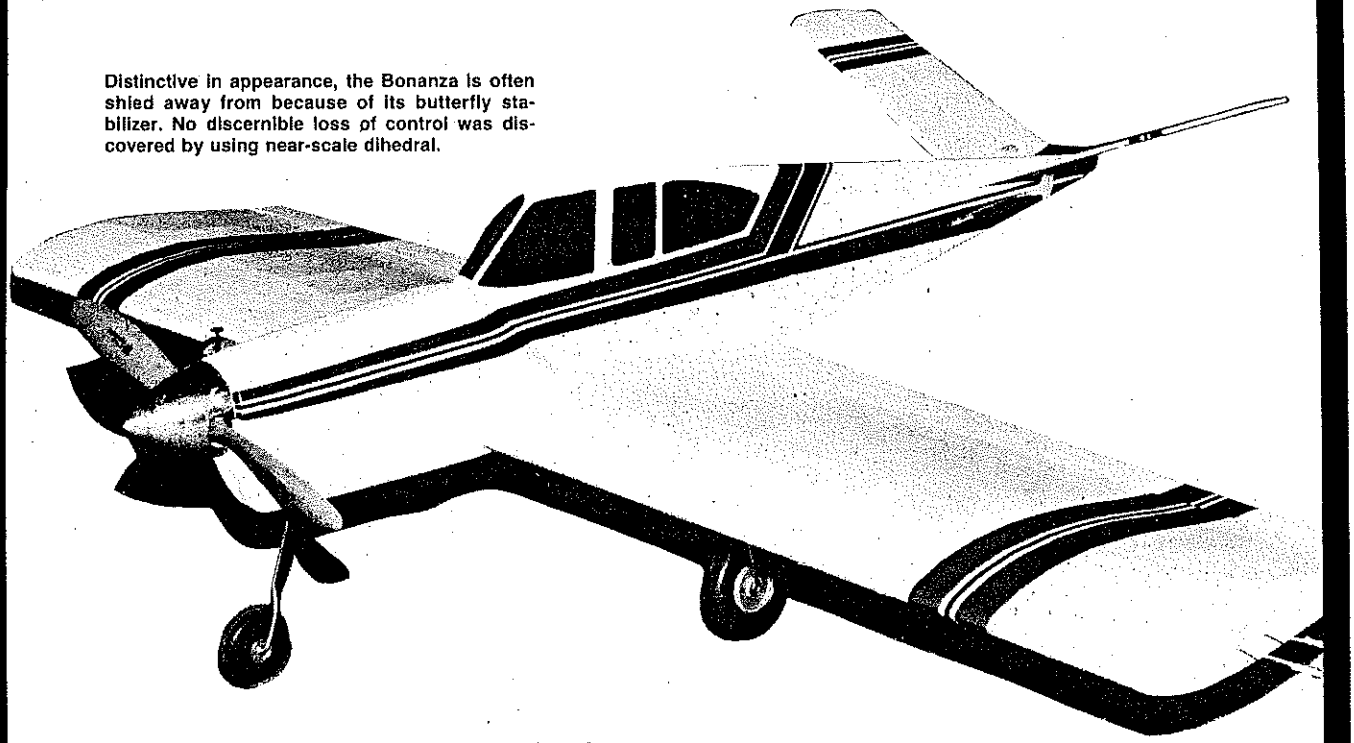
Gene Nelson

Bonanza Profile

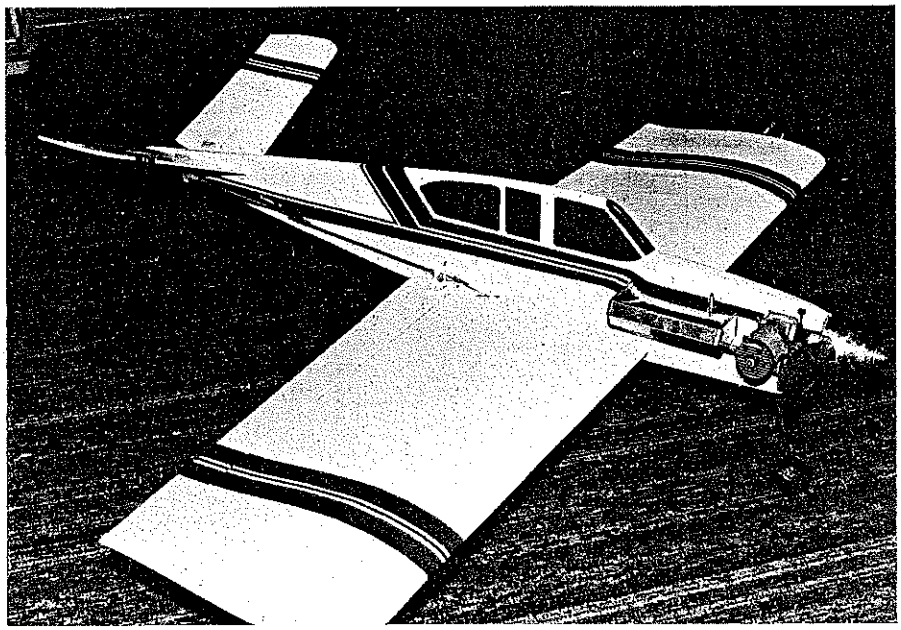


Distinctive in appearance, the Bonanza is often shied away from because of its butterfly stabilizer. No discernible loss of control was discovered by using near-scale dihedral.

A love affair with a Control Line sport model? We can see why by looking at the lines of this look-alike profile and hearing about its flight qualities. For a .25 engine, it has coupled wing flaps and elevators—plus generous wing area—for great maneuvers.

BACK WHEN I was learning to fly the Stunt pattern, one of my favorite models was a profile Cherokee. It had a trike gear, and it hung out on the lines so well. That was over 10 years ago, and the memory still remains. I must have burned five gallons of fuel before the thrill of inverted flight caught up with it.

Ever since the Cherokee bought the field, I've wanted to build another model just like it, but I have a hangup about building the same model twice. I couldn't get myself to build another Cherokee, and so the search began. It wasn't a long search, as the Beech Bonanza was the obvious choice; but the butterfly stabilizer kept my interest at bay. After building a few Stunters with anhedral in the stabilizer without much loss of control, I finally decided the Beech deserved a try.



