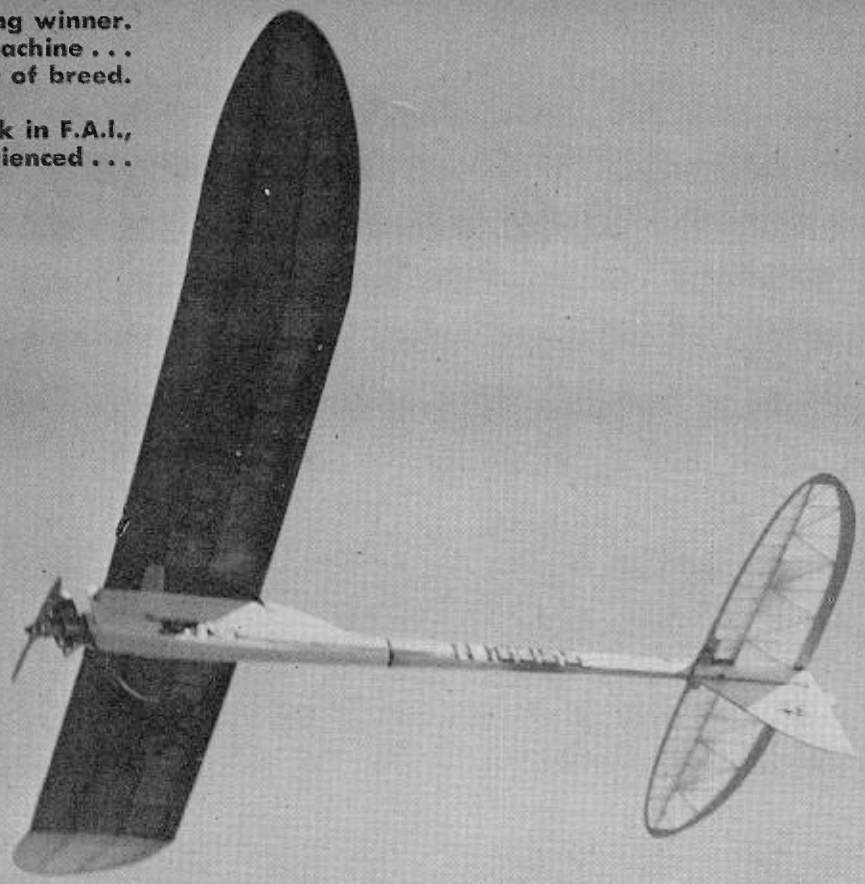
A well-deserving winner.
This is a fast-climbing, soaring machine . . .
Clean of line, the best of breed.

You need far more than luck in F.A.I.,
competition is keen, able, experienced . . .



1965 F.A.I. WINNER at the NATIONALS:

ROGER SIMPSON'S F.A.I. "CENTURION"

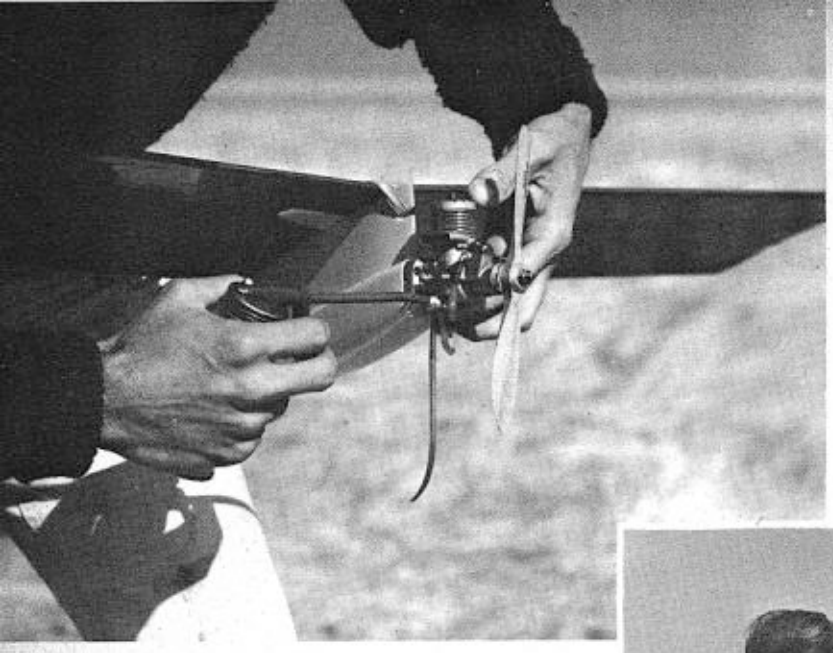
Note underslung fin and triangular fuselage. A stab free to pop-up without altering fin trim.

▸ The "Centurion" was my first try at an F.A.I. power model with elliptical surfaces. Other modelers claimed it made a cleaner model which should be faster in the climb. I was curious to find if such was the case, as no matter how good the model you are flying, something can be done to make a better model.

