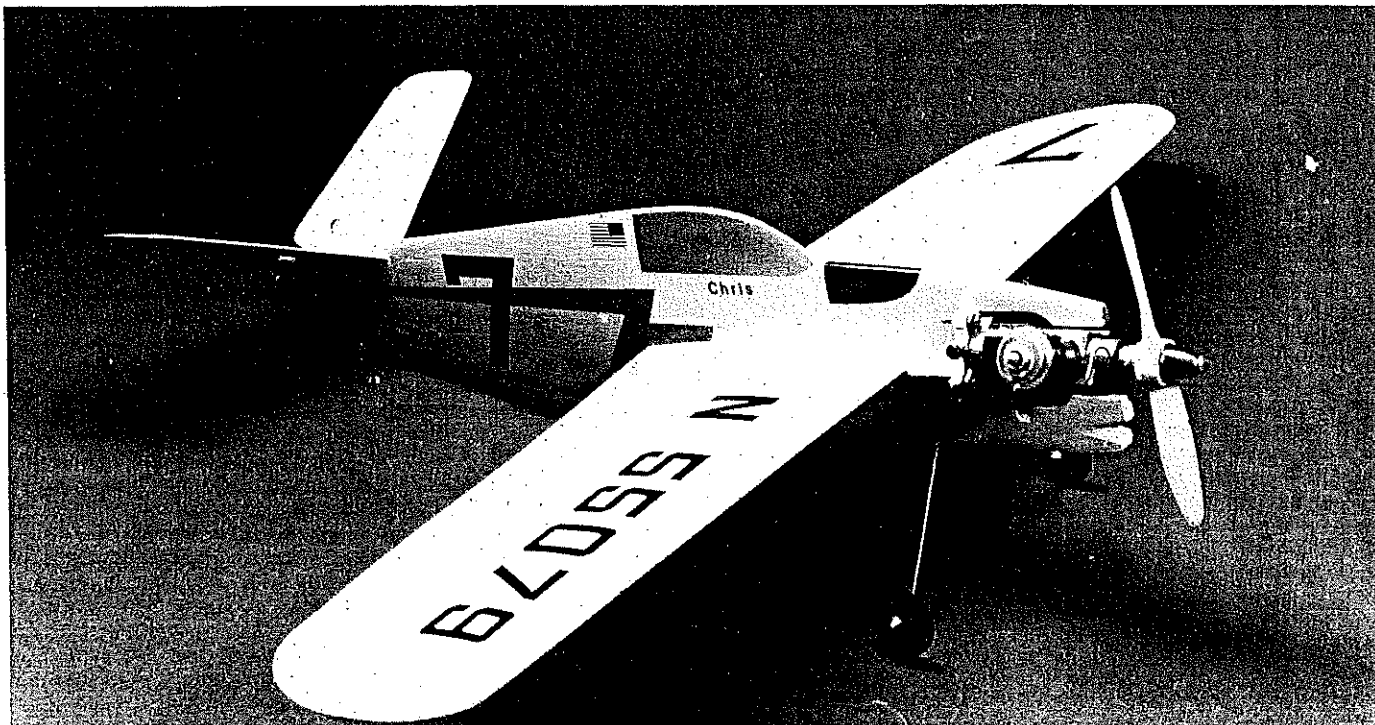


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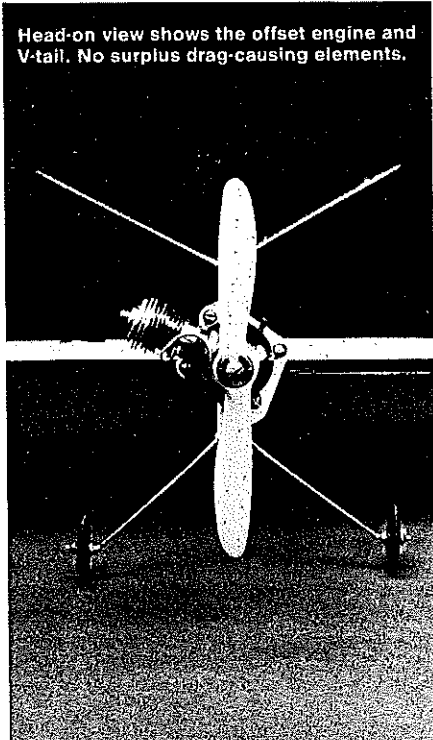


This is Chris Scott's edition of the Sky-Baby. There aren't any secrets here; this is exactly how this winning model is raced. The article in addition to telling you to construct the model, provides some excellent tips on competing with it—from both pilot and pitman points of view.

