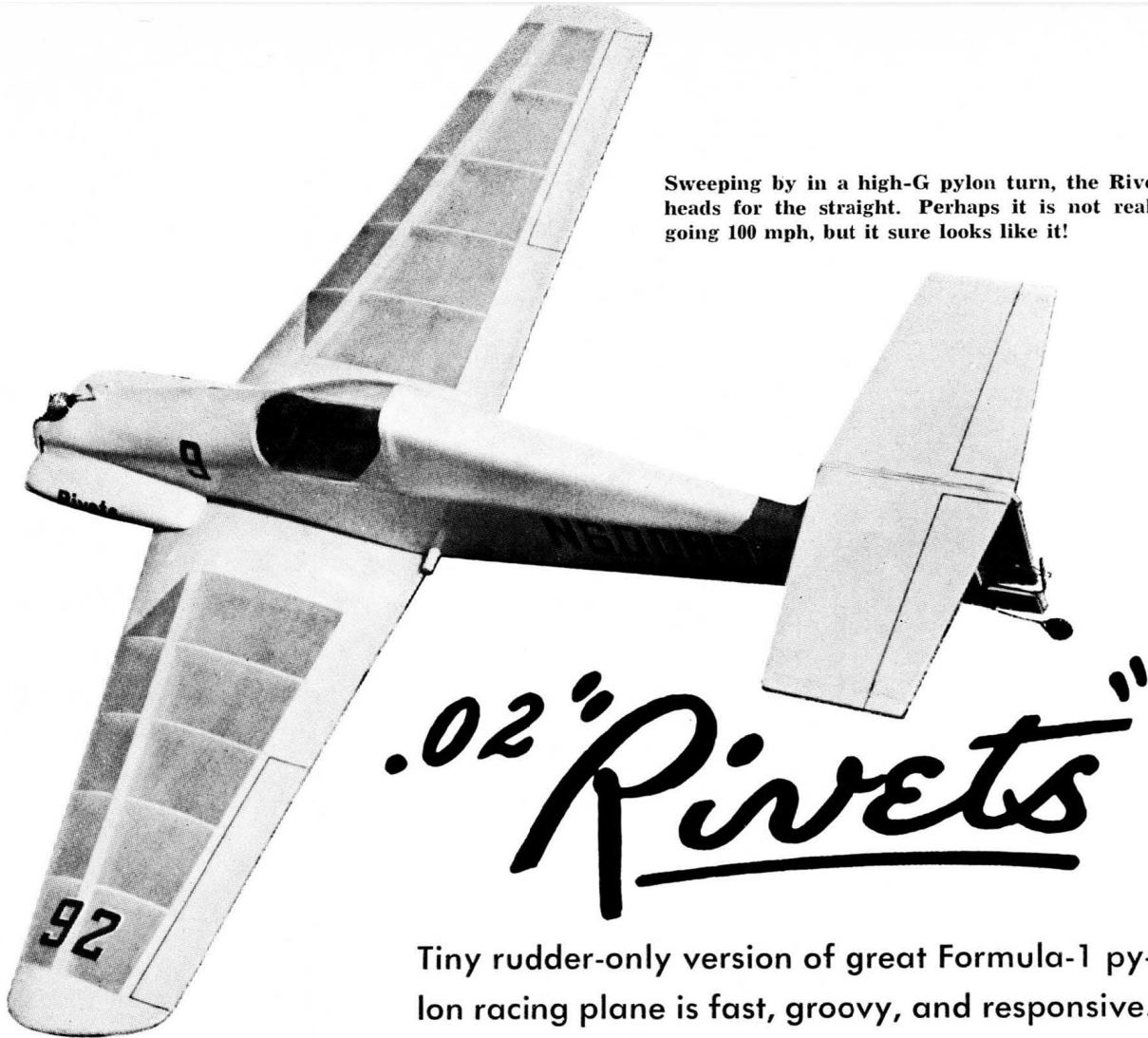


Sweeping by in a high-G pylon turn, the Rivets heads for the straight. Perhaps it is not really going 100 mph, but it sure looks like it!



