over the surfaces during flight it has a tendency to slide toward the tips. Should yaw occur, the leading edge of one half of the wing swings closer to 90° to airflow. This causes that side of the wing to become more efficient with relationship to lift and thus produces more drag, because lift and drag go hand-in-hand. This increase in drag tends to damp the oscillation and stability returns. For full-fledged competition, the extra work involved in building a tapered wing is well worth it, but for Sunday afternoon fun flying a straight wing will suffice.

When the second Olympic did not prove its salt, I decided that the third would have one thing subtracted from it—frontal area. My reasoning lies in the realm of R/C, for it was just about the time that radio flyers were in deep discussion about an aircraft's ability to penetrate.

While we in control line do not have as critical condition as the R/C crowd, this point should be considered. When we perform any maneuver, we change directions in regard to the prevailing breeze. Looking at the loop we find one side, the climbing half, is usually performed slightly upwind and the second part, the diving half, is running slightly downwind. If drag is in excess, the model will slow down on the first half, but will accelerate through the second half, thereby eliminating some of the smoothness we are seeking. An engine performing properly should help alleviate this, for additional power should be available when the load is increased. But the windier the day, the bigger this problem of speed variation. This is the reason for the extremely narrow fuselage. These things help to achieve a good integrated pattern.

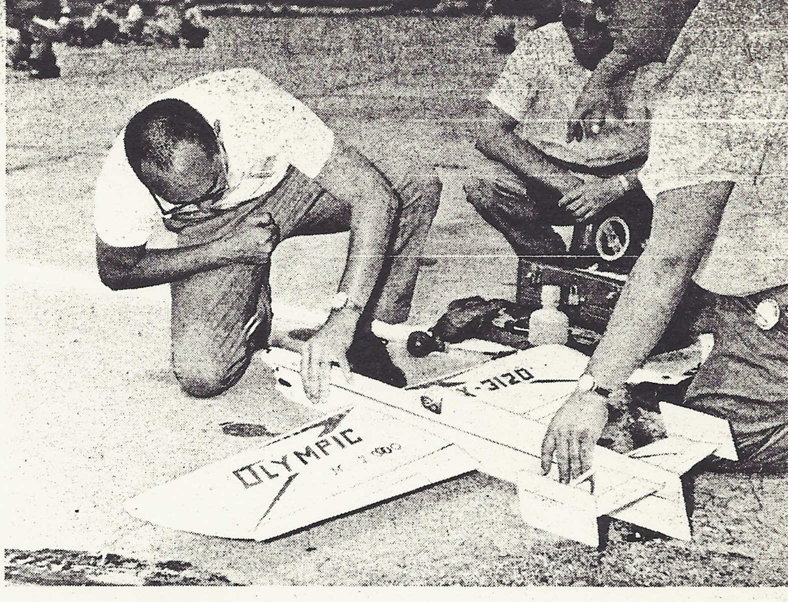
On the Mark VI Olympic I have used an 18% thick airfoil with max thickness at 30% of root chord. At the tips, 19% with maximum thickness at 25%. Looking at the shape of a non-symmetrical section of a light plane, when viewed from the trailing edges, both tips are washed out (bent up). This is done so that when the aircraft is at its rated stalling speed, the tips have not reached stall angle and stability with relation to the roll axis remains. To achieve this same effect with a symmetrical airfoil, the thickness percentage at the tips is greater than inboard with the maximum section closer to the leading edge. Therefore the tips stall last or at a higher angle of attack assuring some tip lift to resist engine torque. To prove this point, while flying one of my older Mark II Olympics I let the engine quit while the plane was quite high. During the landing approach I gave excessive up control to stall the airplane. I experienced a very severe roll, first toward me and then away. With the improved airfoil, my Mark V can be stalled with the only effect being an extremely mushy approach . . . no rolling. This indicates the tips are effective while the center section is stalled. Try it yourself. A great deal can be learned from a gliding stunt job, so observe its characteristics closely when you are making your landing approach.

Speaking of airfoils, let's not forget the stabilizer and elevator. They are working surfaces, too, and in order to achieve their purpose, must be of sufficient thickness.

