49115 NOVEMBER 1997

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## FOCKE WULF TA 152H

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# FOCKE WULF TA 152H

## BY DAVID P. ANDERSEN

**A Scale Model Of Perhaps The Fastest Propeller-Driven Fighter of WWII**

**Part I**

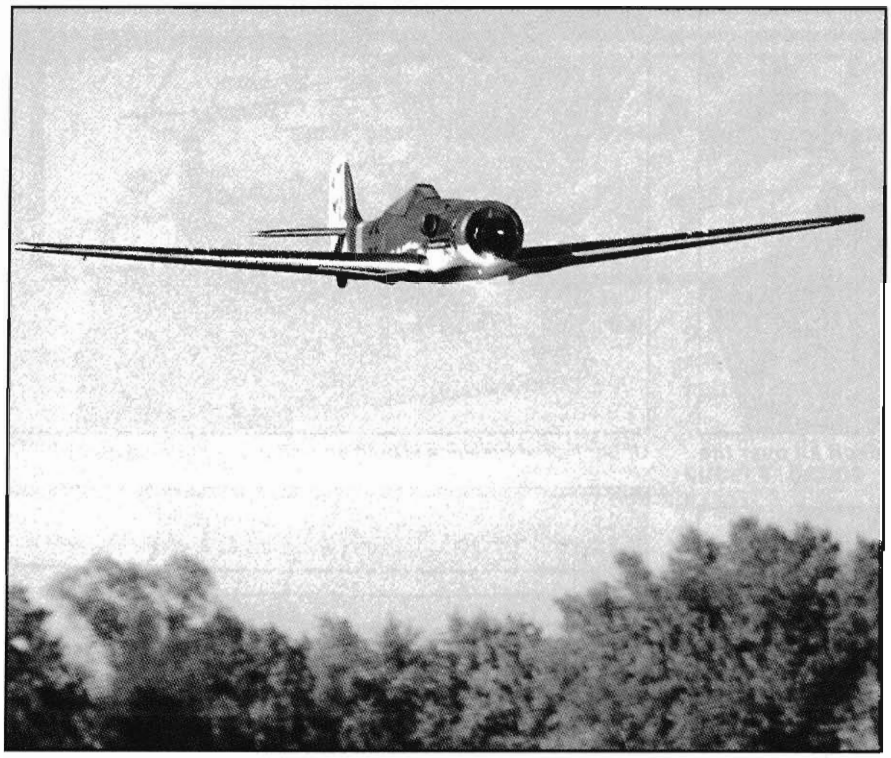
It is believed to be the fastest and highest flying propeller-driven airplane to see combat in WWII. The TA 152H was built to counter a threat which never materialized -- a belief that the Allies had developed very high altitude bombers. Because it was so fast, faster than most jets of the era, its major combat role was to fly cover for ME 262 jets.

But most amazing of all were the difficult conditions under which it was designed and built. In early 1945, the infrastructure of Germany was collapsing. There was no petrol for trucks. Roads and railroads were destroyed by bombing. Aircraft parts were transported by bicycle. Draftsmen ran out of paper and aircraft workers drank water from fire reserves. Test pilots were called to combat, so Professor Kurt Tank, the Chief Engineer of Focke Wulf and designer of the FW 190 series, had to test-fly the TA 152H himself. In one famous flight, he was attacked by Mustangs which he easily outran.

Of the 60 that were built, 12 saw action before the war ended. Only one aircraft remains. It is in the Smithsonian's Silver Hill facility undergoing restoration.

**Speed Without Apology:**

From my experience, the ideal speed for a scale model airplane seems to be about 50 mph at cruise, increasing to a top speed in level flight of about 80 mph, slowing down to less than 30 mph for landing. Flight slower than that becomes vulnerable to turbulence and, if faster than that, the sky isn't big enough for interesting maneuvers. Size should be above the IMAA minimum size



for visibility. Ground handling must be good on both grass and hard surfaces and it should be attractive.

The search for such an airplane led me to the Focke Wulf TA 152H. At 1/6 scale, the TA 152H would have the following speeds in order to fly realistically:

Full size
Landing speed: less than 90 mph
Cruise speed: 311 mph
Max speed: 472 mph
1/6 scale model
Landing speed: less than 15 mph
Cruise speed: 51 mph
Max speed: 80 mph

Few scale model airplanes can fly comfortably at scale speed in all speed regimes, but the TA 152H at 1/6 scale can. With its light wing loading and six feet of flaps, even the very slow landing speed can be flown if there is a small headwind. From a blazing top speed to a glider-like landing, it remains within scale speed range during the entire flight. Even its huge loops and tall verticals are in scale proportions. No longer must the pilot fly on the verge of a stall to maintain realistic speed. This airplane is stable and controllable at all airspeeds and a thrill to fly.

It is interesting to calculate scale altitude too. One-sixth of 50,000 feet is 1.6 miles. One would need a telescope to fly a model that high, if that were possible.

Despite its long wingspan of eight feet, the model is not a monster. It's long and lean, not big. Compared to an FW 190D at the same scale, the 190D would have a wingspan of only 69". One would not want to scale up the TA 152H any further because scale speed would be too fast!

The model presented here was designed by enlarging the ScaleCraft drawings and filling in the structure. It is exactly scale except for one necessary deviation: the thickness of the wing was enlarged at the root by 3/8". This had to be done in order to fit the retractable landing gear. This was accomplished by rounding the bottom of the airfoil, leaving the upper surface scale so that the wing fillet would not be affected. This tends to improve high-speed characteristics in the bargain.

So, if you don't mind being hopelessly outnumbered by the Mustangs and P-47s at your club field, you should consider building a TA 152H. Ignore the crumbling infrastructure of your workshop, scrounge building materials at the local hobby shop, and bring them home on a bicycle. Shove a copy of Wagner's *Ride of the Valkyrie* into your stereo. Then, stubbornly dig in for a good build. Before long, you will be flying faster and higher than all the other warbirds at your field.

**Flying:**

Check the battery before each flight. Except for static display, install a short servo extension cable to the charger jack in the cockpit floor. Use it to check the battery with an expanded scale voltmeter.

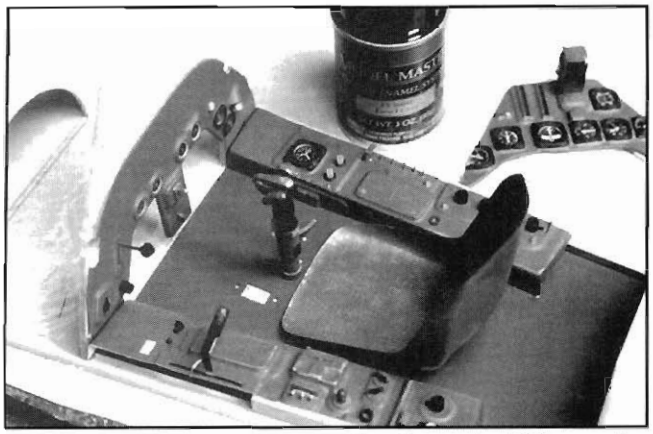
Fuel up and pump the air tank pressure to 80 lbs./sq. in. Turn on the receiver switch located on the cockpit floor. Push Franz Grueberman, the dummy pilot, down into his seat and close the canopy over him. Check all controls. Note especially whether they are moving in the correct direction. Nearly every experienced pilot has crashed at least one airplane because a control was reversed -- get in the habit of checking before each flight. Lift the nose and cycle the landing gear.

Start the engine. Despite the spinner's size, a standard Sullivan starter with a standard cup is adequate. Let the engine warm up and tweak the needle valve to slightly less than full power on the rich side -- we have plenty of power here -- there's no need to risk a flame-out for a little bit more power.

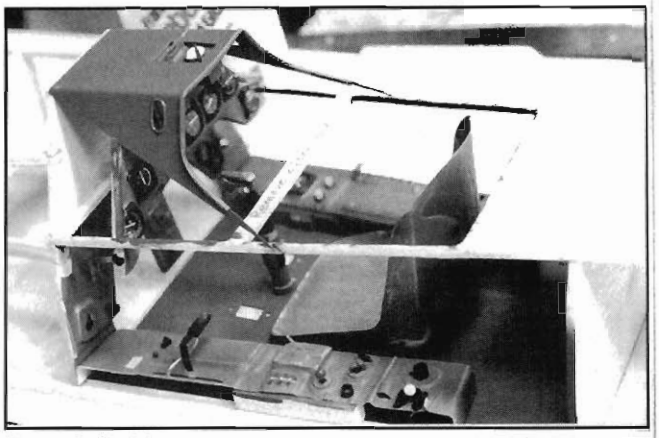
My only disappointment with this airplane is the sound level. Although the Slimline muffler is effective for its size, engine noise measures over 100 db at nine feet -- too loud for many flying sites.