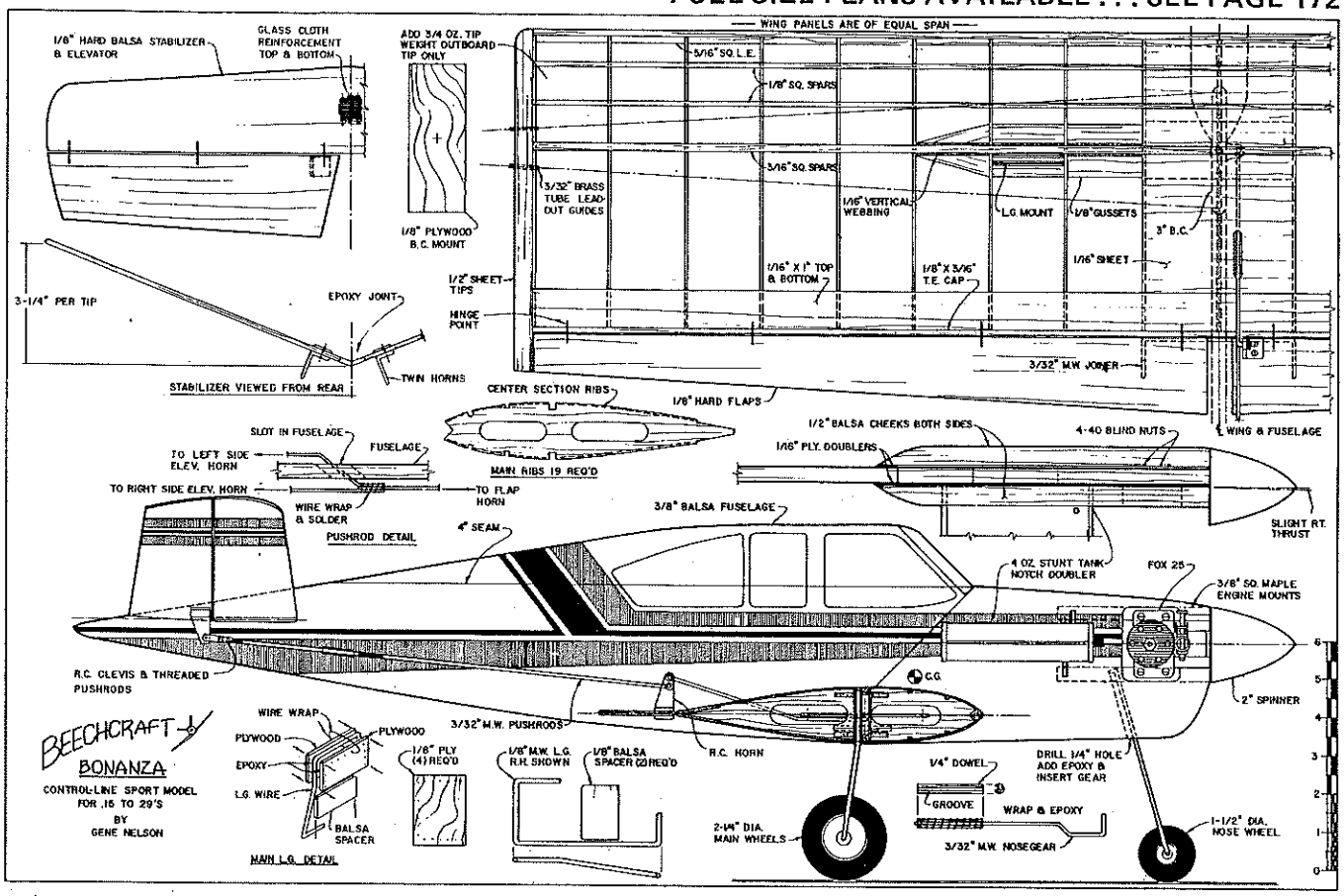
The "dirty" side of the profile. Nearly everything that spoils the scale appearance (engine, tank, and pushrod) was intentionally kept on the outside of the flight circle so the pilot sees the best side. Large fuel tank gives those extra laps after finishing the full aerobatics pattern.

The Stunters I had experimented with had a tendency to turn tighter in the outside maneuvers than the inside ones. The Beech has the opposite tendency, but it isn't hard to compensate for. The spell the Cherokee put on me couldn't approach the great feeling the Beech has given me.

Flying the aerobatics pattern is fun and challenging, especially if the model you are flying is attractive and fun to fly. The Bonanza is both. The trike gear makes those landings so smooth on grass and on pavement. I've used a 4-oz. tank also, to approximate the full time limits for the pattern and to give me a few extra laps to work out those marginal maneuvers. Stunt takes a lot of practice and patience, but it pays off when you can fly the full pattern smoothly and accurately.

Building the Bonanza is very straightforward. The only place it deviates from the norm is the dual control hookup for the ele-

FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 172



vators. A few general items worth mentioning are the equal span wing panels, the use of 36-in. balsa for the wing spars, leading and trailing edge parts, and flaps. This gives a good 36-in. wing without splices. Add the tips, and the full span is 37 in.

Fuselage. Begin by cutting out the blank. Note that the fuselage can be built from a single 4-in.-wide sheet. Cut out the lower rear section, and glue it on the top for the canopy area. The full depth of the Bonanza profile adds to its distinctive appearance. Next, cut out the 1/16 plywood doublers and engine mounts; fit them together. Use a good white glue for the engine mounts and a good contact cement for the plywood doublers. Let both dry thoroughly.

Next, cut out the ½-in. nose cheeks, and tack-glue them onto both sides. When the glue is dry, roughly carve the cheeks to shape; remove and carve out for the tank, engine, and blind engine mounting nuts. Cut out the wing and stabilizer areas, taking care to maintain proper incidence of 0-0 for both.

