TONY(S)

Smooth in the corners, precise in the overheads, it also exudes those all-important impression points. This Tony is a retract-equipped CL stunter. / by Archie Adamisin

Retracting landing gear—the thought again went through my head. Today was like any other day with a plane: small butterflies in the stomach and moist palms. The funny thing is that this was not just any new plane. As I rolled out the lines, a scary thought raced through my mind. What if the plane doesn't fly or the gears don't work? Just as an extra check, I cycled the gear before putting the Tony into the circle. The retracts worked perfectly. There was no more stalling, the time had come and there was no way to get out of it. Everyone was ready; nobody wanted to miss it. Friends had cameras loaded, and all attention focused on me and my new creation.

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Smooth in the lift, precise in the maneuvers, it also exudes those all-important impression points. This Tony is a soaring version of a CL stunter. / by Paul Denson

It must be that old "Yankee Ingenuity" that prompts a model builder to attempt something new. There seems to be no other reason why this whole thing transpired. A U-control plane flying in the lift at Torrey Pines Gliderport? Absurd!

We have heard guys brag about our cliff. They say that you can fly golf balls at Torrey if you could find small *(Continued on page 42)*

enough servos. So why not a CL model for slope soaring? The first attempt along these lines was Midwest's profile Messerschmitt (a kit plane—"Yuuuuch!" from the purists), closely followed by another plane from the same line, the Bell King Cobra. A few weeks later, the third plane—a beautiful, well-detailed profile Mustang—made its appearance. They flew—in fact they flew like nothing else at the cliff. Try a Vertical Eight, starting at the bottom, with a Cirrus. Try a Four-Point Roll with any glider. With three channels, the King Cobra can knife edge in a moderate breeze. These planes can fly inverted indefinitely. No problem with turns, since it uses no rudder in the turns.

These stunts really happen regularly, and it is beautiful seeing two WWII combatants having a dogfight, just like they did back in the '40s over the Channel. You feel as though you are standing on the White Cliffs of Dover, watching a Mustang on the tail of a Messerschmitt. These two guys are having a ball, using maneuvers designed by WWI Aces to get the Red Baron off their tail. To see one of these profile jobs flying among the Windfrees, Cirruses and other soaring type planes makes the soaring giants look unreal. These are *real* looking airplanes.

We decided, rather than using one of Midwest's kits for this article, to select a design of our own. We thought of you purists, who absolutely refuse to build a kit. We further decided to keep the design along WWII standards. So we looked for a plane equipped with an inline engine and found the Tony. The Tony is similar enough to most profile kits that you can follow our building instructions to modify any of them.

For those of you who are not as fortunate as we to have the perpetual lift of Torrey Pines, we have had a ball flying the Tony in a small park (the high school athletic field) using a hi-start. The venerable Editor of this magazine suggested to the authors that we might try catapult launching *(Editors are sadists—php)*. We discussed this at great length with a number of the Torrey Pines Gulls members; our final conclusion was, if he wanted a plane catapulted, *he* would build it and *we* would be glad to try the catapult launch from behind a three-foot-thick concrete bunker. These planes fly exactly like

