Reid Simpson holds RS-3 that has amassed an enviable contest record of seven firsts, five seconds and two thirds; developed over three variants.

RS-3

By REID SIMPSON . . . A screaming climb followed by a contest winning glide can be achieved with this auto-surfaced model that has proven an outstanding competitor on the European scene. Three years in the contest crucible has forged a thoroughbred capable of using high revving engines.

• The RS-3 is the third in a series of auto surfaced models, designed to handle all available power in a controlled, dependable manner. The result is a screaming climb, beautifully patterned, followed by a contest winning glide. It has proven to be one of the finest FAI power ships on the European contest scene during the past three years.

This latest version was redesigned in the late fall of 1967 to take advantage of the newly available, tuned pipe engines. The revision came about through realization that 1967 designs could not utilize these engines to their fullest capabilities. To replace your 19,000 rpm engine with one that not only turns 22,500 rpm but has a brute horse power increase of roughly 30 percent, was a chilly experience.

RS-1 was designed and built after arriving in Germany in the summer of 1966. It was a forward fin model with auto rudder but no auto stab. By the late summer of 1967, it had to its credit such wins as the Bavarian Championships held each year in Munich (the greatest model flying, folk singing, beer drinking contest in the world) and a first at the Air Force World Wide championships.

After returning to Germany following a wonderful "Nats" in Los Angeles, the RS-1 provided three more firsts at local level German contests before being retired in favor of RS-2. This newer and more advanced model has all auto surfaces with the fin moved to the rear of the stab, ala George French's Night Train. The RS-2 was extremely easy to trim with the auto surfaces, and won consistently with reworked Galbreath G-15's. But when the tuned pipe engines were mounted, the pylon proved to be too low, the stab airfoil too thin and the dihedral too shallow to provide the patterned climbs desired.

By this time my twin brother Roger had arrived in Germany and after hours of theorizing over many mugs of good German beer (more

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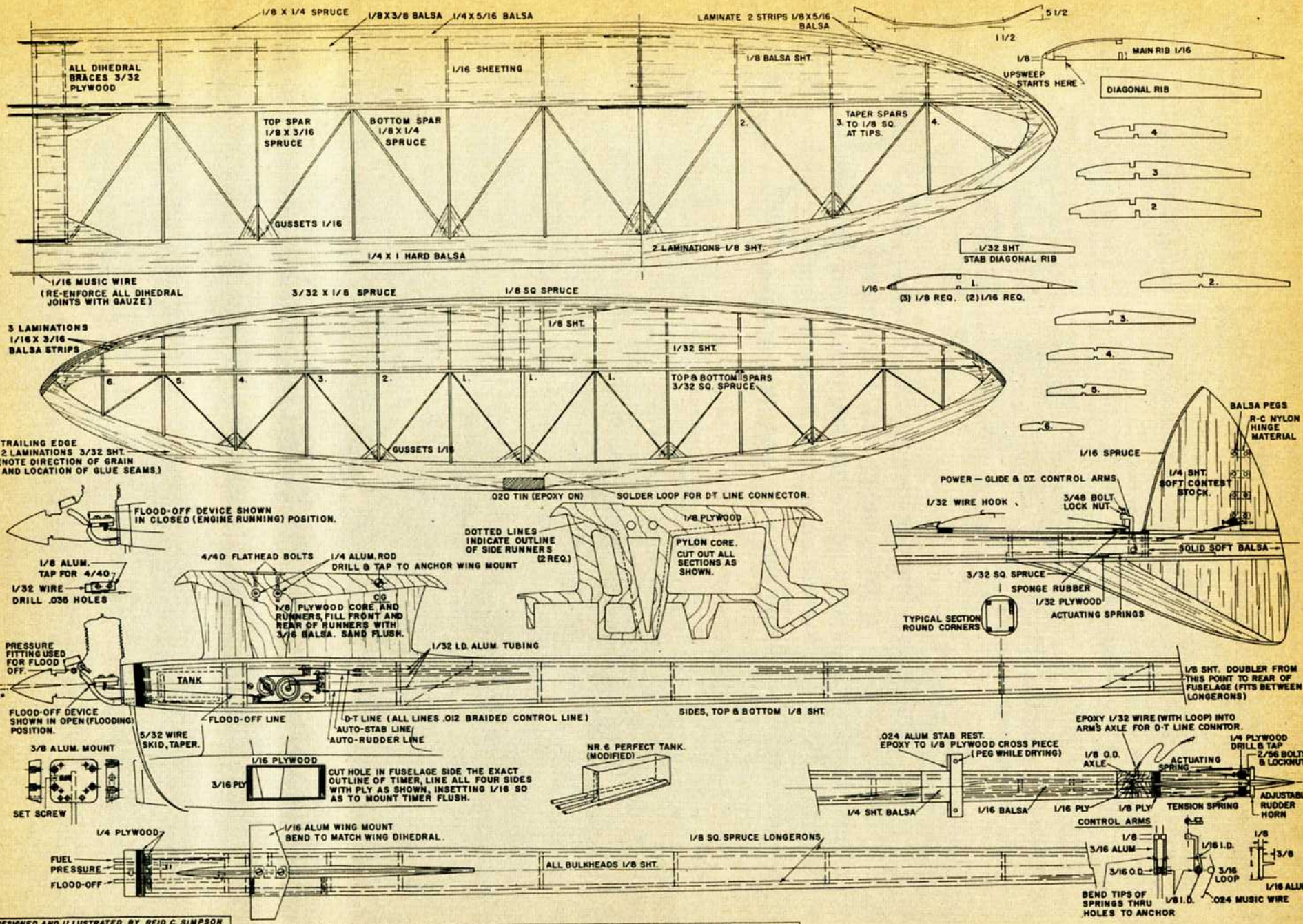

