F-86 SABRE

CONTROL LINE SCALE JET

Full size plans for the F-86 are on Plan #MA572 from Hobby Helpers, 770 Hunts Point Ave., New York 59, N.Y. ($1)

■ Backbone of United Nations air superiority in the Korean War, the North American F-86 Sabre chalked up an impressive battle record of 11 to 1 kills over the numerically superior MIG-15's. In the crazy-quilt air war of Korea the Sabre was at a definite disadvantage in many respects. Limited to the air space south of the Yalu river, our Air Force frequently had to break off pursuit of the enemy because of this limitation just when combat advantage was at its highest peak.

Notwithstanding slightly inferior performance to the MIG-15 at high altitude the magnificent flying of our Air Force pilots, the radar gun-sight and the Sabre made a combination that tipped the balance in favor of the UN forces in the air.

First swept-wing Air Force fighter to fly in combat, the F-86 series of aircraft has been a leader in the jet-fighter field. Ask any Sabre pilot and he will describe the aircraft as one of the finest he has been privileged to fly.

Today the F-86 has been replaced by superior aircraft but it is still flown by National Guard units and as an Air Force trainer and many are being flown by various NATO air forces.

The Sabre chosen for our model is the F-86F, last version to see combat in Korea. Span is 37 feet, length is 37 feet. Power is the P47-GE-27 turbojet engine capable of more than 6000 lbs. thrust, putting the aircraft in the 700 mph class. Many features of the models E and F are similar and much of the data included here applies to both models. Scale fans will note the flat windshield of the F model and the square-sided beaver-tail fairing for the flying tail.

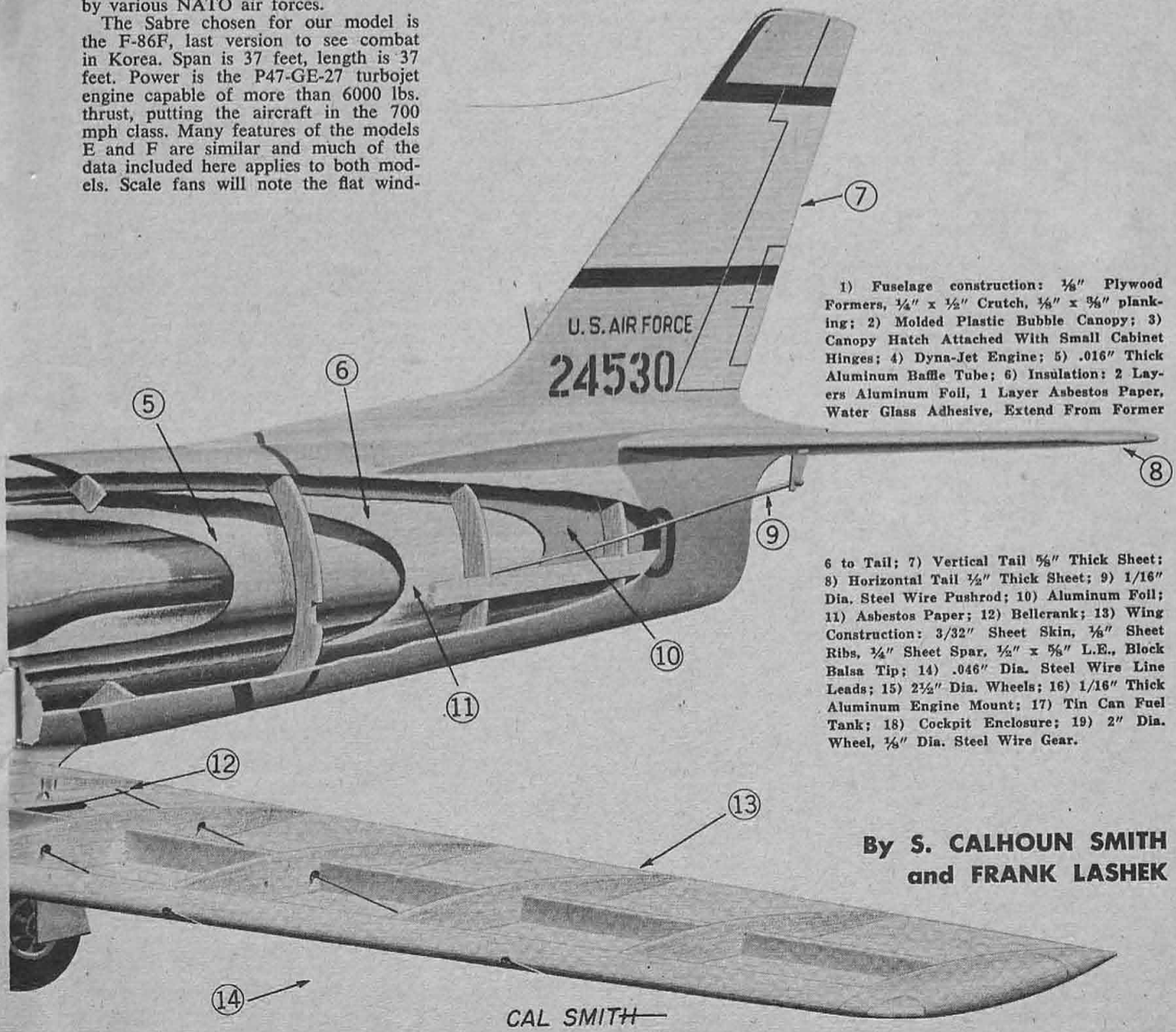
The model was designed from NAA three-views and research of hundreds of photos, so except for departures from scale to accommodate the Dyna-Jet engine authenticity is assured. Scale outlines of fuselage rear and horizontal tail are shown on drawings. The rear portion of the fuselage had to be enlarged in cross-section to allow ample clearance for cooling the Dyna-Jet. The horizontal tail was enlarged in area as insurance against any control difficulties when flying. None developed, and if the builder wishes he could use the scale tail outline. If one wished to go a step further, the flying tail (whole horizontal tail movable) could be built, but this probably would make the model sensitive to fly. Control movement would have to be reduced and control handle and bellcrank system de-sensitized.