Control Line Racing is fun, and the easiest way to get into it is with a 1/2A such as this one. The design's mid-wing location and V-tail are plus features.

Sky Baby

Frank H. Scott



Head-on view shows the offset engine and V-tail. No surplus drag-causing elements.

HALF-A RACERS are fun! No doubt about it, of all of Control Line Racing's many events, the 1/2A Scale Racers and Mouse Racers are the really fun contests. If you're going to be racing, of course it's even better to win. With this thought in mind, you may want to look over our Sky-Baby, a truly competitive machine that has evolved over a period of five years and at least as many airplanes, and has been in the winner's circle more often than not.

The actual Sky-Baby, the ship after which our model is patterned, was first known as Art Chester's original Sweepa Goodyear racer. When Sweepa II was built, with its longer and deeper fuselage, the old Sweepa was sold to Chester's mechanic, Lynn Kauffold, who then stretched and deepened its fuselage and renamed the resulting aircraft the Sky-Baby.

Unhappily, both Sweepa II and Sky-Baby crashed in 1949 within a few weeks of each other, both fatally, and thus two of the faster and more unique of the early Goodyear-class racers were gone.

The model. As a modeling subject, Sky-Baby has quite a lot going for it. The mid-

wing is clean, strong, and it flies without banking, and the long tail moment assures good response from the V-tail unit.

Our racing philosophy holds that it is not necessarily the fastest airplane that wins. Rather, the winner is the first one to cross the finish line. To this end, our model Sky-Baby is an excellent choice, conceived first to be a superb flier—reliable, tough, simple as possible, and as fast as anything else you're likely to come up against.

To achieve all of this, Sky-Baby is more than a bit unusual from its tilted nose to its V-tail. We'll tell you about it.

V-tails can do some really neat things once they are understood.

Sky-Baby uses an elevator on its left stabilizer only. This configuration will impart a "right" rudder effect to help hold your lines tight, just when you need it—during take-off and landing.

Up at the other end is the slant-mounted engine. This is so arranged as to fall readily into your pitman's hand for the fastest pit stops. It resists flooding and affords good cylinder and needle valve protection in the event of a mishap.

The front end of the model employs an

unusual amount of plywood which, while adding very little weight, firmly ties the engine mount, landing gear, wings, and bellcrank mount into a really solid and properly aligned unit. Furthermore, the wing has a basswood leading edge, and the basswood tail is nylon-reinforced. We told you it was one tough airplane.

Construction. The various components can be produced in any order that you like, for it is obvious that they all have to come together sooner or later. We find it convenient to proceed in the following manner.

Select a nice flat sheet of light 1/4-in. stock for the wing. Cut to length, and cut the leading edge taper only. Glue on the basswood leading edge, tape in place, and allow to dry.

Pick a really firm piece of 1/4-in. stock for the fuselage and jigsaw this to shape. Glue in place the tail-skid mount, landing gear reinforcements, the two 1/32 plywood nose doubler. Set aside to dry.

Finish cutting the wing to shape, and cut the small circular recess for the bellcrank mount. Plane and sand the wing to airfoil shape. We use a flat-bottom lifting airfoil section at the center, with the tips washed-out 1/16-in. at each tip to avoid tip stall. The upper surface is formed much like a HL Glider wing, using a straight slope behind the high point.

