



Good moments and generous areas make this an ideal design for Control Line. The tricycle landing gear provides very smooth landings.

Cessna 206

537

Modeled after Cessna's largest single-engine plane, this simple-to-build electric-powered Control Line model makes the perfect transition into the clean, quiet world of this kind of power plant. ■ Dave Haught

WHAT WOULD you say about a model that costs virtually nothing to fly, uses no fuel, does not get oily after each flight, and flies with only a hum in the neighborhood parking lot? Sounds interesting? Too good to be true? Just stick around and hear this story.

Electrics have invaded the Control Line

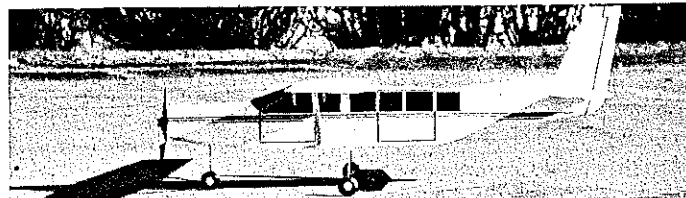
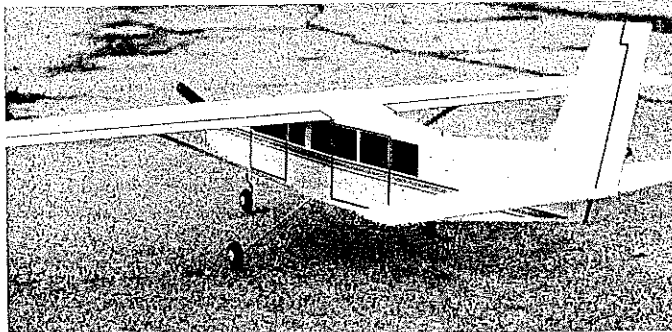
circles, and it looks as though they are here to stay. I was intrigued by the pictures of CL Electrics in the different magazine columns.

I had a brief encounter with Electrics in Free Flight Scale a few years ago that did not impress me. The weight of the power unit was just too much, and I could not get

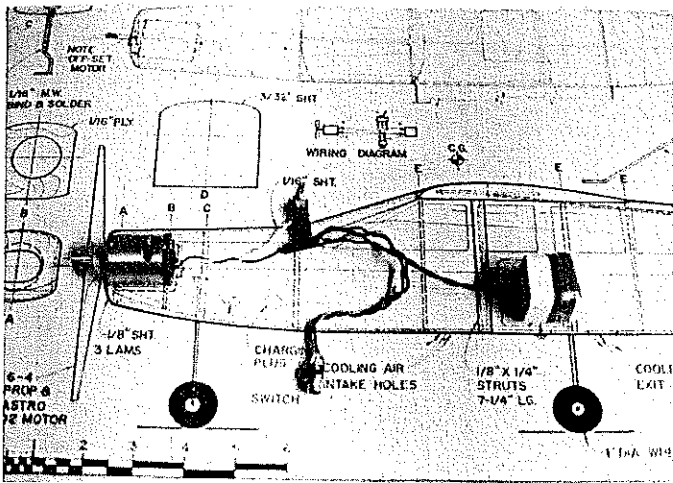
myself to add it to a lightweight FF model. It was not natural for me.

After reading of the success others were having with electric-powered CL models, I decided it was time to give it a try, so I blew off the dust that had settled on my old Astro power unit and charger.

