—10 grams of rubber, 9-1/2-in. plastic prop, 30-in. maximum dimension—this is an especially well thought out model. Its tubular body is wrapped around a broomstick, the tapering boom around a pool cue—so a broken motor won't shatter the fuselage.

■ Mike and Al Lidberg



Mike Lidberg launches his Little Devil P-30, inspired by some Coupe d'Hiver models. Below: Model is not small, but not unwieldy.

THE Little Devil was designed for my son Mike's first efforts in the P-30 rubber event. Rules for this event are simple—10 grams of rubber, 9.5" plastic prop, model limited to 30" in any dimension. We wanted to build a simple model, but one that would be easy to maintain.

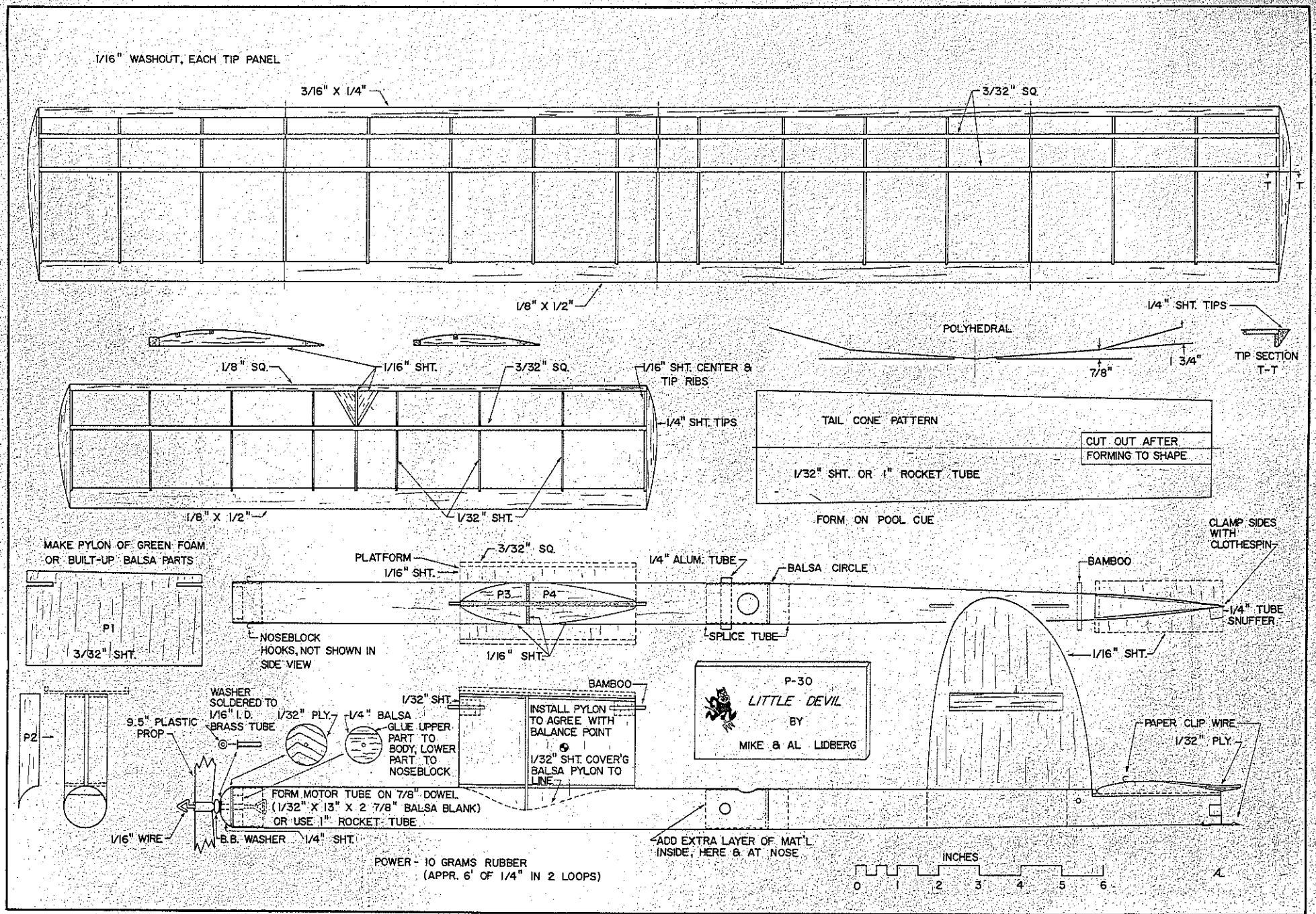
With the sometimes inconsistent rubber available today, we felt the usual stick-and-tissue body construction would be too easy to break. This led to the idea of a rolled balsa tube (or cardboard rocket tube) body, which, if properly strengthened and covered, can be nearly indestructible. A wing mount was necessary, so a pylon, made of polyurethane (green) foam was added. A fixed fin was placed in front of the stabilizer to ensure consistent fin settings. The resulting model has turned out to be a good flier, and even bought home a second-place trophy from its first contest. The Little Devil is a fun sport model, too, and can be flown (with less than full winds) in a neighborhood park or school yard.