DESIGNED AND ILLUSTRATED BY REID C. SIMPSON

RS-3 — 3RD IN A SERIES OF VARIABLE INCIDENCE FAI POWER MODELS, STARTING IN 1966.

TOTAL PROJECTED AREA 595 SQ. INCHES
TOTAL REQUIRED WEIGHT 27.25 OUNCES

SUGGESTED BUILDING WEIGHTS:
STAB 1.15 OZ. WING 6.5 OZ. FUSELAGE 19.6 OZ.

FULL SIZE PLANS AVAILABLE — SEE PAGE 62

contests are flown, maxs turned and 29,000 rpm engines reworked at "Gasthaus" in Germany than at any club meeting I ever attended in the states), the RS-3 came into existence. We built two RS-3's apiece, and by late April, 1968, each had two finely trimmed piped bombs.

Roger and I really enjoyed flying at the various international contests and RS-3 compiled quite a record; seven firsts, five seconds and two thirds. In all cases but one (Europea Coupe), we have flown under the colors of the United States, have felt privileged to do so and have been tremendously welcomed by all.

I realize that, except for a very few, "auto surfaces" on a model have been looked upon about like a good case of Leprosy; something regarded as only used by those incapable of trimming out a model in any other way or for those who like to "tinker." I must admit that I shared this view. But the value of trimming out a model using auto surfaces is something you must experience to appreciate. Imagine this; as you tune your engine, feeling and hearing the tuned pipe jump as your motor comes in at 22,500 rpm, you can picture in your mind the complete power pattern. From past experience you know that this flight will be the same. You carefully check all surfaces, insure all timer arms are in place, release the timer stop and sling the living day lights out of your RS-3 at about a seventy degree angle. It climbs straight away until it reaches an altitude of 60 to 70 feet where it begins to slightly bend to the right, the wash-in in the right wing gently lifts as expected, and keeps the right inboard panel up causing the nose to go near vertical. The model continues straight up in a slight corkscrew pattern (one and one half turns in 10 seconds), still flying on its wings, obtaining maximum speed from the motor and maximum lift from the wing. All of this is possible since you are flying at only one half degree to three fourths degree of incidence. Now, just as the engine quits, to aid in its transition into the glide, your RS-3 bends over to the right and just at the right instant, your auto stab cuts in flipping your model back over its right shoulder and out into a slow floating glide with three degree decalage. Not possible, you say? Sure it is, just try auto surfaces yourself and see.