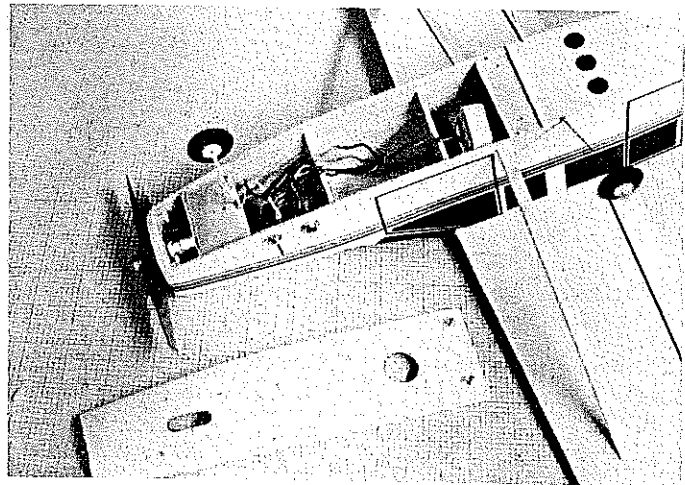
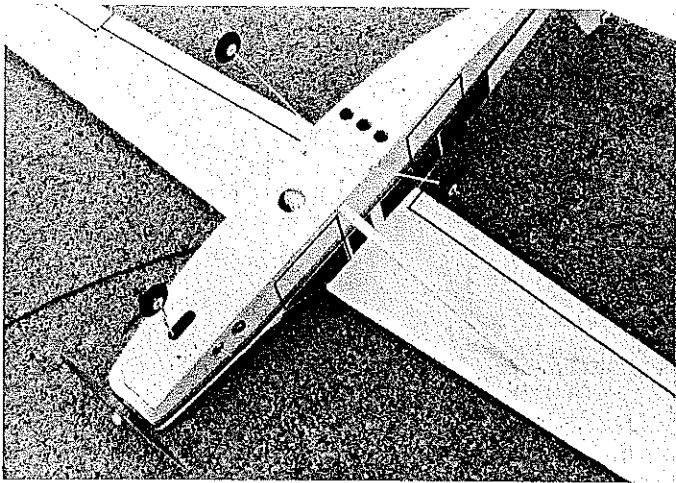
The Cessna 206 Caravan had been in the



Left: Ready to take on passengers, the Cessna 206 shows off its boxy lines. It was those same lines that made it appealing as a simple, quick-to-build semiscale model. The full-size version is a real workhorse. Above: The Cessna takes very little room to fly, and it probably makes less noise than a passing car—a great combination when you can't find a large, secluded place to fly.



Left: Lay out the motor, switch, charging jack, and battery pack prior to installation to ensure proper fit. Right: Because there is no fuel involved, almost anything can be used to trim the model. In this case it's plastic tape and Contac paper trimmed to shape and stuck in place.



Left: Note the cooling holes for the motor and batteries. These are a must to get full battery life! Control outlines are made from thin strips of black tape. Right: Our author's original used a hatch for quick access to all the inner parts. Everything is kept simple, light, and strong.

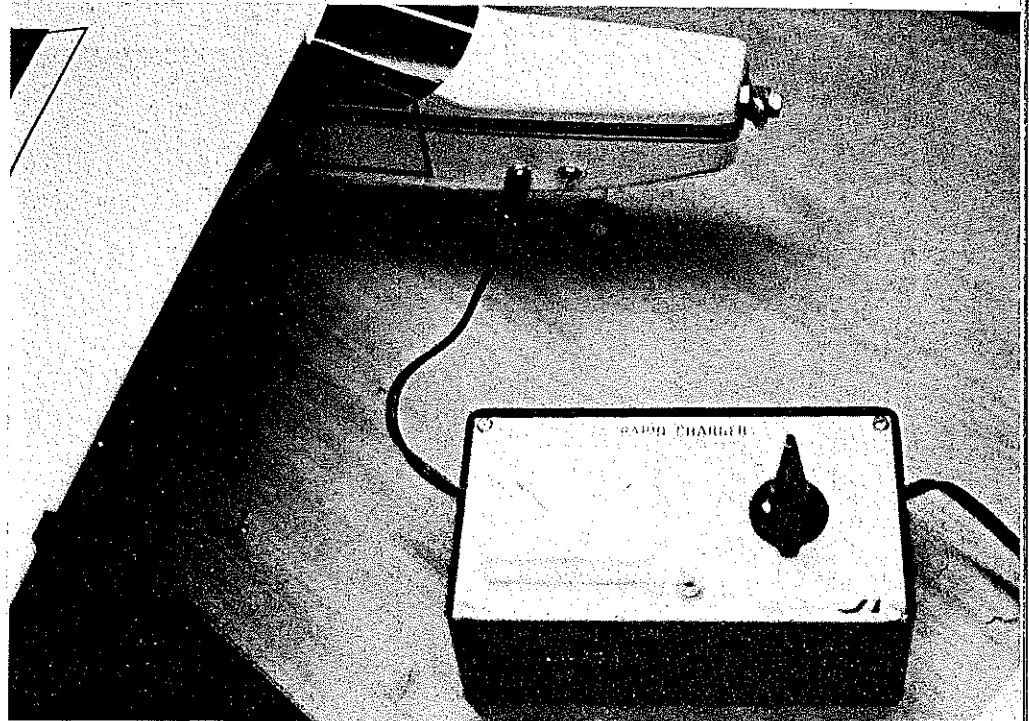
back of my mind as a good starting model for Scale because of its simple, boxy characteristics. After watching a TV special one evening on its use as a bush plane in Alaska, my imagination was sparked for modeling it with electric power.