Two different materials have been used to produce bodies for this model—rolled 1/32" sheet balsa, and model rocket body tubes. The end result is much the same with either material, as both make up a strong body without a multitude of small sticks to break and tissue to patch. The primary advantage to a tube body made from either material is the resistance to damage when rubber motors break. Rocket tubes are stronger in this respect, at a slight weight penalty. Overall, considering the ease of construction with rocket tubes, I'd recommend that you try them.

Balsa Motor Tube: Make up the motor tube blank from 1/32" sheet. Pick sheet balsa which is easy to curl, but not too soft. Obtain a dowel, broomstick, or piece of tubing ⅞" in diameter to use for the body form. Rub the form with an old candle to prevent cement from adhering to it. Wrap the motor tube blank around the form to check its width. Having the sheet a bit too wide is all right as it simplifies removal of the tube from the form. Having the sheet too narrow is not good as it may prevent removal of the tube from the form.

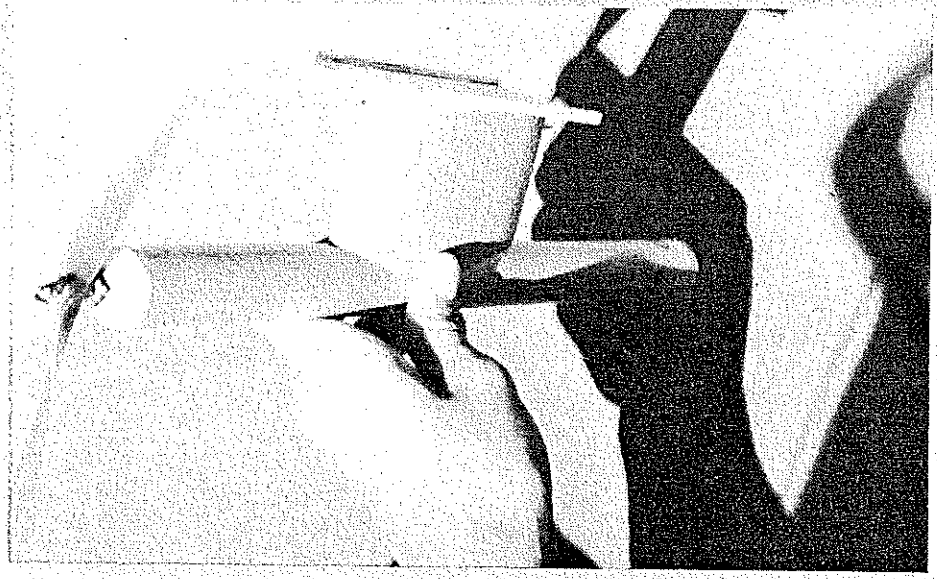
When the sheet is trimmed to the correct size, put two coats of dope on one side. This will cause the balsa to curl up toward the doped side as it dries, beginning the circular shape of the tube. After the dope is dry, wrap the sheet around the form and secure it in place with rubber bands wrapped in a spiral so there is about an inch between each rubber strand. Apply Titebond cement to the edges of the sheet where they meet. After an hour, unwrap the rubber and rewrap, centering the rubber strands over the previously cemented joints. The unglued portions can now be glued. After thorough drying, unwrap and lightly sand the joint, regluing where necessary.