The model is built to scale of 1⅛" equals 1 ft. This scale was chosen to gain dimensions of fuselage large enough to accommodate the Dyna-Jet. Model span is 41", length 41", final weight is 5.5 lbs. and model flies at 90-95 mph.

Before undertaking construction of your Sabre model it would be very helpful to review the article on the Convair XF-92A model appearing in the 1954 *Air Trails Model Annual*. Features such as engine mounting and insulation are identical and these methods have proved practical in the Sabre model.

Just as the design and construction of real jet aircraft has increased in complexity, similar problems have developed in modeling such aircraft. Model problems are by no means insurmountable, but the methods and structures used in building our Sabre should be strictly adhered to, for a successful model. This Sabre is no slab-sided stunt job, it will take time and patience to build but the result will be something to be proud of.

Construction can be started with the fuselage. It is built on a jig made of 1" x 3" pine blocks set edgewise on a plank at each former station. The blocks are screwed or nailed to a 6" wide plank which should be flat and without warps or twists. See that former blocks are same width so height will be uniform.



1) Fuselage construction: ⅛" Plywood Formers, ¼" x ½" Crutch, ⅛" x ⅜" planking; 2) Molded Plastic Bubble Canopy; 3) Canopy Hatch Attached With Small Cabinet Hinges; 4) Dyna-Jet Engine; 5) .016" Thick Aluminum Baffle Tube; 6) Insulation: 2 Layers Aluminum Foil, 1 Layer Asbestos Paper, Water Glass Adhesive, Extend From Former 6 to Tail; 7) Vertical Tail ⅝" Thick Sheet; 8) Horizontal Tail ½" Thick Sheet; 9) 1/16" Dia. Steel Wire Pushrod; 10) Aluminum Foil; 11) Asbestos Paper; 12) Bellcrank; 13) Wing Construction: 3/32" Sheet Skin, ⅛" Sheet Ribs, ¼" Sheet Spar, ½" x ⅝" L.E., Block Balsa Tip; 14) .046" Dia. Steel Wire Line Leads; 15) 2½" Dia. Wheels; 16) 1/16" Thick Aluminum Engine Mount; 17) Tin Can Fuel Tank; 18) Cockpit Enclosure; 19) 2" Dia. Wheel, ⅛" Dia. Steel Wire Gear.

By S. CALHOUN SMITH and FRANK LASHEK

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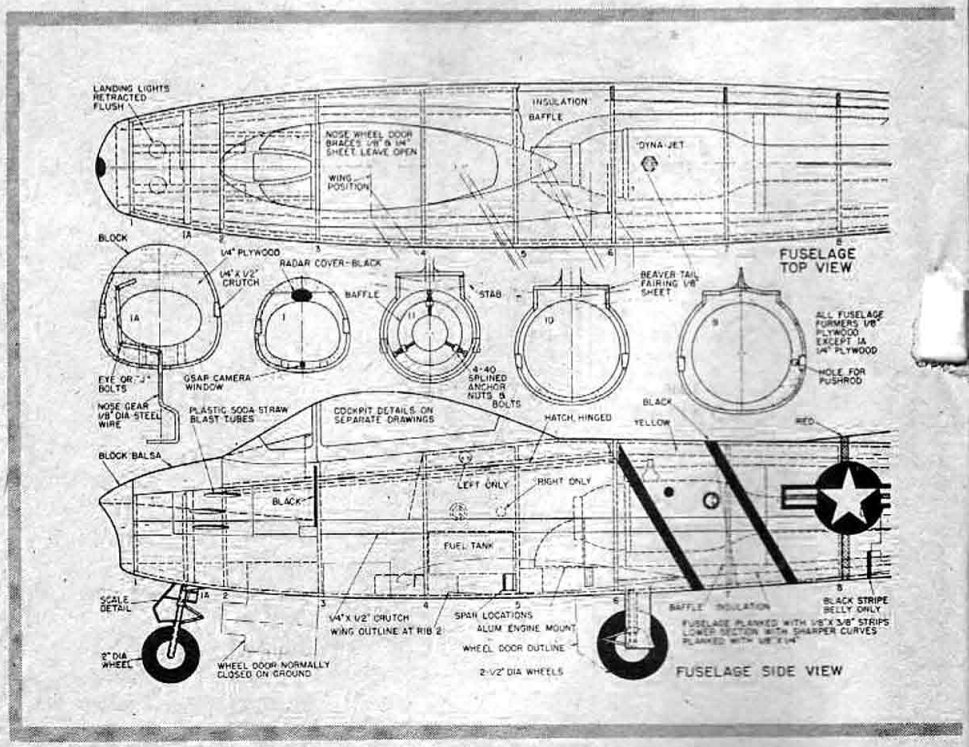
Lay out fuselage center line and crutch positions in pencil on the top of 1" x 3" blocks. Cut out all formers from ⅛" plywood. Note that former 1A is ¼" plywood. Drill for landing gear mount bolts. Some of the smaller diameter formers can be cut from center of the larger formers to save plywood. The crutch pieces should be hard ¼" x ½", these are now pinned down on top of jig blocks with formers 4, 5, 6 slipped into place. Add other formers working outward to nose and tail drawing crutch into place as work progresses. Formers should lie flat against vertical face of jig blocks for proper alignment. Formers such as 1, 10 and 11 can have scrap strip cemented across them for stiffness while building. Hatch rail strips can be cemented in place now. Put strip of waxed paper between top and bottom pieces and hatch formers so they can be easily removed later. This assembly should be put aside to dry thoroughly before planking is started.