I decided to design a new model with elliptical surfaces, as the model I was flying had been developed just about as far as possible in regards to its climb, without changing its layout, moment arms, airfoils, etc. Also the glide was good but one is always looking for some way to improve it.

The model would have more total area than my previous design (600 square inches projected, instead of 570), slightly different airfoils, and less dihedral in the wing. These three changes I believed would improve the glide. I used a shorter tail moment as

FULL SIZE PLAN AVAILABLE THRU "MODEL PLAN SERVICE"



Downthrust clearly visible. A hot .15 engine. . .

1965 F.A.I. WINNER at the NATIONALS:

F.A.I. "CENTURION"

. . . continued . . .

A vertical tune-up to suit the climb angle. An easy aircraft to lose, so always set your D/T.

Feed it hot fuel & thermals. Centurion-Go-Go.

Elliptical tips, undercambered soaring section.

the new stab would have a much higher lifting airfoil and too long a moment arm with the planned airfoil could result in a disasterous over-the-hill climb or prolonged pullouts.

The model was first flown in March 1965. I can't say the model flew perfectly from the start. I didn't have enough left thrust in it for its first flight and it went straight up and straight back down to its right. After I repaired the fuselage and put in another washer increment of left thrust I got it flying pretty fine. More flights resulted in taking out some incidence and adding some downthrust to achieve the straight-away climb I use.

After I got the "Centurion" trimmed out, it has been a very consistent model. Flying in Air Force competition, you fly in all different parts of the country. The model was trimmed out here in California, flown in two Air Force contests in Texas, where it placed first in one and second in the other. It was then flown at the Nats at Willow Grove NAS, Pa., where I won 1st in Open F.A.I. power for the second year in a row. Back home again here at Sacramento, I flew the "Centurion" in a NCFFC contest on September 19th and set an AMA record of 34 minutes 45 seconds. In as much as most of the design features incorporated into the "Centurion" were aimed at improving its glide, plus the fact that it is a larger model, I believe the model is quite an improvement over the previous design, as it climbs as high, if not higher, and certainly outglides it.

CONSTRUCTION

WING: Be sure you use spruce for the spars, as you will need the strength it gives, and the same thing applies to the use of plywood for the dihedral braces. The tips can either be lami-

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nated around a ¼" plywood form, or you can stick pins in your building board to make an outline to bend the balsa strips around. Soak the balsa strips in hot water so they will be extra pliable when bending them.

I used Weldwood Plastic Resin as a glueing agent, (available at any hardware store) it is a powder that you mix with water, so it adheres easily to wet wood. Form your leading and trailing edges, then cut them to their exact shape and sand the bottom side of them before constructing the rest of the wing. Cover the wing with silk and dope as desired.

STAB: The construction of the stab is almost identical to the wing. Do not leave out the 1/32" balsa shear web as it serves the purpose of a full depth spar. Cover with tissue and give it at least five coats of dope.

FUSELAGE: As the fuselage is built in a triangular shape, I've been asked more questions on its construction than on all other parts of the model put together. Therefore I'll try to go through its construction step by step. However I'd like to point out to those who hesitate to build the "Centurion" because of its construction, that a box type fuselage is plenty good, and for models, is just as streamlined as the teardrop section. I've built all of my F.A.I. power ships with the teardrop type of construction for three years and I guess you just build what you are use to. But, why not give it a try, I was the same way with tapered tip wings before I tried this elliptical business.

Start by cutting the pylon core out of 3/32" plywood. Cut out the holes for the No. 6 Perfect tank (laid on its side) and for the ¼" aluminum nutplate Then cut out the two ⅛" plywood runners that go on each side of the pylon core. These runners will each have to be notched so they fit over the nutplate. Place the nutplate in the core, clamp the runners in place and when everything lines up, drill down through the core into the nutplate with a No. 43 drill bit. Then thread the nutplate and the core with a 4-40 tap. The runners are then laminated onto the core.

While the runners are drying, glue the notched ⅛" x ⅜" spruce backbone into place, being careful it is extended straight, also glue on the spruce brace right below it. Next, using a 3/16" sheet, laminate the balsa fill on each side of the pylon. After it is dry use a small hand plane to bring it down level with the runners. Sand the sides smooth and then shape the pylon into a streamlined section with coarse, then smooth sandpaper.

The firewall is laminated from three pieces of ¼" plywood. Cut the two back pieces to shape before gluing them to the front piece. Cut the motor mount out of a piece of ⅜" aluminum. Drill all of the holes in the mount, then clamp the mount and the firewall together in a vise. Using the four outer holes in the mount as your guides drill the mounting bolt holes in the firewall. Since the firewall is smaller in the back, all the mounting holes will have to be angled in.

While everything is lined up, drill the holes for the fuel, pressure, and

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flood-off tubes. Do not finish the mount to its final outline until the entire fuselage is completed. The tank is modified as shown on the plans.

