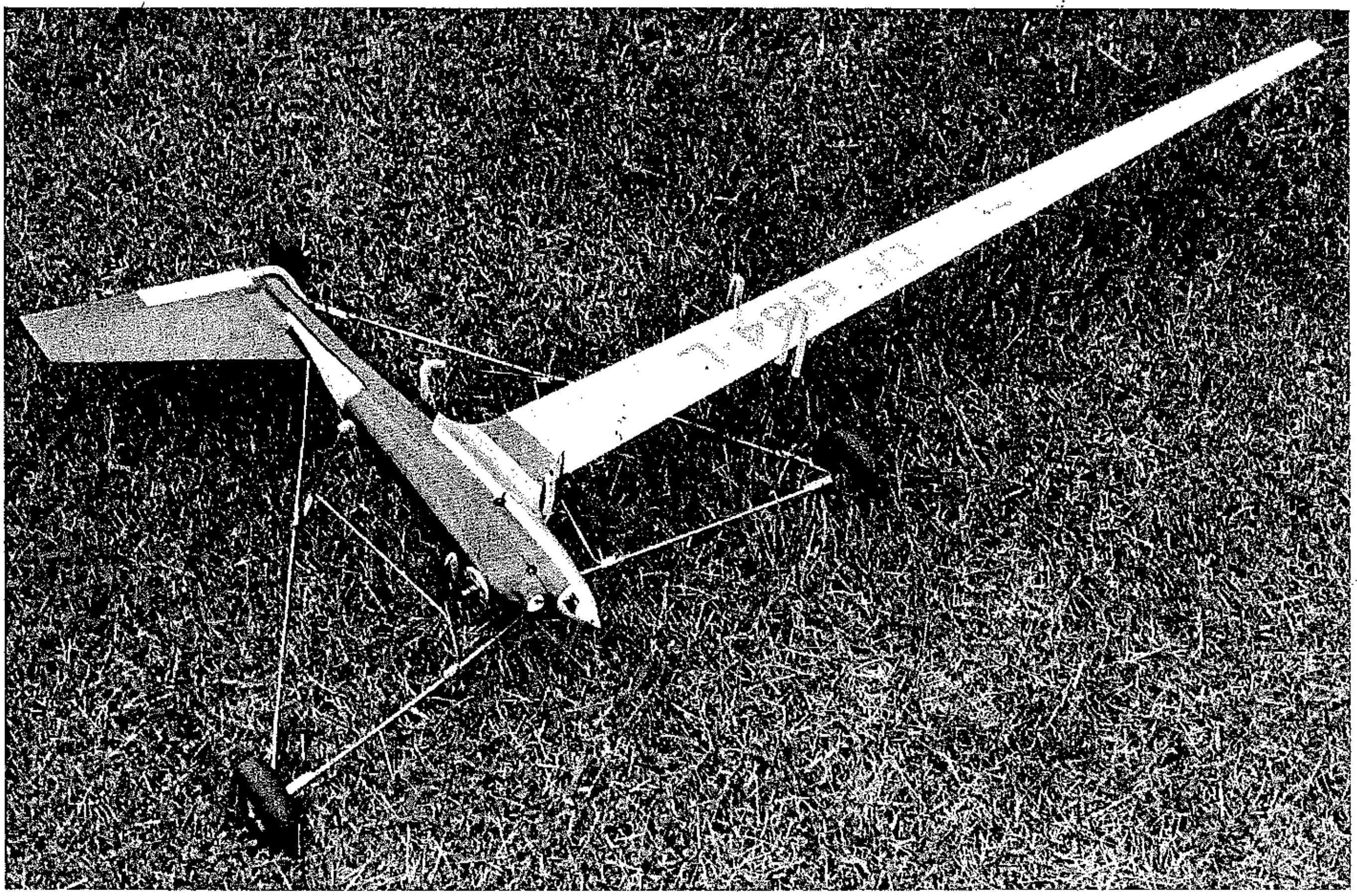
WILDFIRE



Novel construction techniques along with knowledge gained from prototypes place this plane on the leading edge of FAI Speed modeling.

This Canadian national record holder attests to just how much form follows function when it comes to the streamlined shape of an FAI Control Line Speed plane.

■Chris Sackett

MANY OF YOU will look over this design and ask yourselves how a model airplane ever came to look like this; and more to the point, why? The asymmetric Control Line model has been around since the 1940s, but it never gained popularity until it was discovered that there was much speed to be gained through the use of a longer inboard wing to cover up the two control lines used in FAI Speed. Chuck Schuette, the current AMA FAI class record holder, was one of the first to utilize asymmetry, and it caught on internationally in the mid-70s when two Hungarians took it to the limit with wings as long as five feet! The outboard asymmetric sidewinder model, as it is now known, is much more complicated to build than the conventional AMA-style Speed model, but all else being equal, it offers a three to four mph advantage.