The full-size Cessna 206 is quite an airplane. It premiered in the 1983 Paris Air Show as the largest single-engine Cessna ever produced. With its 51-ft. wingspan and Pratt & Whitney PT6A turboprop engine, this craft can carry 14 people comfortably for 1,000 miles. This performance, along with the tricycle gear and short takeoff/landing ability, is right up with the best of bush planes.

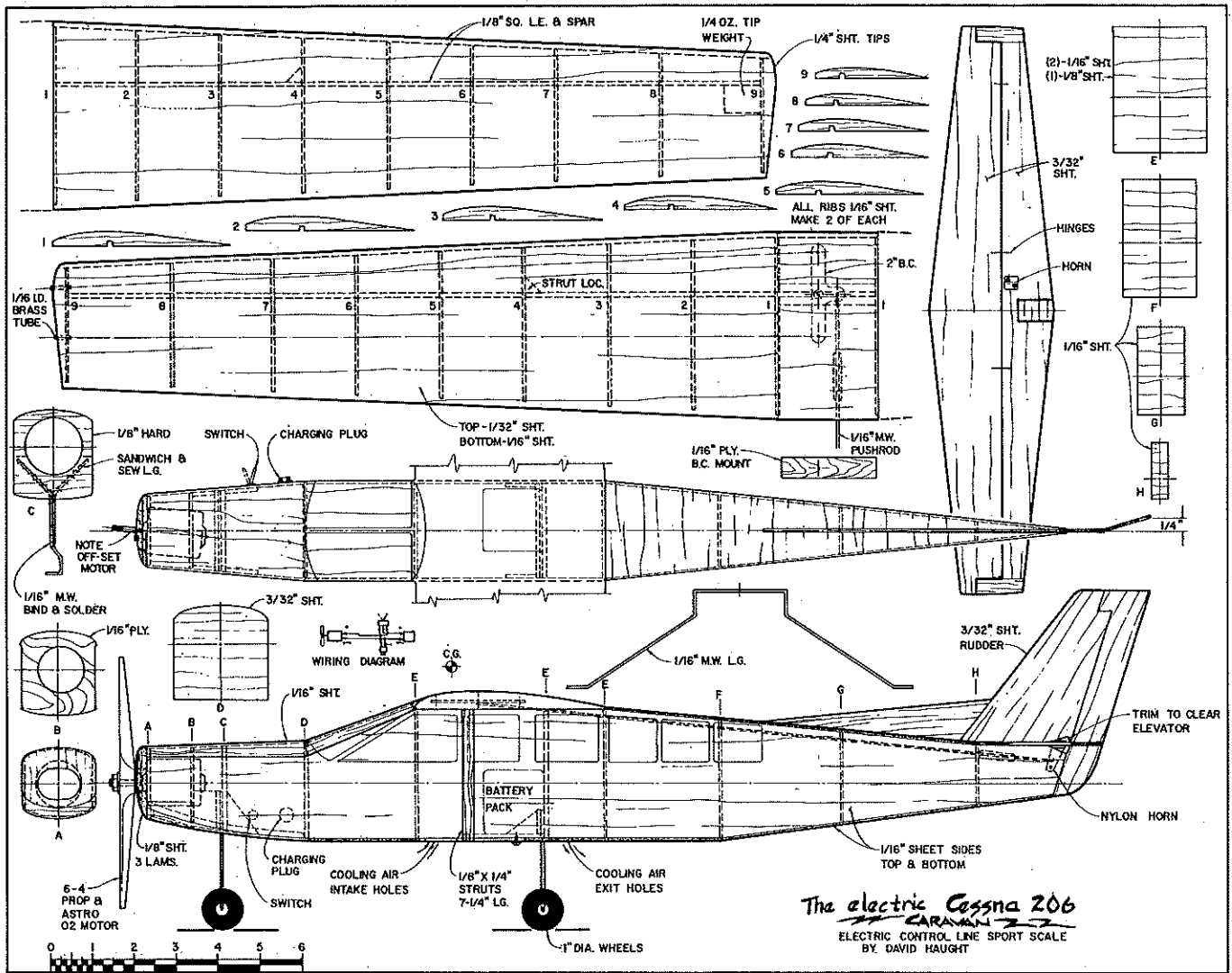
The 206 is also popular with parachute fans around the country. Many examples can be seen at local airfields and even at the larger airports where it is used by small commuter airlines.