Tail surfaces can be carved and sanded to shape from medium balsa sheet. Bottom of fin should extend down through tail top to touch upper surface of stabilizer between formers 10 and 11. The Vee tail is a bit more trouble to build since it is joined with a plywood angle. Make this plywood joiner slightly less in depth than thickness of stab pieces so that balsa can be easily sanded. Bevel center-line faces of stab pieces for snug fit. A few matchstick dowels across here will help also. Cement a strip of silk or nylon over top and bottom of Vee joint for added strength. The elevators can be fitted to stab with fabric hinges or hidden metal F&B hinges. The torque tube joining the elevators is a tricky gadget to build, but is necessary because of Vee tail. Lengths of ⅛" O.D. brass tubing are joined with a stiff spring to carry load across elevators. Begin by flattening tubing end for left elevator, this is pushed and cemented into end of left elevator. Next larger tubing size that is slip fit over ⅛" O.D tube is flattened at end and put in place in right elevator. A shorter length of ⅛" O.D. tubing is slipped into larger tube. Length should permit movement spanwise in larger tube. The left and right ends of ⅛" O.D. tubing are joined across center with a stiff coil spring soldered to tube ends. Tube on right must slide freely since space between elevators changes with up and down movement. Elevator horn is mounted outboard a bit on left elevator. A good substitute for this torque tubing spring gadget would be a length of flexible auto speedometer cable across elevators. If desired, right elevator could be made stationary and left made movable, to further simplify the system. Control effectiveness would be reduced somewhat, however. Lay aside tail group for installation later.

Fuselage planking can be started now. Use ⅛" x ⅜" medium hard strips, work down sides to crutch top. Leave basic structure in jig until planking of top fuselage half is completed. Cement sides of tail fairing in place before planking is completed in this section. Stab and elevator assembly will take a bit of fitting into place over former 10. This should be done now, carefully aligning in relation to fuselage. Center of top of former 11 will have to be cut away to clear elevator torque tube movement. Bottom Vee of stab will also have to be flattened a bit to conform to curve of inside of formers 10 and 11. With stab in place the flat top of beavertail can be cemented down. Leave opening for bottom edge of fin to project through down to stab top. Cement fin in place, and complete any planking needed in this area. Leave this fuselage-tail assembly on jig and let dry thoroughly.

The wing must be built next and added to fuselage before bottom of fuselage can be planked.

Study the wing plan carefully before proceeding, since the left wing contains the bellcrank linkage and this is a bit different than that used on most control-line models. Because of the space requirements inside the fuselage for jet engine and insulation and the necessary



wing center section structure the bellcrank had to be moved out into the wing. An additional smaller bellcrank was necessary to change direction of push rod for connection to elevator. The center section construction detail drawing shows the relationship of the various parts.

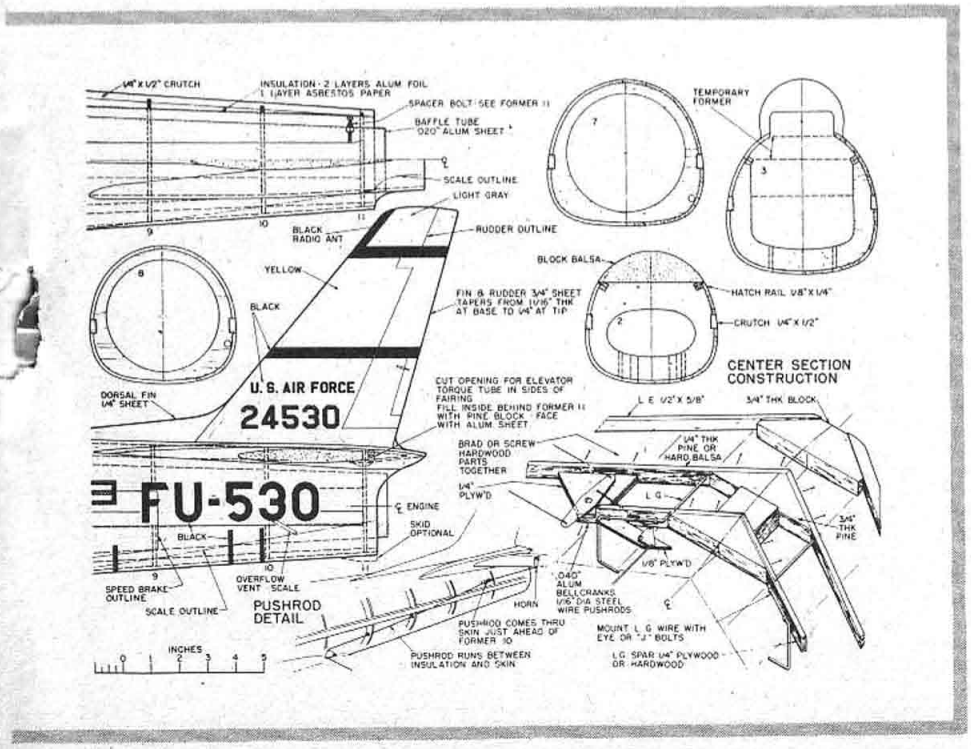
Begin wing construction by cutting out required ribs. Note that ribs 2 and 3 are ⅛" plywood while others are ⅛" sheet balsa. Rib outlines shown allow for bevel at front to fit sweep of leading edge. Hold ribs over plan to make bevel cut of front and slot for spars. Cut main spar to tapered shape. Drill hole in spar at rib 2 for front end of landing gear wire. If balsa is used a plywood doubler should be added at this point as shown on plan. Now pin spar down over plan. Next put ribs in place to check positioning and fit. When this is satisfactory pin in place and cement. Be sure to block up leading and trailing edges to height indicated on plan. Leading edge stock can now be cemented and pinned in place against front of ribs. Inboard end will have to be raised a bit if ½" thick stock is used. Leading edge can be carved after wing planking is completed. Right wing top planking can be applied back to landing gear spar while assembly is pinned down over work board. Cut landing gear spars to shape shown in pattern on plan. Bevel top and bottom edges to mach curve of rib outline. Glue in place against rear of ribs 2 and 3. Gussets at corners will help. Block up spar so that it is flush at top and bottom with ribs. Remember to drill holes for landing gear wire and mounting bolts before putting spar in place. Right wing top planking can be completed now.