CONSTRUCTION: Since a properly seasoned wing is of utmost importance in the trimming of your RS-3,

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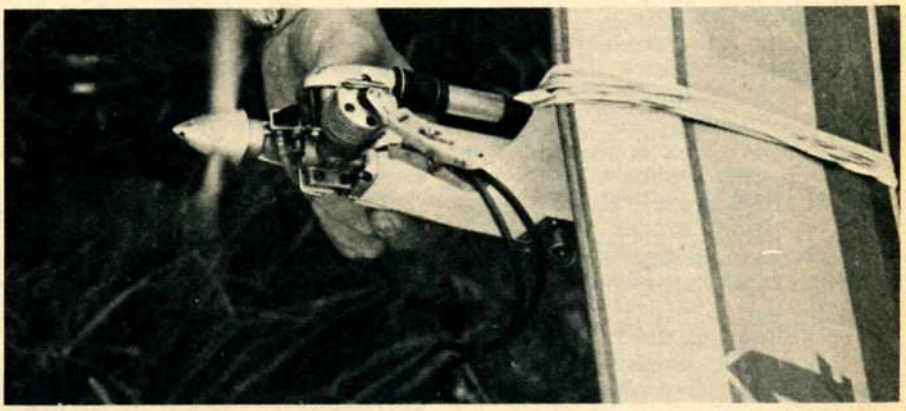
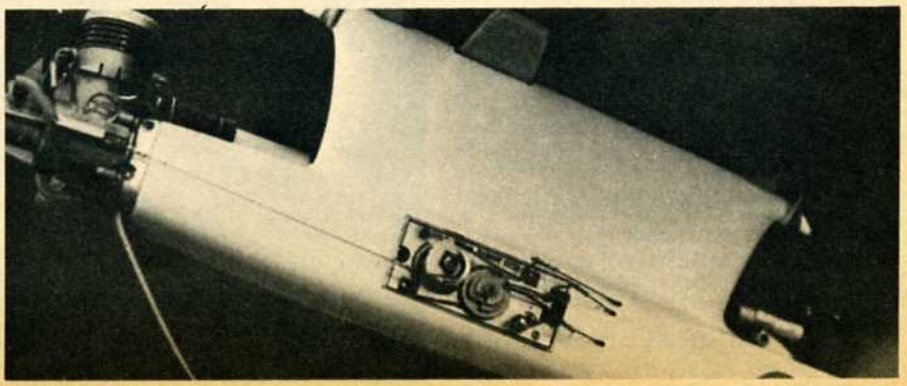
A good launch at the proper time is as important to the contest win as accurate adjustments.



The reworked, Super Tigre G-15 is peaked out for another fine flight; ship handles hi-power.



Timer installation is explained on plans, rig handles engine cut-off and the auto stab/rudder.

let's start at this point.

Wing: The construction is fairly standard, best described in a step by step building list:

1. Cut out the 8 required tip trailing edge pieces.
2. Laminate tip trailing edges as shown on plans with Resorcenal glue, allow to dry overnight pinned securely in place.
3. Laminate the 2-1/8 x 3/8 inch balsa strips to make the curved tip leading edge. I use a 1/4 inch sheet outline to form leading edges, allowing one overnight period to dry.
4. Carve and sand tip trailing edges, notch for ribs, and pin into place.
5. Pin formed tip leading edges into place.
6. Cut the two tip fillers from 3/8 inch sheet and glue into place — notch for 1/16 inch sheeting.
7. Notch and pin the main panel trailing edges into place.
8. Pin the balsa main panel leading edges into place. Glue the 3/8 x 1/8 inch horizontal leading edge backing strips into place for both the main panels and tips.
9. Pin bottom spars into place.
10. Glue ribs into place.
11. Glue top spars into place, make sure you taper the tip spars to 1/8" square at the tips.
12. Glue diagonal ribs into place. (Might I suggest you tailor fit each one, since their exact alignment insures against warps).
13. Glue rib gussets on trailing edge of ribs.
14. Pick all four panels up and after carving the leading edges to conform with the front of the ribs, block up the tip panels for the correct dihedral angles; glue in all required plywood braces.
15. Glue in all remaining dihedral ribs and adjoining diagonal ribs and gussets.
16. Block up the 2 wing halves to the correct dihedral angles and glue in all required plywood braces.
17. Sheet all four panels, sand flush with front of leading edge when dry.
18. Soak the spruce leading edges for the tips in hot water for five minutes, when pliable, bend, glue, and pin in place on wing tips, or use strips of masking tape to hold in place.
19. Glue spruce leading edge in place on main panels.
20. Carve and sand spruce leading edges to airfoil shape as shown on plans.
21. Sand entire wing with 200 sand paper, finish up with 400A.
22. Gauze all dihedral joints, rub at least three coats of glue into each joint.
23. Predope entire wing at least three times, sanding lightly between each coat.
24. Cover with silk or silkspan, apply at least eight thin coats of dope, I personally have been covering over my silk with Jap tissue for three years now. It's almost puncture proof and you can come up with some wild color schemes this way.

Stab: 1. Cut the 6 required trailing edge pieces from 3/32" sheet, being careful to align correctly with wood grain.