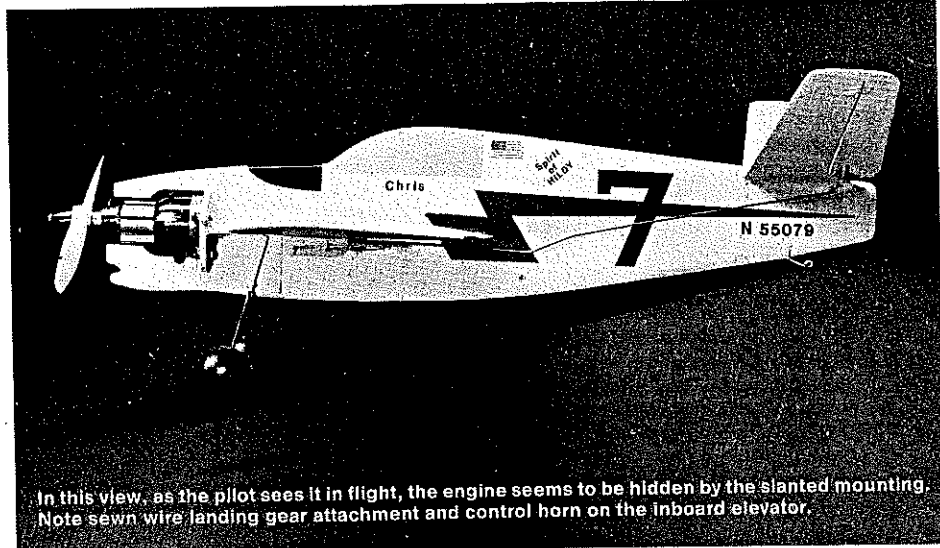
The L.E. of the right wing is sharp, while the left L.E. remains round; this is done to cause the right wing to stall first, thereby maintaining line tension at landing speeds.

Assemble the bellcrank mount to the 1/16 plywood wing mount. Install a 2-56 blind mounting nut in the wing mount assembly, then fill the nut threads with modeling clay (this is to keep glue and paint out later). Glue wing mount to wing. Set aside.

Cut slot in the fuselage for the stabilizer, clean up slot for wing, carve and sand the fuselage. Bend landing gear wire to shape, and assemble wheels to axles (don't even think of using anything other than carefully soldered washers!). Assemble landing gear to fuselage by "sewing" with soft wire through drilled holes. Cut plywood firewall to shape, drill mounting holes, and insert 2-56 blind mounting nuts. Plug threads with modeling clay, and secure nuts with Hot Stuff. Note that the angle of the front of the plywood wing mount will establish proper engine off-set.

Epoxy the wing and wing mount assembly into slot in the fuselage, then epoxy the firewall to fuselage and wing mount. Fillet the joints with Sig Epoxolite or equivalent.

Cut stabilizer to shape as one piece. Sand to streamline airfoil. Cut nearly through the center, crack to proper dihedral angle, and secure at this angle with Hot Stuff. Next, apply a strip of nylon tape to the top and bottom of the dihedral break using epoxy glue. Allow to cure, sand smooth and separate elevator from the left stabilizer half. Epoxy stabilizer assembly into fuselage slot, and glue nylon tape strips to the fuselage—lower stabilizer joint (one each



In this view, as the pilot sees it in flight, the engine seems to be hidden by the slanted mounting. Note sewn wire landing gear attachment and control horn on the inboard elevator.

side). Epoxy the tail skid in place, and add reinforcing patch.

A lightweight airplane will accelerate faster than a heavy one, so we're going to hold the weight down. Carefully sand the whole model smooth, and fill any dings and nicks. Sand some more. Brush on a single coat of K&B Superpoxy Primer; when cured, sand with No. 200 paper. Protect wheels from paint with aluminum foil. Add line guide. Spray on two very thin coats of yellow Superpoxy. When cured, lightly wet-sand with No. 400 wet-or-dry paper. Add decals as desired—license number, racing number, etc. Allow to dry completely. Finish with a single coat of clear Superpoxy to protect everything.

Hinge the elevator (you did remember to paint it, didn't you?) to the stabilizer using dental floss "sewn" in a Figure-8 pattern through drilled holes. This way it will never bind with paint. Assemble entire control system to the model.