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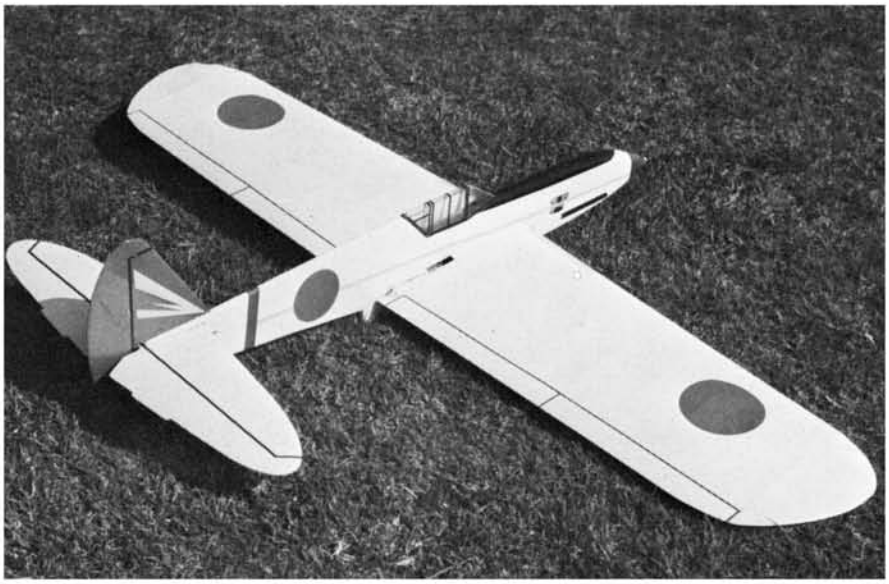
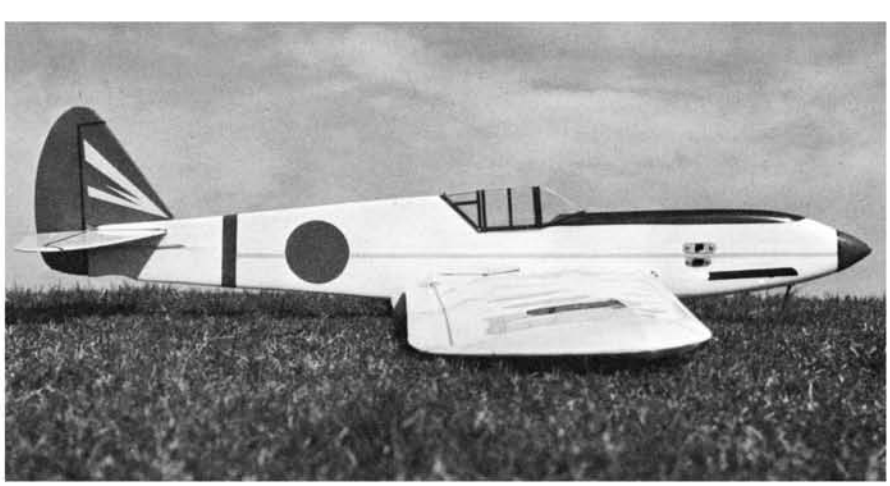
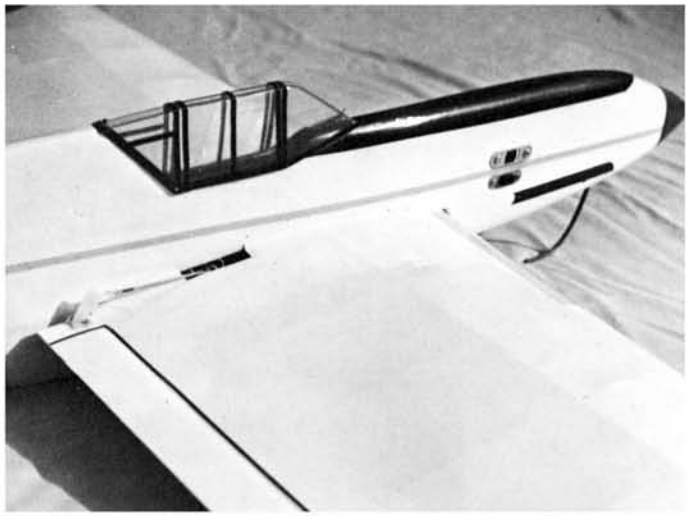


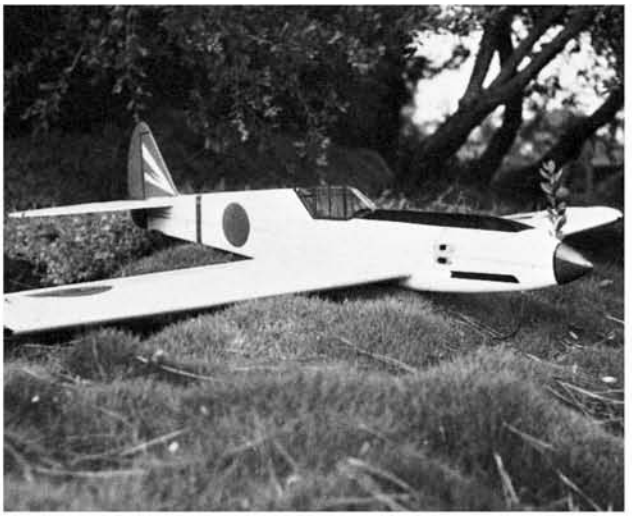
It's not surprising that the Tony shown here strikingly resembles a CL model. Notice that all of the areas and moments are from today's CL profile kits.

ABOVE: The access hatch in the side of the fuse, ahead of the wing, covers a flat battery pack and the elevator servo. BOTTOM: In profile, the profile fuse really comes into its own—you really can't distinguish it from a built-up version.





The aileron linkages exit in a convenient manner. Since the model is one-piece, nothing needs to be disconnected.



In the shade of a tree, the Tony rests between aerobatic flights.

their full-scale counterparts. Put them in an altitude, and they stay in this altitude. If you trim for level flight, the plane will fly level. Put it into a bank, it stays in that bank. At the tremendous speeds that you would get from a catapult, any slight movement of the controls would be so exaggerated that something surely would part company from the rest of the plane. If you trim the model beforehand on a winch or hi-start, the excess speed and lift of a catapult would probably precipitate the wildest loop ever seen. We would be glad to hear from any of you fliers with enough "Yankee Ingenuity" (guts) to fly the Tony from a catapult.