It did not take me long to get the Cessna three-view drawing and the balsa together. The model construction plans were developed as the plane was built. Only six days went by from the time I had the three-views until the model was ready for flight.

Construction was kept very simple and light—but rugged. It would have to fly with what I thought would be a higher wing



The Cessna drinks deeply off the car battery via its charger. New technology not only makes Electrics competitive in most phases of our hobby, but gives them their own advantages.



The electric Cessna 206
 CARAVAN
 ELECTRIC CONTROL LINE SPORT SCALE
 BY DAVID HAUGHT

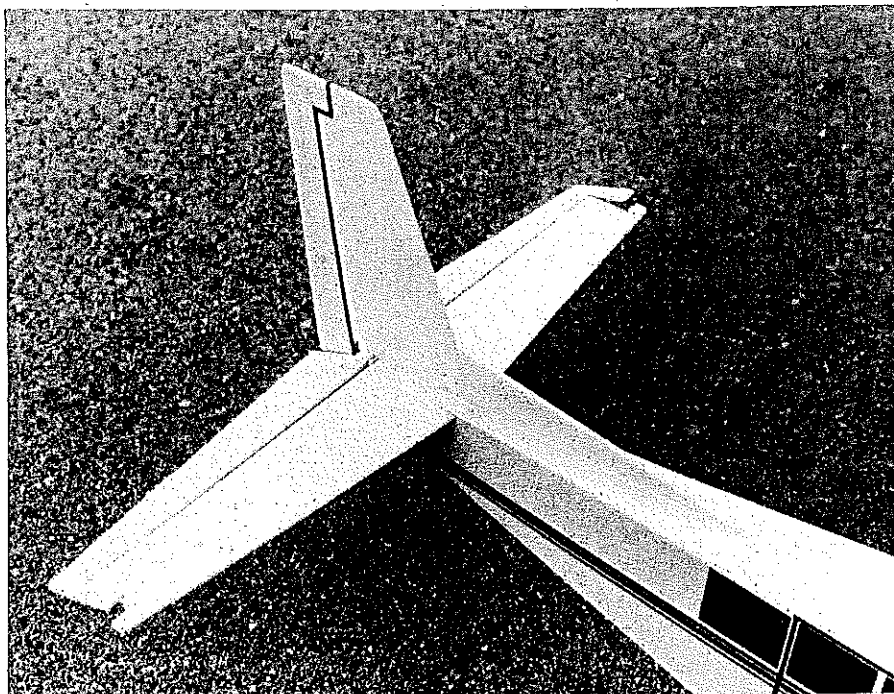
loading than the standard glow-engine model. I was depending on the tricycle gear to help out. Looking back, the fears of the model being too heavy were unfounded.

The Electric Cessna weighs just 10 oz. ready to fly.