2. Glue and pin trailing edge pieces into place, allow to dry.

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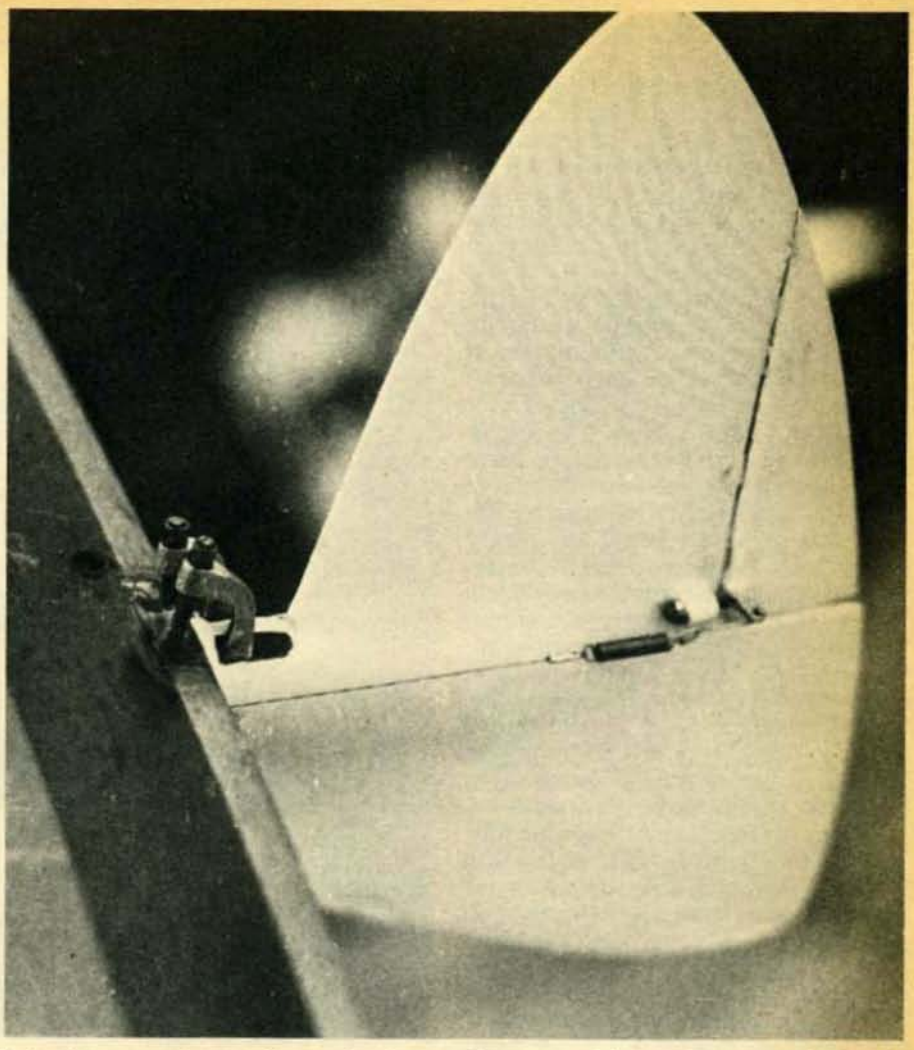
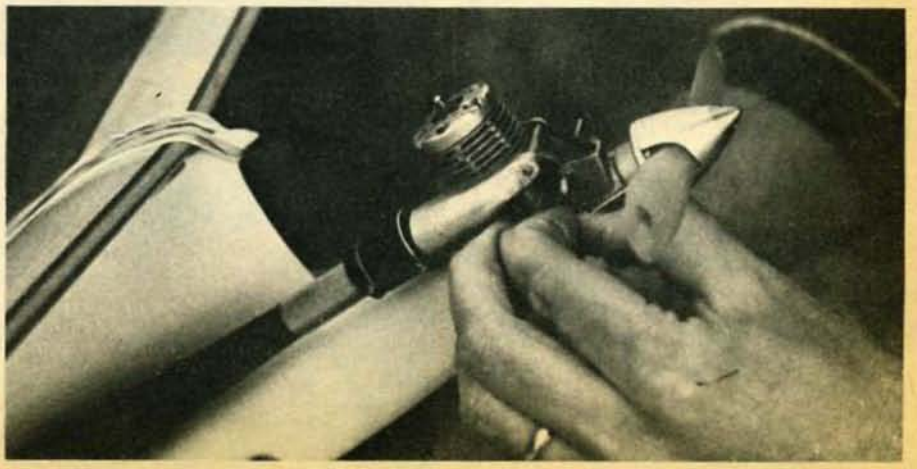


Stab adjustment and auto-rudder can be clearly seen in this photo. Rearward placement of the fin removes violent tendency to go hard right at launch; set all adjustments slowly with care.



Recent CIAM ban on the use of pipes for F/F will tone down that G-15 somewhat. Reid was getting 22,500 rpm from the mill and this converted to climb was something to behold; progress slows.

NO SPEED LIMIT

(*continuea from page* 54)

was called for whipping at this year's Nats and he was a little obvious, we noticed that he had completed ten full laps at the pylon when his plane had only completed five . . . how obvious can you get? The Speed Nats was a great series of events that proved the continuing popularity of U/C speed in all its many forms. ON TO CHICAGO! ▪

RS-3

(*continued from page* 14)

3. Bend three soaked 1/16" strips around a 1/4" sheet outline to form the curved leading edge. Glue with a water based Resorcenal glue and allow to dry over night.