Tiny rudder-only version of great Formula-1 pylon racing plane is fast, groovy, and responsive.

OWEN KAMPEN

THINK small! Until recently the size of an R/C model was dictated by the size and weight of its electronic payload. Now with the availability of systems in the 3-ounce or less range, many small models are possible. Rivets is one. True to its prototype, it is small in size but not in performance. It's a mover, fast and responsive, not for slow reflexes and definitely not for the novice.

In this day of big displacement engines, the tiny Cox T.D. 02 powerhouse tends to be regarded as a cute novelty. Don't be misled for this engine-airframe combination can create plenty of excitement on rudder only. While fast, it is also honest, a groover

in the turns, with a flat power-off glide when properly trimmed and balanced.

When designing small planes I have tended to avoid a low-wing configuration for rudder-only use as the need for excessive dihedral tends to destroy scale-like appearance. Being aware of the fact that a sharply raked-back leading edge contributes to dihedral effect I have long considered Rivets as a possible answer.

The T-tail effect was also something I wished to learn more about. It seemed ideal for permitting uninterrupted airflow to the rudder, rather important when that's all you've got. Flight performance has borne this out as this little one really reacts to a command.

Not wanting to re-invent the wheel, use was made of many photos and drawings,

and a special kudo is due Joe Foster for his unknowing contribution. The small one was completed shortly before the '68 Mid-winter Toledo Conference and there received considerable interest from spectators and judges alike.

Surrounded by large ambitious projects, the little Rivets seemed lost but before long it became apparent that it possessed a special appeal. For reasons still not clear, everyone wanted to touch—pet—bounce and hold it. I had thoughts of renaming it "CUDDLES."

Rivets claimed a victory and came home with an award half as large as itself and all was well except for a nagging doubt. Would the cute thing fly? Well, it almost didn't.

Early attempts with Dick Adams at the controls were borderline at best and at times almost disastrous. Behavior was erratic and at least 150 feet were necessary for recovery from steep spiral dives. One session was enough and Rivets was retired to a hook on the wall—head down in disgrace. I salvaged my damaged pride with the philosophical observation that "you can't win 'em all." It was Rivets' first defeat. For several weeks other projects took priority and Rivets was allowed to gather dust.

All would have ended there had it not been for a visit from Carl Goldberg. After giving his usual fine talk and demonstrations for a record MARCS turnout, we spent a delightful evening together. At one point attention turned to the "hung up" Rivets and its failure to perform. Carl looked things over and then chided me for giving up so easily—for not accepting the challenge of the designers' art. His words really reached me and, feeling a little ashamed, I went back to problem solving.



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Rivets

Fin area was reduced, stab area enlarged, CG moved forward and VOILA! the aerodynamic problem was identified and solved. Careful inspection showed it to be a binding linkage at the actuator! In such ways are we humbled. Embarrassing as the experience was, it is mentioned only to serve as a reminder that attention to "obvious" details can and do spell the difference between success and failure.

Now a word here about the guidance system. As space and weight are limited, a small package is a definite must and the Adams Baby Actuator is coupled with Ace Radio Control's Commander DE superhet receiver which is designed for actuator use with the "add-on-switcher" built into the circuit. The small size and weight plus excellent range and sensitivity make this a winning pulse proportional combo at a bargain price. Two 225 mah nickel-cadmium button cells and a small switch complete the works at an all up weight of about 2½ ounces.

Any rudder only or Galloping Ghost pulse transmitter will handle the remote controlling. Just be sure to follow actuator instructions with care—no binding linkages for instance. Also, no pushrods here—torque rod only and please keep the battery voltage at 2.4V. for the whole works. The actuator can be mounted on a 1/16" ply slide for quick removal.