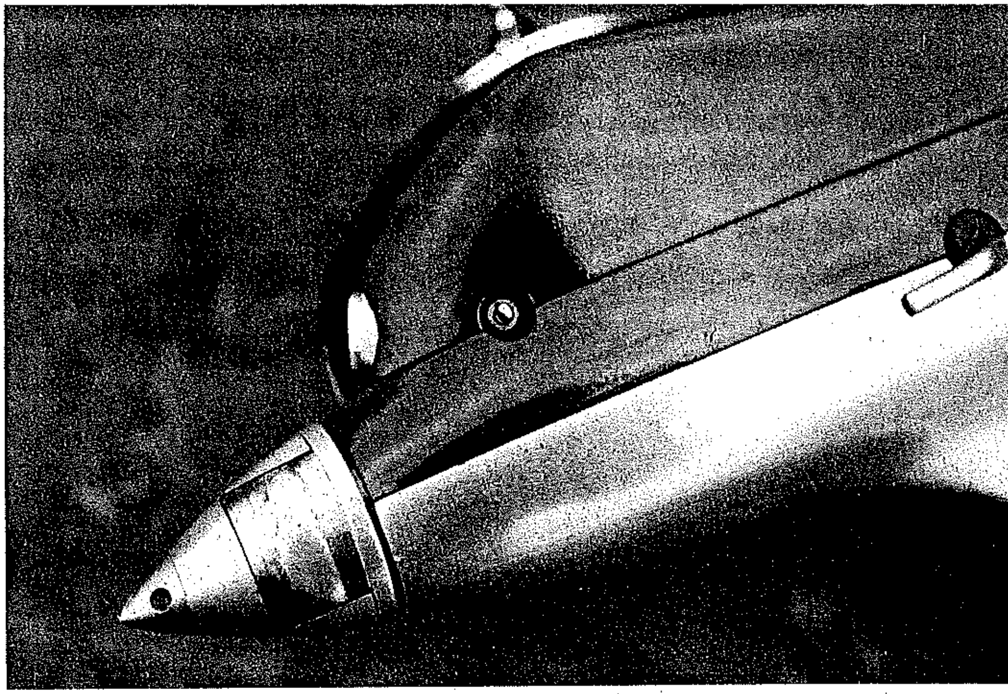
To understand why the FAI Speed models have evolved into the exotic creations they are today, it might be helpful to review a brief history of the event. The first Control Line Speed World Championships was held in 1955 at Croix de Berny, just a few miles outside of Paris. It was a rather loose affair, and there was no official team from the U.S. The airplanes were very small, high wing loading creations typical of the AMA ships of the early 50s. The fuel was unlimited, and the line diameter for two lines was .25mm. Jozef Sladky of Czechoslovakia won the event at 111.3 mph using his own engine. *(Editor: AMA files show the CL Speed World Champs history a bit different from this, there being a 1954 World Championships at The Hague, Netherlands. The 1954 contest had two Speed classes, 5cc and 2.5cc, and Bob Lutker of the U.S. won the 5cc class.)*

There was a second attempt at a World Championships in Czechoslovakia in 1957 *(Editor: Really a fourth, as the 1956 Speed World Championships was in Florence, Italy),* and team trials were held in the U.S. for models to be proxy flown, but contestants could not agree, and the models were never sent. It was not until 1960 that a World Championships was staged with a full U.S. team. At this time there were specific wing loading requirements but still unlimited fuel, and Monoline was acceptable (although its use was protested by the Italians). Ugo Rossi of Italy won the event by actually whipping the model, to narrowly beat 2nd-place finisher Bill Wisniewski 146 to 142 mph. This is the first time that models of the FAI size (77.47 sq. in minimum) were used.

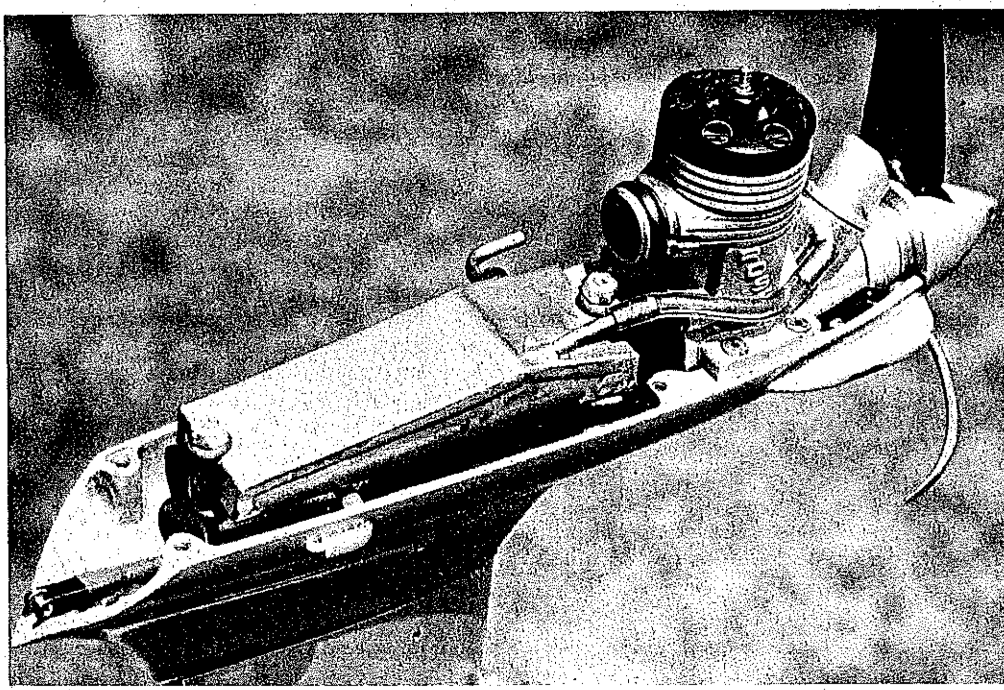
At the 1962 meeting in Kiev, the straight fuel combination of methanol and castor oil was first introduced. Chuck Schuette, one of the fathers of asymmetric sidewinder designs, attended as a U.S. team member but with a conventional symmetrical model. He flew an asymmetric backup ship in practice, and that may have been the Europeans' first sight of the design. At subsequent World Champs all kinds of asymmetric designs turned up—either upright semi-asymmetric or true 'dog leg' inboard full asymmetric.

Californians Chuck Schuette, Arnold Nelson, and Bob Spahr, among others, used the inboard design; a number of European speedsters, notably the Italians, were playing with the outboard layout plan (pan on the inside, engine head on the outside), and they were flying the concept on all classes of Speed, including the 10cc class. This is the basic design that is almost universally accepted now by all competing nations in FAI Speed except for U.S. team members, who continue to use the inboard version. One of the prime reasons for utilizing the outboard setup is to enable the modeler to use a pure suction fuel feed system. When the pan is on the inside, it makes room for a large hard tank inside the centerline of the venturi so the engine can have a richer mix during flight—somewhat like having a mild form of pressure. The system is simple, reliable, and the model becomes airborne quite easily.

When I first decided to design this model, I borrowed a lot of ideas and came up with some of my own, hoping for the best of all worlds. I wanted a long inboard asymmetric wing, an outboard fully asymmetric layout, a model that was as clean as could be expected (slim fuselage with enclosed pipe) and a two-piece shell for easy maintenance. As I was designing the model, Jurgen Lenzen, the West German FAI flier, had just made available a perfect sidewinder speed pan with integrated wing stub. I based the final design around this pan. (The speed pan is available from Jurgen Lenzen, Alfred-Dobbert Str. 57, 5600 Wuppertal 2, West Germany. Twenty U.S. dollars will bring it right to your door. The wing can be obtained from Sackett Products, P.O. Box 82294. North Burnaby B.C. V5C 5P7. The price is $30 U.S. The Rossi MK III is available from Rossi Sales of America, 1325 Carol Dr., Memphis, TN 38116.)