ABOVE: The Tony in the company of a Kingcobra, which is converted to RC from the kit produced by Midwest. RIGHT: Sharon Powers poses with the Tony in front of historic Presidio Park in San Diego, Calif.

CONSTRUCTION

Wing: Let's start by building the wing. Years of experience seem to indicate that once the wing is built the plane is built. First, make a template of aluminum or stiff cardboard to the shape indicated on the plans. Use this template to cut all of the 1/16" medium hard balsa ribs to shape. Sand the ribs, using No. 400 wet or dry sandpaper, and use a soft plastic sponge as your sanding block—this rounds the edges slightly. Since your are not going to sheet or cap-strip this wing, you will get a smooth job when you are ready to cover.

Cut out the two spars from hard 1/16" sheet balsa, then sand, and add the 1/16" ply doubler which goes out to rib No. 5. Next take some 1" pre-shaped, leading edge stock and cut 1/16 x 1/8" deep slots for the ribs, as shown on the plans. I use an old hacksaw blade for this purpose. Break the blade in half, then tape the two halves together, side-by-side, with masking tape. This saw will cut a slot exactly 1/16" wide. Where the two leading edge pieces join together in the center of the wing, cut a 1/8" horizontal slot for the plywood dihedral brace. It is very important that these slots are cut on the exact centerline, so that the two halves of the LE will match up. Now, do the same with the trailing edge stock. The TE stock may be tapered at this time.

Cut two each of the wing building jigs from hard 1/8" balsa sheet. Place jigs No. 1 between ribs 1 and 2. Jigs No. 2 go between ribs 8 and 9. Pin the TE on the plans. Glue all the wing ribs to

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the balsa spar and the trailing edge. Allow this to dry for a short time, then install the leading edge. Allow the wing to dry overnight. Next, remove the pins from one half of the wing. Insert the plywood dihedral braces in their slots. There should be enough slop in the fit of these braces to raise the outer end of the trailing edge material one inch. Enlarge the slot until the dihedral can be installed without structural tension. Apply five-minute epoxy to these two joints. Dihedral is not absolutely necessary in this plane, but it adds aesthetic value. When the epoxy is dry, install the 1/8 x 1/4" spruce spars on top of the main spar, and add the center dihedral brace. Add the wing tips and T-1 and T-2. Set the wing aside to dry.

From 1/2 x 3" medium balsa, cut fuselage piece No. 1. From 1/2 x 1" medium balsa, cut fuselage pieces Nos. 2, 3, and 4. Cut the elevator slot in No. 2, and rudder slot in No. 3. In No. 1, cut space for one servo and battery pack to fit. From 1/4" soft balsa cut parts 5 and 6. These two pieces are to be mounted on either side of the forward part of the fuselage, as indicated by the dashed lines on the plan view. Contact cement works best when gluing large sheets of balsa, because the water-solvent cements cause warps. Do not mount parts 5 and 6 until you cut a slot in piece No. 1 for the elevator control rod. From 3/32" sheet balsa, cut pieces 7 and 8. Contact cement these to either side of pieces 5 and 6.

If you have the proper tools, shaping the fuselage is quite easy. It must be tapered from 1-3/8" at about 30% of the chord to 5/32" at the tail. The excess wood may be removed with a hand plane, very coarse sandpaper or, if you have a belt sander, it can be mounted upside down in your vise and used. Be sure to round all corners, taper the nose and sand out the tail parts as much as possible. If you take the time to do all this sanding, the plane will not look much like a profile job. The Mustang, when moved five feet away, looked just like a full-scale plane.

Fair in the 3/32" doubler just under the stab mounting. This is a weak point and this vertical grained doubler adds necessary strength. The plane is capable of speeds up to 70 mph and a loose stab will cause it to fly quite erratically.

To fabricate the hatch cover, first make a vertical cut with razor saw or X-acto knife about 1/2" forward of the battery location. This cut will be only through the first (3/32") layer of balsa wood (part 7). It should be far enough forward not to penetrate into the radio compartment. Make a similar cut about 1/2" behind the leading edge of the wing. Connect the ends of these two slits with two horizontal cuts. Remove this rectangle of wood. Replace the hatch piece and MonoKote the fuselage. When you have finished the covering job, cut around the hatch cover, except for the forward vertical side. The covering will act as the hatch hinge. If you paint, a piece of vinyl tape may be used as a hinge.

