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WORKING WITH RESIN, WHITE-METAL, AND PHOTOETCHED DETAIL SETS

Over the past few years there has been an incredible explosion in the variety of resin and white-metal detail and conversion sets that are available to the modeler. Before we go into our discussion of working with resin, white metal, and photoetch, let's talk about how these conversion and detail sets are made. Resin and white-metal detail sets are manufactured very differently from injection-molded kits in a process that is very labor-intensive. The first step is to scratchbuild a set of masters from materials such as basswood, plastic, and brass. The designer of the master patterns needs to engineer how the parts will fit together, how they will be cast, whether resin or white metal will be used, and how they will fit on the modeling subject. Once the master patterns are complete, a set of molds is made from liquid RTV rubber. The molds are specifically engineered for the master pattern parts and this can be a very intensive trial and error process. Once the molds are complete, a set of castings are made and the castings are checked to see if any changes are needed to the master patterns or the castings. If adjustments to either the master patterns or the molds are necessary new molds will need to be created. Once the designer is satisfied with the master patterns and the resulting casting, instructions are developed and the kits are then produced, packaged, and marketed. There is no automation in the mold making or casting process; it is all done manually, which adds a great deal of expense to the overall price of the detail set. In addition, mold making and casting are usually done

using a pressure or vacuum chamber, which adds to the time, effort, and expense required to produce a kit. Now you know what it takes to make conversion or detail sets and why they cost almost as much as the kits do.

Photoetched detail sets are not as complicated to produce or as labor-intensive, which is why they are fairly inexpensive. The toughest part of photoetch designing is to ensure that any parts that need to be bent into shape fit together correctly and that all the individual parts and subassemblies fit into their respective locations correctly. Part fitting is especially important with interior detail sets. The designer uses either a computer drawing program or manually draws the parts. Once the design is complete and ready for initial manufacturing, it is imprinted onto a brass or stainless steel plate and this metal is then given a chemical bath. The chemical bath removes the metal from all areas except where the imprint is, and what is left is the photoetched detail set. The parts are then tested for a final fit check, adjustments are made, and then the photoetched sheet goes into full production.

Working with resin is easy as long as you follow a few simple guidelines. First and foremost, you need to be very careful when removing resin pour plugs from parts. Resin is easy to cut and sand, so be careful not to overdo it. I recommend cutting the resin plugs down to as small an area as possible using a razor saw and then sanding the remaining resin off. The excess resin on parts can be easily sanded off by running the part across a stationary piece of sandpaper. Be sure to rotate the part so that you do not sand off too much resin on one side. Be sure that you wear a dust mask when sanding resin, as the resin dust particles should not be inhaled. One way to avoid the resin dust problem is to use waterproof sandpaper and wet-sand the parts. Once you get the excess resin off, wash the parts with mild soap and warm water to remove any mold release agents.

Resin parts sometimes have tiny voids or air bubbles, which will need to be filled. While the quality of resin castings for aircraft models is very good, you still get an occasional void or air bubble. While some modelers may complain about these occasional problems, I look at it this way: Injection-molded models have seams to repair, mold seam lines to scrape off, and indentations to fill; and resin parts have pour plugs and occasional voids and air bubbles. It's six of one and half a dozen of the other. Personally I like parts such as resin tires, especially ones with treads, because you do not have to repair the tread detail after you deal with the seam, which is exactly what you would be doing if the tire were from an injection-molded kit.

Voids or air bubbles can easily be filled with super glue or putty or even Evergreen strip stock. For voids on flat or large curved surfaces use Duro's blue tube super glue. This thick gel glue works great as a filler. Testor's plastic modelers putty also works well for these voids. For small air bubbles use very thin super glue applied with a thin wire applicator. Sometimes the air bubbles will be so small that the surface tension of the super glue will not allow the glue to seep into the tiny area. In these cases, slightly enlarge the hole with a drill bit. Super glue accelerator will not affect resin, so you can use it to speed up the drying process of the super glue. You can also use Evergreen strip stock on small shapes, in corners, on edges, or on the rims of circular shapes. Use a strip size which fits into the hole, dip the tip of the plastic in a puddle of super glue, and insert the tip of the strip into the hole. When the glue is dry, cut the plastic and trim and sand to shape. Sometime parts may also be warped or bent and these can be corrected by submerging the part in hot tap water and then straightening the part out. You will need to secure the part in its new position until it cools down; otherwise it may snap back to its former shape, as resin sometimes has a shape memory. You can also use a hair dryer, but be careful not to melt or distort the part. If you do not feel comfortable trying to fix the problem, return the kit, as most resin manufacturers will gladly replace the kit or the defective part.