For the engine, it is pretty darned hard to beat a good Cox Black Widow in which all of the parts fit right. (You can forget the new

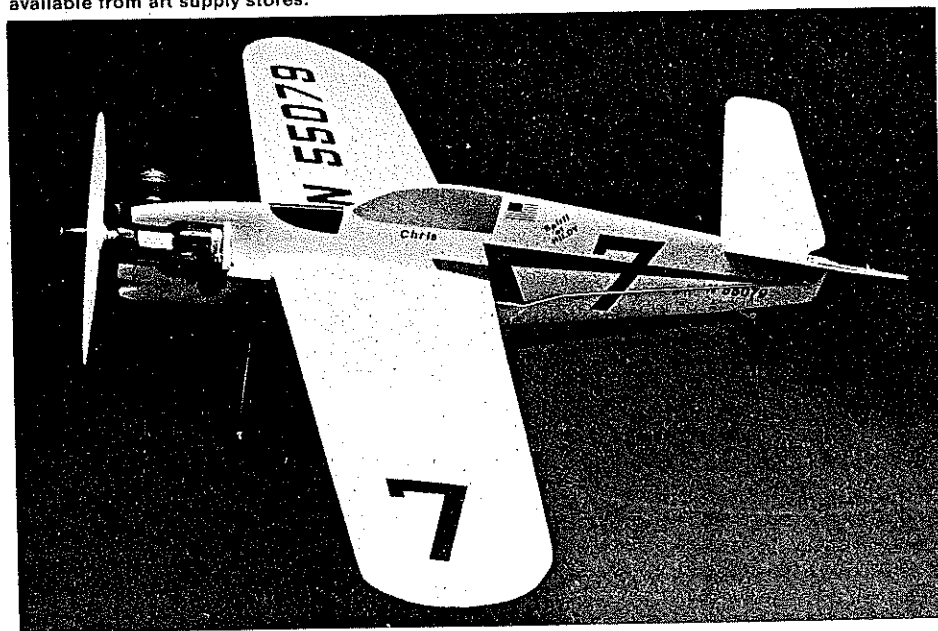
ones with the funny exhausts, though.) This can be either a matter of skill or of luck. Our best racing engine was bought for one dollar at a garage sale. Anyway, a Black Widow with a Tee Dee .049 cylinder and a high-compression head jacked-up with a couple of extra gaskets may be just the combination that you are looking for. Nothing radical, you understand, we just want this to be reliable both in starting and running, and not touchy on the needle.

While you are setting up your engine, be sure to locate the fuel pick-up tube so that it will be on the outside of the flying circle.

Flying. There are two ways to go for propellers. The Tornado 5-4 is fast right out of the box, and it is relatively tough; this is what we usually use. However, the Cox 5 1/4-4 gray can be cut down to 4 3/8, area trimmed, balanced, etc., and it will be a skosh faster—but will be much more likely to break during a botched takeoff or landing.

There are several approaches on the subject of fuel, as well. More nitro will go faster, but will take a considerable toll on

Trim is from a color decal sheet cut to shape. Lettering and numbers are from press/transfer sheets available from art supply stores.



engines and plugs. Something like Cox Racing Fuel is usually just about right, giving a good turn of speed with good starting and engine longevity. With any normal fuel-engine combination, however, you may find yourself making more pitstops than are required—and you know that you're not going to win by sitting on the ground. The trick is to make up a can of "long-range fuel" by adding one part (by volume) of castor oil (ugh!) to four parts of unleaded gasoline (Coleman stove fuel is excellent), and then add one part of this mix to four parts of racing fuel. The gasoline contains more energy per unit of volume than does alcohol; therefore, the engine can be run at a leaner needle setting to give you a few extra laps.