Mount the aileron servo in a 1/8" sheet balsa compartment fashioned between ribs 1 and 2. The choice of which side of the fuselage is up to you. Note: The servo is shown inverted on the plan view for clarity. The top of the servo must be in the center section of the wing between the No. 1 ribs. Therefore, it is necessary to cut a square hole in rib No. 1 to accommodate the top of the servo. The servo is mounted on its shelf with servo mounting tape. For easy removal of the mounting tape, put a piece of vinyl tape on the servo, then stick the mounting tape to the vinyl tape. Before the servo is mounted permanently, get two 9" threaded pushrods, bend to the shape shown, and fit for length between ribs 1 and 2, on the opposite side and forward of the servo. Allow the receiver to protude into the center section of the wing.

Temporarily slide the wing into the fuselage. Use wedges to assure that everything is square, then drill 3/16" holes from the bottom of the fuselage, through the fuselage, the leading and trailing edges, the plywood dihedral braces and up into the fuselage again. The back hole goes all the way through the air scoop. These holes are for the 3/16" wing mounting dowels. When you get everything aligned, put some epoxy in the holes and insert the dowels. Add epoxy where needed to mount the wing firmly in place.

Add the wing planking where shown in the plans, leaving slots for the aileron control rods to exit. Do not plank directly under the receiver.

Cut the stab and rudder from 3/16" balsa and sand to shape. Connect the two halves of the stab with a piece of 3/16" balsa and sand to shape. Connect the two halves of the stab with a piece of 3/16" dowel. Cover with MonoKote or paint. Be sure to leave uncovered places for gluing the stab and rudder to the fuselage. To avoid losing the rudder and elevator while in violent maneuvers, it is suggested that small bamboo skewers or 1/8" dowel be countersunk through the rudder and stab, and into the fuselage. This can be done by gluing them into the rudder from the bottom. When dry, use the dowel to mark where the holes are to be drilled into the stab and fuselage. They will help keep things in alignment.

A piece of 1/16" plywood should be laminated to the bottom of the air scoop, as a landing skid. Epoxy a wire skid on the front of the fuselage, under the battery compartment, as shown on the plans.

A piece or two of servo tape may be affixed to the exposed side of the elevator servo. When the hatch is closed, the tape serves as a latch (Velcro tape will also work). There is really no reason to go into the hatch once you have the plane trimmed out, because both switch and charging jack can be placed externally on the right side. The canopy may be mounted to the fuselage using short pins or by using doublesided Scotch tape. Take the antenna through a 3/32" hole into the canopy compartment, then out just behind the canopy and up to the top of the vertical fin. I have seen a plane with an antenna that

ran across the top of the fin, jumped the gap between fin and rudder and was taped along the TE of the rudder. The antenna bent with the movement of the rudder. There was no apparent difficulty with radio reception. *(Eventually, mechanical fatigue of the wire might result–php.)*