Once you have fixed any problems, clean the parts again to remove dirt and resin dust, give them a final cleaning with Polly S paint preparation cleaner, and then give them a coat of primer. The primer will act as a final check for any voids or bubbles that you may have missed. They are easy to miss, especially with light-colored resin parts; your eyes have a tendency to become "snow blind" when looking at the parts because of their light color. Once the parts are completed you are ready for their final painting and assembly.

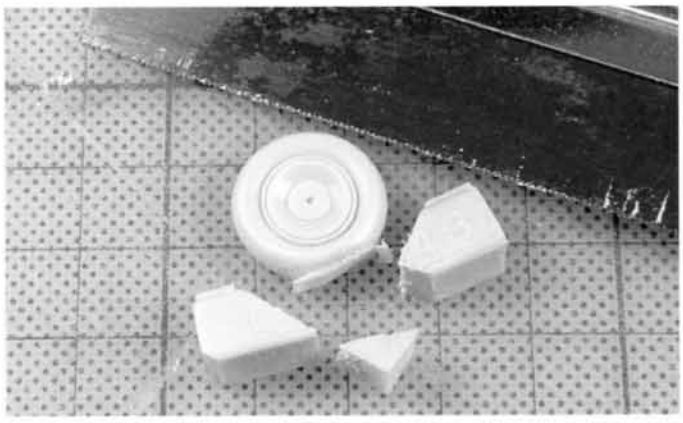
Resin will sometimes shrink, and while some master pattern makers account for this when making their master parts, some do not. Shrinkage can be somewhat of a problem on resin control surfaces, but the solution is easy. Usually the width of the control surface is slightly shorter and all you need to do is add a layer of Evergreen sheet stock to the ends of the control surfaces and then form-fit them into place.

White-metal parts are also very easy to work with, as they can be scraped, sanded, and shaped just like plastic. White metal, like resin, can have mold release agents on it, so give it a good cleaning with an enamel-base paint thinner. Sometimes the surfaces of white metal can have minute voids, which can easily be filled with super glue. White-metal parts typically have very small seam lines much as injection-molded parts do, although they can be difficult to see because of the shiny appearance of the metal. Scrape and sand the white-metal seam lines just as if they were plastic. When you are satisfied with your work give the parts a shot of primer. The gray color will highlight any seam lines that you may have missed. To get the primer to blend in, sand the surface with 600-grit sandpaper, coat the bare area with primer, and then give the entire part a complete coat of primer. White-metal parts are very flexible and as a consequence are sometimes bent when you get them. Have no fear, though, as they are easily bent back into shape. A word of caution here—white-metal landing gear may not be as strong as injection-molded gears are, and over time the gear may begin to sag. This does not happen on all types of white-metal landing gear parts and it depends on the thickness of the metal, the weight of

the model, and the type of metal mixture the white metal is composed of.

The first step in using photoetch is to clean the surfaces by running the photoetched sheet across a stationary sheet of sandpaper. A light touch is all that is needed to clean up the metal, and when it is shiny it's clean. Always cut photoetch with a sharp blade and cut the parts on a hard surface such as a glass plate. Generally, it is easier to cut a photoetched part off its tree by leaving a little of the stub attached to the part. You can easily remove the remaining stub from the part with a Flex-I-File sanding stick. Stainless steel photoetched parts can be more difficult to cut off their trees because the metal is very strong, but this strength can be an advantage. Brass, on the other hand, is very bendable and soft, which can also be advantageous. To get curves in photoetch, simply bend the part around a wood dowel or other round object that has a diameter slightly smaller than the diameter that you need. You need to use a slightly smaller diameter when you are bending the photoetch into shape because the photoetch will spring back a little. Sharp bends and angles can be achieved using a set of flat needle-nose pliers or by using two single-edge razor blades. When gluing photoetch be sure that the gluing surface is shiny. For cleaning edges, run a Flex-I-File sanding stick back and forth across the edge a couple of times to clean it. Super glue is an excellent bonding agent for both brass and stainless steel photoetch and when strength is not an issue, white glue also works great. Using white glue will allow you some flexibility in positioning the pieces together correctly. White glue is also an excellent filler for cracks and voids when using photoetch. Photoetch should also be primed prior to any finish painting. To strengthen photoetched shapes such as boxes and corners, use small lengths of Evergreen strip and round stock cut to size and glued to the inside areas of these delicate parts. Another benefit is that the strip stock can act as a handling stem so that you can more easily position the part.