The lines are your only control and safety link with your racer. Take good care of them. Always make up your lines with the same type of handle, connectors, and airplane that you will be using so as to avoid variables. Also, make up your lines to the nominal 42 ft. required, and while you are at it, make up a pair 5 in. over length and one set 5 in. under length. At the contest, use the shortest length that you are allowed. The contest committee may measure somewhat differently than you did. Additionally, legally shorter lines can offer a very slight advantage (in terms of both speed and distance flown) over long lines of legal

length. Examine your lines and connectors carefully before each race, and wipe off the accumulation of oil and grime with a clean paper towel; this crud can contribute to sticky controls.

Racing. A Control Line race is most definitely a team effort between ground crew (pitman) and pilot. We have already shown you how to build and setup a competitive airplane at modest cost. Now, we'll take care of the ground crew, using the same winning (although inexpensive) philosophy.

First, provide your pitman with a starting glove. To do this, start with a left-hand (for most of us) cheap cotton work glove. Secure a pair of "heavy duty" D-size dry-cells to the back of the glove by means of a battery box (from a hobby shop) and several turns of electrical tape wrapped around the glove. Brass rings (soldered up from 1/2-in. brass strip) are placed on the thumb and forefinger and are wired to the batteries—wiring in parallel. Because of the likelihood of "shorts," it is a good idea to place an on-off switch in the circuit, too. Just remember to turn it "on" when you are needing it! Notice how, when the pitman grasps the model by the engine, his thumb ring falls naturally to the top of the glow head and the forefinger ring to the crankcase. (Important: be sure to scrape colored coating from the crankcase where the ring contacts it in order to ensure

good electrical contact.)

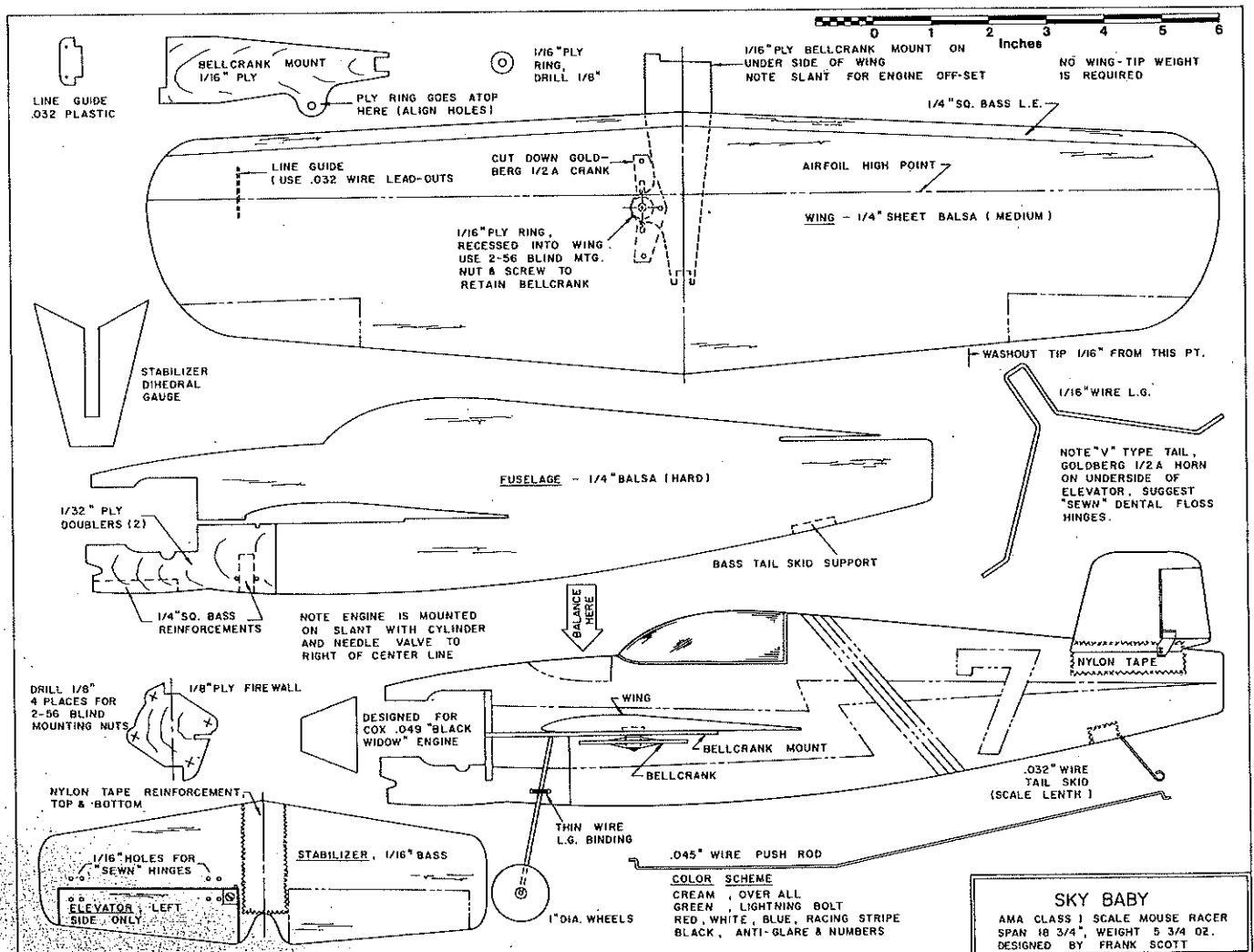
While a bulb will do nicely to fuel the model, we find it convenient to use a 10cc disposable syringe. These hold just enough to fill and prime the engine, and are very convenient if it ever becomes necessary to "short-tank" in order to come out right on the number of pit stops.