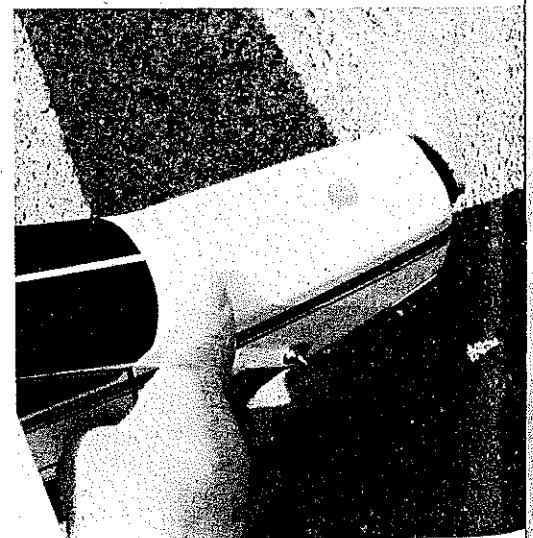
Let's get started. The first thing to do is

obtain the electric motor system you intend to use. There are many available these days that offer many different features. The model in the pictures is adequately powered by an Astro 02 unit I had purchased for PF use years ago. If you want to spunk up the flight of your 206, you might try an

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Clean and simple designs like the Cessna 206 are a snap to model. Keep the hinges free of glue and paint for smooth in-flight operation. The balanced elevator is quite effective.

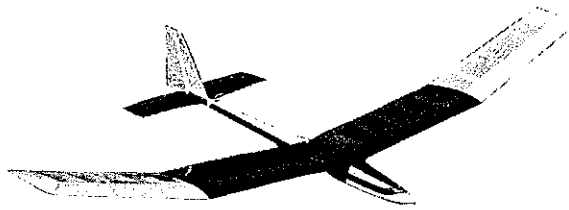


Just flip the switch and you're off. Switch forward for power on; switch back for battery charging. Keeping things simple helps to make the flying day hassle-free and safe.

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The nylon prop will save money over the wood variety, and if you use a 10-6, it has plenty of flywheel effect to help start the engine. The prop and gear also help when you ricochet off the ground during matches. The object is to keep the cost per match low and the life-expectancy of the model high.

In areas where noise is still not a problem, the VooDoo/Fox combination (I've mentioned it before) would give a little more performance, whereas the full-bodied model would give better protection to the muffler, would balance better, and has the ability to use a stooge for launching.

Flying style would also need modifying. Stealth Combat won't be any more fun than the other variety if practically every match ends in a midair. My suggestion would be to start off slowly doing wingovers, playing leapfrog, and using other simple maneuvers. Stand right next to your opponent, and don't run around or flap your arms.

If you use more wrist-action in flying, you'll be able to fly consecutive loops around your opponent's lines without getting tied up. This is the style that looked so impressive during the diesel days in Europe, where they'd do 20 consecutive insides followed by the same number of outsides to keep the lines clear. All this without running a 100-yard dash around the circle and wildly waving their arms around, thereby snagging opponents' lines and locking them together during a tangle.

If I ever had a formal contest using such models and flying style, I think adopting the *Cartier Five-Round System* would be the best bet. Everyone flies at least five rounds, and the points from all matches are added together with the highest combined score placing first. With such mellow models and pilots tuned for fun, it

might be possible for every pilot to fly 10 matches in a day.

In the Cartier System you sit down for the day after two mid-air, and both pilots are out completely if either model is cut away. These may be very harsh rules, but banzai-type flying has to be strongly discouraged or the event will be just another 70-mph-midair meet.

I've had very little experience with muffled Combat engines, so if there are others flying with mufflers who have a good engine to suggest, please let me know about it so we can all make smart purchases from the start.

Charlie Johnson, 3716 Ingraham St., San Diego, CA 92109.

CL Navy Carrier/Perry

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leasing the line slider. One could also use a flexible line or pushrod-and-bellcrank arrangement connected to the tail hook so that the lines would be released as the tail hook falls.

It is essential that once the line guide is released, it must immediately move fully aft and stay there. The most common method of achieving this effect is to use a rubberband to move the line guide. It is also possible to use the drag of the lines to accomplish the same thing, but bellcrank position must be well aft of the center of gravity for this method to work reliably.

A combination of a bellcrank mounted at the balance point and a free-sliding line guide without a spring to move it aft will result in a line guide that moves back and forth in flight, with potentially serious control problems as a result.