The two-piece cowl. The engine has a uniflow ram intake tube that is sealed to the cowl with a rubber grommet, and a Lenzen counterbalance is in the spinner. The needle valve has been shortened to facilitate engine removal without disturbing the flight adjusted setting.



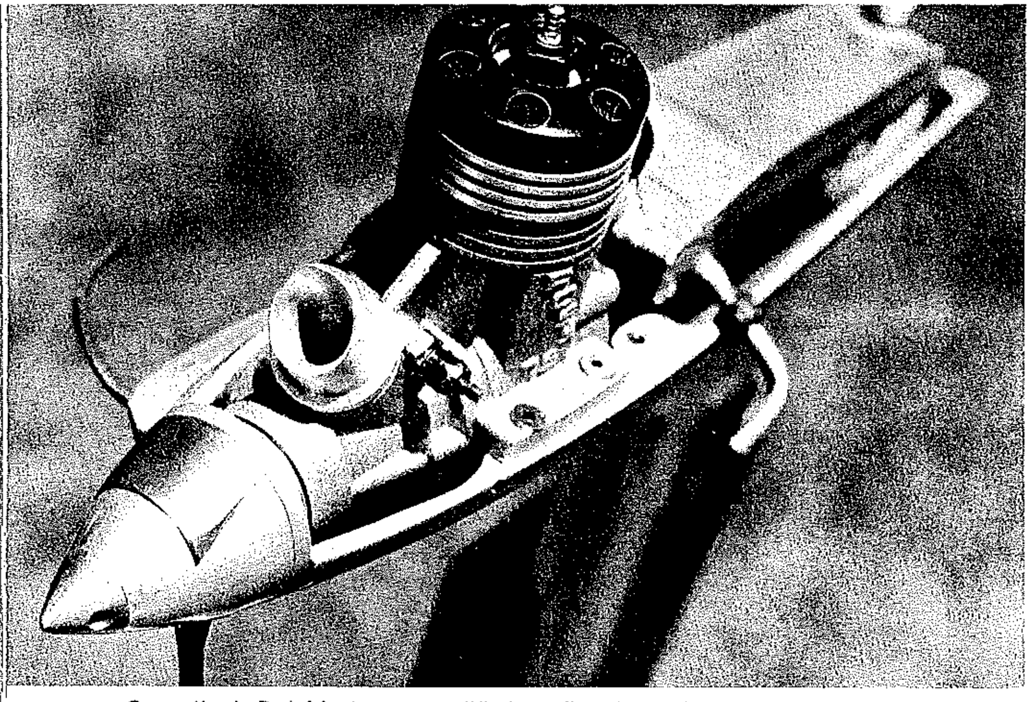
A suction-only fuel feed system has proven to be very reliable. Note the position of the overflow tube (for tank pressurizing purposes) and the quick-link pushrod connector.

The speed pan. Take an exact dimension from the front of the pan to the leading edge of the wing, and set up the speed pan carefully. The stock pan comes with the root chord too wide so that the leading edge of the fillet must be cut back to accommodate the 3-in.-wide wing. The dimension from the leading edge to the backplate of the spinner must be 3¾ in. You will have to grind the inside of the pan carefully to provide clearance for the Rossi .15 and to get the right location. Once you are satisfied, spray on some blue layout dye, mark the holes with a scribe, center punch, and drill and tap for 4-40 bolts ½ in. long.

Make up a jig to hold the pan at 90° while drilling, and make sure you don't drill through the casting. You must work with the utmost accuracy, as any sloppiness in drilling may give up or downthrust from the engine.

The next step is the installation of the spar and control system. The spar is formed from a piece of ⅜-in aluminum bar stock which can be found in most metal shops. Type 7075 is nice but not necessary. My original was built from a piece of soft aluminum and is working just fine. Cut a piece to 25 in., and taper it to 5/32 at the tip. Notice that it is not necessary for the spar to extend full length. The material can be tapered in a lathe or simply filed by hand with a flat, top and bottom.

The spar is attached to the pan by tapping and threading ¼-28. When tapping the pan, use a jig and drill press to assure accuracy. Test-fit the spar in the pan, and make sure everything lines up square. You may find it necessary to use small shims between the spar and pan in order to obtain the desired location. The wing alignment and incidence



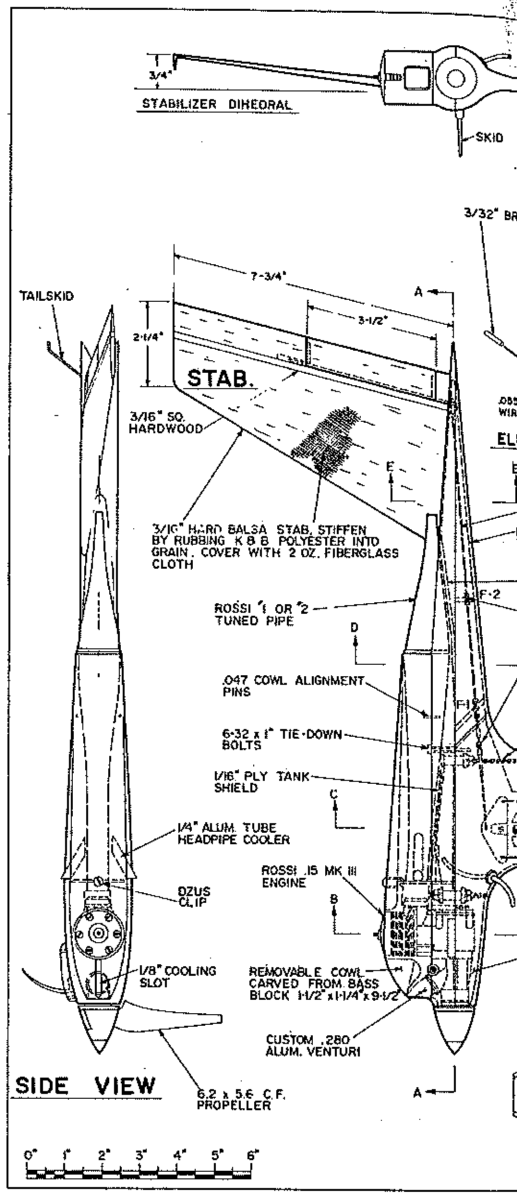
Our author's Rossi features a modified needle valve and a custom-shaped .265-in. aluminum venturi. The custom speed pan is available from Jurgen Lenzen in West Germany.

is set by the root fillet of the pan. The .010-in. wing skin slips over the fillet by ¼ in. By filing the fillet you can set the exact root angle of attack. Using a wing with the correct twist, carve .090-in. positive incidence into the root of the pan.