**FOCKE WULF TA152H**

**Designed by:**
David P. Andersen
**TYPE AIRCRAFT**
Scale (1/6)
**WINGSPAN**
94 Inches
**WING CHORD**
10.5 Inches (Avg.)
**TOTAL WING AREA**
987 Sq. In.
**WING LOCATION**
Low Wing
**AIRFOIL**
Scale Progressive Semi-Symmetrical
**WING PLANFORM**
Double Tapered
**DIHEDRAL, EACH TIP**
10¾ Inches (6°)
**OVERALL FUSELAGE LENGTH**
72 Inches
**RADIO COMPARTMENT SIZE**
Ample
**STABILIZER SPAN**
24 Inches
**STABILIZER CHORD (inc. elev.)**
5½ Inches (Avg.)
**STABILIZER AREA**
132 Sq. In. (13.3% of wing area)
**STAB AIRFOIL SECTION**
Symmetrical
**STABILIZER LOCATION**
Top of Fuselage
**VERTICAL FIN HEIGHT**
11 Inches
**VERTICAL FIN WIDTH (inc. rud.)**
9 Inches (Avg.)
**REC. ENGINE SIZE**
1.08 2-stroke
**FUEL TANK SIZE**
16 Oz.
**LANDING GEAR**
Conventional (Retractable mains)
**REC. NO. OF CHANNELS**
6
**CONTROL FUNCTIONS**
Rud., Elev., Throt., Ail., Retracts, Flaps
**C.G. (from L.E.)**
3½ Inches (25%)
**ELEVATOR THROWS**
3/4" Up — 3/4" Down
**AILERON THROWS**
1/2" Up — 1/2" Down
**RUDDER THROWS**
1½" Left — 1½" Right
**SIDETHRUST**
0 Degrees
**DOWNTHRUST/UPTHRUST**
0 Degrees
**BASIC MATERIALS USED IN CONSTRUCTION**
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa & Ply
**Wt. Ready To Fly** 212 Oz. (13 Lbs. 4 Oz.)
**Wing Loading** ..... 31 Oz./Sq. Ft.

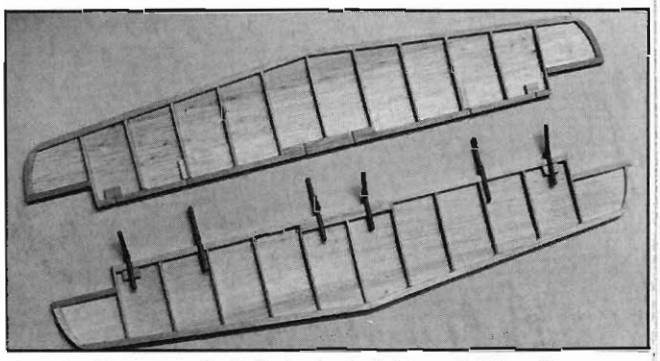


*Construction begins by assembling the cockpit kit over the plans.*

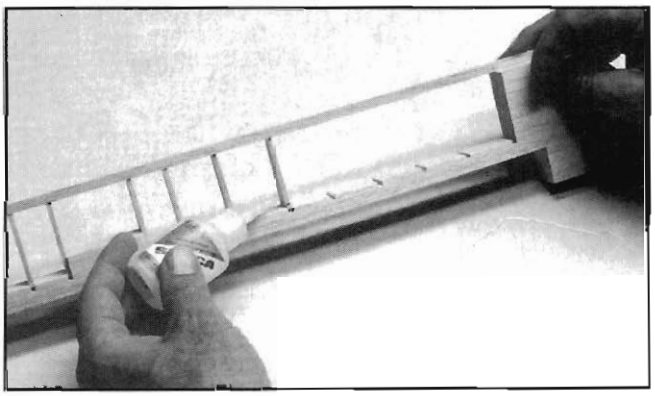


*Upper half of fuselage is built around the completed cockpit.*

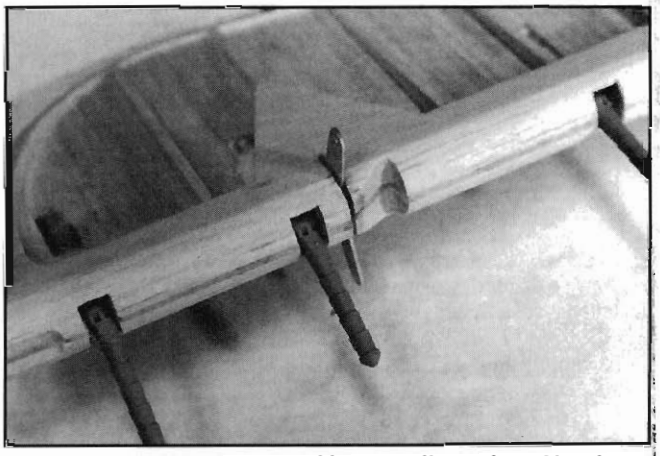
*Stabilizer is built in two clamshell halves.*



*Elevator hinges are installed prior to joining stabilizer halves.*



*Elevator ribs are CA'd in place using trailing edge for alignment.*



*Rudder hinges are recessed into leading edge. Aluminum control horn epoxied in slot.*

Slowly taxi to the end of the runway and stop. The forward position of the wheels prevents nosing over so there is no need to hold up elevator while taxiing. Check for Mustangs. Slowly advance the throttle to half power (full throttle at take-off looks more like a blast-off than a take-off). Steer with the rudder. Lift off after more than sufficient flying speed is reached. Continue straight ahead, still steering with the rudder during the entire climb-out. Use the ailerons only to hold the wings level during this phase of flight.

Flick the retract switch. The sudden release of landing gear drag and movement of the weight of the gear rearward tends to cause a slight pitch-up of the nose and a change in trim equivalent to one-fourth of the elevator trim range. Anticipate this by throttling back prior to retraction and tap a bit of down elevator. This would be a good application for mixing of elevator and retract channels.

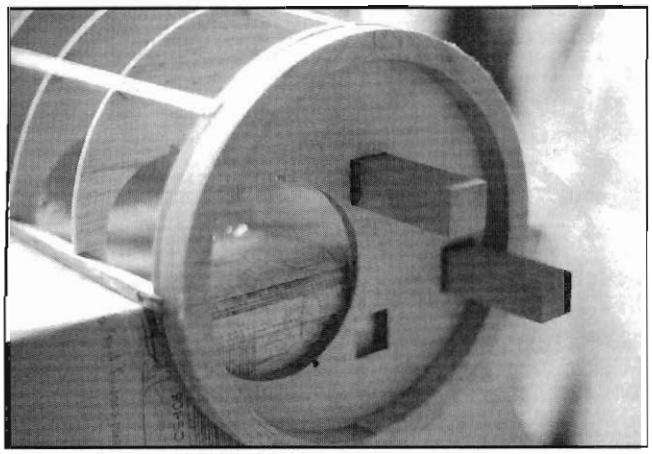
Throttle back to one-third throttle and adjust the elevator trim lever to maintain level flight. This setting will produce a moderate climb at full throttle and a shallow glide at idle, allowing you to control climb rate with throttle.

Approach the field from downwind and do a slow fly-by. The light wing loading and low drag combine to permit very slow fly-bys. If the plane is well-built and truly aligned, there will be no tip stalling tendencies despite the long wing.

So far, we haven't gotten past half throttle. So push the loud-lever fully forward and watch the lean machine leap forward. Hold some down elevator pressure to keep it from climbing, then release and pull up to create a chandelle turn -- point the nose up at a 30° angle and turn with the rudder while using opposite aileron to limit the bank. Turn 180° and level off and throttle back.

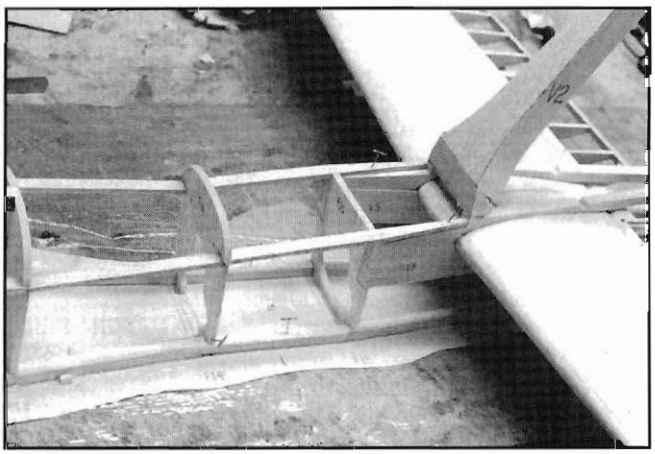
Now Split-S. There will be a change in heading due to adverse yaw in the inverted position. You must use rudder in the roll to inverted to correct for this -- this effect is common in all airplanes but is more pronounced in the TA 152H because of its long wings.