The next step is to assemble the pylon, tank, and firewall. Slip the tank into place and slide the firewall onto the the tubes extending from the tank. Now bend the tubes a little to get the firewall properly aligned with the pylon. When everything is positioned, use an epoxy resin glue to stick everything in place. Next cut the top and bottom lengthwise formers to shape. You will note on the plans that these formers come straight back from the rear of the firewall and jut out 1/16", so that they are flush with the 1/16" plywood doublers. From the rear of the doublers, the bottom former tapers to the exact width shown on the top view of the fuselage, and the top former tapers to zero at the rear of the pylon.

Next glue in the plywood doublers with epoxy resin glue. Inset the upright formers and splice backing, and glue on the ¼" sheet top. When dry, sand the formers and top flush. At this point I use a simple jig to make sure everything is lined up perfectly straight. At the speed this model climbs, if the rudder is out of alignment, you have had it. The jig is a very straight two by four board, long enough to hold the entire fuselage. Draw a centerline, then cut a 3/32" slot approximately ten inches long to hold the rudder in place during the rest of the fuselage construction. Draw out the fuselage bottom on a sheet of 3/16" balsa with a centerline drawn on it. Slot it for the rudder.

RUDDER: The rudder is simply made, sand the ⅛" balsa down flush with the plywood outline. Put waxpaper down in the slot of the jig so you don't glue the rudder to the jig. Place the rudder in its exact position with zero degrees incidence in it. Put glue in the slot of the bottom piece and slide it in place around the rudder. Pin it down to the jig making sure you line up the centerline of the bottom piece with the centerline drawn on the jig. Glue the ⅛" spruce longerons in place, then notch the bottom pylon former so it fits over the longerons.

Glue the pylon assembly in place making sure the pylon is exactly in line with the rudder. Pin the pylon assembly in place and adhere the backbone to the top of the fin. Cement in the fuselage formers and the 1/16" plywood braces under the stab rest position. When dry, take the entire assembly up from the jig and trim off the bottom sheeting outside the longerons. Next step is to glue on the ¼" sheet on the bottom front of the body.

Sand to shape after the glue dries properly. Glue the 3/16" sheet on the

(Continued on Page 50)

F.A.I. "CENTURION"

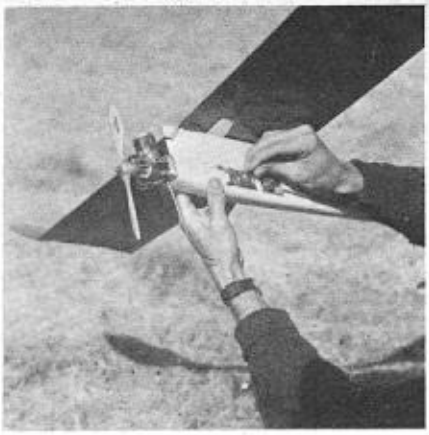
(*Continued from Page 39*)

sides at the front. When dry, trim it at the bottom, so the fuselage assembly can be repositioned on the jig once again. The ⅛" sheet sides are cut to fit and then glued on, using a lot of pins to hold it in place along the bottom and clamps or clothes pins to hold it together at the top. The fuselage is carved and sanded into a teardrop shape.

For covering the fuselage I prefer the strength and absolute fuelproofing obtained from covering the entire front end and pylon with fiberglass cloth and resin. After fiberglassing the front end back to about one inch behind the pylon, cover the rest of the fuselage with silk and dope to a high gloss. Mask off the rear of the fuselage and spray the fiberglassed portion two coats of Hobbypoxy. The fuselage complete with timers, engine, and mount should weigh 18½ ounces. The model put together must weigh at least 27.3 ounces, for F.A.I. competition.

TRIM

Before you go out to test fly your "Centurion," make sure you have 3/32" wash-in in the right inboard wing panel, and *"make sure you have the necessary left thrust!"* I try to build my fuselages with no side-thrust and then use washers between the backplate of the engine and the aluminum engine mount to shim in left thrust. To start with, use four washers left thrust. This may seem excessive to you, but if you don't have enough left thrust it will dork into the right immediately. If you have too much left thrust, the model will swerve left on the launch but won't come in.



Tandem mounting for fuel, D/T cut-off timers.

First test flights are made with full power and a maximum of two seconds motor run. The model should climb straight away. If the model tends to go over on its back add downthrust, (as a last resort take out incidence) until it climbs at approximately a 70 degree angle. Use the aluminum rudder tab only to control the last part of the climb to keep the model climbing to its right. As this is a very fast climbing model, all adjustments should be made a little at a time and above all, take your time and have patience. If you get in a hurry you may plant a "Centurion" tree.

The model should glide right, as when the engine quits and the left thrust becomes non-effective, the model will roll naturally to it's right, and right again in its glide pattern. I hope you enjoy flying the design as much as I have, GOOD LUCK. ●

Red and natural wood, good visibility, pleasure to watch it perform. Build and trim with care.