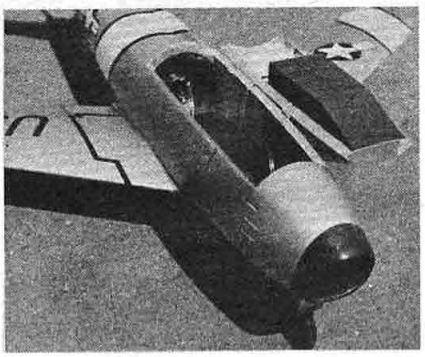
Bellcrank plywood mount and landing gear spar will have to be installed in left wing before any planking is done. Glue plywood mount to spar and rib 3. Add landing gear spar in same manner as for right wing. Note additional holes required for spanwise pushrod through rib 3 and spar. Add small bellcrank mount of ⅛" plywood and rear end of rib 2. Now would be a good time to fit control parts into wing. Cut slot in main spar to clear bellcrank end and cut holes in ribs 4, 5 and 6 for line leads. Make bellcranks and short pushrod. Put parts in place and check for free movement, enlarge holes as necessary so that no binding occurs. Bellcranks are bolted into place permanently after top planking is completed. Now plank top surface of left wing with $\frac{3}{32}$" sheet. Planking of both wing panels need only extend a bit over rib 2 at inboard end.

When both wing panels are dry they can be taken up from the workboard so that they can be joined with triangular shaped blocks at center section. These should be carefully cut to proper angle and checked for accuracy before final gluing. The blocks can be glued to one panel then the other or both together. Block up each tip 1¼" with inboard spar ends and joiner blocks flat on workboard for proper dihedral angle. When dry, wing can be taken up and landing gears installed. Fasten with eye or "J" bolts. Proceed to plank bottom surface of wing. Check frequently to see that no warps or twists occur as skin is applied. Add tip blocks and carve to shape, leading edge can be carved now also. Sand entire wing surface smooth. If desired, wing can be clear doped and covered with tissue preparatory to final finish before it is joined to fuselage.

The wing spar joiner blocks are positioned so that their rear faces mate with the lower ends of fuselage formers 4 and 5. This joins the fuselage and wing together with considerable strength so the fit of these parts should be checked carefully before final assembly is made. Glue with hard glue and add brads or woodscrews for strength. Check alignment carefully.

With wing joined to fuselage work on bottom of fuselage can be completed. Add pine block ahead of landing gear spar center for front engine mount. The nose gear wire can be bent to shape and bolted in place on former 1A. The nose wheel well opening is left open to admit more air for engine cooling so sides





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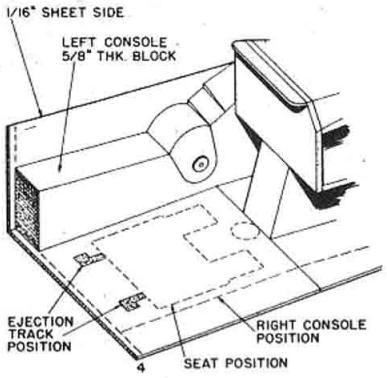
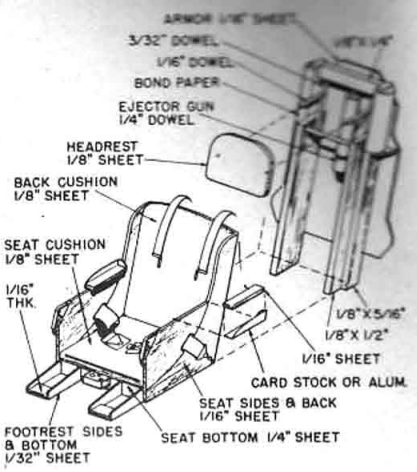
SEAT CONSTRUCTION DETAIL





should be braced with ¼" and ⅛" sheet as indicated.