Five minutes before the race is no time to get your act together. Check out and pack all of your necessary gear the night before. A good night's sleep is a lot more productive than a last-minute panic (but don't pay any attention to us at the circles—we know better, but do everything in a panic mode!). The best thing that you can do is practice flying with the same pilot/pitman combination that you'll be racing with.

A hint for fast starts: warm up your engine at the two-minute warning, then shut down by holding the model's tail straight up or press a rag into the hub—don't ever throw a rag into the prop, as this can break a prop or crankshaft. Top off the tank, keeping the plug hot, and firmly grasping the prop, turn it smartly so that you can feel the engine "bump." At 10 seconds, stop "bumping"—and engage and wind the starter spring. On the word "Go!" everything should.

Tips for pilots: dive, or whip, your gliding model to your pitman. The model glides a

Continued on page 168



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Propeller, cont.

0.030 is suggested. Assume E of 0.85, calculate MPH using a HP value from an engine (10cc) power curve, and proceed as follows:

1. Align the edge at the HP and RPM values taken from the engine curve.

2. Place a T-pin on L at the intersection, and pivot the edge so the right side aligns with the calculated MPH value.

3. Read J from the J scale, and calculate diameter and pitch as shown.

4. Determine E and thrust as before. Many propellers will not attain 85% efficiency because of low p/d, so for general application, MPH might need to be recalculated after a first approximation.

These results will be quite accurate, and you may proceed with confidence to carve the oddball propeller described if you have accurate engine and airframe drag data. Just conform to the parameters defined earlier.

If, however, you play with the nomograph for a while in conjunction with an engine curve and a propeller efficiency curve, you will conclude that for a typical 10cc engine and Pattern airplane, you will get essentially equivalent performance using a 10 $\frac{3}{4}$ x 7 $\frac{3}{4}$... or an 11 $\frac{1}{4}$ x 7 ... or an 11 x 7 $\frac{1}{2}$... or an 11 x 8. About all that will change is engine RPM.

Sky Baby/Scott

Continued from page 70

lot faster than he can run, so try to land the airplane about a quarter or an eighth of a lap short of him. This can save a lot of time on the ground.

Tips for pitmen: when the model touches down, it will be travelling pretty fast. The biggest target, and the strongest part of most $\frac{1}{2}$ As, is the engine and its mounting. It seems a pretty good trick, then, to field the dead-stick (though moving) airplane by its nose. The filled fuel syringe is held in the left hand (which is already wired for starting), thus leaving the right hand free for catching.

Fly a smooth race with your Sky-Baby, and we'll soon see you in the winner's circle.