Trim and Flying: It is important to re-

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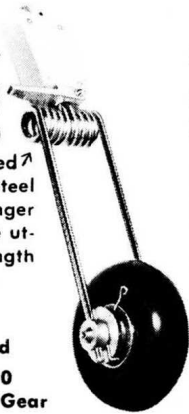
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member that *all* small airplanes are subject to *scale effect*. To simplify, this means that wing loadings of 10-15 ounces per square foot on a wee-one are the equivalent of a 20-30 oz. loading on a five or six foot model. The exact ratio is not important here but the principle is. With limited area a wing must fly faster to create lift, with the result that there is less speed spread between power on and power off. Because of this, trim and balance are more critical. The little ones are less forgiving. Rivets is no exception.

You will find that 1/32" of stabilizer trim has a positive effect on performance and small changes of the CG or balance point do likewise. Regarding the latter — because of the wing taper, the CG as shown on the plans must be measured balancing the plane at the wing roots — not the tips. It's easier to measure with the ship held upside down. A forward CG will give you a more stable tracking flight with less noticeable stabilizer trim effect — while a forward CG will produce an opposite effect. The force arrangement shown on the plans gives a fast grooving flight but not for loops — be sure you have plenty of altitude before holding the nose down, for recovery takes lots of air space. A final comment on landings. Set up the approach and leave it alone! Major last minute corrections will only dump lift and the plane as well. As mentioned, when properly trimmed, the glide is fast and flat — if you don't disturb it.

While the foregoing comments may seem on the negative side, they are not intended as such. A scale racer such as Rivets has been designed to do certain things well at the expense of some limitations which should be respected. This is just common sense. A trainer it is not. An exciting performer it is. To put it another way —

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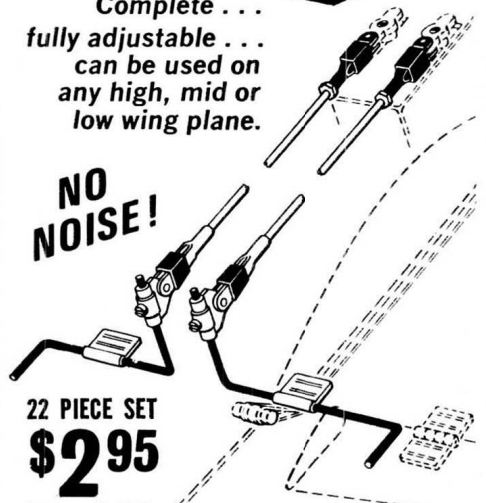


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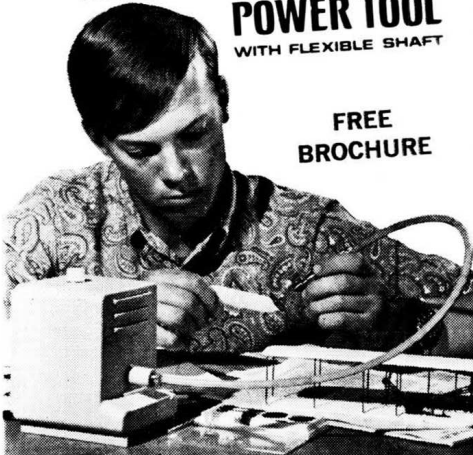
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Bill Falck did not design his racer to replace the J-3 cub.

CONSTRUCTION NOTES

Fuselage: Cut out the sides from rather stiff 1/16" sheet balsa. Locate and glue F2 and F3 in place on the right side. When dry, glue the left side in place holding down with weights and/or pins. Use contact cement to add the 1/16" sheet vertical doublers between F2 and F3 and glue the 1/8" square stringers to the bottom of the sides. Glue and clamp the rudder post in place. Make sure it's vertical.

Install 2-56 blind nuts in F1 to take the .02 engine bolts and epoxy F1 in position at the indicated side and downthrust angles. Locate and glue F3A and when dry add the 1/16" sheet rear decking. Sand the bottom edge to fit the sides and use a block to sand the top edges flat.