Wing. Making these aluminum wings is very simple, and once you've tried it, I think you'll agree that they are the quickest and easiest form of wing you can make. The material is ALCLAD 2024 T3 with a thickness of .010 in. Many Speed fliers find this material at aircraft surplus stores or around airports that do service work. The cost at these outlets is quite reasonable, and a sheet of 3 x 10 ft. will build many airplanes.

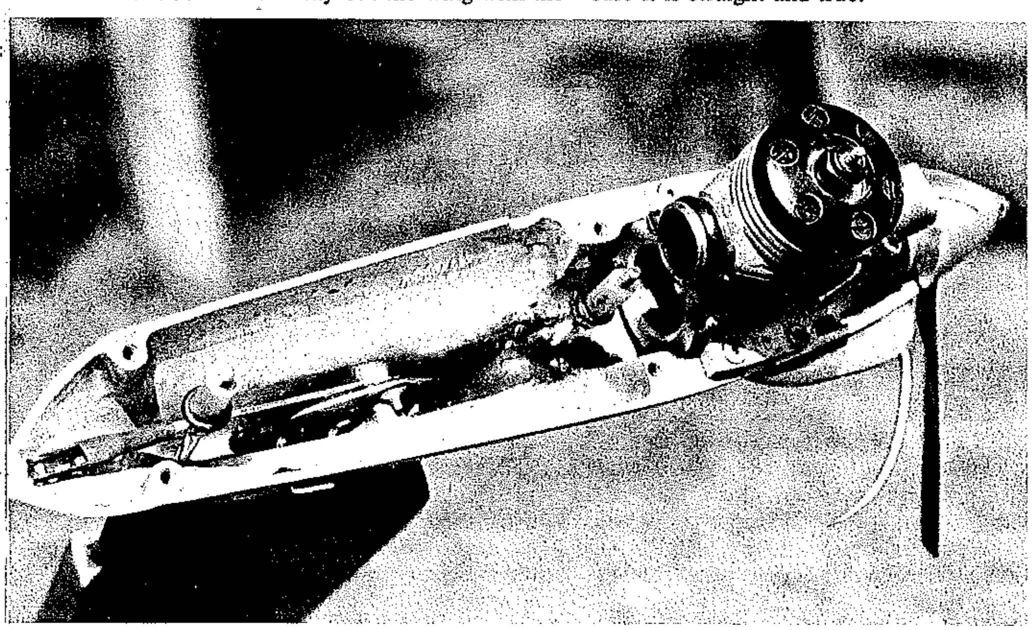
Determine the grain of the material first. It can be seen in the brushed effect the material possesses after being rolled at the mill. Be sure to lay out the wing with the grain running from the leading edge to the trailing edge. Otherwise the wing will split when being folded. Use a spray-type layout dye on the aluminum surface, and mark the pattern carefully with a scribe.

Cut the wing with a No. 11 X-Acto blade, scoring the aluminum skin three or four times. It is not necessary to cut right through, as the material will break off very cleanly when it is bent slightly. To achieve the airfoil section you must first bend the material flat in a sheet-metal brake. Failing that, you can clamp it between two pieces of 2-in. angle iron clamped in a large vise and use a third piece of straight angle iron to bend it to 90°. Remove it from the vise, and carefully bend it flat on a workbench using a couple planks of ¾-in. plywood. Try to flatten the fold to around ¹⁄₁₆ in. for a nice sharp leading edge. Open up to 30° using a couple pieces of sheet metal and making sure it is straight and true.