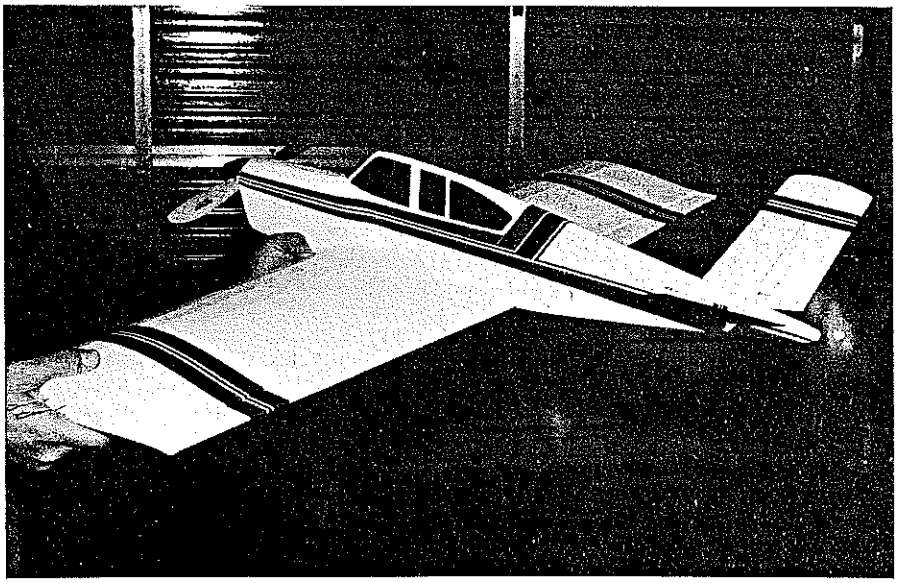
Stabilizer and elevator. Cut out the parts from hard ⅛ balsa. Round all the edges, add hinges, and glue in the proper dihedral—note that it is 3¼ in. *per tip*. Use epoxy for this joint, and let it cure completely before working on it further. When it is dry, add the fiberglass cloth reinforcement to both top and bottom. Do not omit this, as this is the one place that gets the most strain during aerobatics. Add hinges and the two nylon control horns.

The wing builds fast. Multi-spars make it strong and give it a good airfoil section for the full span. Choose good, straight wood for all the parts, and you will be off to a good start for a straight wing.

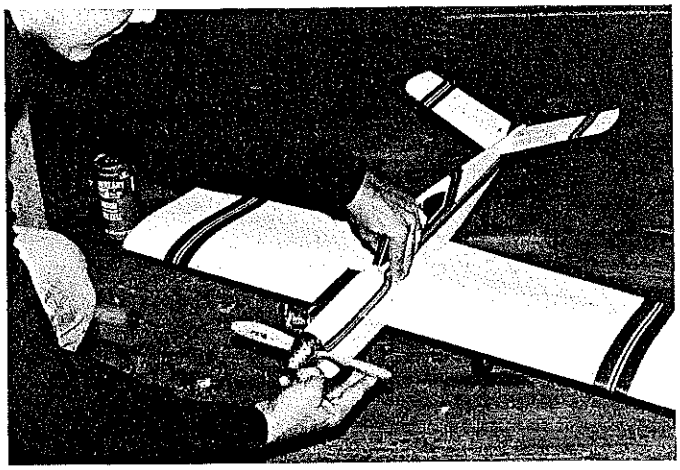
All the ribs are spaced at 2-in. intervals. so begin by marking all the straight wood in 2-in. increments. Stack-cut all 19 ribs. To do this cut out 19 blanks of 1/16 balsa 8 in. long by 1½ in. wide. You can rip a 3-in. sheet down the center, and then cut off the 8-in. pieces. Stack the blanks between two template ribs, and push pins in from both sides until all the blanks are well secured. Carve the stack nearly to the surface of the template ribs, then sand until you have what looks like one thick rib.

Next, mark the spar notches and trailing edge notches on the template ribs. Use a razor saw to cut the notches to the full depth. Trim out the excess wood, and clean out the spar notches. Cut the leading edge notch, and drill the holes for the lead-out openings. Remove the retaining pins and there you have it—all the ribs cut the same.