4. Carve and sand trailing edge to shape.

5. Notch and pin leading and trailing edges into place.

6. Cut and glue into place the two tip fillers from 5/16" sheet balsa.

7. Pin and glue spruce and balsa leading edge backing into place.

8. Pin and glue bottom spar into place.

9. Glue all ribs into place.

10. Glue top spar into place.

11. Glue diagonal ribs into place.

12. Pick stab up from plans, sand leading edge to conform with front of ribs.

13. Sheet leading edge with 1/32" sheet, sand front flush.

14. Glue spruce leading edge onto front of stab.

15. Carve leading edge to airfoil as shown on plans.

16. Predope with at least three coats of thin dope, sanding between each coat.

17. Jap tissue, water shrink, and apply five to seven coats of thin dope.

18. Epoxy stab hooks into place.

19. Solder a small loop of 1/32" wire to the bottom of the tin plate hammer rest prior to epoxying hammer rest into place. Wire loop should be at least 1/4 in. long to protrude through bottom of trailing edge for D.T. limit hold down.

20. When finished with stabs, I always strap them down to a good flat surface and let cure for two or more weeks.

Fuselage: 1. Cut out the 1/8 plywood pylon center and the two pylon runners, then laminate with a good white glue.

2. Drill 1/4" holes for the 1/4" aluminum bolt hold downs. Prior to cutting these aluminum rods to length, drill vertically from the top of the pylon and through the aluminum rods, remove, tap, cut to length and bolt in place while epoxying in place.

3. Fill the sides of the pylon fore and aft of the side runners with 3/16" balsa, when dry, sand flush and taper the front and trailing edges.

4. One good straight grained sheet 3" x 48" of 1/8" balsa will do for both fuselage sides. Mark the outline of the fuselage with tracing paper or pin pricks, glue the 1/8" sq. spruce longerons to the 1/8 sheet prior to cutting the sides out. Sand edges smooth and square.

5. Cut the fin from the lightest 3/16" sheet you can possibly lay your hands on. Laminate the 1/8" square spruce along the bottom. Sand roughly to shape.

6. Glue the bulk head formers to the sides of the pylon.

7. Cut out the 1/4" sheet plywood for the firewall, laminate, drill for tank outlets and motor mount holes, fit and epoxy in the blind mounting nuts.

8. Cut the hole in the left fuselage side for your timer. Glue the three aluminum tubes for the auto rudder and stab to the left fuselage side, 1/16" ID is good, using scotch tape to connect the pieces.

9. At this point the tank must be completed. I use a modified "perfect #6 tank," inserting my own vent pipes.

10. Glue the two sides to the pylon formers, align carefully, measuring to be sure the incidence is correct in the pylon.

11. Pull the rear of fuselage together with the fin inserted in between, before making the final glueing, insure the fin is perfectly straight with the pylon. Now fill in from the rear of the pylon to the fin with the rest of the bulk heads.

12. Install the tank and firewall at this point, I prefer a good epoxy, allowing an overnight period for drying.

13. Sheet the bottom and top and install the stab rest.

14. Carve the corners of the fuselage round. Carve the fin to final shape. Round and taper the rear of the fuselage, fairing smoothly into the fin.

15. After completely sanding the fuselage, fiberglass the front 3 in. of the nose. Sand this smooth also.

16. Cover the fuselage from the front of the fin forward with silk, jap tissue the remainder. Finish with 10 to 12 coats of dope, sanding between the last four or five coats.

17. Install the auto stab power and D.T. arms and lines, also the rudder line and adjustment bolts. Install the timer and adjust the release arms so the auto stab and rudder are activated one full second after the engine quits.

18. Install the wing mount, engine and firewall.

19. Assemble the model, key the wing and make sure the CG is exactly as located on the plans.

20. The model should be test flown with the power incidence set as shown on the plans. The glide incidence should be about 5/32 to 1/8 in. higher (test glide in

this position with the rudder to the right). Adjust incidence and rudder for a slow flat wide circle.

21. I believe you will find this model as easy to trim as any you may have previously flown. With the fin in the rear, the violent tendency to go hard right at launch is gone. In fact all of the RS-3's that my brother and I have flown have needed some right rudder for power. With these models, power incidence plays an important part in the trimming. Too much incidence will cause the model to go too much to its right; not enough will cause a low straight climb pattern. Make your standard adjustments slowly, and good luck. ▪

ENGINE REVIEW

(*continued from page* 19)

ability, a performance range adaptable to a wide variety of requirements and all for a price that is low by any standards, domestic or foreign.