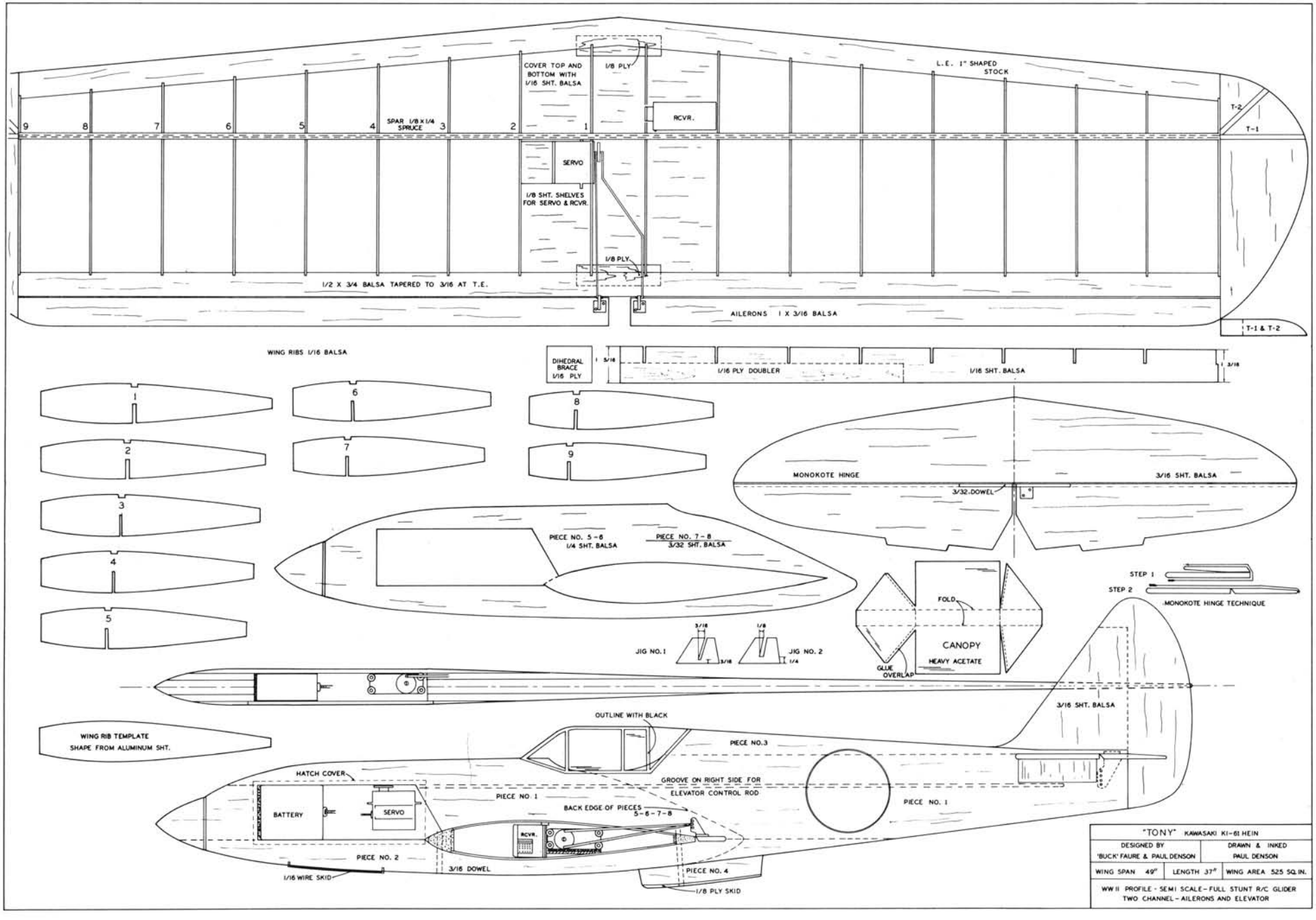
When covering the stab, we recommend a MonoKote hinge. On all the planes, we use this type of hinge for ailerons and elevators, and we have never had a failure. Wing tip wire skids should be added if you make many landings on hard surfaces. Another type of wing tip protector is a piece of servo tape placed where the last rib and the spar intercept. Cover the servo tape with vinyl tape, unless you want some abrupt spot landings.

When locating the Center of Gravity, it is necessary to invert the plane. Balance it on your finger tips, then add weight as necessary to bring the center of balance to just aft of the main spar. If you build the plane as specified, and taper down the tail sufficiently, the plane will balance as indicated without weights. The plane should weigh out at 25 to 26 oz. Since the wing area is in the neighborhood of 500 sq. inches, this gives 7.6 oz./sq. foot. The plane glides exceptionally well. The first time you launch it you will be surprised at the way it seems to fly right out of your hand.

Looks as if we have a completely new type of glider flying, all the way from stunt contests to combat.

With its light wing loading (lighter than a melmac Cirrus), the Tony glides exceptionally well. While not a thermal hunter (wrong airfoil), it can provide plenty of thrills when flown in the flatlands. Its true element is the slope, where it makes aerobatics a real breeze (or makes really breezy aerobatics!). If it doesn't really turn you on, get a control line bellcrank. . .or better yet, build Archie Adamisin's CL Tony stunter.

FULL-SIZE PLANS AVAILABLE—SEE PAGE 100

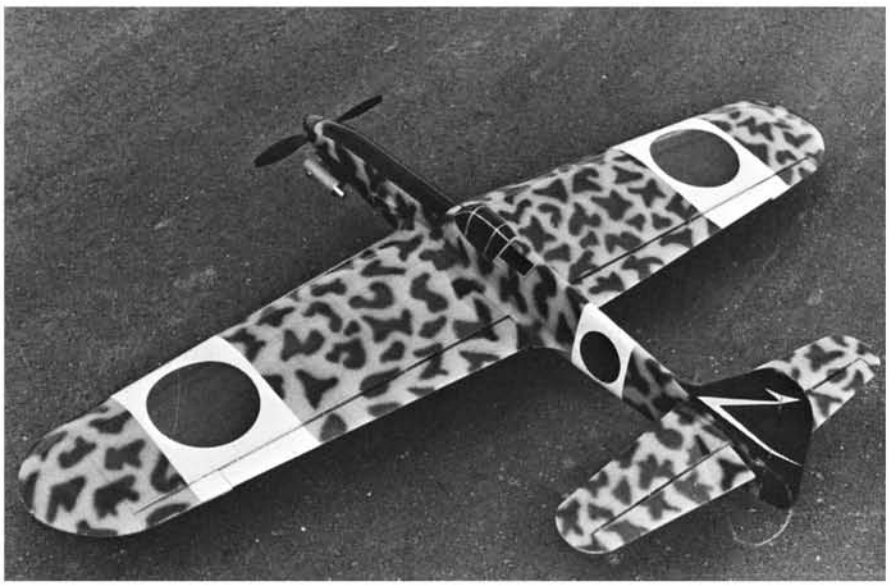


"TONY" KAWASAKI KI-61 HEIN

DESIGNED BY	DRAWN & INKED
'BUCK' FAURE & PAUL DENSON	PAUL DENSON

WING SPAN 49"	LENGTH 37"	WING AREA 525 SQ.IN.