Some models oscillate rather badly in low

speed. Smooth application of power can help prevent the oscillations from starting, but getting the proper combination of lead-out position and outboard wing tip weight for the particular model can significantly reduce the tendency.

In general terms, most models improve if line sweep increases. Also, most models improve if the tip weight is increased. That may be because it seems the most logical solution and is the first thing most people try. Some models have improved with opposite corrections, so adjustable tip weight and lead-out stops are appropriate. Increases in line sweep usually require less tip weight for satisfactory low speed flight.

New address. I've settled in at my new home, although I spend most of my time deployed with my unit to Malmstrom Air Force Base, MT. By the time you read this, I should be home with my modeling gear unpacked and able to answer my mail.

Richard L. Perry, 10035 Deadwood Ave., Ellsworth AFB, SD 57706.

Cessna 206

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Astro 035. I think the 02 and 035 have the same outside diameter, with the 035 being a bit longer.

You will need a good charger. Either use the recommended charger for your motor or do some research to find one that is compatible. Electrics are fun, simple to use, and clean, but you need to pay careful attention

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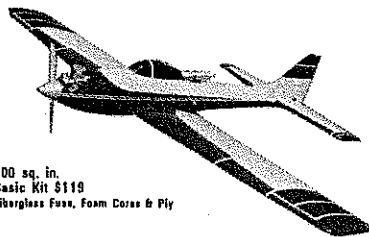
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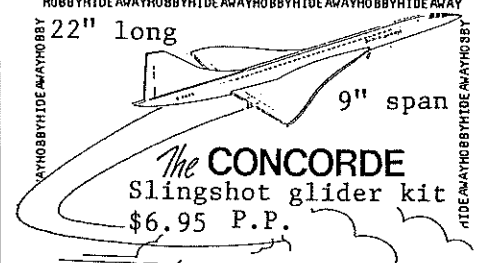


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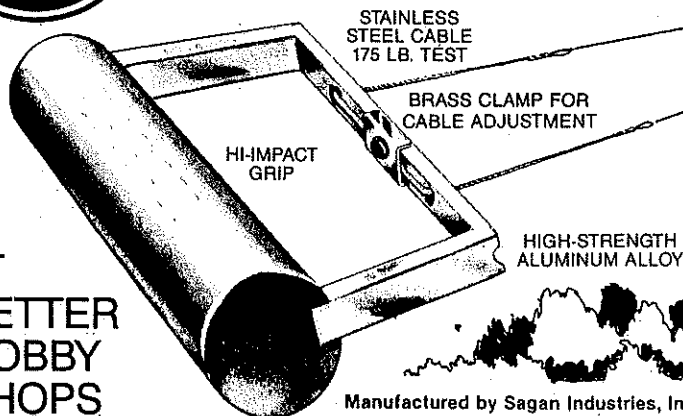
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to the charging process to ensure safety and long life for the battery and motor.

I used medium-light balsa throughout the model's construction for minimum weight. Watch the strength of the balsa you use in the tail assemblies to prevent warps and fluttering; these areas should be built with balsa a bit on the firmer side.

Fuselage. This is the best place to start. Study the plans, taking note of the cooling air holes on the fuselage bottom. Both intake and exit holes are needed for cooling the battery and motor.

Cut out all the fuselage formers, and label them. Cut the fuselage sides from medium-hard $\frac{1}{16}$ sheet. Try to match these two sheets in firmness and grain.

Begin gluing the E fuselage formers in place, taking time to assure that the fuselage is kept square. When the glue has dried on these three formers, pull the tail together and add Formers F-H. Note the notches in these formers for the pushrod to pass through. While this is drying, laminate the nose block from three layers of $\frac{1}{8}$ -in. sheet balsa. Carefully pull the nose together, and glue the nose piece in place.

When this glue is completely dry, add Formers B-D, offsetting Former B to the right for motor thrust offset. The offset thrust line may look like too much, but this amount is required to keep the Cessna at the far end of the lines in flight (maintaining tension so that the controls will operate).

It's time to fit the power unit. Seat the motor first. It should be a tight fit into Formers A and B. If the fit should be too loose, try wrapping the motor with masking tape. A small drop of white glue will hold the motor in place (once it is fitted) until final assembly.