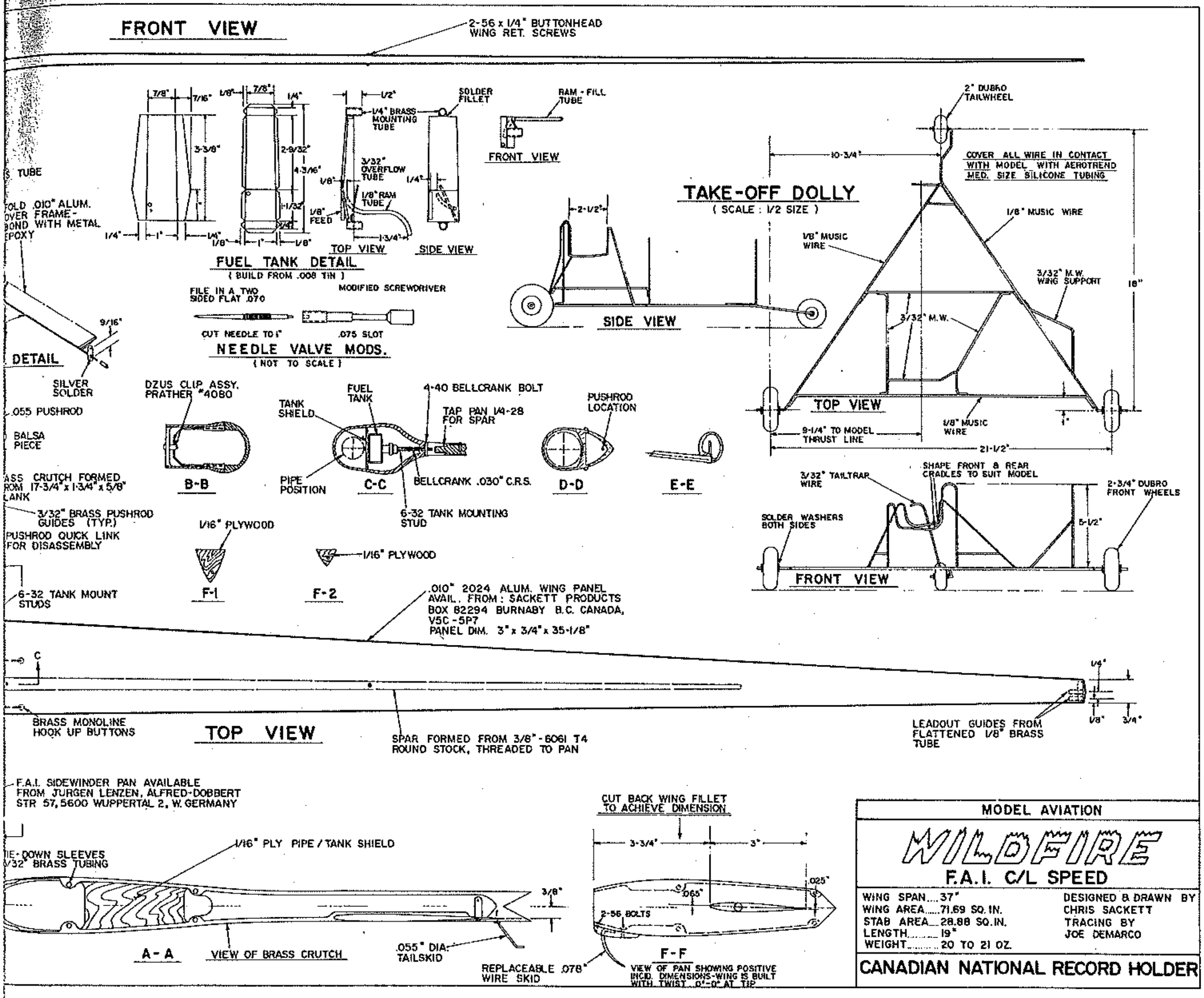


Rough up the inside bonding surface of the wing with coarse sandpaper, and bond with Goodyear Pliobond. Clamp the wing between two pieces of 1½-in. angle iron in a good-sized vise. Align it carefully until you get the desired airfoil section and a slight washin effect. Clamp only the last ¹⁄₁₆ in. of the trailing edge to get a true symmetrical airfoil with no polywog. Clamp the full length of the wing with small C-clamps spaced every 6 in. and bake in a 350° oven for an hour and a half. An alternate method of bonding the wing is to use 3M 2216 gray epoxy and clamp in the same manner. Use as little as possible, as the weight will build up quickly.

Bellcrank. Cut out the bellcrank from a piece of .030 CRS as shown on the drawing. Be sure to bush all holes with brass tubing. Cut a slot in the boss provided on the Lenzen pan to accept the bellcrank. The crank is anchored with a 4-40 flathead Allen screw which is tapped to the pan. To make a smooth bearing surface for the bellcrank, run some solder (approximately .080-in.) over the threads that come in contact with the bushing.



The bellcrank resides beneath the fuel tank. Two mounting studs hold the tank in place.



Cut out the exit holes in the pan at the wing fillet area for the control lines. The lines are attached using small Monoline buttons hooked up to the .047-in. lead-outs (see drawing). Finally, drill and tap two 6-32 holes for the tank mount.

Finish shaping the pan externally until you get the exact shape you want, then lap the engine mount surface with some emery paper and oil on a plate of sheet glass. Square all mating surfaces and true up, as much of the model's favorable flying characteristics will depend upon this.

The alignment of the entire model is based around the basswood crutch, so great care should be taken to get the stab mounting surface square to the thrust line. Start by laying out a centerline on both sides of the ⅝-in. crutch, and work solely from this reference line. Beginning with a square edge, locate and cut the stab mount area which should sit at a 7° dihedral angle ⅜-in below the centerline of the crutch. It's easier to keep everything aligned if you work with a table saw, but you can cut by hand if you're accurate.

Lay the pan on the crutch, centering

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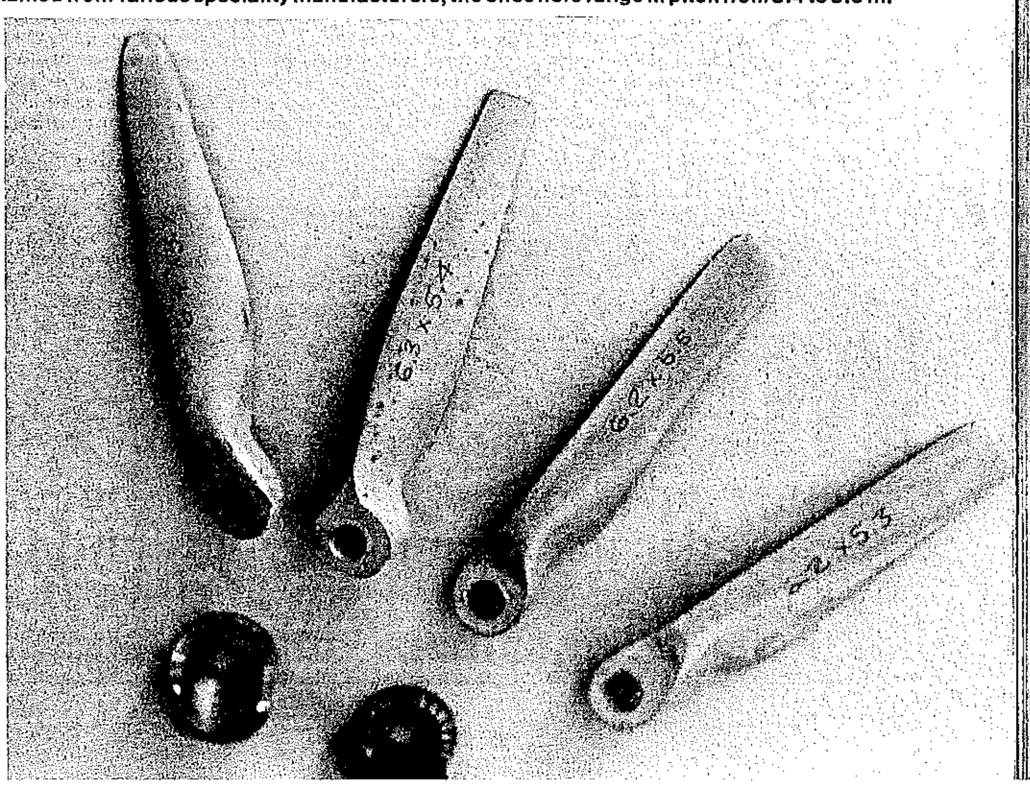
A variety of single-blade carbon fiber props with Lenzen counterweights. Props were obtained from various speciality manufacturers; the ones here range in pitch from 5.4 to 5.9 in.



performances. These Championships showed that aeromodeling is a sport which can unite competitors from all countries, and that no matter how good an individual may perform, all love talking about model airplanes. It should also be remembered that if you don't go, you won't learn, and learning is an essential part of improving your performance.