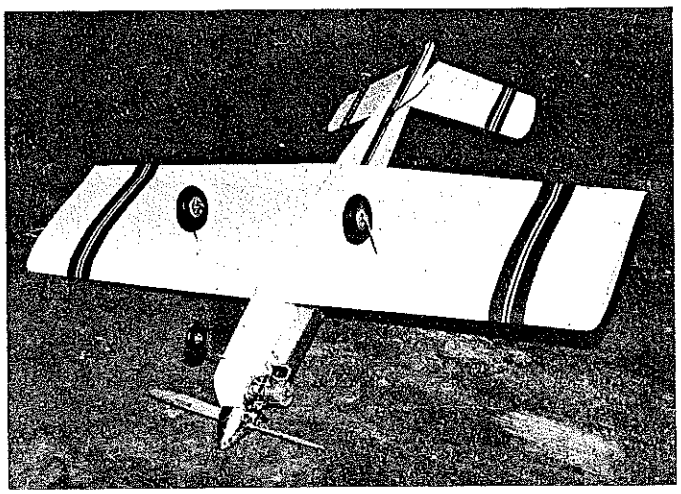
Pull out three ribs, and trim them 1/16-in. undersized for the center-section ribs. On a flat building board, pin down the main 3/16-in. spar over the plan. Add the ribs to



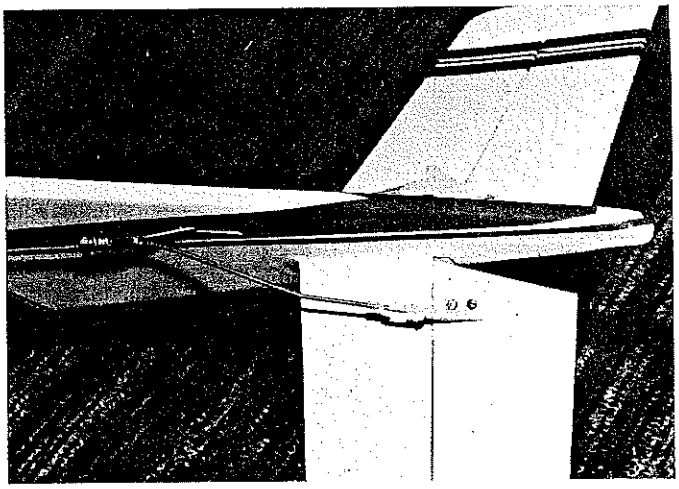
A colorful finish trim is easily and quickly obtained with plastic electrical tape; it's obtainable in a rainbow of colors. Full-span flaps allow the Bonanza to turn tightly and smoothly.



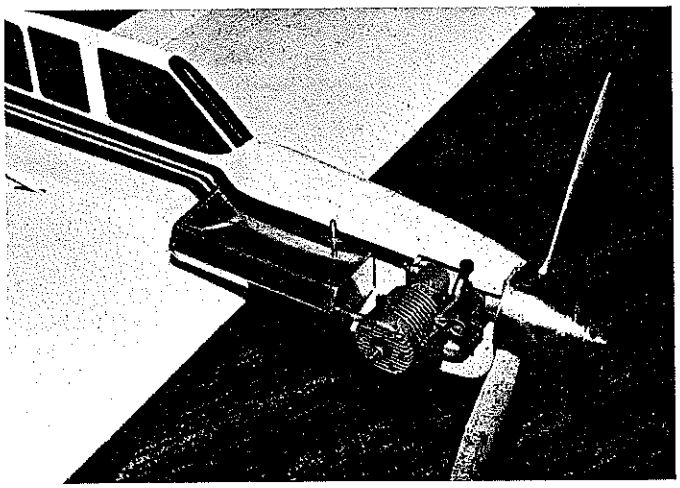
Compact size of the model makes ground handling and carrying in a small car easy. Note battery and fuel bulb are out of the way, but within reach, for starting. Trike gear gives it a good starting stance.



Bottom view shows the Fox .25 engine installation and how the landing gear emerges from the wing and fuselage. Note outboard pushrod linkage.



Split pushrod for the butterfly elevators is what makes them work. Inboard pushrod passes through the fuselage and is attached to the conventional outboard pushrod. RC nylon clevises and threaded pushrods used.