Wire the switch, charging jack, and battery pack as per instructions that came with your motor. The wiring diagram shown on the plans is the way my model was wired. When the toggle switch faces forward, the motor is running. When the toggle faces to

the back, the motor is off and the battery can be charged.

Add a floor of $\frac{3}{32}$ balsa for the battery pack to rest on, and add the rear landing gear strut, gussets, and braces. Install the switch and charging plug into the right side of the fuselage as shown on the plans.

Bend the nose gear to shape, and fasten it to the plywood former with heavy thread; coat it with epoxy. Plank the fuselage bottom with cross-grain $\frac{1}{16}$ sheet. Remember to put in the cooling holes. Also plank the top of the fuselage. I made the bottom front of the fuselage (between Formers A and E) into a removable hatch. This allows adjustments to be made easily, and the motor can be changed to another model without much trouble.

Tail surfaces. Cut out the stabilizer and elevator parts. Note the small balances on the tips of the elevators. These need to be added and trimmed to fit so they clear the stabilizer when they are hinged. I used small nylon hinges with pins to keep the movement free.

Sand all the exposed edges to a rounded contour, and then attach the elevator horn. Locate and glue the stabilizer assembly to the fuselage, taking care to see that it is in alignment in both the plan view (top) and front view.

While the glue is drying, cut out and assemble the rudder and fin parts. Add the rudder offset, and set it aside to dry.

Wing. This builds in one piece flat on the building board. Cut out the bottom skin sheets from $\frac{1}{16}$ balsa. You will have to edge-to-edge glue two sheets to make one wide enough for the job. Pin the bottom sheet to the plan, and glue and pin the leading edge and main spar in place. Then add the bellcrank mount, wing ribs, tip blocks, wing strut gussets, and lead-out tubes in place.

When this is all dry, unpin the wing and notch the ribs for the lead-outs to pass through. Install the bellcrank and tip weight,

and fit the pushrod. Make the pushrod exit through the bottom of the wing center section as shown on the plans. Check the control system for smooth operation; once you are satisfied, sand the tip blocks to shape and sheet the top of the wing with $\frac{1}{2}$ balsa. When dry, shape and sand the wing to its finished shape. Align the wing with the fuselage, and glue it in place. Hook up the controls to the elevator horn. The fin and rudder can now be added.

Shape the wing struts. Fit them, but do not glue them in place until after the final painting has been done. The Cessna is now structurally complete.

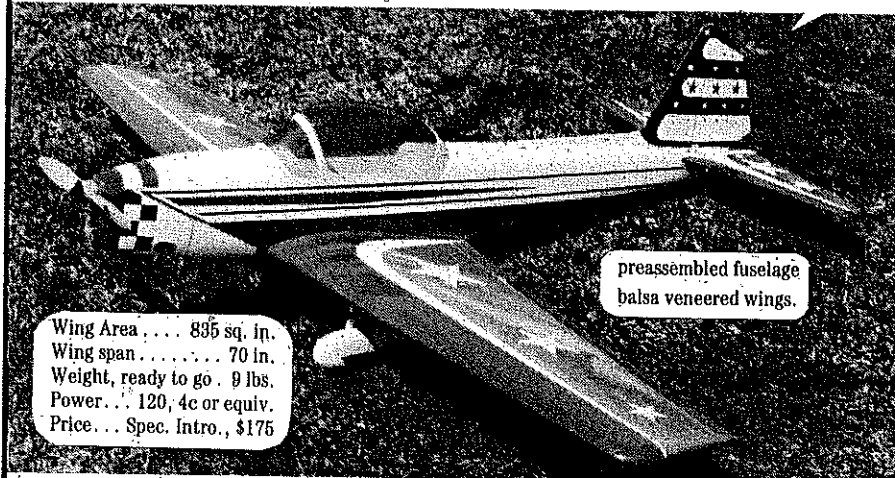
Finishing. Since Electrics do not have to be fuel-proofed, your choice of finishing material is wide open. I first gave my model two coats of sanding sealer with a good sanding after each coat. Then I sprayed on two light coats of white acrylic enamel from a spray can; this dried fast and did not add much weight. For the color trim I used Contact brand self-adhesive plastic film and colored electrical tape (both products are available at most hardware stores in many colors).