WWII PROFILE - SEMI SCALE - FULL STUNT R/C GLIDER
TWO CHANNEL - AILERONS AND ELEVATOR



Adequate areas and moments ensure stable stunting with this Tony. And—it's retract equipped.

ABOVE: A neatly done canopy adds that final touch to any model. That's where the attention focuses on any plane. BOTTOM: The distinctive profile of this famous WWII fighter retains its integrity as a CL stunter, even though the nose has been lengthened.

After filling the tank and priming the engine, I once again cycled the retracts *(Come on Archie, the suspense is killing us—php.)*, and again they worked. The motor fired up on the first flip and we were off. As the Tony started to break ground, I hesitated, then hit the switch. . .the wheels came up. My obsession of the past months was suddenly a reality. I flew 10 or 12 laps, just getting the feel of a model with no wheels. I then went through the Pattern. Although the Tony was a bit nose heavy, it turned the corners of the Wing Over very crisply. Going on through the inside loops, inverted flight, and outside loops, the model tracked extremely well.

As I started the squares, I decided to open them up to about 50º. This gave me the chance to fly the airplane "through" the maneuver a little more, and also to give the airplane a little room to roam on the first flight. Again, as in the Wing Over, the Tony went through the corners very quickly, with no wobble or yaw problems. The triangles are the maneuvers that usually determine how good an airplane really is. The Tony made these look as though they had been drawn with a T-square and triangle. Both of the Horizontal Eights were done with very little effort on my part. As in the previous maneuvers, the Tony seemed to coast through. The remainder of the Pattern was completed with about the same relative ease.

As I finished the Four Leaf Clover, I again felt butterflies. Would the wheels come back down and give this splendid bird an opportunity to fly again? I waited until I heard the motor sputter before I hit the switch. As I hit the switch, the motor quit. The wheels had gone up with little or no effort—they also came down as effortlessly.

I can't really express the feeling that ran through my system as the Tony rolled to a stop. I guess it was a feeling of accomplishment, of having started something and having seen it through to the end, even though many people had told me that I was just wasting my time and that the idea wouldn't work. In all, the Tony has been flown to date 14 times, by five different people, and all had the same thing to say. Retracts are definitely an improvement over the conventional landing gear system, not

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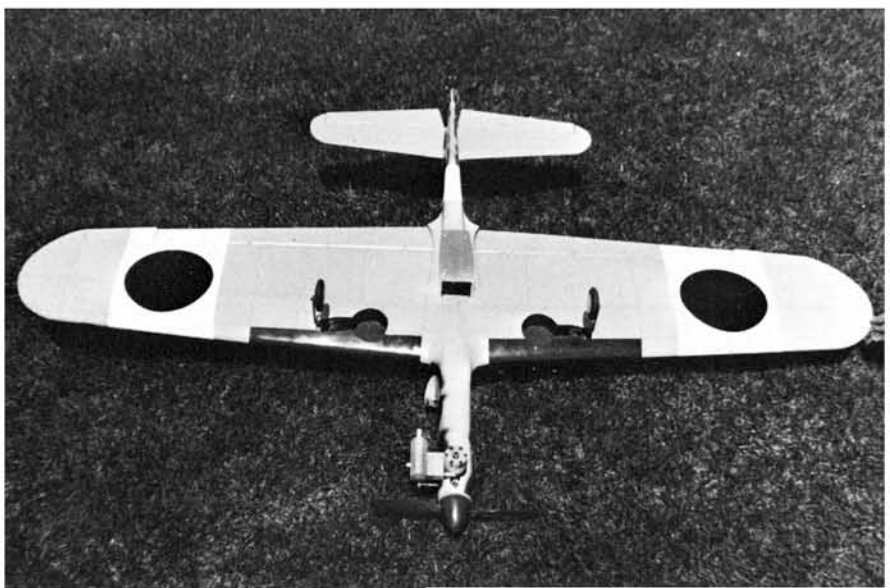
A homemade muffler keeps contestants, spectators happy. Details like cannon fairings are the coup de grace in the judges' eyes.

Models always seem to look good in a landscape setting. The Tony's camouflage, one must admit, is very effective.