The recently introduced 36X R/C, the subject of our report this month, is a continuation of this basic formula, with the addition of a throttle type carburetor of typically distinctive Fox design for radio-control use. The result is an engine of notably good all round performance. Our test unit was a perfectly stock motor obtained from a Fox distributor. It started quickly, showed a very good power output, had excellent throttle response and was easy to adjust.

The carburetor fitted to the 36X R/C is a new design, the Fox Model 4-A. It is permanently installed in the 36X R/C crankcase casting and is not intended to be sold as a separate part for converting the regular 36X engine to R/C. The 36X R/C crankcase casting has been specially modified with a widened intake boss to take the careburetor plus an exhaust stack center post for the pivoted plate type exhaust valve.

The Model 4-A carburetor is an ingenious piece of work. Fox radio-control motors have always had rather novel carburetors. Instead of using airbleeds or devices for reducing fuel flow through a single jet as the throttle closes, Duke Fox has shown a marked preference for multiple jets as a means of maintaining correct mixture strength at various throttle openings. In the 4-A carburetor, three separate jets are used and these come into operation successively as the throttle opens. The amount of fuel released by each individual jet is adjustable, so that exactly the right mixture is supplied for idling, intermediate and high speed operation.

This is achieved without resorting to extra fuel lines or a lot of gimmickry that is tricky to adjust. All fuel is fed to the engine via a single inlet nipple cast into the back of the carburetor body. From here it takes one of two routes.

Fuel for the low speed mixture is bled off and goes vertically downwards through a small passage in the casting to enter the intake down-stream of the throttle valve. The amount of fuel admitted here (and, therefore, the mixture strength at low speeds) is adjustable by means of a small brass needle screw immediately behind the carburetor air intake. Fuel flows through this jet at *all* throttle openings.

Fuel for the intermediate and high speed mixtures flows through another (horizontal) passage in the back of the carburetor body, then forward through a hole in the throttle barrel housing. Here it is picked up by a 3/64 in. wide slot in the surface of the throttle barrel and conveyed into the interior of the barrel which is drilled through axially. The fuel is then discharged through two jets in the bottom of the barrel: a small one to the left (the intermediate jet — 0.025 in. dia.) and a large one to the right (the high speed jet — 0.040 in. dia.). Steps are formed in the bearing surface of the barrel housing so that both these jets are blanked off at low speeds and come into operation as the throttle is opened.

The amount of fuel metered to the intermediate jet is adjustable by means of a needle screw in the left side of the barrel, while the amount of fuel metered to the high speed jet is controlled by a similar needle in the right side of the barrel. Each of these screws is fitted with a short length of rubber tube which not only acts as a friction device but also effectively serves to prevent the leakage of air into the barrel, which could upset adjustment.

The idea of having to adjust three needle valves (plus a throttle stop screw) probably sounds a bit off-putting to those who find difficulty in adjusting less sophisticated throttle systems. Therefore, let us emphatically state that the 4-A carburetor is *not* difficult to set up.

The trick is to start by adjusting the idle mixture first. At low speeds (i.e. with the throttle valve less than one fourth open) the engine runs *only* on the idle jet, so you only have the idle needle valve (the small central vertical brass screw) to worry about. Simply adjust this like an ordinary needle-valve: in to lean the mix, out to enrich it, until the engine is idling smoothly. Now move the throttle arm to the midway position and adjust the left-hand (bypass side) needle for maximum speed at that setting. Finally, move the throttle arm right forward and adjust the right-hand needle.

This is all there is to it. (The maker's instruction leaflet on the 4-A carburetor gives additional information including the approximate initial settings on the nee-