For the thin striping and window details, I first adhered the plastic to a sheet of thick Plexiglas. Then I cut the desired shapes with a single-edge razor blade and a straightedge. This process takes only a few minutes, and it produces great results.

Add the wheels and propeller. Check the balance point (CG). Control Line models are more docile with a forward balance point, so begin your flying with the balance point as shown on the plans. Move the battery forward or rearward as necessary. Once the proper balance point had been achieved, I kept the battery in place with foam rubber wedges. However, I made sure there was room for air to pass around the battery for cooling.

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lines around .007 dia. and 25 ft. long. Models of this size fly much better on metal lines, and they are safer as well.

Pick a calm day, and head for the nearest vacant parking lot. Charge the battery about halfway, and give the model a short trial hop. If the controls seem a bit too sensitive, move the battery ahead a bit. If the controls are too sluggish, move the battery back a little. When the controls feel

right, charge the battery full up, and let the model roll.

The 206 should roll about a quarter of a circle before it will have enough speed to rotate. Feed it some up elevator, and have fun. There is a slight burst of power during takeoff, then the motor settles down to a strong hum for the rest of the flight.

Near the end of the flight, the power slowly drops, and the Cessna will cruise in

for a smooth powered landing. Pretty neat, huh? And guess what: no oily mess to fuss with. Welcome to the clean fun world of Electric Control Line.

Next? Let's see, I have a DeHavilland Rapide plan that looks pretty good. I wonder what twin Electrics will sound like.

FF Old-Timers/Haught

Continued from page 73

the same measure in 1940. In this light, it comes to better focus.

I just received a mailing from John Targos, 3229 Dianora Dr., Palos Verdes, CA 9027 who distributes the line of engines from Dunham Engineering of England. In the category of spark ignitions, Dunham produces the popular Orwick series of engines. These engines originally appeared shortly after WW II and were sought after as a powerful engine. Dunham, through John, offers the Orwick in .29, .32, .64, and .73 cu. in. sizes. Prices run from \$150 to \$210 U.S. In addition to the Orwicks, they also offer the Mechanair 5.9cc and the Viking 5.3cc engines.

Diesel engines are also getting more use in Old-Timer activity. Dunham produces the Effin 2.49cc, the Valkyrie 5.3cc, the Orwick .29, and the Oliver Battleaxe. Diesel engines normally require much more breaking in than we are accustomed to in modern glow engines but offer quick-start/launch techniques for thermal flying, and they are a great change of pace.

Clarence Haught, 3226 Honeysuckle Dr., Coeur d'Alene, ID 83814.

FF Duration/Murphy

Continued from page 75

some national "notoriety."

In the letter Bill confessed that, over the years, he had kept an accounting of all the Ramrods that his small clan had built, and that the subject 150-sq.-in. version was actually Ramrod No. 70. Incredible! Bill even related that Ron St. Jean admitted that this was a far greater number than he had ever built.

Bill further advised that they had built more 1/2A/A "250s" than any other size. It was first published in the June 1956 issue of *Model Airplane News*. They had ordered a set of full-sized plans from which they made a set of templates which they still use. The original construction article had also incorporated a chart that had given dimensions and wood sizes for three other sizes of the Ramrod: 432 sq. in., 600, and 750 squares. Bill's family had built and competed with all versions.

He stated that the 150-size was first worked out in 1960 and saw use in 1961 in the .020 Payload event competition with a fuselage revision which permitted incorporation of the required one-ounce dummy pilot. As late as 1981, Bill's grandson, Bill Coffey, was the "Junior Sweepstakes" winner at the U.S. Free Flight Championships at Taft, CA—aided by Ramrod 250s being flown in the 1/2A and Nostalgia Gas events.

Oh, yeah. Bill closed by saying that No. 71 will be another 150 which is coming off son Jim's workbench—and I just saw Bill a week ago, and he informed me that he hopes to have another 432 readied by the October 5 Central Indiana Aeromodelers' All-Nostalgia Gas Contest at Wright Field. So, apparently there will be even more Haught Ramrods yet to come. Man, talk about dedication to a design!

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