Add the soft 1/4" sheet top to cap the deck and add the fin, being careful to align straight. Round off the corners of the deck and use plastic balsa to fillet around the base of the fin. Add the stabilizer saddle to the top of the fin and brace with a 1/4" triangular strip. Be sure there is zero degrees incidence. Add the 1/8" square strips to F1 and F2 and glue cockpit dash panel F2A in place. Add 1/16" crossgrain cockpit "floor."

Cover the forward fuse top with 2 pieces of soft 1/16" sheet, moistening them on the outside so they will bend without splitting. Take time to fit carefully before gluing. Add 1/4" nose doublers and install a 1/2 oz. tank or make one of thin brass. A cylinder 1 1/4" long by 7/8" diameter will give double the normal Cox tank time. (Note: if the regular Cox tank is used, the motor bulkhead F1 should be positioned 7/16" further back than shown on plans.)

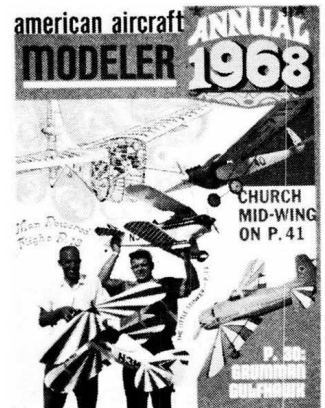
Glue the 1/2" bottom nose block in place

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and round to shape. Carve the cheek blocks and oil cooler fairing and glue in position. Leave the bottom face of the cheeks until they can be fitted to the leading edge of the wing. Around the tank and battery compartment use foam — use white glue to avoid "melting" the foam.

Install the torque rod and finish sheeting bottom. Don't add the cut down canopy until ready to paint. Don't add the rudder until all doping is completed and dry. Keep your finish light: 1 sealer, 2 coats of clear, 2 color and one clear should do it.

Stabilizer: Choose light wood. The 3/16" x 3/32" edging helps considerably to reduce warping.

Wing: Locate rib notches from the plans.

Make sure the landing gear is firmly anchored. Covering was colored silk and clear dope. Again — keep it light. Attach the wing to the fuse for the addition of the back section of the oil cooler and soft block to blend in with the fuse bottom. Anchor the forward wire holddown hooks with epoxy.

Try different wheels if the CG needs adjusting. Good luck and have a ball!

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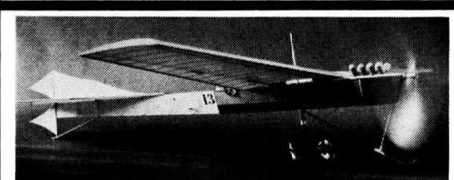
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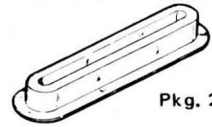
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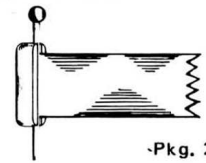


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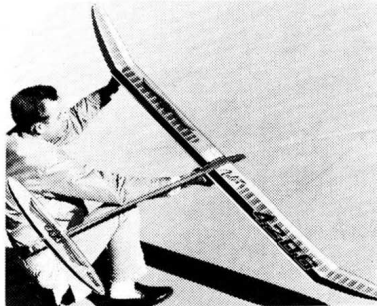
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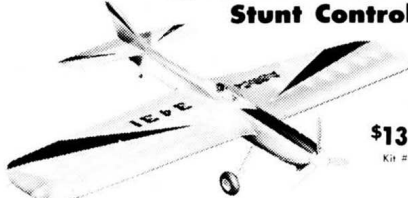
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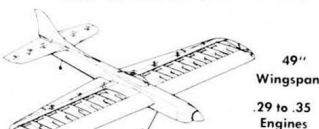
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