Accelerate out of the Split-S and advance to full throttle. Gently pull back on the stick to start a big -- really big -- loop. There is little tendency to torque roll to the left. This is one of the advantages of the long wing: torque effects are minimized because the propeller diameter is small in comparison to the wingspan. Flatten the top of the loop with a brief application of slightly down elevator, then throttle back as the nose drops. Glide through the remaining half of

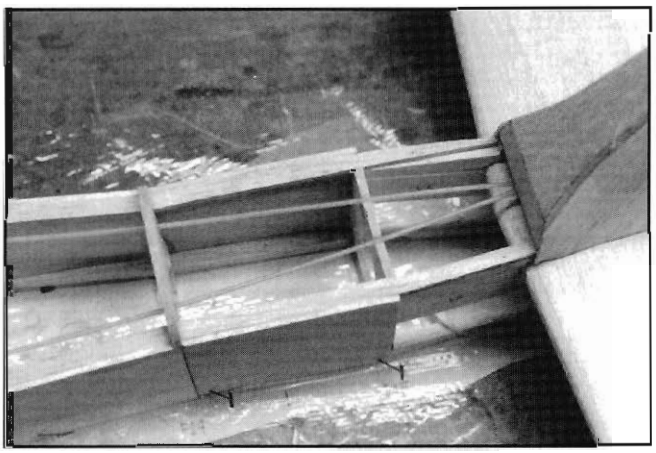


*Crutch fuselage construction requires the fire wall to hang over the edge of the building board.*

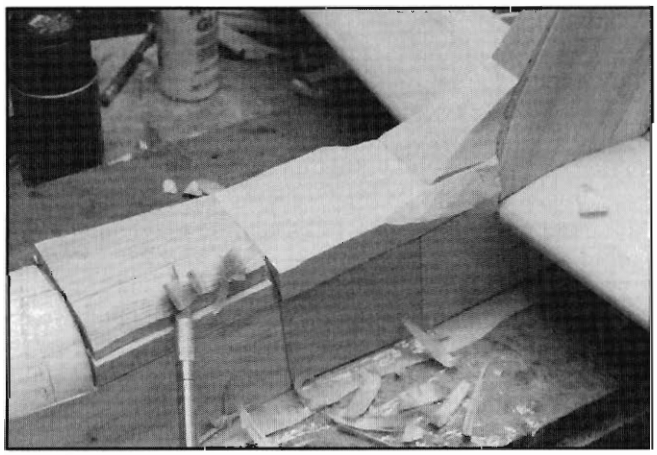
*Joined stab and elevator are glued in place early in fuselage construction.*



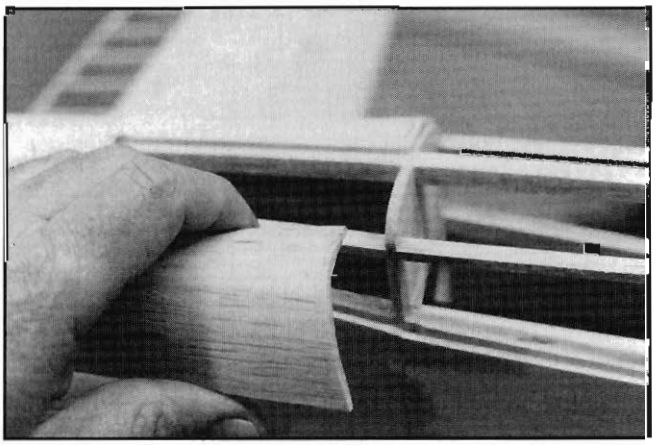
*Formers and stringers of upper half of fuselage in place; then the fin leading edge is added.*



*Rudder cable guides are added before sheeting is completed.*



*Soft balsa blocks are rounded with #11 X-Acto knife. Hollowed for lightness.*



*Soft balsa sheet is wetted and curved with fingers before gluing in place.*

the loop. The engine is quiet now; most of the sound from the airplane is the whoosh of air over the airframe and windmilling prop.

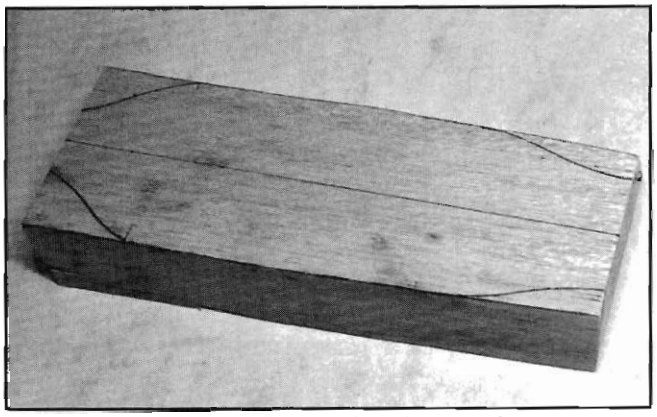
Stall turns are tall with good rudder response at the top, but use opposite aileron to prevent the 6° dihedral from causing a roll.

Climb to altitude and head into the wind. Reduce throttle to fast idle and gradually lower flap while increasing up elevator. Search for the combination of up elevator and low throttle which minimizes speed without losing altitude. Rudder input may be required to maintain heading if the air is turbulent. Very slow flight is possible. With only a 15 mph wind on the ground, nearly hovering flight at altitude is possible.

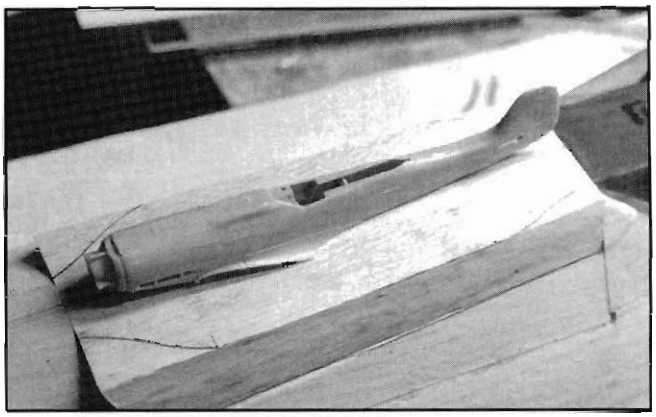
A really good slow roll requires practice -- it is the TA's poorest maneuver. When the plane rolls inverted, wing wash-out (negative twist) becomes wash-in (positive twist). The ailerons become less effective, slowing the roll rate. The long wings exacerbate this. You must learn to compensate for this effect by kicking the tail around with a boot of opposite rudder or increasing the aileron deflection during the inverted phase of the slow roll. Practice has its rewards -- those long wings rotating slowly across the sky are a spectacular maneuver when done well.

Spins are spectacular but the forward C.G. and small elevator are not an easy combination for spins. If the entry is right and elevator effectiveness is boosted with sufficient prop wash -- about 1/5 throttle -- graceful, slowly rotating spins are possible.

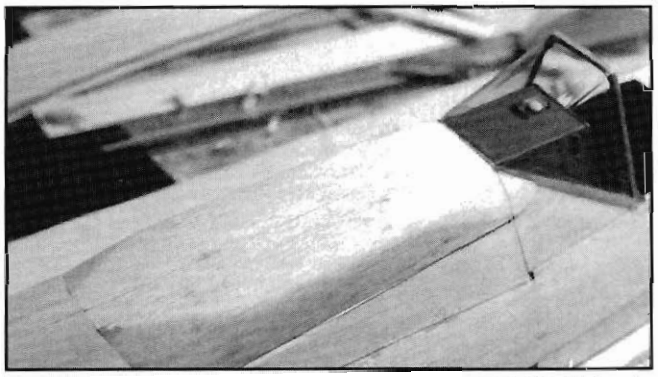
Eventually, we must prepare for landing. Throttle back to fast idle and the nose will drop into a shallow glide. When slowed, lower half flap. This increases lift momentarily, flattening the glide at first. But flaps also increase drag and move the center of



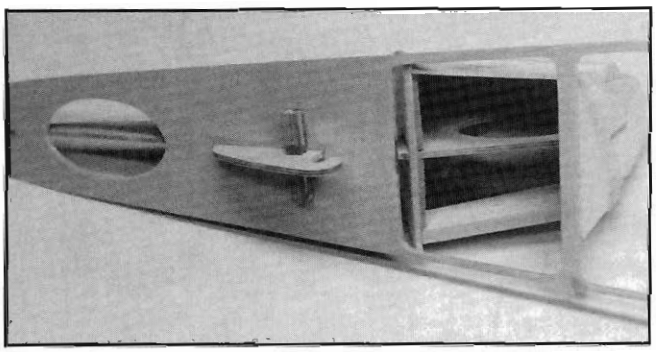
*Gun cover is 1" sheet, beveled, and marked per plans.*



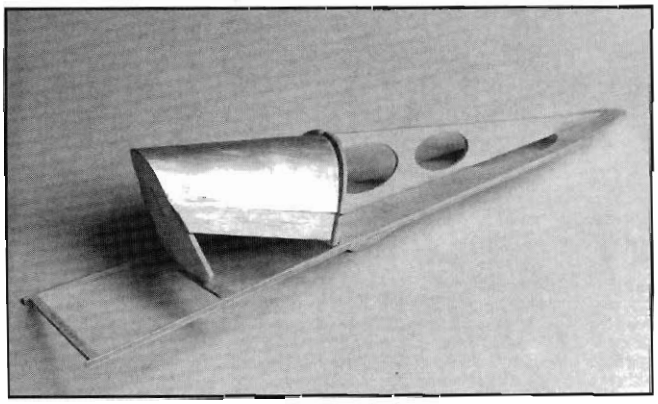
*Gun cover trial-fitted before shaping. Plastic model is used as a reference for rounding.*



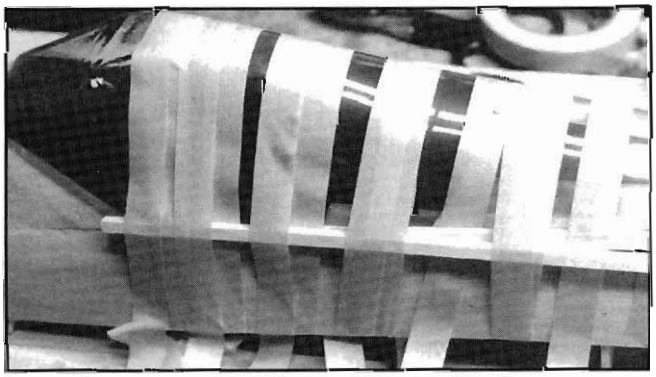
*Completed gun cover is hollowed for lightness before gluing in place.*



*Ply hook and crosspiece on canopy bottom provide simple 3-position sliding canopy.*



*Ply and lithoplate canopy frame ready for painting.*



*Innovative Models FW 190D canopy is glued in place over completed cockpit.*

lift aft, making the plane, in effect, nose-heavy. Pitch stability is increased. The glide gradually steepens as speed is reduced. When the nose drops further, increase flaps to full deflection. Once again the glide momentarily flattens, then steepens as speed is reduced further.