The contestants finished in the following order (best speed in kilometers per hour is listed): 1) Kalmikov (U.S.S.R.)—293.63, 2) Piskalev (U.S.S.R.)—288.00, 3) Mult (Hungary)—287.53, **4) Dodge (U.S.A.)—286.39,** 5) Chojnacki (Poland)—286.39, 6) Szegadi (Hungary)—285.26, 7) Kohaniuk (U.S.S.R.)—281.91, 8) Molnar (Hungary)—280.59, 9) Rachwal (Poland)—279.93, **10) Schuette (U.S.A.)—277.34,** 11) Novakowski (Poland)—275.22, 12) Ding (P.R.C.)—272.31, 13) Zhu (P.R.C.)—272.31, 14) Halman (U.K.)—271.49, 15) Li (P.R.C.)—270.27, 16) Assen (Bulgaria)—269.05, 17) Kabakov (Bulgaria)—267.45, 18) Kales (Yugoslavia)—265.48, 19) Bianchi (Brazil)—261.81, 20) Matilainin (Finland)—257.14, 21) Schmidt (F.R.G.)—256.22, 22) Hrustanovic (Yugoslavia)—255.34, 23) Hiern (Australia)—254.95, 24) Rosenhan (F.R.G.)—252.63, 25) Magne (France)—251.74, 26) Brewin (U.K.)—251.22, 27) Bilat (Switzerland)—248.79, 28) Borovac (Yugoslavia)—248.10, 29) Borer (Switzerland)—247.42, 30) Bontcev (Bulgaria)—245.90, 31) Metkemeyer (Netherlands)—245.23, **32) Newton (U.S.A.)—244.06,** 33) McGalddery (U.K.)—243.57, 34) Bertin (Brazil)—243.24, 35) Fallgren (Sweden)—240.96, 36) Christen (Switzerland)—239.52, 37) Rietbergen (Netherlands)—239.52, 38) Kjelberg (Sweden)—238.09, 39) Valo (Finland)—235.60, 40) Wake (Australia)—230.47, 41) Fagerstrom (Finland)—229.29, 42) Hanting (Australia)—223.32, 43) Pinho (Brazil)—0.

Thanks once again to **David Brewin,** a member of the U.K. Speed team, for this report.

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CL Racing/Ballard

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fiberglass/epoxy prop, it means that the epoxy/curing agent mixture was improper, and this prop should be sent back to the manufacturer for refund/replacement. In addition, if your inspection of the fiberglass strands in the blade shows a minimum amount of strands in the hub area, the prop, will certainly be prone to shrinking under the heat and pressure of a high-winding Rat engine.

At the end of each flying day, I always take the props which I've used and inspect them in front of a strong light to see if there are any internal cracks or air bubbles which may produce a crack and subsequent failure. I also look for hairline cracks around bubbles which are locked in the epoxy which could lead to blade failure.

As always, I solicit your comments and ideas (and photos!).

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Wildfire/Sackett

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carefully, and tack-glue in position using a few drops of cyanoacrylate (CyA). Draw the outline of the fuselage, and rough-cut it to shape. Next take a piece of 1¼ x 1 x 10-in medium balsa and tack-glue it into position for the tailpiece. The outer shape of the fuselage can then be sanded to the final shape, leaving only the area for the removable cowl unfinished.

Break the assembly apart, clean the pan, and mount the engine—taping up all the openings to keep dust and dirt out until all the shaping work is completed. Locate the four tie-down holes, drill them out a little oversize to accommodate the brass tubing, and glue the tubes in place with a slow-drying epoxy such as Hobbypoxy 2. To ensure accuracy, wax the tie-down bolts, and insert into position when gluing in the tubes. Use elastic bands to hold the pan and crutch in position. Let the whole thing dry for at least 24 hours.

Take the assembly apart, and use a coping saw to cut out the center of the crutch to the outline shown on the drawing. Decide whether or not you wish to enclose the engine lugs completely in the fuselage or cut around them. I suggest you enclose the engine completely, as it tends to weaken the crutch severely to do otherwise. A slight amount of material will have to be removed from the lugs of the Rossi .15 to accomplish this. Cut the lugs back 1/16 in. on the inside of the pan, leaving enough material on the crutch for adequate strength.

The cowl is formed from a blank of straight-grained basswood. I prefer a wood cowl over a fiberglass lay-up for better vibration-damping and strength. Start by cutting out the engine hole to a diameter 1/16 in. larger than the head. Use a circle cutter, then rough-clearance the inside to allow the cowl to accept the engine. Rough-shape the outside to approximately ⅛ in. larger all around than is shown on the drawing, then tack-glue to the crutch, and blend it into the rest of the fuselage. Break apart, install the pipe, and clearance the inside to an approximate thickness of 3/32 in. in the pipe area. The front should be as solid as possible.

Shape and sand in the cooling slot and venturi opening. As you may have noticed, the needle valve exits right on the cowl-crutch parting line. So as not to remove the needle valve when disassembling the model, the needle is shortened and modified. This will be covered later.

Stabilizer. It is quite important to build a light yet very rigid stab assembly in order to get the center of gravity (CG) correct. Select a piece of stiff medium-hard 3/16-in balsa, cut it to shape, and stiffen with 3/16-in. sq. spruce hardwood. Use slow-drying CyA. Sand to a perfect symmetrical section, and cut out the elevator area. The elevator used on the original is an all-metal type which, when built correctly, will resist failure from vibration and fatigue.

Simply solder up the frame as shown on the plan (I use Sta-Brite), and fold over a .010-in. aluminum skin. Cement in place with 3M 2216 epoxy.