Half-inch cheeks give the nose a smooth contour into the spinner—looks great and adds considerable strength. Fox .25 pulls the Bonanza through the whole aerobatics pattern at just the right speed.

the pre-marked locations, add the upper 3/16-in. spar, and block up the rear sections of the ribs. Before adding the glue, check for warps and correct as necessary. I suggest you use thinned white glue to brush onto each exposed joint. Thin the glue with 20% water. Next, glue on the leading edge and then each of the ⅛ sq. spars and trailing edge sheet. When the glue has dried, lift it and add the remaining spars, trailing edge sheet, and trailing edge cap.

Controls, etc. It's time to fabricate the control system parts. Mount the bellcrank to the plywood mount and attach and solder the lead-outs and the 3/32-in. music wire pushrod. String the lead-outs through the wing. Fit and securely mount the bellcrank to the wing. Make sure it is centered and that the bellcrank clears all the ribs as it moves. Add the ½-in. sheet balsa tips, tip weight on the outboard end, and lead-out guides for the inboard tip. Use epoxy to mount the last two items securely in place.

Plank the wing center section with 1/16 sheet. Fabricate the landing gear parts, and epoxy them in place in the wing. Add the full complement of bracing around the landing gear mounts and adjoining spars as shown on the plan. Make sure the lead-outs do not rub on any of the bracing.

Give the wing frame a good sanding. Cut out and fit the flaps. Do not hinge the flaps until after the wing has been covered and joined to the fuselage. Apply three coats of clear dope to the framework, lightly sanding between each coat. Cover the wing with medium-weight silkspan. Water-shrink the tissue. When it is dry, give the covering three coats of clear dope. After a light sanding, carefully fit the wing to the fuselage. Center and square the wing to the fuselage, and epoxy it in place.

Add the blind mounting nuts to the back side of the engine area, and fit the nose cheeks. Glue them in place, clamping well until dry. Fit the flaps and their hinges next. Use free hinges to keep the flap movement smooth. Add the flap horn, and give the flaps three coats of dope.

The stabilizer assembly can now be attached to the fuselage. Be sure it is aligned correctly from the front as well as the top. Epoxy it in place, adding a small epoxy fillet on all corners for strength. Give the stabilizer and elevator three coats of dope, sanding well between each.

Cover all the wood areas with tissue. Give the entire model five coats of clear dope. Fabricate the nose gear parts as indicated on the plan, and install them. Now it is ready to paint.

A visit to the local airport or a look through some old airplane magazines should turn up a realistic color scheme for your Beech. Select a colorful one, and finish your model to match. It adds a lot to the model's appearance if it is given a realistic paint job. I trimmed mine with plastic electrical tape in green and black. It only took two hours while I watched a movie on television. If you use trim tape, give it a coat of clear dope to seal out the oil.

Now the part you've all been waiting for—the control hookup. You will need to assemble all the necessary parts and tools. Obtain two RC nylon clevis and pushrod assemblies, a length of 3/32-in. music wire, solder, washers, copper wrapping wire, pliers, wire cutters, and soldering gun. Bend the 3/32-in. music wire pushrod to the shape and length shown on the plans. Solder the retaining washer on the one end before slipping it into the lower hole on the flap horn. Add the outboard clevis and pushrod to the elevator horn, and cut it to length. It should overlap the 3/32-in. pushrod by ¾ in.

Cut a slot through the fuselage as indicated on the plan, approximately ⅛ × 1 in. long. Snap the inboard clevis to the respective elevator horn, and bend the pushrod into a Z shape as shown. Slip it through the slot

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Round nine brought Eric Ristrim against Dave Shadel. Dave had all wins up to this point, and Eric was only one point down, needing this win. Dave was off first with Eric right on his tail. Somehow, the flag at the No. 2 pylon got in Eric's way, which sent pylon and plane crashing to the ground. Our female pylon judge took it like a champ and never left her post during the heat of the battle! My hat's off to her, and we thank her for a job well done.

It is a bit difficult to recall what happened in the Standard class, because we had combined the Standard and Expert classes together. A total of nine rounds were flown with a fly-off for second and third in Standard between Kennedy and Hankins. Apparently, Hankins never made the turn at Number One and crashed, leaving Kennedy alone, though he eventually flamed out. The decision went by their times. There was only one fly-off in the Expert class, which was for fourth and fifth place.