Now lower the landing gear. This steepens the glide even further due to increased drag. Wheel drag nearly a foot below the fuselage leverages the nose down further. The result is a steep but slow descent to the landing area. Aileron effectiveness is reduced due to the lower airspeed but there is plenty of reserve. In extreme turbulence, augment turns with rudder as needed. Control the glide angle with throttle, not elevator. Only a tiny increase in engine speed is needed to flatten the glide.

If you are ever forced to do an off-field landing in the rough, I suggest that you set down with partial flaps and gear up. This will minimize damage.

The reduced airspeed also reduces elevator effectiveness which might limit the amount of flare available. Compensate for this by increasing up-elevator trim during final approach by about half the trim range or add some power immediately before touchdown in order to blow more air over the elevator during the flare.

The forward rake of the wheels prevents nose-overs, but it makes the plane more prone to bouncing. Immediately raise the flaps at touchdown to kill lift. This prevents bounce. Taxi to dispersal.

On your next flight, try flying to music. Get a tape of Kay Kyser's *There'll Be Bluebirds Over The White Cliffs of Dover.* Drop it in a boom box and bring it with you to the pilot station. Fly a rectangular pattern approach to the field and push the Play button. Time loops, slow rolls, and stall turns to be in sync with the crescendos of the music. Note the irony of the lyrics. Land as the final notes fade. We only wish the original TA 152H's were flown like that.

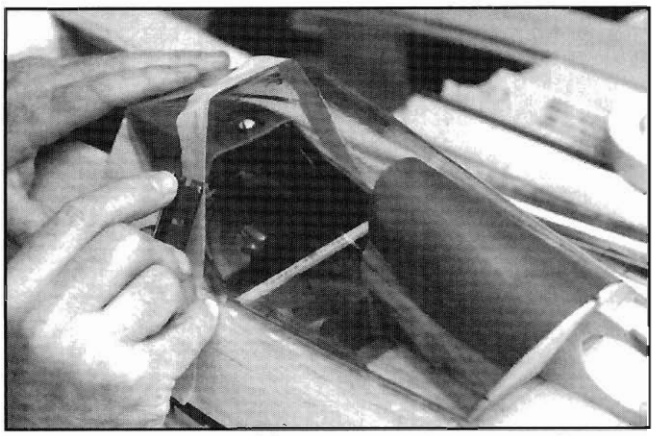
## CONSTRUCTION

**Some Day My Prints Will Come:**

While waiting for your RCM plans to arrive, gather all scale documentation. I strongly recommend that you purchase the ScaleCraft 5-view drawing and tack it up on the wall of your shop (see the references at the end of this article or on the plans). The plastic model kit is very useful too — it shows certain features in three dimensions as no drawing or photo can. Now is a good time to decide on a color scheme too — get the color drawing and color chips too. All of this takes time so start early.

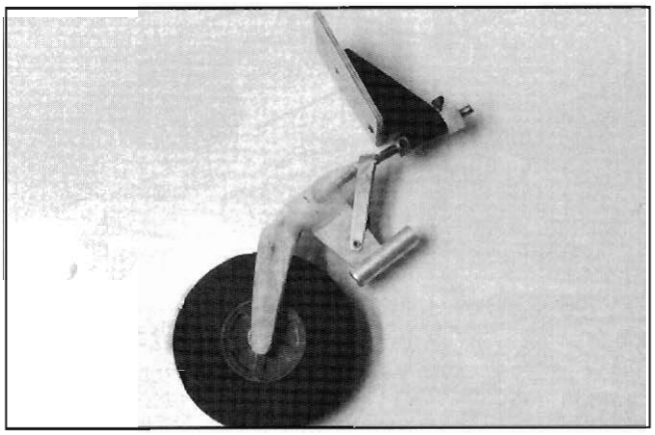
The long nose simplifies balancing but the small horizontal stabilizer mandates a light tail. Unnecessary weight in the nose and tail adds to the moment of inertia about

***Continued on page 92***

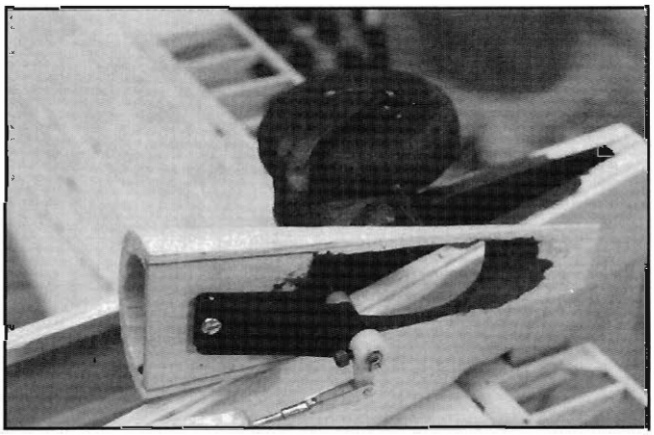


*Windscreen is separated from canopy using masking tape as a cutting guide.*

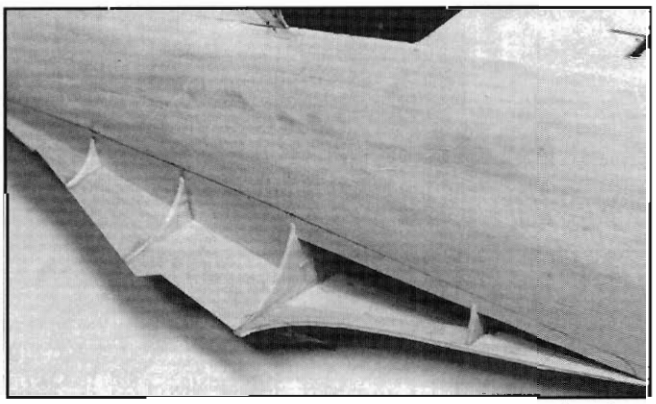
*Painted frame is glued to windscreen. A lot of clothespins hold while glue sets.*



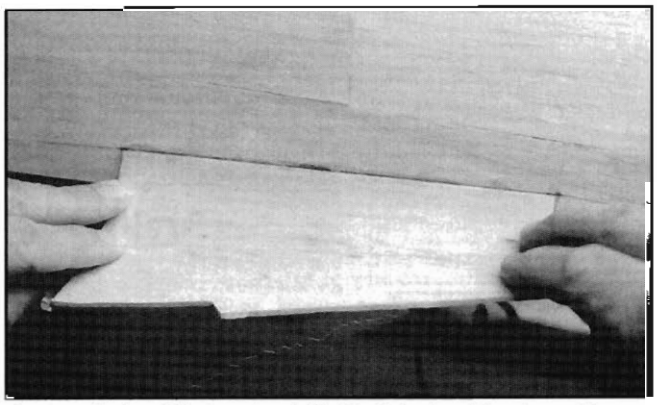
*Tail wheel assembly is completed before installation. Light Flite tail wheel for lightness.*



*Balsa tail wheel pushrod is attached to cut-down nose wheel steering arm.*



*Ply wing saddles held rigid by fillet formers. Line on fuselage marks upper edge of fillet.*



*Pre-sanded soft balsa sheet fillet is CA-glued in place. Fingers alone hold it in position.*

*Continued from page 89*

the pitch axis. This must be controlled by the rather small stab and elevator. Too much nose and tail weight will degrade pitch stability even if the Center of Gravity is correct. The same applies to the wings — keep the wings light, especially the outer panels; this improves overall performance and reduces stress on all components. So keep the whole airplane light, it will fly better and last longer. Spend a couple of extra bucks for 4-6 lb./cu. ft. balsa. It's well worth it.

My favorite method of cutting parts is to photocopy individual parts from the plans on a copy machine (the Fair-Use Doctrine of the copyright law allows you to do this for personal pattern-making purposes). Trim the pattern and glue it to the stock with a glue stick. Kinko's glue sticks work very well for this purpose and peel off easily, leaving no residue if removed before the glue cures. Cut out the part slightly oversized on a scroll saw and sand away half of the line with a small disk sander. Then peel off the pattern. Alternatively, you can cut up the plans and use them directly. But save the patterns -- some contain notes needed for later assembly.

Cutting parts is a very enjoyable aspect of this hobby. It's a relaxing diversion from one's work day pursuits that is compatible with listening to music while crafting parts to perfection. Isn't that what a hobby is for?

**Decorating the Office:**

We construct the scale cockpit while it's accessible and then build the fuselage around it.

Assemble and paint the Innovative Models FW 190 cockpit kit. It is not exactly scale for the TA 152H, but close. If you are a fanatic about scale detail, see the Watanabe book. The major difference between the 190 cockpit and the TA 152H cockpit is that the TA 152H had a narrower upper instrument panel. Attach it to former F8 and trim to size, cutting through the outer instruments as needed; the missing parts won't be seen after assembly. Cut the cockpit floor. Cut the joystick to length and screw it to the floor, then remove it for later assembly. Cut

holes in the cockpit floor for the radio switch and charging jack. Trial fit now. Completely paint and finish all cockpit parts now.