The control horn is cut from a bit of .030-in. CRS and bushed for the .055-in. pushrod. Check to be sure the height of the horn from axle to pushrod is exactly 5/16 in. or your model may be too sensitive. Carefully attach the elevator to the stab by gluing in the 3/32-in. tubing at the ends of the axle with slow-drying Hobbypoxy 2. To be sure you don't glue down the elevator, wax all areas with Chapstick where glue is not needed.

When dry, sand smooth, and stiffen the stab with a couple coats of thinned K&B polyester resin rubbed into the grain with a cloth. Three thin coats should be fine. Further stiffen the stab by covering with 2-oz. fiberglass cloth and resin. When dry, sand off any lumps and finish with two more coats of clear resin. Test-fit the stab to the fuselage. Hollow out enough material from the crutch to allow the control system to work smoothly, and hollow the tailpiece to a thickness of 1/8 in.

The pushrod must be installed on the elevator when attaching the stab to the crutch. Coat the control areas with Chapstick, and glue in place. The pushrod is a two-piece affair. To allow for disassembly of the ship, the back half was cut to the approximate length. You can now install the two 1/16 ply formers and the two 3/32 x 1/2-in. pushrod guides. As shown on the drawing, the pushrod runs close to the inner edge of the fuselage. Bolt the whole assembly together to hand-fit the pushrod in its proper position. Fine adjustments can be made by resoldering the quick-links along the pushrod and by adjusting the threads.

Before gluing on the tailpiece it is a good idea to fuel-proof the tail section with a few coats of clear epoxy. When dry, check for smoothness of operation. This system must be precise, with little or no play; otherwise, flying becomes erratic at high speeds. If there is any sloppiness, fix it now.

Carve and sand the pipe area as you like to get a nice smooth seat for it to float on. (The pipe is attached to the engine from the head pipe so that it somewhat 'floats' in the fuselage.) I use two small .031-in. wire hooks attached to the head pipe and around the front of the engine to a small spring. This is the *only way* to mount a tuned pipe if you are to avoid bending and breakage.

Test-fit the 1/16-in. tank shield by adjusting it to come as close as possible to the pipe without touching it. This is necessary because you'll need all the room you can get for tank adjustment. When satisfied, glue in place. This tank shield is important, as it prevents the fuel from becoming heated during flight.

Install .055-in. skids on the stab and fuselage. To keep the pan in good alignment during the hard wear and tear these ships receive, glue in four alignment tabs made from 1/16 ply. Put two at the very front of the pan and two at the rear. To make a perfect fit, I like to actually mold it by mixing up a filler from epoxy glue and finely-chopped fiberglass cloth and dabbing it all over the tabs. By waxing the pan you can now put the crutch-pan assembly together with the tie-down bolts, and when dry it will break apart to a perfect-fitting pan with no play.

The cowl is mounted to the ship with a Prather DZUS clip and .047-in. wire hooked into the crutch.

Finish. I have found that the K&B Superpoxy system works best for providing a tough, durable, and fuel-proof finish. To begin with, treat all the bare wood surfaces with three coats of K&B polyester surfacing resin thinned about 50-50. Spray on a couple coats of K&B primer, sand smooth, and spray on your favorite color thinned 200%. To get a really smooth and shiny look, you have to spray on very fine coats. This wet look is really quite simple, and with a little practice you can achieve outstanding results.

Fuel system. The fuel system most commonly used worldwide is the simple, pure suction method. Most other forms of fuel delivery have their inherent inconsistencies, and inconsistency is the last thing you need with models that fly at tremendous speeds.

The tank, as is shown on the drawing, must be no wider than 5/16 in. Otherwise the weight of the fuel from centrifugal force will make it difficult for you to get the engine lean enough for an optimum setting. All tubing is 1/8-in. brass, and you should cover the pickup tube in the tank with a fine screen to prevent any air bubbles from entering the fuel line. The tank *must* float on the mounting studs and be totally free of any metal-to-metal contact with the pan. I achieve this by running large-size soft silicone tubing inside the 5/16-in. brass tube mounting brackets using small rubber grommets as caps on the ends.

The tank is located and adjusted using 6-32 aircraft nuts with washers on the mounting studs. Make sure to use a grommet on the fill line as it passes through the pan.

The venturi diameter will probably be determined on each individual model. You should try to run as large an opening as possible and still have enough fuel draw to get off the ground. Start out with the stock Rossi unit or enlarge it to around .280 in. If you like you can increase performance by adding an air-collecting funnel to the existing venturi to help supercharge the mix as it enters the crankcase. This can be achieved by gluing on a piece of aluminum tubing to the existing venturi flange with epoxy or by machining one out of bar stock.

Engine. The Wildfire was built around the Rossi Mark III engine, but any good racing .15 will work. The OPS .15 is a good choice; so is the Cox (K&B). All of these engines will fit the spacious Lenzen pan just fine. Start all rework by carefully disassembling the engine and inspecting the parts. To remove the bearings, heat in an oven at 300° then lightly tap the case and the bearings will fall out freely. Remove the casting steps in the main bypass areas of the crankcase with a Dremel tool, and then polish. The Rossi is a pretty good engine out of the box, so this is all the rework you should need for the case.

The latest Rossi pipe-timed engines are coming through with revised crank and liner timing figures. The crank should open at 35° after bottom dead center and close at 65° after top dead center. Crank work starts by boring out the inside diameter to about .300 in.

Radius the internal areas of fuel flow as well as the opening at the counterweight area shown on the drawing. To help atomize the incoming fuel charge, carefully cut in eight grooves around the crank hole at the back. It is a good idea to cover the crank pin with a small piece of brass tubing to protect it while grinding.

The latest Rossi Mark III engines of the pipe-timed variety are using ABC piston and liner sets with timing figures of 127° of transfer timing and 194° for the exhaust. These are ideally suited for high rpm, small prop, alcohol-burning models of the FAI Speed type. All you need to do to the liner is to smooth out the corners on the transfer and boost ports for a little better fuel flow. These piston and liner assemblies are set up very close to optimum fits right out of the box, so there should be no need for any lapping or refitting.