Materials list

- 1 $\frac{1}{4}$ x 3 x 36 Balsa (hard)—Fuselage
- 1 $\frac{1}{4}$ x 3 x 36 Balsa (light)—Wing
- 1 1/16 x 2 x 18 Bass—Tail
- 1 $\frac{1}{2}$ x $\frac{1}{4}$ Bass—Wing and tail skid mount
- 1/32 Plywood—Doublers
- 1/12 Plywood—Wing mount
- $\frac{1}{8}$ Plywood—Firewall
- .062 Diameter wire—Landing gear
- .045 Diameter wire—Pushrod
- .032 Diameter wire—Tail skid
- .025 Diameter wire—Lead-outs
- 5-Minute epoxy glue
- Hot Stuff
- Goldberg $\frac{1}{2}$ A control horn set
- Goldberg nylon reinforcing tape
- 2-56 Blind mounting nuts (5)
- 2-56 x $\frac{1}{2}$ -in. Screws (5)
- K&B Superpoxy Primer, yellow, and clear
- Cox Black Widow engine
- Tornado 5-4 nylon prop

FF Scale/Warner

Continued from page 57

prop shaft. Then apply a little heat from a match or hot soldering iron and they contract neatly onto the wire, making a hook which won't cut your rubber motor. They can be used to make winding tubes shrunk to size (the bigger sizes used for wiring harnesses) which retain flexibility and toughness. A small bit shrunk on the end of an axle holds on a wheel.

Another hint for Hot Stuff addicts involves what to do when the darn stuff won't set up and you're tired of waiting. I used to blow a fine baking soda dusting on the joint, using just a pinch between thumb and first finger ground back and forth while blowing toward the wet adhesive. A new product finding its way to the shelves in most hobby stores is a lifesaver (or time saver, as from the smell I think that breathing it may do you no good). It comes in a small bottle with a pump-spray nozzle. When used, it evaporates almost instantly. Although it can be used to "prep" surfaces, at five bucks a bottle I prefer to just save it until I need that "instant" setting. It's a super-glue accelerator—makes cyanoacrylate glues set up almost instantly. Several manufacturers (ZAP, Ace, Hot Stuff) market it.

Make your own planes? Why not your own wheels? Your local surplus or auto parts store and even a hardware store or two can be relied on to stock a variety of sizes of O rings. They make great-looking tires for gas jobs (weight is a factor with Peanuts). I don't recommend them for the clever rubber-motor "hook-ons" which some of the guys use them for. I have seen a couple break at very inopportune times, and I figure one has enough trouble without adding another thing to go wrong!

Like simple, weird models? Dave Aronstein of the Mid-Hudson Model Masters (Baron Von Heinigrabber's outfit) has plans ranging from the ultralight Goldwing to the Miles Libellula. He has Peanut plans for the HE 100, Gipsy Moth, Stinson Reliant, Goon, Monocoupe, and others. I've seen one of his ultralights, a Cloudbuster, fly, and his claim of a two-minute model is not exaggerated. Send him a buck for a plans list, and put some fun back in your jaded existence! Dave Aronstein, 50 Pasture Lane, Poughkeepsie, NY 12603 is the address.

Our final hint of the day comes from none other than our neighbor in these pages, Bob Meuser. Bob pre-shrinks his superfine tissue in a frame. He then takes a Sharpie pen from an art-supply store and saws it open. The "guts containing the ink" are then slobbered around in a small pan with lacquer thinner (about $\frac{1}{8}$ -in. depth) in it. The resulting mess is then swabbed onto the tissue, using the absorbent material inside for a mop. Bob says that by "... swabbing back and forth north and south, then east and west, then repeating with plain lacquer thinner, I managed to get it fairly even." Somewhat similar results may be obtained by using a Marks-a-Lot (alcohol-based) felt pen and overlapping strokes. Not as fancy, but a quick-and-dirty way to get the job done, especially on condenser paper. Yellow seems to work the best.

Thanks for the great support, the 5 x 7 contrasty prints (which I see too seldom) and the hints to share!

Bill Warner, 423-C San Vicente Blvd., Santa Monica, CA 90402.

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