**Horizontal Stabilizer:**

The stab and elevator will be needed midway through fuselage construction, so we either build them before starting the fuselage or do it later when needed. Later requires more workbench space.

The stab is built in two clamshell halves. Pin the half ribs to the building board over the plans and add the leading and trailing edges. Then, plane the leading and trailing edges down to the height of the ribs. Cut 1/16" sheeting slightly oversize, sand it on a flat surface, and glue it to the stab frame. No further sanding should be required, except for the leading edges later. Sanding after assembly will show the ribs as indentations. Make two stab shells.

Notch the trailing edges of the stab halves to receive the Robart hinges. Epoxy the hinges in place and glue the two half shells together. Then plane and sand the leading edges to shape.

**Elevator:**

The entire elevator can be assembled while holding it in your hand. Cut the elevator parts and insert the ribs into the slots in the elevator's leading edge. Don't glue yet. Pin the trailing edge in place and carefully align all of the elevator ribs. Use a straightedge to verify that they are exactly parallel and touching the trailing edge. When all is positioned, fix the parts in place with CA glue.

Drill holes in the elevator's leading edge for the Robart hinges, using the stab as a guide. Don't glue yet. Round the elevator's leading edge and plane and sand the elevator tips to an airfoil shape.

Fit the elevator to the stab. Note that the hinge line is well into the elevator and at the center of curvature of the stab's leading edge. Cut notches around the hinge holes in the elevator with a #11 X-Acto knife as required for hinge clearance. Verify that the elevator swings at least 45° up and 45° down without binding. Then, CA and epoxy each hinge to the nearest rib. Finally, plane and sand the elevator with a sanding block so that its surfaces are flush with the stabilizer, especially the tips. Block-plane the elevator's ribs so that all rib surfaces are in the same plane. Last, add the elevator horn. The stab and elevator are now ready to be installed in the fuselage. Put them aside until the fuselage is ready to receive them.

**Rudder:**

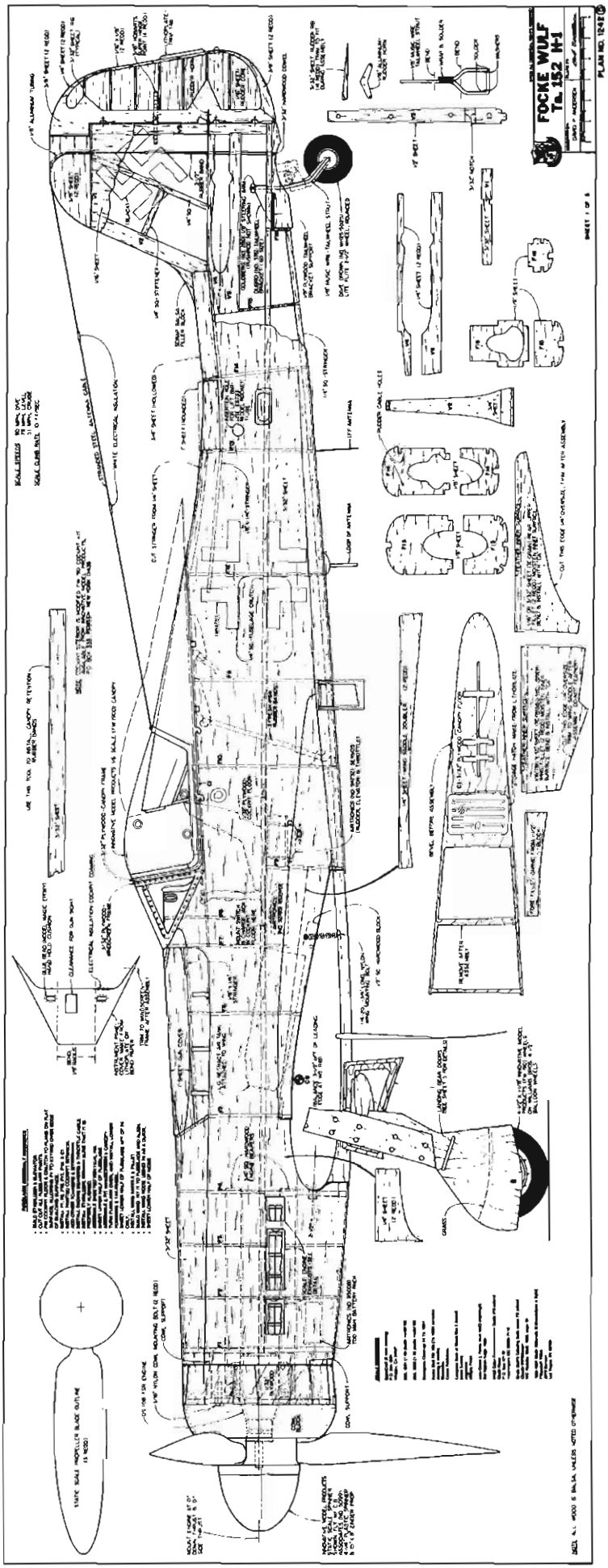
The rudder can be built any time prior to final shaping of the fin. Set the darkness control of a copy machine to very dark and photocopy the rudder from the plans. Lay the photocopy face down on a sheet of 1/16" sheet balsa and iron the pattern onto the wood with a hot iron. This transfers some of the ink to the wood to form a reverse image. Cut along the outer line, pin the part to a flat surface, and glue the leading edge, half ribs, and trailing edge in place on the pattern you just printed. Flip over and glue the parts to the other side, using the first side as a guide. Ain't that slick?

Plane and sand to an airfoil shape. Rough-shape the top of the rudder, final shaping will be done later when the rudder is fitted to the fin. Glue the hinges in place. Note that the hinge line is recessed to the center of radius of curvature of the rudder's leading edge. The hinges should swing at least 45° each way without binding.

Last, cut a slot in the rudder's leading edge where shown. Scratch and roughen the surface of the aluminum rudder horn and epoxy it in place.

**Upper Fuselage:**

The fuselage is built around a horizontal crutch that

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runs the length of the fuselage on the centerline. We will partially build the upper half of the fuselage, then flip it over and assemble the lower half. Begin by laying the top view of the fuselage on a flat building board. Cover with wax paper or Saran Wrap. The fire wall F1 is one piece, so the plans must drape over the edge of the building board so that the lower half of F1 can dangle over the edge.

Lay the cockpit floor on the plans, then fit the 1/4" sq. balsa crutch to the plans, recessing the crutch by the thickness of the floor where it meets the floor. Glue the crutch to the cockpit floor with epoxy. Note that the floor will support a lot of stuff: the radio switch, charging jack, joystick, seat, and pilot. Glue all upper formers to the crutch and install the completed lower cockpit parts. The floor is about 1/4" higher than scale, so the side panels must be cut down accordingly.

Screw and glue the 3/4" sq. hardwood cowl support post to the fire wall and epoxy the fire wall in place on the crutch, overhanging the end of the building table. Then epoxy the upper engine bearer in place. Verify that the engine bearer and the cowl support project from the fire wall exactly the length shown on the plans, or else a lot of trimming and shimming will be needed when fitting the cowl.

Do not install the windscreen frame at this time.

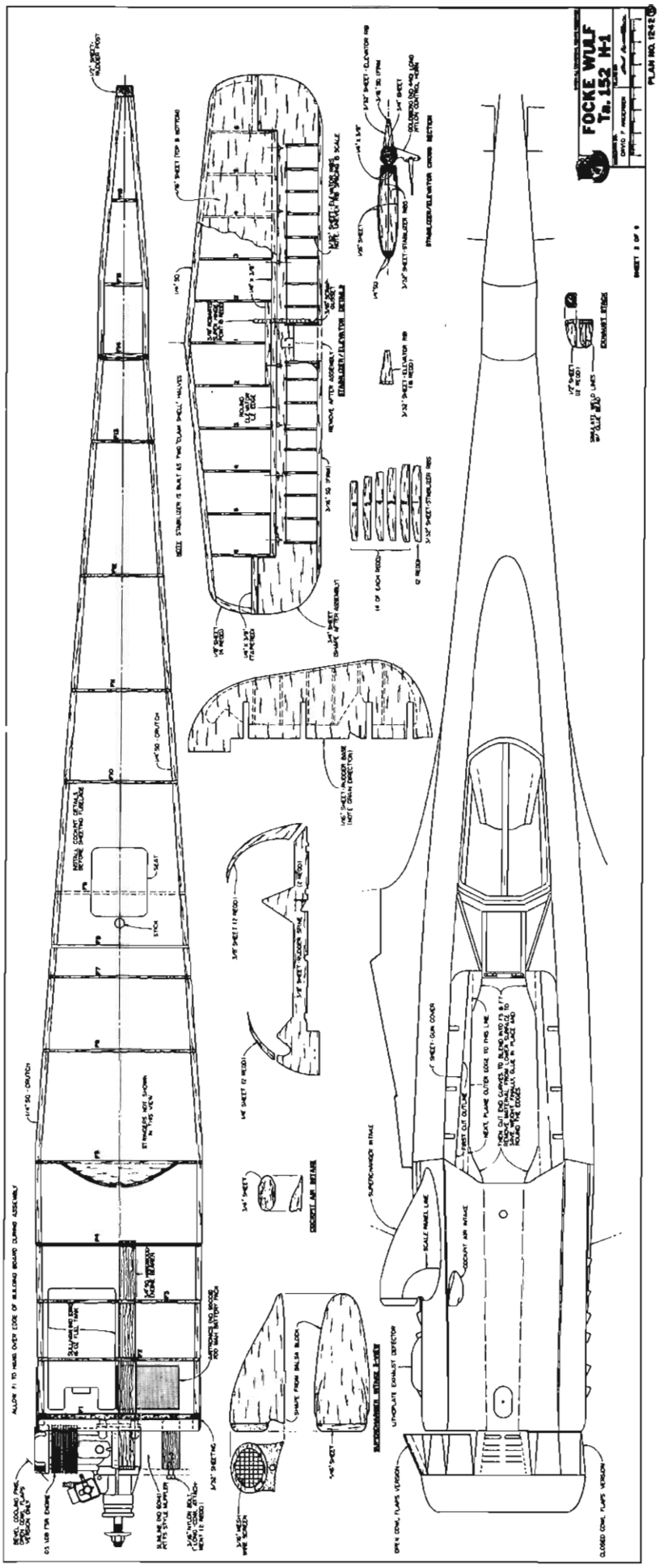
Install C1 canopy floor. This supports the upper instrument panel and instrument panel cover. Install these now and admire the completed cockpit despite its being surrounded by only a hint of a fuselage.