ABOVE: Retracts on a CL model are fast becoming the norm. They add much to the symmetry of the aerobatic maneuvers. LEFT: Although the nose cowl almost completely obscures the OS Max 35's venturi, this doesn't detract from reliable performance.

only from the standpoint of reduced drag, but also because of the subtle psychological advantages felt in competition.

Don't get me wrong, I'm not saying that putting retracts into your present model will make it a winner. Nor am I saying that the Tony is the ultimate stunt plane. What I am saying is that I do believe that, after flying the Tony, no airplane could claim being ultimate unless it contained a set of retracting landing gear. For the few hours' more work and the two oz. of extra weight, I can't see any reason why more fliers will not be using them soon.

CONSTRUCTION

I prefer to build what might be termed a stressed skin wing, of sparless construction and using a conventional leading and trailing edge with a plywood reinforced center section. To start the wing, stack 47 rib blanks (24 inside and 23 outside) around the three plywood templates and proceed to carve them. When the ribs are fully carved, cut lightening holes in all but the landing gear, center section, and tip ribs. These ribs are made of 1/8" sheet for structural reasons and, therefore, should remain intact.

Carve all ribs from 1/16" sheet and then re-cut the landing gear, center section, and tip ribs from 1/8" stock. Once the ribs have been completed, you should proceed onto the leading and trailing edges. As seen on the plans, these have to be notched to receive the 1/16" rib locaters, as well as the landing gear floor and center section crutch (both are made of 1/8" plywood). The notches are cut with a Woodruff Key Cutter to insure uniform height through the leading and trailing edges. When all of this has been completed, the wing is then jigged on a building board. Use small, hard balsa blocks sanded to the correct thickness so that the centerlines of the leading and trailing edges are both parallel to the board. The wing is assembled upside down to facilitate the installation of the landing gear.

A slight modification is necessary in order for the landing gear to fit on the platforms as shown. I moved the mounting holes inward toward the centerline of the gear, in order that the

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rib spacing would stay uniform. After moving the holes, it is necessary to do a little surgery to the units themselves, in order to obtain the necessary mounting clearance. After the gears have been cleared and mounted onto the platforms, install the wheel housings.

Mount the retract servo on the center section brace, and install the 1/16" music wire pushrods. This is not a difficult job, but it is time-consuming and requires some tinkering. During this adjustment period, it is prudent to install the necessary batteries to power the servo. I used RC hook-up wire to lead from the servo to a charging plug jack located in the inboard wing tip. All of the connections must be carefully soldered to insure that no vibration malfunctions occur. After these steps have been completed and the unit works to your satisfaction, the wing is then ready to be sheeted.

To insure that the planking does not buckle after finishing, always butt-join the sheets prior to installation on the wing. The joint seam should wind up on the flat portion of the airfoil. The application of the sheeting is the most important part of the wing. The sheeting is applied with Hobbypoxy Formula 2. The epoxy is heated slightly, and then thoroughly mixed. A very thin coat of glue is then applied to the sheeting, as well as to all the ribs, LE and TE. The sheet is then placed on the wing starting at the TE. Working toward the LE, place weights as you go, and finally pin to the leading edge. Allow this to dry overnight. When the bottom sheeting has dried, the wing is then turned over and re-jigged. The leading and trailing edges are sanded, the bellcrank installed, and then the wing is sheeted in the above manner. The flaps are now carved out of 3/8" sheet and installed. Add the tips and the wing is completed. Be sure that the plug jack for the retracts is as close as possible to the leadouts.

Fuselage: The fuselage is constructed about the same as any other. Cut the body sides out of very soft 3/16" sheet. After the wing and stabilizer cutouts have been made, the formers are cut out and installed. The motor mounts are epoxied directly to the fuselage sides. Install them in this manner so that the wing/fuselage joint will not develop stress cracks.