Before bottom planking is added the insulation can be applied to the inside of the formers from 6 to 11. Insulation is two layers of heavy duty aluminum foil and one layer of asbestos paper. These are applied to the formers and each other with water glass. Cut foil and asbestos to size, roll up slightly smaller than tail opening. Brush water glass onto former edges and pass foil through tail, unroll and smooth into place against formers working through tail and hatch openings. Apply each layer separately and allow ample overlap.

Now install the push rod conecting the small bellcrank and elevator horn. This wire must be bent to curve along the fuselage side just under the skin and trial and error is the only way to fit this part. Refer to PUSHROD DETAIL on the plan. When pushrod is installed and checked for free movement the lower portion of fuselage below crutch can be planked. Add nose air intake block and complete any other woodwork necessary. Mount hinges on hatch rails and check hatch for tight closing fit at edges of opening. Hatch is held down with rubber band or spring mounted inside. The openings in formers 1 and 2 can be lined with heavy paper to make a smooth air inlet. Inside of fuselage from former 3 back to former 6 can be lined with a layer of asbestos paper for fireproofing.

The fuel tank is made from a section of 3" dia. tin can. The size shown will hold enough fuel for about seven laps. Double the size of this tank for flying in events that require 10 laps for scoring. Larger tanks are not advised since prolonged flights may let heat build up excessively.

The bubble canopy is of a size and shape not obtainable commercially so instructions are given on a separate sketch in the full size plans for making your own. Cement canopy in place on hatch and mask off clear areas before painting the model. Cockpit details are dealt with at the end of this article. If cockpit details are to be put into model the canopy should be left off until this is done.

Now for that contest winning finish. All wood is sanded smooth and any cracks or holes are filled with Plastic Balsa. Apply two coats of clear dope and sand lightly. Sanding sealer could be substituted for clear dope. Next apply tissue over all wood. Apply two coats of clear dope and sand smooth. Duco auto primer is then applied, either sprayed or brushed on; build up four or five coats until all cracks are filled. Sand dry between primer coats and finish with 280-400 grit wet. Final finish is 4-6 coats of aluminum dope. Mix aluminum powder and clear dope and spray finish if possible. Sand very lightly between first two coats but do not sand last two coats. The whole model is then smoothed with rubbing compound, followed by Simoniz Kleener. Wax is applied after trim colors and details are added.

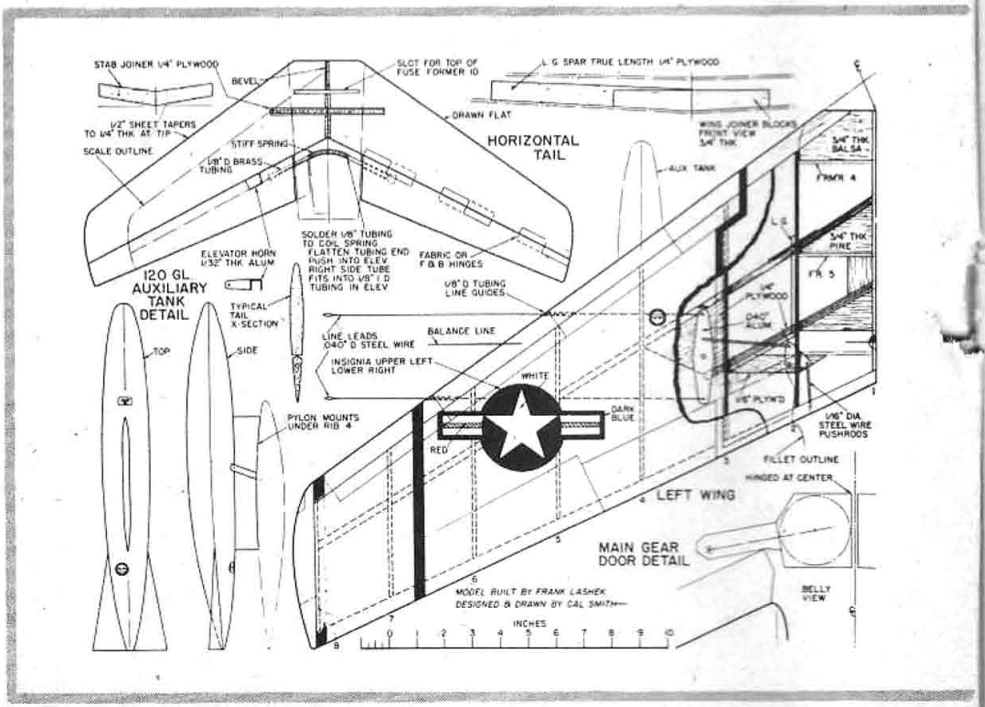
The markings shown are those used on aircraft of the 4th Fighter Interceptor Wing during the Korean War. In addition to the standard Air Force insignia and numerals the aircraft had fuselage, vertical tail and wing tips painted with wide yellow band with black bands edging the yellow. These yellow and black bands can be doped on while other markings can be made from decal sheets.

There are numerous other small details all over the aircraft, some of which are shown on the drawings. It would be difficult to include all the markings since some are lettered placards stenciled directly onto the skin consisting of lettering that would be about 1/32" high on the model.

Beginning at the nose, details shown include: Gunsight radar cap on upper lip of intake, black. GSAP camera window on lower lip can be made of piece of clear plastic. Machine gun blast tubes on fuselage nose can be made of soda straws or tubing cut off flush with skin.