Conversion parts that require major surgery to the aircraft such as cutting off the wing tip to add wing tanks, adding a new nose piece, or cutting out the center section of a fuselage or wing and adding a new piece are easy if you have a few simple tools, plan your work, remember to think about what you are doing, and go slow. Just about all the resin conversion sets are painstakingly engineered and they usually fit very well. It is always a good idea to reinforce these types of parts so that they are firmly secured to the plastic. If you are adding a new nose piece or cutting out a center section of a fuselage or wing and adding a new piece, it's a good idea to add a strip of Evergreen strip stock around the perimeter of the inside of the kit so that there will be a larger gluing surface. Parts that are heavy and hanging such as wing tip tanks can be reinforced by filling the tip of the wing area with resin or super glue and then setting lengths of brass wire into the connection points between the wing tip tank and the wing area. These are simple tricks that will ensure that the heavy parts you add do not break off, which would really ruin your day, especially after you invested so much time in finishing the model.



\Fig. 2-1. The first step in working with resin tires is to remove the part from the pour blocks. The easy way to do this is to use a razor saw and cut as close to the part as possible.

Fig. 2-2. Next, hold the tire flat and run it across a stationary piece of sandpaper to remove the remaining resin.

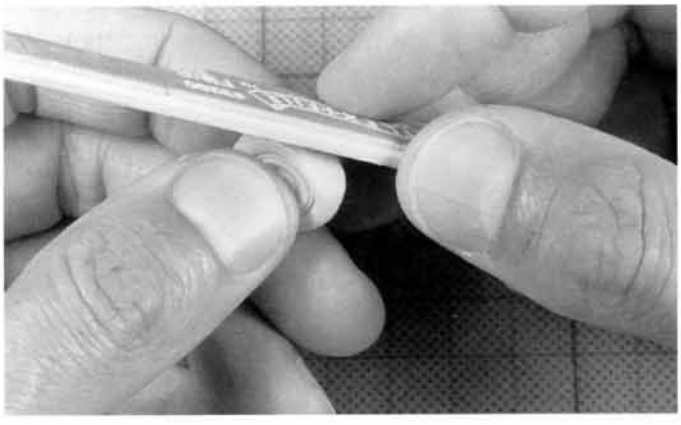


Fig. 2-3. Clean the edges around the flattened portion of the tire with a Flex-I-File sanding stick.

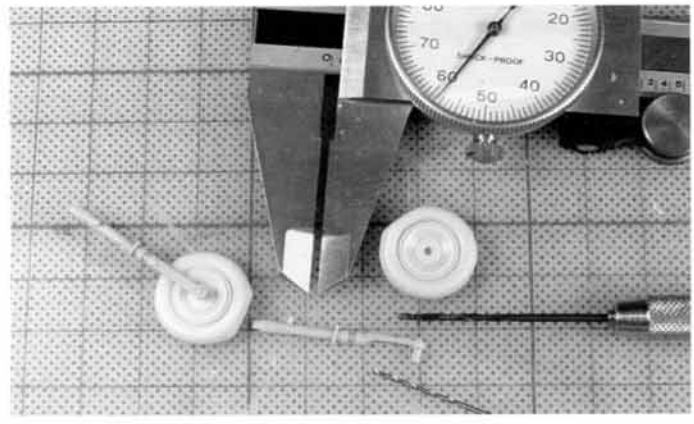


Fig. 2-4. To get the correct diameter of the landing gear wheel stem, use calipers or a similar device to measure the diameter and then drill the appropriate size holes in the resin wheels. If you drill a bad hole, simply fill it with super glue, let it dry, and then re-drill.

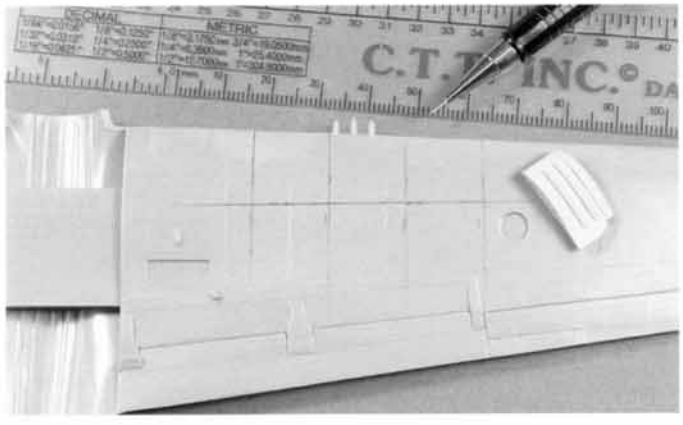


Fig. 2-5. To add detail resin sets to the wings, you need to set a grid on the wing to properly locate all the parts.