Install the rudder post V3 and stab saddles V5, verifying that the rudder post is perfectly vertical. Don't merely eyeball it, use a draftsman's triangle or small carpenter's square. It must be true, or else the plane will roll when there's a change in airspeed.

Trial fit the stab to the stab saddle. It should be parallel to the building surface with 1° of positive incidence. If your flying style is to always fly full throttle even in level flight (very non-scale!) and you don't like to hold down elevator while doing so, use 2° incidence instead. Otherwise, the 1° incidence angle assumes that we want a pronounced climb at full throttle, with neutral elevator, transitioning to level flight at one-third throttle. Shim or trim the stab saddle V5 as required. Then, attach the arrow shaft pushrod to the elevator horn, shove it into the fuselage, and glue the stab in place. Double check the incidence angle again before the glue sets. Also verify that the trailing edge is horizontal and perpendicular to the fuselage centerline or else the plane will corkscrew in a loop.

Install the top half of V5 on top of the stab and assemble the fin structure, less the fin top, on top of V5. Cut oversized sheets of 1/16" balsa and sand smooth on a flat surface. Then, sheet both sides of the fin with the 1/16" sheet balsa. No further sanding of the fins side should be necessary. The leading edge of the fin will be shaped later.

Bend the aluminum tubing for the antenna guide with a K&S coiled-spring tubing bender and sandwich it in the grooves of the fin top. The full-sized TA 152H used a pulley and a

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spring to maintain tension on the antenna as the canopy slid back and forth. We use tubing and a rubber band — why didn't Professor Tank think of that? Later, we will install the rubber band through the tail wheel hole and secure it with a dowel across the crutch. For now, we assemble the fin top and glue it in place. Rough shape it to a taper with a razor plane. Final shaping will come later when the rudder is in place.

Drill diagonal holes in the fin sides and install the rudder cable guides from the exit holes, under V2 and extending forward to F13. Leave the rear ends long for now, trim them flush after painting. Note that the cable guides cross in an X somewhere under V2 -- this allows the guides to exit the fin at a less oblique angle. The guides should point to the ends of the rudder horn.

Sheet as much of the fuselage as you can. Don't forget to paint the inside of the sheeting in the cockpit area before attaching it.

Add the two balsa blocks above F13 and F14. Rough carve and hollow before gluing in place. The two odd sections in this area are due to the evolution of the TA 152H from the FW 190A. The first section was added during the design of the long-nose D model and then another section was added for the TA 152H. We maintain these discontinuities with wood joints.

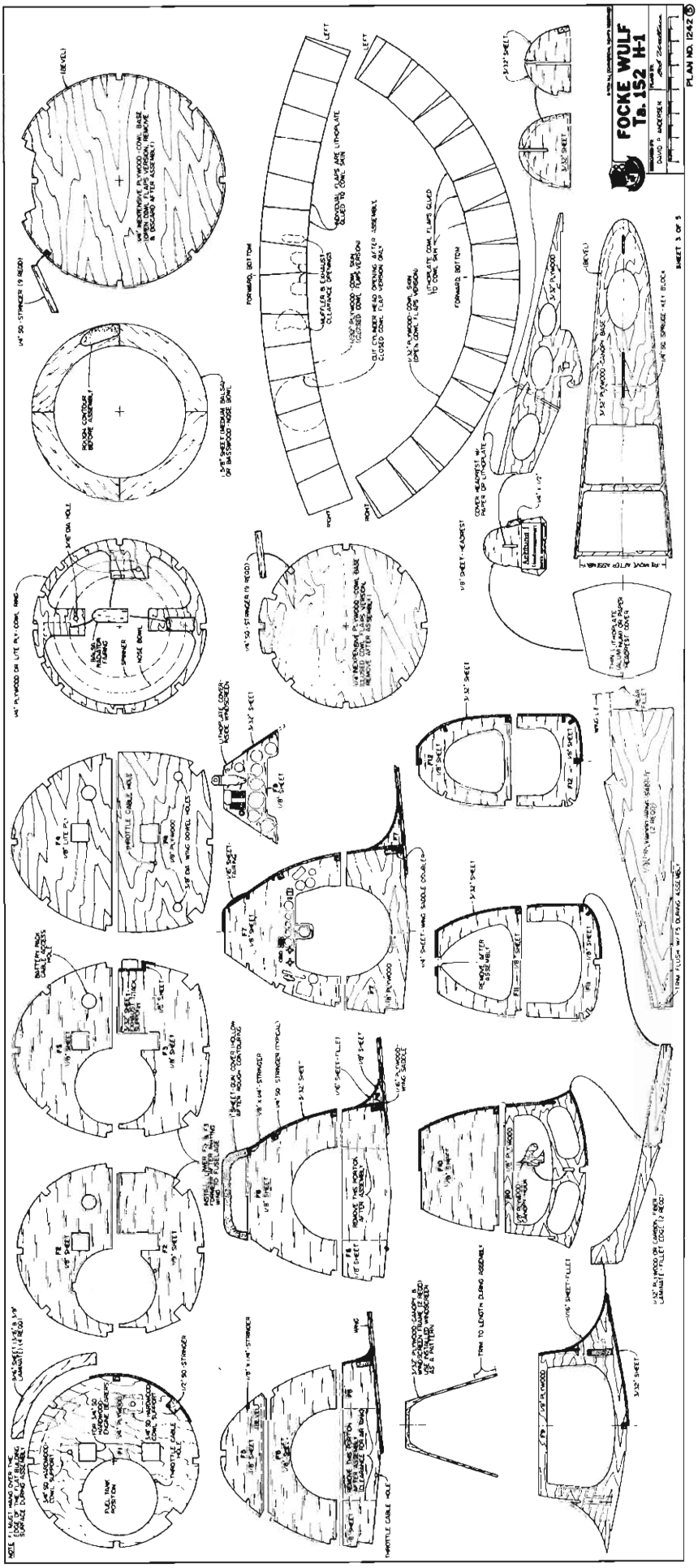
Round and carve the leading edge of the fin and its transition into the fuselage. Note that the leading edge of the fin is very blunt -- to get it exactly right, look at photos of the full-size TA 152H or the plastic model kit as you round the leading edge of the fin.

**Sliding Canopy:**

Focke Wulf canopies slid on a single rail centered under the canopy. We do almost the same -- we use a ply tongue sliding in a ply slot. A key block in the canopy base falls into one of three slots in the canopy floor, allowing three canopy positions -- fully open, fully closed, or cracked open a little bit. The canopy is held in position by two #64 rubber bands hooked on the tongue and connected to another ply hook in the bottom of the fuselage. The rubber bands tend to pull the canopy down and forward. To slide the canopy, we lift up on the canopy, pulling the key block out of its slot. Then we slide the canopy forward or backward and drop it into another slot. One rubber band is strong enough to hold the canopy in flight but we use two in case one breaks -- check them before each flying session. And don't use cheap drug store rubber bands; they will break. Use only fresh Sig or Hobbico rubber bands.

Pilots typically took off and landed with the canopy open, allowing a quick escape in case of a mishap. It might be possible to actuate the canopy by servo. To do so, eliminate the key block and its slots and use a strong servo or air cylinder, linked to the retracts, to pull the canopy back. I haven't tried this yet. If you do, let me know how it works.

Assemble the canopy frame. Fit it to the fuselage. It should slide easily back and

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forth and drop into each of the three keyed positions without friction — better too loose than too tight. Paint the headrest area and install the jettison warning. All portions of the canopy frame should be painted at this time.