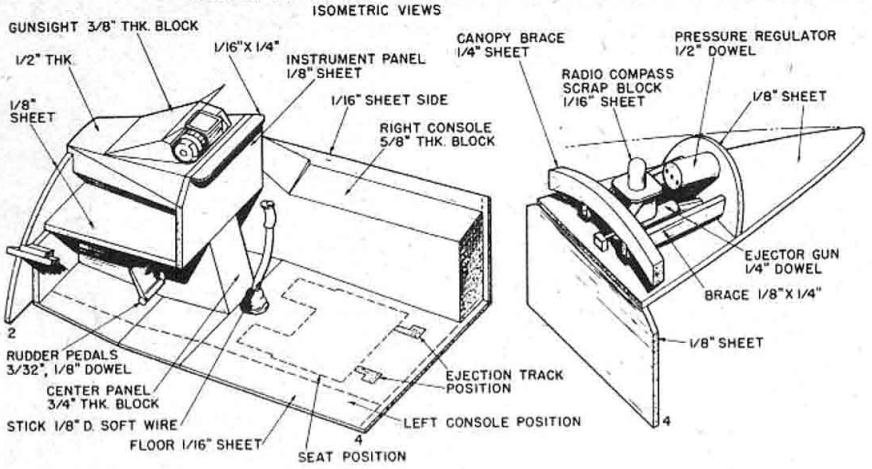
Black vertical stripe below canopy marks kick step location at lower end, appears on both sides. Ammo magazine door and entry step appears on both sides just ahead of wing leading edge. Circle just below canopy rail is emergency canopy release and appears on left side only. Fuel tank filler caps are ringed with red circle. Note that one appears on right and one on left in different fore and aft positions. Black spot near filler cap is ground wire plug-in. Line ringing fuselage just aft of filler cap is station where fuselage separates for engine access. Speed brake outlines appear on both sides of fuselage aft and below insignia. Four belly stripes are black on lower fuselage section. Fuel overflow vent is streamlined pipe extending out at an angle from rear fuselage appears on left side only. Top of fin above black band is light gray fiber-glass antenna housing. Fin tip leading edge is black. Rudder trim tab actuator rod apears left side only.

Wing leading edge slats are outlined



COCKPIT CONSTRUCTION DETAILS

ISOMETRIC VIEWS



in black line. Navigation light fairings at wing tips are clear plastic. Pitot tube is on right wing tip only. Wing tank filler caps are similar to those on fuselage. Black and red "step" outlines on wing top near fuselage. Main gear door detail appears on left wing plan. Flap and aileron outlines are also shown on plan.

With details added to exterior the Dyna-Jet can be installed now. Enclosing the engine in a baffle tube reduces the heat radiated and prevents burning up the model. This is the proper method for installing the engine. Pattern for the baffle tube is shown in separate sketch. Roll the tapered rear section to shape and fasten seam with 1/16" dia. aluminum rivets, small sheet metal screws or brass nails. Riveting can be done with the aluminum passed over a section of 2" dia. water pipe.

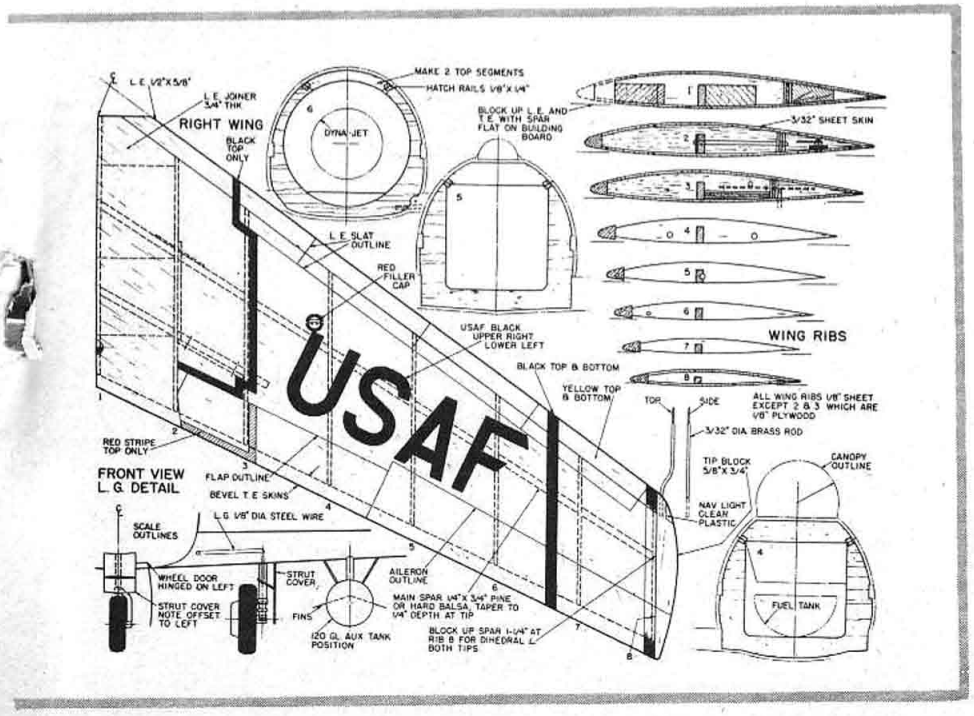
The front section of the baffle tube is cylindrical in form and is rolled and riveted in same manner as rear section. Lower part of the front section forms a bib under the jet head to catch any spilled fuel. The rear end of the baffle tube is fitted with three bolts to position tube and engine tailpipe in fuselage. The full size plans show procedure for installing the baffle tube, Dyna-Jet and fuel tank.