Expert:

1. Shadel	1:11.4 (Fast Time)
2. Hover	1:13.9
3. Schorr	1:18.2
4. Ristrim	1:15.0
5. Van Baren	1:12.7

Standard:

1. Leon	1:41.1
2. Kennedy	1:18.9
3. Hankins	1:37.7

It is interesting to see what is going on in different parts of the county. But I can't print what I don't receive! If your club has a race, send me a write-up. You can send pictures it you want (5 × 7 black & white is preferred). Send all information and photos to me.

See you next month.

Bill Hager, 706 Glen Haven, Conroe, TX 77302.

Bonanza/Nelson

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in the fuselage, and trim it to match the lap of the other pushrods. Wrap this joint with copper wire, and solder it well. To adjust for zero-zero control, unsnap the clevis, and turn it to suit. This system works quite well; it shows no signs of binding or fatigue.

While the soldering iron is hot, add the wheels. Bind and solder the lead-outs, too. The tank is glued in place with silicone caulking glue. This keeps it in place and also helps to absorb some of the vibration. Add the engine, along with the out-thrust washers. Engine offset is important, since you do not have rudder turn to keep the lines tight. Run the fuel line and filter to the engine, add prop and spinner, and your Bonanza is ready to balance. Add lead to either end to make the model balance in the correct position, securely attaching the weight.

When the calm weather arrives, it's time to test your new ship. I had to wait for the snow to melt! Fire up the engine, and get

ready for a long day at the flying field.

The Bonanza is very smooth and responsive in the air. It will turn tight corners—both inside and out. The inside corners tend to be more crisp than the outside, so you may need to over-control on those outside squares. It doesn't take long to get the difference down pat. Now, just fill up the big tank, and have fun.

CL Scale/Boss

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to meet the fuselage. This space on the real Ryan (and many other planes of this type) was used as an air vent for engine cooling. If you eliminate this space by snugging the cowl to the fuselage for what you feel is a better appearance, you are making a serious mistake. Not only are you eliminating a good cooling vent, but you are also downgrading your static fidelity score by not following the real plane's construction. Also seen in the side and front views are cowl outlets for the engine exhaust stacks (B), the main lower cooling vent (C), and air intakes (D), (E), and (F).

Every effort should be made to utilize all cowl inlets and outlets to their maximum for engine cooling. In this case, make use of the exhaust stack outlets for venting the model's engine exhaust. This can be accomplished by installing an exhaust manifold (such as one made by Tatone) on the engine and running neoprene hose of appropriate size through the cowl's exhaust stack openings. Also, be sure to cut openings into the cowl for all other inlets and outlets marked G to F in the sketches. The object is to get the best possible airflow over the engine and through the cowl (note the dashed lines representing airflow in the sketch).

A general rule I have used on my own scale models (it has worked successfully for me) is that the total cowl air outlet area should be at least *twice* the size of the inlet area. In addition, the air coming into the cowl is directed toward and over the engine cooling fins. It might even be necessary, with some models, to build baffles, etc. to be sure air is flowing directly over the engine.

Sketches B and C are further examples of cowlings that could present engine-cooling problems if not handled properly. In Sketch B, a P-40, and Sketch C, a radial-engine-type cowling, the builder should take advantage of the cowl flap area for engine-compartment cooling. In both of these cases, the modeler should modify or construct the fuselage or engine nacelle in such a way that the area under the cowl flap location will be open and free of obstructions. The next step would be to simulate open cowl flaps by cutting and bending an aluminum cowl (if used) at the proper locations, or to make the cowl flaps of a material appropriate for the model under construction. Providing engine cowling openings in this manner will generally permit a sufficient amount of air to pass through the model's engine cowl for proper engine cooling. In the case of the P-40-type models, you might even want to provide additional openings in and around the dummy inline engine exhaust stacks. Even these small openings will provide a surprisingly good amount of airflow from the engine compartment.

Remember, study the real plane's engine cooling details, and take advantage of every possible opening when constructing your model. A little extra thought and ingenuity on your part will go a long way toward a cooler, better-running engine. Who knows, you might even want to try the ultimate some day—working cowl flaps which will not only provide the necessary engine cooling, but will also provide extra points for an in-