At this point we have a very light, but not very strong, tube which needs some reinforcements. Cut a 1" and a 2" long

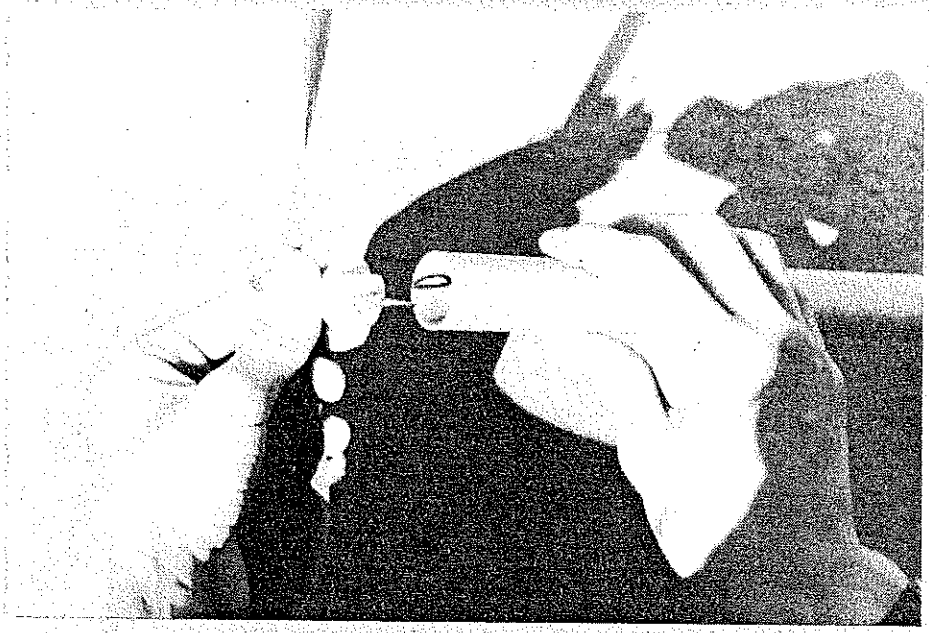


FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 112

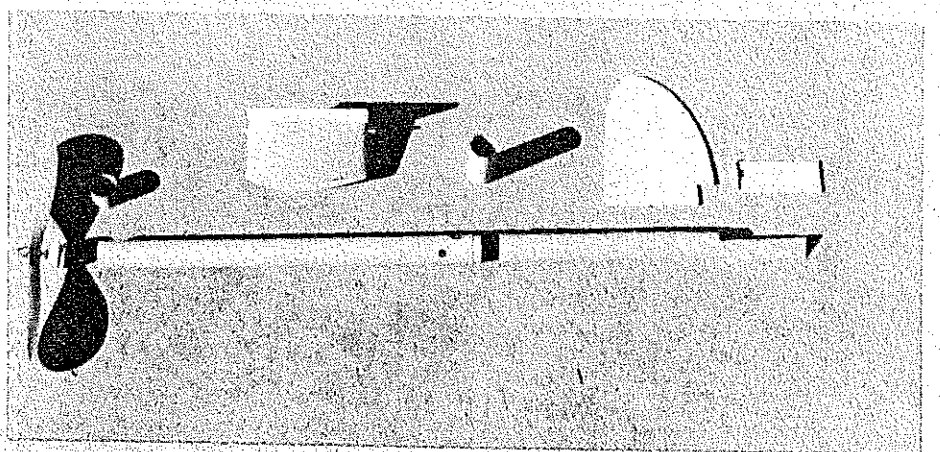
piece of 1/32" sheet the same width as the tube blank. By cutting off thin slivers of wood with the grain these pieces can be rolled up and slipped inside the motor tube. The 1" piece reinforces the nose, while the 2" piece helps to hold the rubber peg securely, and becomes the splice tube allowing the tail cone to be attached. Install the splice tube with ½" protruding.