Be sure model balances at point shown before attempting a flight. The original Sabre model required about 10 ounces of ballast in nose to balance properly. Ballast is installed inside nose between formers 1 and 1A. A strip of 1/16" thick lead shower pan sheet was wrapped around nose opening under skin. Individual models will vary so 8 to 12 ounces of lead ballast will be required.

Be very familiar with the operation of your Dyna-Jet before putting it in this model or attempting to fly it. Do not flood when priming to start. Overpriming and subsequent fire could set fire to rear of fuselage. If you should get a fire while starting the engine, keep on pumping because the air blast may blow the fire out. If the engine starts it will also blow out the fire. Keep a small CO_2 fire extinguisher handy.

When flying the model, the flyer should be on the handle ready to take off as soon as engine starts. Starting crews should be well drilled to remove pump and battery leads as quickly as possible. Close the hatch and let her rip. Less time spent on the ground prevents excess heat from building up. Once airborne and rolling along there is adequate cooling air flowing through the space around the engine. However, when the model lands the engine is still hot. It is a good idea to get to the model quickly, open the hatch and pump air into the space around the engine.

Use .020"-.021" dia. flying wires. You don't want this Sabre to go free flight.



F-86 SABRE BILL OF MATERIALS

48 pieces 1/8" x 3/8" x 36" for fuselage planking; (2) 1/4" x 1/2" x 36" for fuselage crutch; (2) 1/4" x 3/4" x 36" for wing spars; (2) 1/2" x 5/8" x 36" for wing leading edge; (12) 3/32" x 3" x 36" for wing skins; (2) 1/8" x 3" x 36" for wing ribs; (1) 1/2" x 3" x 36" for tail horizontal; (1) 3/4" x 3" x 36" for vertical tail, nose; (4) 6" x 12" piece 1/4" plywood for spars, former; Block 1 1/2" x 3 1/2" x 3 1/2" for nose; Scrap balsa, 3/4" pine; (1) 36" piece 1/8" dia. steel wire, landing gear; (1) 36" piece 1/16" dia. steel wire pushrod; (1) 36" piece .040" dia. steel wire, line leads; Scrap .040" thick aluminum, bellcranks; Scrap .062" thick aluminum, engine mount; 1 pr. 2 1/2" dia. Veco wheels; (1) 2" dia. Veco wheel; (7) Eye or "J" landing gear mount bolts; 1 piece 11" x 25" .020" thick aluminum, baffle tube; 2 pieces 16" x 30" heavy duty aluminum foil; 1 piece 5" x 14"—1/16" thick clear plastic, canopy; Cement, glue, water glass, silkspan, clear dope, Duco Auto primer, aluminum dope, yellow, black dope, decals as required.

■ Scale fans interested in adding point-getting features to their F-86 model can use the cockpit detail drawings to advantage.

Consider the cockpit detail as a model within a model. It may look complex at first glance but it is not too difficult to construct if proper procedure is followed.

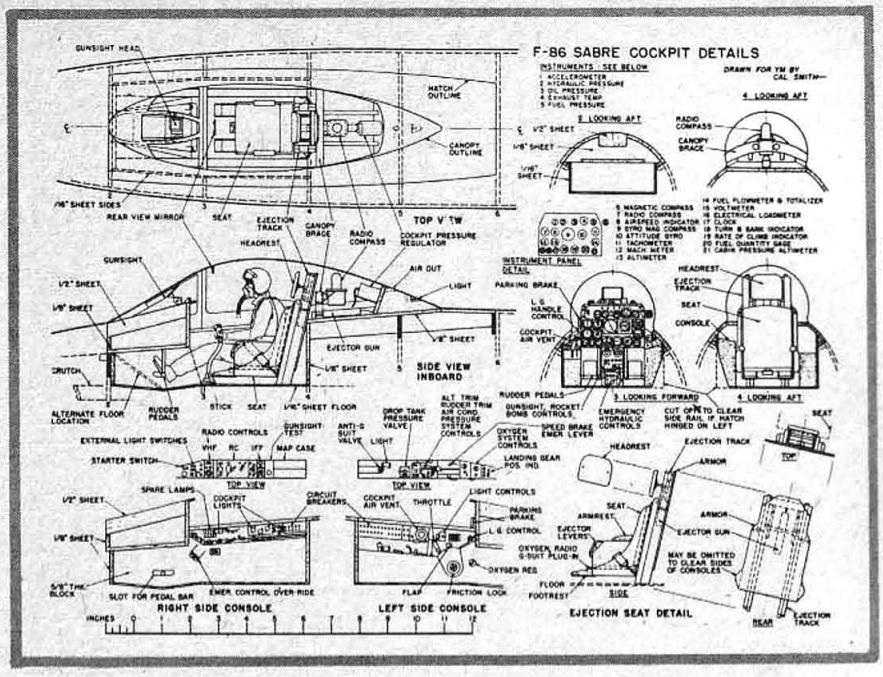
The bubble canopy should be left off the hatch area to make it easier to add most of the detail. The hatch should be planked and hinges temporarily fitted to left side. Hatch should open freely and surfaces should be flush with rest of fuselage skin when closed. Cut outline of bubble canopy a bit undersize into hatch planking. Add flat turtle deck piece to top of formers 4 and 5. Trim planking for snug fit along sides of this piece. Extend center portion of former 4 down to form rear wall of cockpit. This could be cut from plywood and used in initial construction or added now.