The connecting rod can be streamlined to a symmetrical section to improve the fuel flow. This should be done with a small jeweler's file set using rounded files for the corners. Finish up with No. 320 paper, and polish out. To ensure that you have a good leak-proof seal between the liner and glowhead, first lap the liner top flange on a piece of No. 400 paper on glass to remove any machine scores; then take an old glowhead and lap the two together with a mild-cut polish to achieve a perfect fit.

Thoroughly clean the parts before you reassemble them. It's a good idea to scrub all parts with a toothbrush and methanol, then follow with an ultrasonic cleaner if you have one. In any case, all should be clean and free of lint. Warm up the case, and drop in the bearings and crank. Put on a prop, and tighten it up to seat the bearings; let it cool slowly, then test spin. The crank should spin freely for six or seven seconds and come to a stop at TDC (top dead center). If any binding occurs, warm the case again, and tap lightly with a small wooden block. This will seat the bearings properly. The new Rossis are really precise engines, and you should experience no difficulty with this step.

Assemble the rod, wrist pin, piston, and liner in the engine. While dry, turn it over and check for any binds or roughness as you go. The engine should feel extremely free except for approximately .040 in. from TDC where the liner taper cinches the piston. To set up your head clearance, mark the deck height at TDC and compare this to the depth of your plugs. By using various shims, try to achieve a head clearance of .022 to .024 in. to start with—or maybe a little more. Later in your flying you can play with this dimension to attain maximum power from your particular combination.

The backplate is used stock as it comes, although some guys have had success in shimming it out .040 to .050 in. with an aluminum spacer. This engine needs very little break in—maybe 10 or 15 minutes of fast four-cycle hops. Bolt on a 7-3½ prop cut to a 6-in. diameter, and run it fast and rich with no pipe for the first 10 minutes. If the needle holds steady, try a few peak runs, and check the rpm with a tachometer. You should read a figure of around 27,000 or maybe 28,000 for a good engine.

Attach a Rossi No. 2 pipe, bring it up to peak, and take a reading. The rpm figure should be around 34,000 or 35,000. An engine that will turn this rpm is good for the high 160s with the right prop. An engine that tachs 33,000 will fly most FAI ships at around 158 mph—very competitive, and this is what most Rossis will turn right out of the box. If you wish, you can pass up on the engine modifications for your initial flights, get the feel of the airplane, and do the modifications later. You can then note the difference.

Propeller. Single-blade carbon fiber or, in some cases, hardwood props have been the accepted standard in FAI Speed flying since it was found that the way to go fast on alcohol is through high rpm. A number of companies produce these props in different styles and pitches. Try for a 6.2-in. diameter by 5.4 or 5-in. pitch for best results with a Mark III Rossi. Jurgen Lenzen has copies of the famous world-record-holding Hungarian designs as well as a number of his own. The prices are very reasonable: about $5. Props are also available from Walt Perkins, Bill Hughes, and myself.

Dolly. Construct the dolly as shown, and note that it, too, is asymmetric. This is to help balance the model in the dolly and to ensure good tracking and line tension during the critical takeoff period. Take the time to build a very true and straight unit with all solder joints pre-soldered and wrapped with fine brass wire, then soldered with Sta-Brite or an equivalent high-temperature solder. When making the dolly, be sure to slip some silicone tubing over those areas that come in contact with the airplane and do so *before* the final assembly.

Flying. Check your model carefully to make sure everything is solid and operating 100%. Your two lines should be *double looped* to prevent any chance of one of the ends opening up and causing a disaster. Two-line models are not quite as safe as the Monoline AMA models that use very large wire diameters which are easy to maintain. For safety's sake, always inspect your lines before flying for kinks or other signs of wear.

To begin with an approximate needle valve setting, strap on your standard bench test prop, fill the tank, and fire up the engine. After a slight warm-up period, the engine will hit the pipe dramatically. Adjust the needle for a full-peak run (slightly on the rich side), shut off the engine by placing your thumb over the back of the pipe, open the needle another one-quarter turn, and bolt on your flying prop. You'll be ready for the first flight.

To make this fuel system work correctly you must first understand that the tank position sets the needle in flight, and the only adjustment you should make to the needle is to get the setting necessary to become airborne.

Fire up the engine, and let it warm up for about 10 seconds, then raise the nose slightly to lean it out and pre-stage the pipe. Once the engine picks up on the lower stage of the pipe, you will have enough power to launch. Hold the elevator in neutral until sufficient speed is attained to lift out of the dolly (usually one-half to three-quarters of a lap), then release the model. If the engine floods out rich in flight, move the tank outboard slightly (about 1/16 in.), and try again until a steady full-peaked run is achieved. If the engine runs lean, hitting the pipe on and off, then move the tank inboard slightly and go again. With a small amount of fine tuning like this, you will find the optimum setting very easy to come by (and it should be very consistent).

FAI Speed is one tremendous challenge. Just coming up with a good-flying airplane and reliable fuel system is half the battle. The Wildfire is a solid good-flying ship that allows you to concentrate on other essentials such as the engine and propeller. If you build the model carefully and follow directions, it shouldn't be hard for you to become competitive and eventually join in world class competition. Give it a try.

Speed equipment suppliers/information.

North American Speed Society, P.O. Box 82294, Burnaby, B.C. V5C 5P7, Canada: Topflight detailed information on all phases of CL Speed flying. Quarterly publication $15/year. Ed. Chris Sackett.

Jurgen Lenzen, Alfred Dobbert Str. 57, 5600 Wuppertal 2, West Germany: Speed pan for the Wildfire Speed model, FAI single-blade props, metric-size lines.

Sackett Products, P.O. Box 82294, Burnaby, B.C. V5C 5P7, Canada: Aluminum wing panels, carbon fiber props.

Rossi Sales of America, 1325 Carol Dr., Memphis, TN 38116: Rossi .15 MK III engines, Rossi .15 tuned pipes and glowheads.

Shadow Racing, 1100 S.E. 28th St., Ocala, FL 32670: FAI single-blade propellers, carbon fiber, and special prop-making epoxy.

Kelly Props, P.O. Box 38, Western Springs, IL 60558: Many sizes of FAI single-blade props in glass or graphite.

Mall Show/Nunes
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Ask the manager if there are tables, barriers, tablecloths, etc. available for use in your display. Our mall location provides the materials, and we set them up and take them down when we're finished. If the mall in your area does not provide the items mentioned, then you will have to take steps to locate and secure these items on your