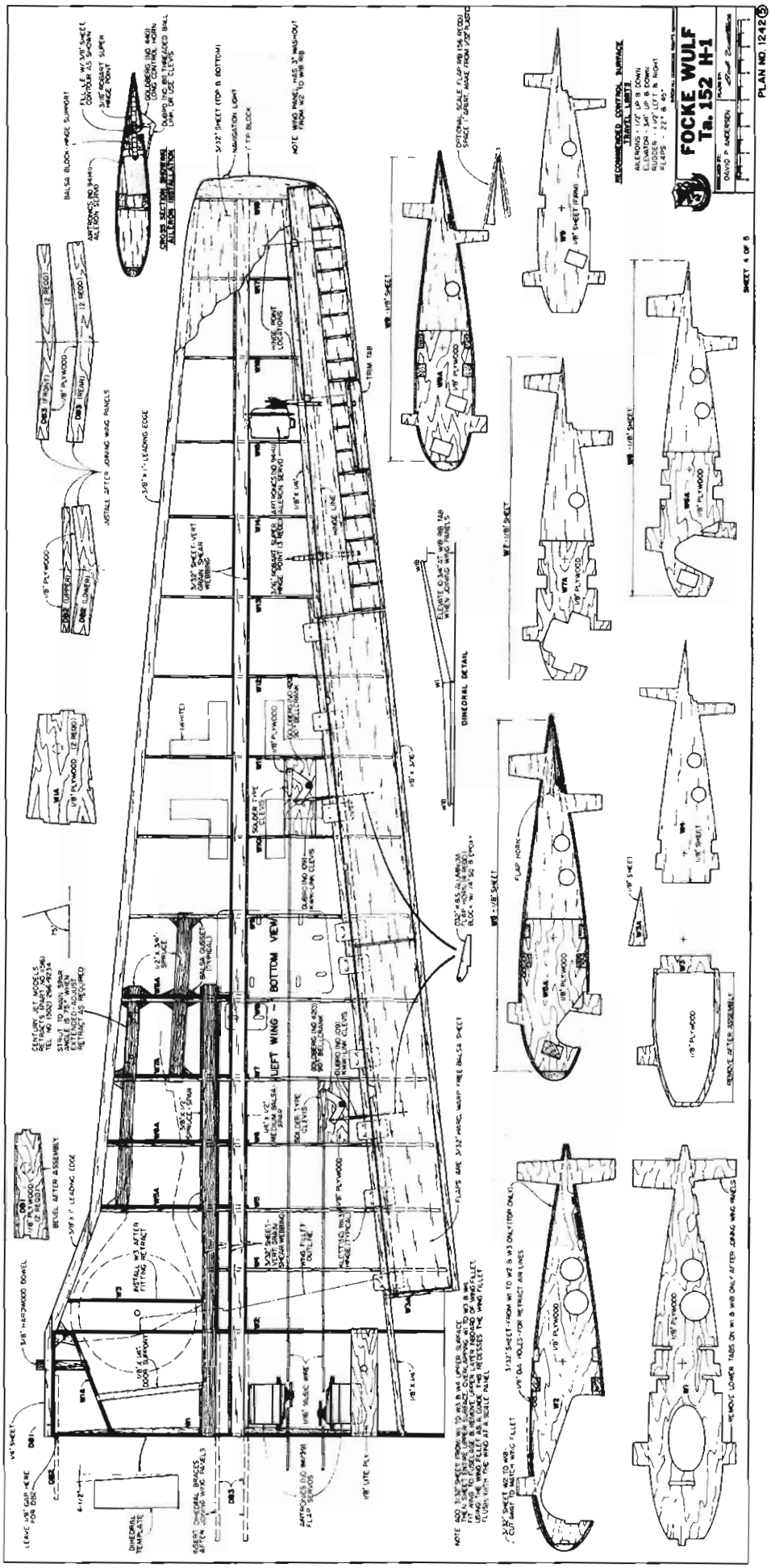
Place the canopy frame on the fuselage in the closed position. Trim the edges to a flush fit to the fuselage, but recessed by the thickness of the canopy plastic. Trim the plastic canopy and place it over the canopy frame. Trim to fit. It might be necessary to remove the last inch or so to get a good fit -- this can be filled in later with wood and filler. If this proves too troublesome, replace the whole turtledeck with 1/64" ply. Cover the canopy base of the fuselage with Saran Wrap to keep glue out. Roughen the inside edges where the plastic meets the canopy frame and glue it in position with Formula 560 Canopy Glue. Clamp and tape it in place while the glue sets. A balsa stick placed along the lower edge helps the tape put pressure on the canopy frame. Wait at least 24 hours for the glue to cure.

Next, we separate the canopy from the windscreen. Place masking tape where the break between the windscreen and canopy will be, it will be used only as a cutting guide. Cut along the edge of the tape with a single-edge razor blade, making several passes until separation occurs.

Make the windscreen frame from the pattern on the plans or, better yet, make a pattern from the edge of the windscreen and cut the frame from it. Cut two identical frames simultaneously. Paint the windscreen frame and glue it in place with Formula 560 Canopy Glue. Recess it slightly, leaving room for a gasket molding of 22-gauge electrical wire to be installed (remember that the TA 152H had a pressurized cockpit so the canopy frame had molding). Use a lot of clothespins on the frame to hold it in place while the glue sets. Paint and glue the other frame to the canopy. When placed back on the fuselage, there should be a perfect fit between the canopy and the windscreen frame.

Finish the canopy frame with elbow-shaped pieces of ply to connect the frame to the canopy base.

The plans show a tool to install the rubber bands. Tie string to two rubber bands and loop them into the notch in the tool. Slip the tool through the slot in



the canopy floor and engage the rubber bands in the hook in the bottom of the fuselage. Withdraw the tool, pull the rubber bands out by the string and connect them to the hook in the canopy Remove the string.

**Lower Fuselage:**

Now we can turn the fuselage over. Support it in some sort of cradle device while working on it.

Epoxy the lower engine bearer in place while carefully measuring how far it projects beyond the fire wall. It must be the same as the other engine bearer and the cowl support for a good cowl fit.

Install the lower fuselage bulkheads. Assemble and paint the tail wheel assembly. Insert the tail wheel's pushrod inside the fuselage, connect it to the tiller, and glue the tail wheel assembly to the crutch.

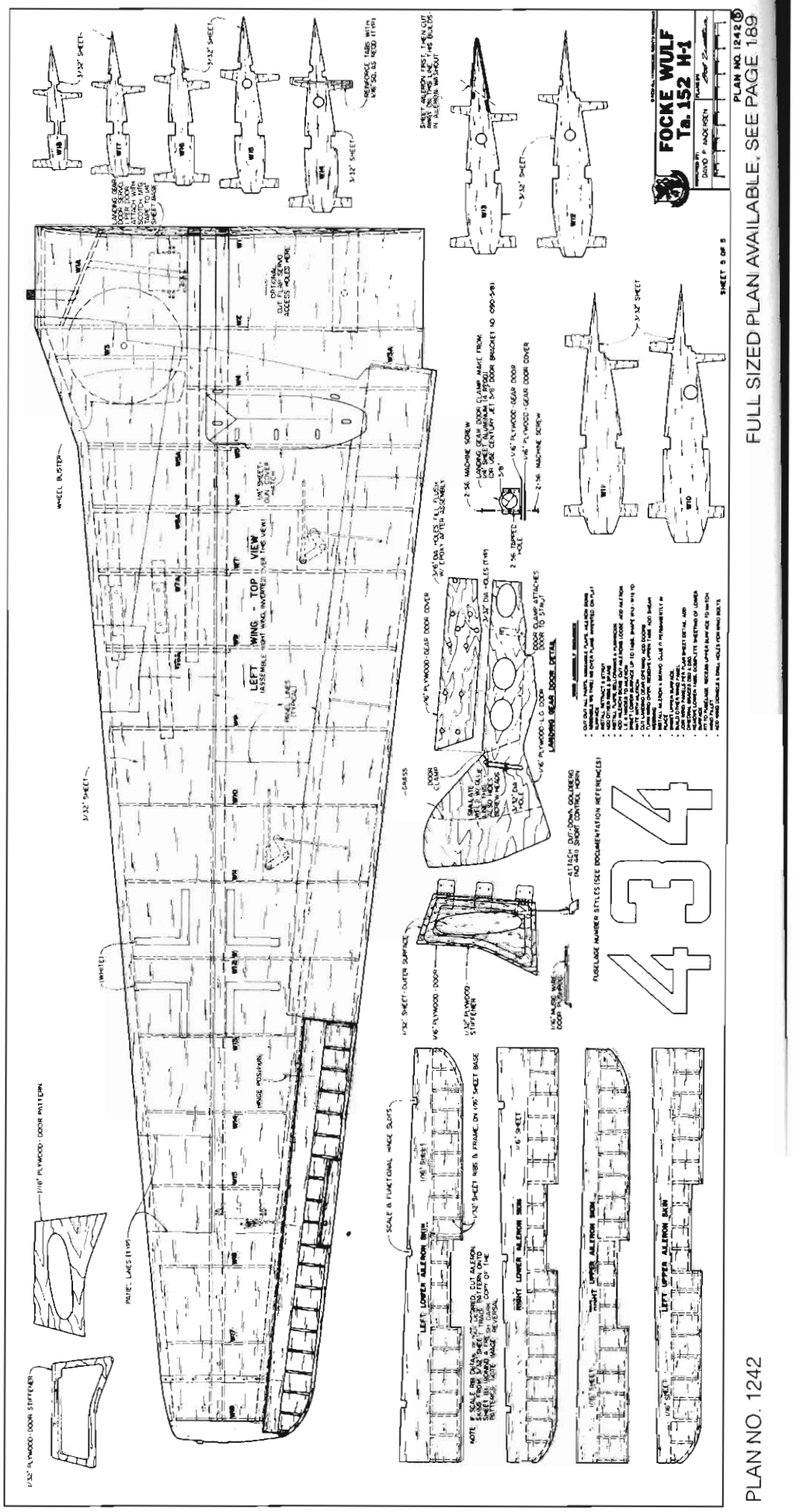
The tail wheel of the full-sized TA 152H was designed to retract straight up into the fuselage, remaining partially exposed. But there were production problems with this, so a wartime expediency was to leave the tail wheel down. We do too. This is documented in the "Monogram Close Up" book.