Now add 1/16" sheet sides of cockpit enclosure to underside of hatch. Some cutting and fitting will be required for smooth fit under hatch planking. Note that sides taper inward slightly from former 3 to 2. Front wall can be added now to give sides proper width.

The consoles on right and left sides are shown as 5/8" thick blocks, but these can be built up of thinner stock if desired. Cut bottom edges to same shape as 1/16" sheet sides. Note difference in shape of console top surfaces. The many dials, switches and levers can be added to tops of consoles either before or after they are cemented permanently in place.

Now prepare the parts that make up the instrument panel assembly. Carve the top 1/2" sheet to shape. Top portion of former 2 should be notched for 1/2" and 1/8" sheet that form top and bottom of area ahead of instrument panel.

It will be easier to paint instrument panel and add instrument detail before cementing panel in place. The center panel below main panel is noted as 3/4" thick block. This can be built up if desired. Cut bottom to same profile as sides. Make up rubber pedal assemblies and cement in place in underside of panel assembly.



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It would be a good idea to paint the various parts as they are assembled. Use flat colors such as model railroad paints. Instrument panel, consoles and other parts are black. Some details are other colors, these will be noted as they are covered.

The various levers and dial knobs can be simulated with short lengths of dowel. Items such as spare lamps and circuit breakers can be made of small model pin heads. Toggle switches can be made of short lengths of model pins. The instruments on the panel have face raised off the panel. Cut 1/32" sheet to square outline to simulate this. Instrument face needles and calibrations can be painted on in white or yellow and covered with disc of clear plastic if desired. Knobbed levers can be made of map tacks. The many warning lights are just the size of the head of a straight pin, these should be painted red. The control stick can be made from a length of soft wire such as TV antenna ground wire. The stick grip has finger notches shaped on front edge and there are no less than five controls on the grip itself. These are pretty small to duplicate in this scale. However, they are: gun trigger at top front, aileron and elevator trim knob at top rear; nose wheel power steering button on top left; bomb release button on left side and radar target selector button on left bottom. All these controls in one place save a lot of reaching around the cockpit for the pilot, but he has to have an educated right hand and fingers.

The throttle lever on the left also has numerous controls in addition to being a push-pull engine control. Speed brake switch is on top of lever. Microphone switch and gunsight electrical cage button are on top front. Gunsight manual ranging is accomplished by twisting whole grip. Also on throttle quadrant is flap control lever which has rectangular knob shaped like a flap. On left side of instrument panel is landing gear up and down lever with knob shaped like a miniature wheel. Above landing gear control is L shaped parking brake lever.

Detail in the turtledeck area can be added now. Note the bulkhead just ahead of former 5, this should fit the inside contour of the canopy rear. Pressure regulator can be a length of ½" dowel. The ejector is ¼" dowel laid flat on turtledeck. Front end has length of 1/16" dowel protruding against small block. The canopy brace has beams of ⅛" x ¼" running fore and after underneath. The canopy brace should fit across inside of canopy and can be supported at ends with scrap blocks until canopy is cemented down. The radio compass is made up of scrap block base with 1/16" sheet top. The dome-shaped housing on top is length of ⅜" dowel and is colored light gray. The whole assembly is mounted on back of canopy brace with 1/32" sheet angle braces.

The ejection seat and ejection track should be made as separate units then joined together and whole assembly put in place in cockpit. Begin by cutting out armor plate from 1/16" sheet. Cement various track parts and gun dowel directly to armor sheet outline. Note simulated tubing mounting of headrest made of dowel.

Make up seat of 1/16" sheet sides and back and ¼" sheet bottom. Cushions are made of ⅓" sheet and should have a few grooves cut into exposed surfaces to simulate wrinkles. Levers on front sides of seat can be made of a bit of dowel. The left side is shoulder harness lock, while right is canopy and seat ejector release, painted red. Safety belt and shoulder harness can be made of ribbon or heavy bond paper. Belt is khaki color and harness is white. Cement assembled seat to front of ejection track to complete unit.

With all work completed on instrument panel and consoles the 1/16" sheet floor can be cemented in place. Note dip in floor level under rubber pedals. To simplify front end, the floor could be angled up as shown on side view inboard; see alternate floor location.

Now put stick and seat assembly in place to complete cockpit detail. Don't forget rear view mirror on underside of canopy.

The canopy can be cemented onto the hatch section now. Build up a shallow fillet along bottom edge where canopy and wood meet. Mask off clear areas of canopy and paint aluminum dope like rest of fuselage.

If the individual builder wished to vary color scheme and markings from those shown on plans, there are two sketches included showing other choices. The Korean War Sabre sketch shows another squadron band marking similar to those shown on large plans. Bands are in same location.

The Navy used several experimental models of the Sabre designated XFJ-2. The aircraft was outwardly the same as the F-86 but varied in many other ways. Folding wings were provided and arresting gear hook and tail bumper were added of course. Color scheme at that time was Navy dark blue over entire aircraft. Trim and lettering were white. Sketch shows experimental ship assigned to Navy Test at Patuxent.

If the builder has ever had occasion to look over an F-86 at an Air Force Base or Armed Forces Day exhibit he will appreciate the fact that it is almost impossible to duplicate in a model of this size all of the numerous gadgets angles, corners, tubing, wiring, etc., to be found in the cockpit. We hope the simplified version described here will satisfy most builders. The data was taken from the real aircraft, service manuals and numerous photos. Many thanks to Capt. Tom McMurray of the New Jersey National Guard for his kind assistance in preparing this material.