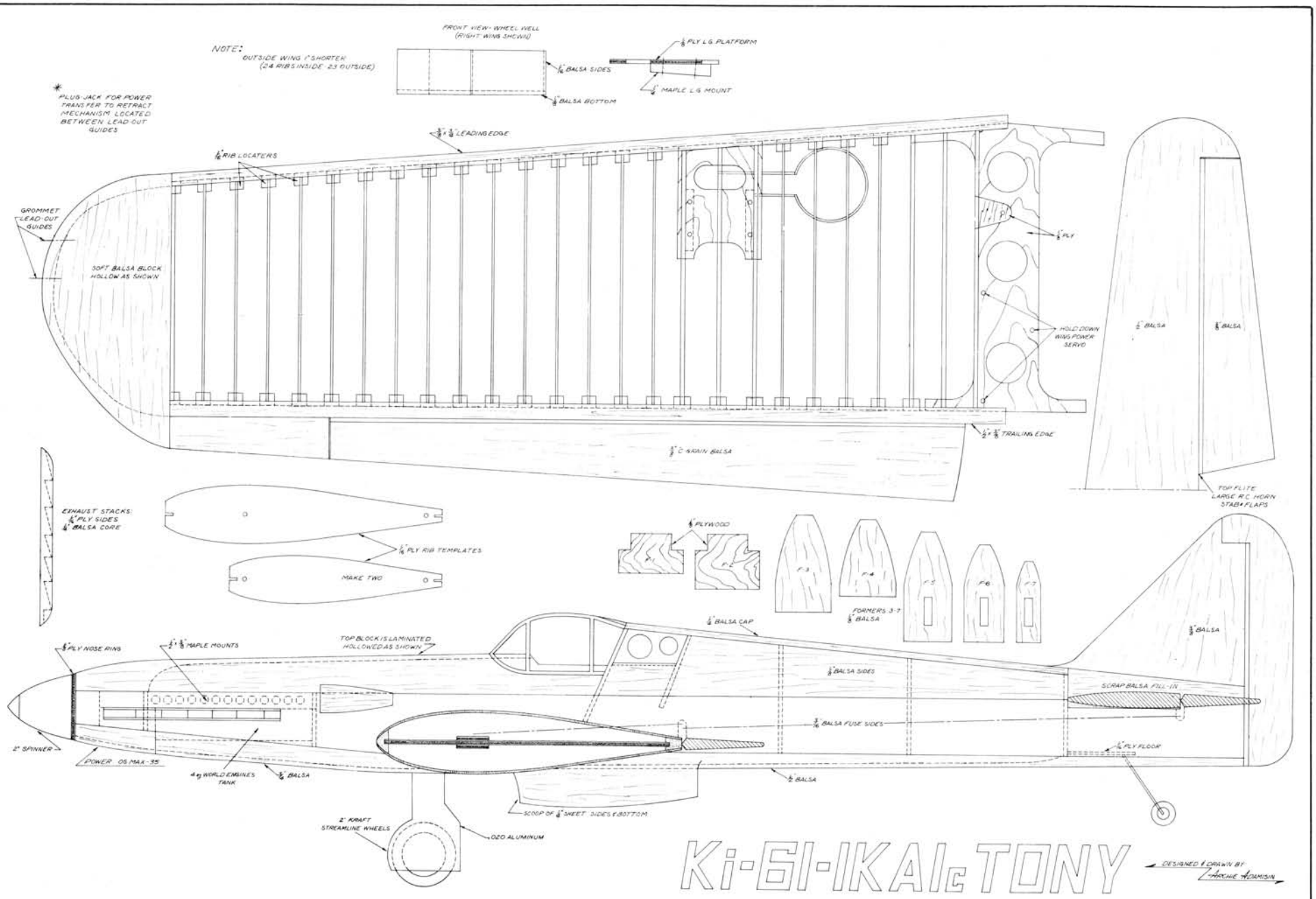
Stab & Elevator: The stabilizer and elevator can be cut out of 1/2" sheet, or use 3/8" stock for the elevator and be very careful when carving the airfoil. Be sure to leave the bottom center section of the stab flat in the middle to insure correct alignment during final assembly.

The rudder and fin assembly is carved out of 3/8" sheet and beveled in the same fashion as the flaps and elevator in order that it might give the appearance of being a functional control surface. It is then epoxied with 3/8" offset.

Final Assembly: Now that all of the main units are finished, the Tony is ready to be assembled. Start by epoxying the wing and elevator assembly into the fuselage. After these have dried, the tank should be installed, the turtle deck sheeted and the necessary blocks tack-glued on. I use a stock World Engines I.M. Products four-oz. stunt tank, except that I bring the tank vents out through the supercharger intake on the side of the fuselage. After these blocks have been carved, they should be removed and hollowed to at least the thicknesses on the plans, and then permanently reinstalled. The cockpit detail and canopy can be finished at this time, and the bottom air-scoop epoxied into place. The bottom of my scoop is removable to allow access to the retract mechanism. I use a 1-56 bolt and blind nut in each corner of the bottom of the scoop to keep it secure during flight. The rudder and fin assembly is now epoxied into place and fillets are applied.

Finish: I think that the finish should be left up to the individual, as everyone has his favorite procedure. My model is finished in the camouflage colors of the 244th Home Defense fighter squadron *(Profile Publications, No. 118).* My model weighed in at 52 oz., ready to go, and I found this weight just about right. The Tony is powered by an O.S. Max 35, swinging a Rev-up 10 x 6 EW propeller. Fuel is Supersonic 100. This engine, prop and fuel combination has been used by our family for about 7½ years, and we can't see any reason to change now.

I would really be interested in hearing any comments anyone might have about my project or about modeling in general. Any comments you might have on this project can be forwarded to me, in care of **AAM.**



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