Install the elevator, rudder, and throttle servos now while there's plenty of accessibility. Connect only the elevator and tail wheel pushrods now. The rudder cables and throttle pushrod can be installed after the fuselage is completed and painted.

Add the 1/4" wing saddle doublers and plane the forward portion to blend into the curvature of F4. Add the 1/32" ply wing saddles and 1/32" ply wing fillet edges. Install the two fillet formers at F6 and F7.

Complete the sheeting of the fuselage except for the lower half of the nose which must be left open until the wing dowels are added to the wing. Note that there are no lower wing fillets; the lower sheeting runs up to the edge of the ply fillet edges. When sheeting the sharp curve near F16, use soft, flexible balsa. Wet the outside surface of the sheet balsa with hot water and rub it into the wood. Gently curve the wood slowly as you rub hot water into it. When the curvature matches the curvature of F16, install the sheeting with CA or use yellow glue and lots of tape. Use wood joints at F14 and F15; we want these to look like stove-pipe sections of the fuselage, which they were.

Now comes traditionally the messiest part of scale modeling,

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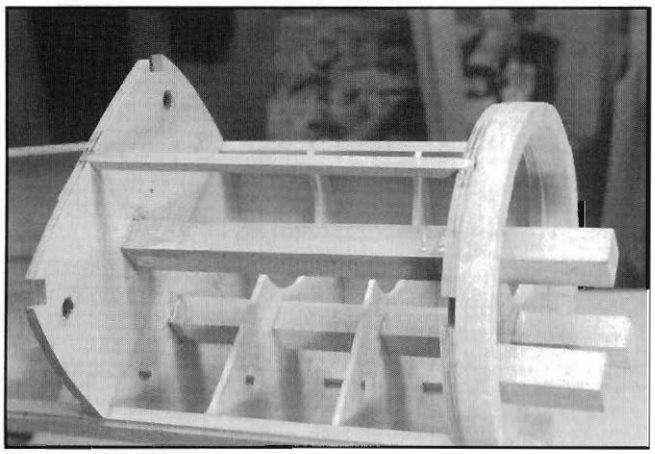
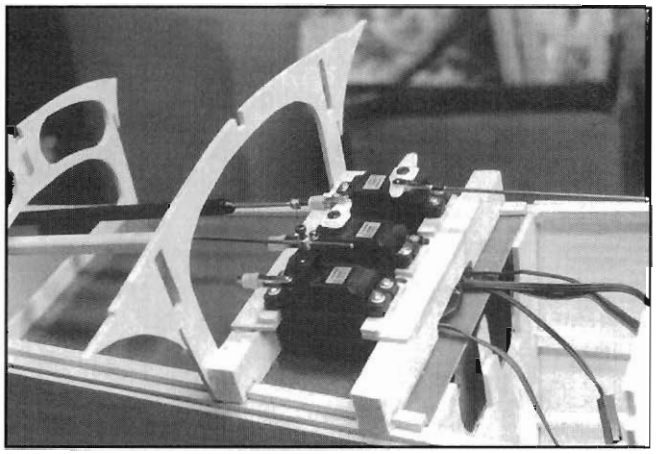
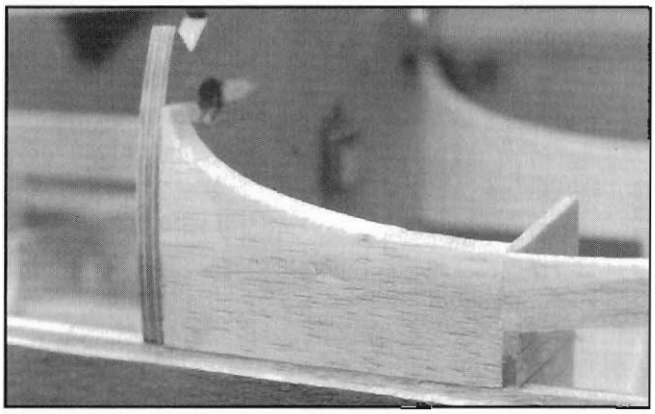


*Ply wing support and lower engine bearer are added to bottom of nose section.*



*Rudder/tail wheel, elevator, and throttle servos are installed beneath canopy floor.*

making the wing fillets. But there's a neat way to do it. The full-size TA 152H's fillets were formed from three flat sheets of sheet metal bent into simple concave forms. We do the same with sheet balsa. (We can't take the time to mess with microballoons and resin because there's a war on.) Carefully select soft and flexible sheets of 3/32" or 1/16" A-grain balsa. Cut the rear, upper wing fillets per the patterns shown on the plans, leaving the outboard edge a little oversize. Sand the upper surface smooth, it shouldn't need any further sanding after installation if this is done right.



*Forward wing saddle block is shaped to former before fuselage sheeting is added.*

Feather the inboard edge with a razor plane. Draw a straight line on the fuselage where the upper edge of the fillet will be, as shown on the fuselage side view. Wet the inside surface of the fillet. This expands the wood and helps it bend. Don't wet both sides or it may crack when dry. Bend it in your hands until it matches the radius of curvature of the fillet formers. Work the wood slowly in your hands, a little at a time. Press the fillet against the fillet formers and trim the forward edge so that it overlaps only half of the former F9. CA glue it in place; first the

top edge, then the front edge, rear edge, and finally the outboard edge. Trim the outboard edge to match the ply wing saddle. Done. Wasn't that easy?

Do the same for the middle wing fillet sections. Trim the outboard edge by cutting vertically with a razor blade held vertically to produce a squared-off, not tapered, edge. This edge corresponds to a scale panel line that will drop down into the recessed center section of the wing. The forward part of the fillet, between F5 and F6, is too small for this technique, it must be carved from solid balsa. Using the side view pattern, cut the forward fillet from sheet balsa and install. Trim to a concave shape with a small wood-carvers' gouge and sand to final shape with sandpaper wrapped around a dowel.

**Materials List**

*All material is 4-6 lb. balsa unless otherwise specified, and all dimensions are listed in inches.*

1 — 1/32 x 3 x 36
5 — 1/16 x 3 x 36
12 — 3/32 x 3 x 36
8 — 3/32 x 3 x 48
2 — 3/32 x 3 x 36 hard balsa
8 — 1/8 x 3 x 36
4 — 1/8 x 4 x 36
1 — 1/4 x 3 x 36
1 — 3/8 x 3 x 36
1 — 1/2 x 3 x 36
1 — 3/4 x 3 x 36
1 — 1 x 3 x 36
1 — 5/8 x 3 x 36
10 — 1/4 sq. x 36
2 — 1/4 x 3/8 x 36
1 — 3/16 sq. x 36, medium
4 — 1/4 x 1/2 x 48, medium
6 — 1/8 x 1/4 x 36
2 — 3/8 x 1 x 36
2 — 3/16 x 1/8 x 36
1 — 1/2 sq. x 36
1 — 3 x 3 x 6 balsa block

1 — 1/4 x 12 x 36 ply
1 — 1/8 x 12 x 36 lite ply
1 — 1/8 x 12 x 48 ply
1 — 3/32 x 12 x 36 ply
1 — 1/32 x 12 x 48 ply

2 — 1/2 x 3/8 x 24 spruce
2 — 1/2 x 3/4 x 24 birch
2 — 3/4 sq. x 12 maple
1 — 1/4 sq. x 36 spruce

1 — 1/8 x 12 music wire
3 — 1/16 x 36 music wire
10 ft. Proctor control cable
4 — Proctor swages
6 — 2-56 solder clevises
8 — 2-56 threaded clevises

1 — Dave Brown carbon fiber pushrod
2 — 8 x 11 sheets, thin lithoplate
8 — Robart Super Hinge Points
15 — large Klett hinges
4 — aileron bellcranks
2 — 1¾ x 1/4 nylon wing bolts
2 — 1 x 3/16 nylon cowl bolts
1 — Du-Bro #376 tail wheel bracket

1 — Goldberg #280 1/8" nose wheel steering arm
3 — Goldberg #440 long control horns
1 — Sullivan R-16 fuel tank (new style)

O.S. 108 engine
Slimline #6014 Pitts-style muffler
4 — standard servos
2 — low-profile servos (for ailerons)
2 — proportional retract servos (for flaps)
Century Jet Models retractable landing gear, p/n 11516
2 — Century Jet or Williams Bros. 4½ x 1⅛ FW190 balloon wheels
Dave Brown 2½ tail wheel, p/n WH25-5525
Innovative Model Products 1/6 scale FW 190D canopy
Innovative Model Products 1/6 scale FW 190D cockpit kit
Innovative Model Products 1/6 scale FW 190D aluminum spinner
CB Associates 4½" flying spinner, p/n 5099
AH Designs 1/6 scale WWII German pilot

**(Part II continued next month)**