Note how the pylon is shaped to fit on the motor tube. The foam block, already contoured, can be fitted by sliding it back and forth over a piece of sandpaper wrapped around the tube.



Nose block is keyed so it always fits the motor tube in the same way. You'd be surprised how many "experts" get the thing in upside down; and blocks that tumble free will ruin a flight.



Balsa motor tube is sheet balsa wrapped about round object, like dowel or broomstick (see text for procedure), or can be made from a rocket tube. Tail cone is bit more difficult, since it is tapered. But, following description, can be wrapped, or rocket tube. Cue stick a good form.

Rocket Tube Body: Pick up a couple of Estes or Centuri 1" diameter, 18" long, model rocket tubes at the hobby shop. The Centuri tubes are slightly larger in diameter than the Estes, but either is satisfactory. Cut some reinforcement rings; a 1" long piece for the nose and a 2" long piece for the splice tube. Reduce the diameter of these rings by cutting slivers of material from the sides of the rings until they will just fit the motor tube. Glue the rings in place.

Finishing the Motor Tube: A circle cut from 1/16" sheet balsa, pushed into the splice tube of either the balsa or rocket tube body, will help maintain the circular shape. The motor tube should have a couple of coats of dope inside for protection against the effects of rubber lube. This can be done by pouring about an ounce of thin dope into the tube at the nose end (before cutting holes for the motor peg and rubber access), putting your palm over the open end of the tube, and then moving the tube to distribute the dope. When you're fairly sure the whole inside is covered, pour out the excess and prop up the tube so it can drain and dry completely. After a couple of hours, repeat the dope process and leave the tube to dry overnight.

Tail Cone: Sheet balsa or another rocket tube can be used to make the tail cone. Borrow a pool cue for this operation. Be careful with it and you'll be able to return it in good shape. You could also buy a cue just for this purpose. We got a good one at a swap meet for $2.00. New, inexpensive cues are often available for little more (of course, I found that out after a 6-week search of swap meets).

Find and mark the place on the tapered part of the cue that is the same diameter as the *inside* of the motor tube. This will be the same size as the *outside* diameter of the splice tube. Make a mark 11" toward the small end of the cue. These marks establish the shape of the tail cone. Rub the cue with an old candle between the marks so glue won't adhere to it. Make a paper pattern to check for proper size of the tail cone blank, because your choice of motor tube material (balsa, Estes or Centuri rocket tubes) affects the diameter of the finished body. When a paper pattern fits correctly, make up the balsa blank, and then wrap and glue as noted for the balsa motor tube. When dry, the tail cone should fit tightly over the splice tube. A bit of sanding on the splice tube might be needed.

A rocket tube can be made into a tail cone in a similar manner. Cut a long, thin triangle from the side of an 11" length of rocket tube; then wrap and glue as noted for the balsa tail cone.

For either type of tail cone, make up the

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old-time engines please contact me and I'll get the word out.

C. E. Haught, Route 5, Box 16, Coeur d'Alene, ID 83814.

Wind Sock/Johnson

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Mounting Sock Base and Bearing: Measure down 9-⅜ in. from the top of the base angle and drill two 5/16″ holes, 6 in. apart in the center of the angle crotch. Two 5/16″ dia. × 3-in.-long machine bolts, with lock nuts, are used to secure the base to a 15-foot, 1¼″ steel pipe.

Two ⅜″ washers are slipped down the pivot rod, the bearing tube is slipped on, followed by another washer and a cotter pin. I used a cap from a plastic detergent bottle to cover the top of the bearing tube for keeping out rain. Grease the bearing tube profusely.

Erecting the Pole and Attaching Sock Base: The 1¼″ pole can be put together from two or more pieces with pipe connecters, but one piece is recommended. A point should be formed and cleats welded near the bottom to make easy removal by vandals impossible. The pipe should be driven in with a post driver rather than a sledge hammer. Drive into ground about 36 in.