On the plans I have offered an alternate type of landing gear. The first design series used the fuselage gear incorporating a torsion principle which does a fine job of absorbing landing shocks. Its drawback was that when the gear was loaded as in a bump, it returned with authority driving the plane back into the air. This occurs on hard surfaces, not on a grass field. If the majority of your flying is off the grass, the torsion gear is then best for you.

On the Mark VI I switched to the swept-in wing mounted gear in my search for better landing ability on hard surfaces. When flexing to absorb the shock of landing, the gear has to be in a position which will not transfer the shock into the plane. If you trace this shock line, you will find that the straight-ahead gear has to spring forward to absorb this shock and has to flex farther for a given amount of load. With the swept-in gear, the motion of the gear is 90° to the shock line and its movement is not as great for the same amount of load. The secret is that the shock line is not straight up but somewhere around 45°. Most straight-ahead gears are at an angle of 45° and in direct alignment with the bump load.

A slightly stiffer gear has to be used in the wing for good ground stability. It also tolerates a much faster landing speed. A proto landing on two wheels should be the result of a good approach and this means that once you are committed, you should not whip it around another lap to align yourself with the wind. When the motor quits, set up a fast, deliberate approach immediately and with ample flying speed you can set your model down on the downwind side and just hold neutral control until the plane loses momentum. Also, with the lift of the wing remaining effective at the faster landing speed, it's not as likely to bounce.



Designer Gialdini fires up his Fox .35-equipped Olympic Mark V design at the 1962 Nationals in Glenview, Ill. Bob had his usual run of Nats luck . . . lou-say.

Good judges look for a one-approach landing and when a pull-up is detected to take advantage of the wind, most subtract landing points. Don't forget, dead stick landing of a real aircraft is completed with just one approach and this is what we are trying to duplicate.

With regard to tanks and other hardware, I would like to point out just a few gimmicks that quickly prove their worth.

I have utilized both the single-vent pressure tank (not crankcase pressure but velocity ram) and the two-vent pressure tank with success. More important is tank location and above all cleanliness. Dirt can be a real problem, so keep your tank vents plugged during building and while the airplane is in storage. The best quarter investment one can make is a line filter between engine and tank because regardless of how clean you keep your fuel dirt can be picked up while flying . . . especially if you operate off a grass field. Nothing can be more disgusting than to get halfway through a stunt pattern and experience engine failure and especially so during a contest.

Another item that can be a big help to performance is wheels. Most rubber wheels we utilize have turned aluminum hubs and the bearing surface for the wheels is a mating of aluminum with piano wire or steel. Unless well lubricated, the aluminum will eventually gall and the bearing fit becomes very sloppy—but even more, it causes a great deal of excessive drag. By bushing the aluminum with brass tubing or some other material, the wheel will perform its task more efficiently. A fast proto landing creates quite high wheel velocities and, therefore, a good bearing is important.

Before getting into the construction, I would like to review the various Olympics I have built and the results.

The original Olympic-Nobler mod job (detailed earlier) never quite felt under control due to opening corners in high wind although it flew well enough to place 4th at the Nats in '58. Upon retirement, the ship showed excessive strain cracking at wing and cockpit, indicating areas for beef-up. Engine vibration is inherent so must be carried out in shear as widely distributed as possible. Engine bearers on subsequent Olympics are tied directly to wing leading edge and polyester resin is used to fix. Doublers in other areas proved effective in eliminating strain cracks.

Olympic Mark I, same shape, but ½" longer nose and tail moment arm, Fox 35 power and leadouts over and under. More paint to 48-oz weight. Frankly, this ship was a dud. It flew with the grace of a drunken elephant and turned with all the snap of a soft marshmallow just off the toasting stick. This bloop took a good deal of valuable time in measurement and flight (maybe fright) analysis. Couldn't even make thrust line adjustment take and later tries at this fix did little good.

Flying a proved Mark IV a year and a half later we changed thrust line angles as much as 5° with little effect on flying characteristics. Could be that long nose moment

(*Continued on page* 64)