Attach the sock base, with sock intact: with the 5/16″ bolts and lock nuts. I remove the sock and base one week before Holloween and replace after Easter, next spring.

Keep your sock bearing lubricated and happy flying!

(Editor's Note: After two summers of exposure, the light canvas originally used in this windsock has all but decayed. The replacement material proved a perfect choice —lightweight, easily lifted by the wind, tough to the point of being impossible to tear with bare hands, and is expected to weather indefinitely. Bright orange, it is 1.9 oz. K-Kote, rip-stop nylon. It was mail ordered from I. Goldberg Co., 902 Chestnut St., Philadelphia, PA 19107; catalog No. 1-KRSN, price $2.50 a yard. Sewing can be done with polyester thread on a household sewing machine.)

Little Devil/Lidberg

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stabilizer platform, and cut the cone to accept the platform as shown on the plan. Use a clothes pin to pull the small ends of the cone together and glue the platform in place. Make a 1/16″ wide slot for the fin and glue it in place. The tail cone can now be glued to the motor tube and holes for the 1/4″ aluminum tube rubber peg and rubber access can be made.

Noseblock and Prop: Make up the noseblock as shown on the plan and fit it to the motor tube. The upper part of the rear piece is glued to the motor tube and serves to key the noseblock so it will always fit in the same location. Solder a washer to a piece of 1/16″ inside-diameter brass tube to make up the bearing. When drilling the noseblock for the bearing, angle the drill bit slightly to produce about 1° down and right thrust. Use the required 9.5″ plastic prop with a bead, washers, or ball bearing washer between the prop and bearing. The prop will need to be drilled out for the 1/16″ wire shaft—this will save you some trouble with bent prop shafts.

Pylon: The pylon is made from foam or built up of balsa parts. We used green polyurethane foam because of its resistance to glue and dope. If you use white beaded foam, you'll have to skip doping the pylon. Handle the foam as if it were a block of very soft balsa, cutting and sanding to shape. Bamboo sticks, or halves of a round toothpick, for wing hold down pegs are added to the foam pylon by glueing them into the foam. Add a film of glue where the sticks enter the foam.

For the balsa pylon, cut out the core piece P1, add the bamboo sticks and reinforce with scraps of 1/32″ sheet. Glue on two vertical pieces P2 and add four P3 ribs and four P4 ribs. Cover the sides of the pylon with 1/32″ sheet, leaving these side covers a bit oversize.

Sand the saddle shape on the bottom of the balsa or foam pylon, using sandpaper wrapped around the motor tube. Don't glue the pylon in place yet; it will be attached later, when the balance point of the completed model is located. Make up the wing platform and glue to the pylon.

Wing and Stabilizer: The flying surfaces are conventional and should take a minimum of time to build. Make cardboard templates of the ribs. Use the templates to assist in cutting the ribs from 1/16″ or 1/32″ sheet as shown. Pin all the wing ribs together in a stack so they can be sanded to the same shape. While the ribs are stacked, cut notches for an exact fit for the spars. For a bit of extra strength and warp resistance, be sure to notch the trailing edges for the ribs. When the basic structure is dry, cut the wing into four panels and rejoin as shown on the polyhedral detail. If the polyhedral joints are carefully fitted and glued, no additional bracing will be required.

Covering and Assembly: Cover the wing and stabilizer with thin Japanese tissue and use three or four thin coats of plasticized dope (Sig Lite-cote; or nitrate with 6 - 8 drops of castor oil per ounce). The body should also be covered with Japanese tissue; two layers on the balsa motor tube to make sure it can stand up to a motor burst. Cut tissue strips about 2″ wide and spirally wrap them around the body. The balsa or green foam pylon also is covered with tissue. The body is given three or four coats of dope.

Make up a 10-gram motor. This will be about 6 feet of Sig 1/4″ rubber. Other brands of rubber may turn out to be shorter or longer for the same weight, depending on thickness. To be sure, ask your pharmacist to weigh some motors. Tie the 6′ strip's ends together to make a 3′ loop, and then double it on itself to make an 18″ long 4-strand motor. This is the motor we usually use. You may also want to try a 6-strand motor 12″ long. The 6-strand motor takes fewer turns and runs out quicker, but climbs at a much steeper angle. Use the motor that gives the most consistent results.

Install the motor and noseblock/prop assembly. Add the various fittings for the dethermalizer and the noseblock hooks. Use a small rubber band to hold the nose-

block to the motor tube. Attach the stabilizer with a rubber band. Strap the wing to the pylon and you are about ready for final assembly. Hold the pylon to the motor tube temporarily with a rubber band. This will be secure enough for balancing. Move the pylon as necessary to place the point of balance at 60% of the wing chord. Glue the pylon in place. Check the wing and stabilizer for warps and steam them out if necessary. Steam 1/16″ of washout into each wing tip panel (that is, trailing edge 1/16″ higher than leading edge at the tip).

Try some test glides. Experiment with one or more shims of file card stock or 1/32″ sheet under the stabilizer's leading or trailing edges to obtain a nice slow glide. Remember that we have a free-wheeling prop so make sure it turns freely when the rubber is unwound. If the prop won't turn, the glide will suffer. A natural turn to either side is all right, if it's not too tight; 50 to 75′ in diameter is about right. Tilting the stabilizer works nicely for glide turn without bothering the climb trim. The model turns toward the high side in the glide.

Try low power flights with about 100 turns. Wind the motor with a wire hook securely chucked into a hand drill. Your helper should hold the model with both hands on a piece of 1/8″ wire which has been pushed through the 1/4″ aluminum tube motor peg. Hook on and stretch the motor out to 3 or 4 times its normal length. Start winding at that length and begin moving toward the model at about half of the total winds. Keep slowly moving in until, at full winds, the noseblock will be just in front of the motor tube. (A much safer winder for small models of this type can be made by unscrewing the chuck from an inexpensive hand drill. Drill a hole near the end of the threaded shaft for a tall "C" shaped hook made of 1/16″ wire. With this type of winder there's no danger of a hook slipping out of the chuck.) Power trim changes are made with shims behind the noseblock, tack glued in place, or by bending the aft 1/2″ of the fin. Add turns in easy stages, making sure you compensate for any strong changes in climb trim before adding more power. Our Little Devil climbs in one big circle to the right with a smooth transition to a left glide turn as the power runs out.

Each brand, batch, and size of rubber is quite different in operating characteristics, so I won't recommend how many turns the motor can take. The best way I know to find out how many turns to use is to buy enough rubber for a few motors (50′ makes 8 motors) and wind a couple to destruction—outside the model, please! It would be tempting fate to intentionally burst a motor inside the model. Keep a record of how many turns each motor takes before bursting, and then only wind to 85 or 90% of that figure when flying. Wash off the motors between flying sessions and examine the rubber strands carefully. Look for hairline cracks or check marks at the edges. When you see these marks, save yourself some grief by throwing out the motor and using a new one. Always use rubber lubricant (Sig, Peck, or equal); it will make the motors last longer and work better.

We've found the Little Devil to be an enjoyable, dependable model. Hope you enjoy it too. Use that dethermalizer; the thermals don't know when you're "just testing."

Editor's Note: *Regrettably, For Openers was not able this month to talk, as planned, about some of the noteworthy things in the issue, such as Brad Powers on Reynolds' Numbers, Bob and Dolly Wischer's extraordinary piece on the do's and don'ts of RC Scale—all RC crates for that matter. This is a landmark article, recommended to all. And you'll find Bill Lee very thoughtful on an issue of broad interest. There's Saftig's Zilch, too. You'll enjoy them all.*

Letters to the Editor

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Curtiss-Wright Hawk 75 or P-36, which, was most likely the "successful rival" referred to in the last sentence of the article.

Researching this plane has become more and more interesting with each letter I write and receive and in the reading of similar articles as you published about the P-35.