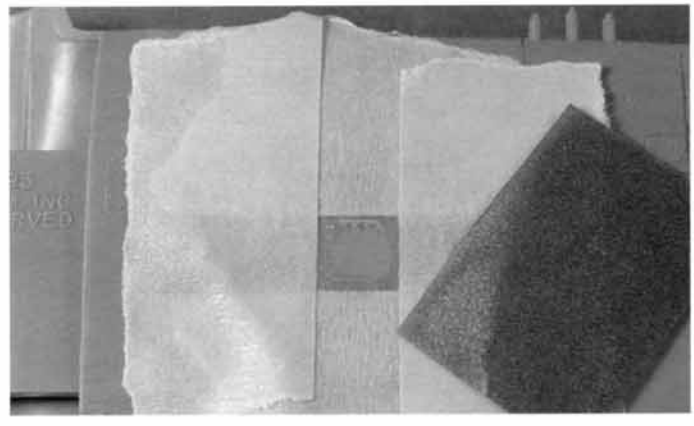


Fig. 2-6. Sand off any surface detail that would interfere with the attachment of the wing parts. Use masking tape to protect any surrounding detail.

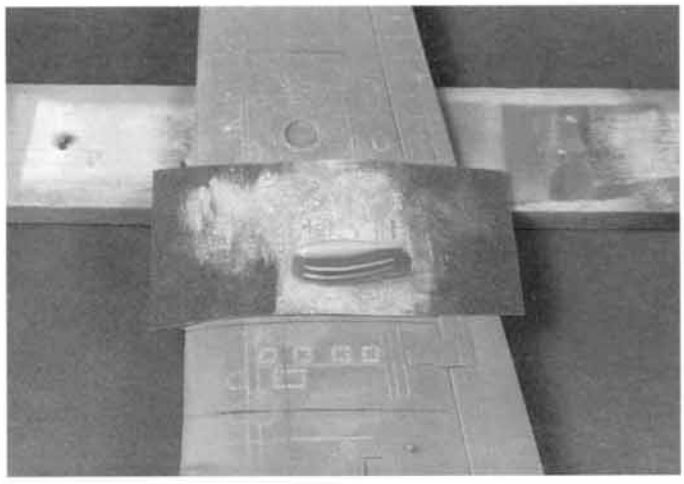


Fig. 2-7. To contour the parts correctly to the wing, place a piece of sandpaper on the surface of the wing, hold it stationary, then run the part back and forth across the wing at the approximate location where it would be attached.

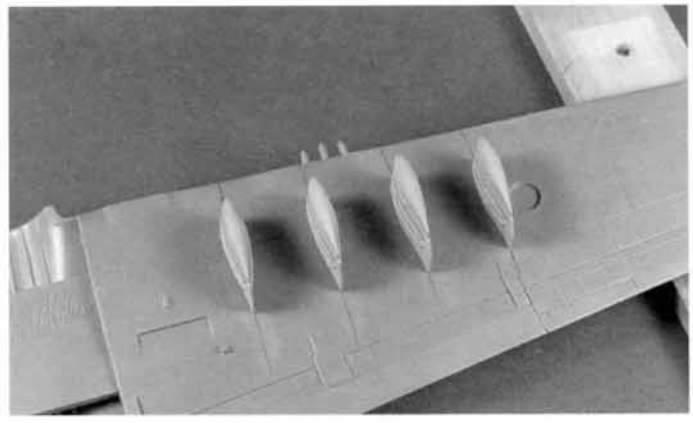


Fig. 2-8. Once all the wing details are added, check the bases where they attach to the wing, and fill in any voids you find with white glue.

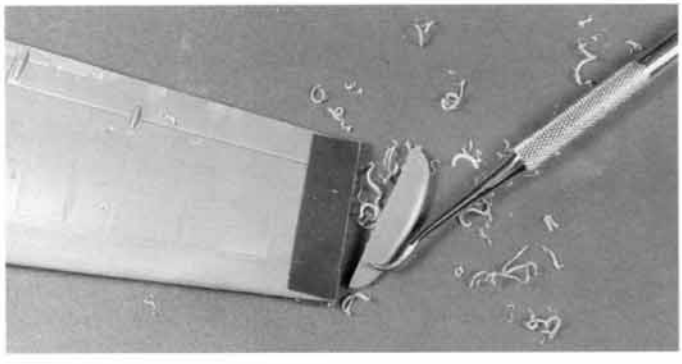


Fig. 2-9. The first step in installing wing tip tanks is to cut off the end of the wing. Use a piece of labeling tape to guide your scriber or razor saw.

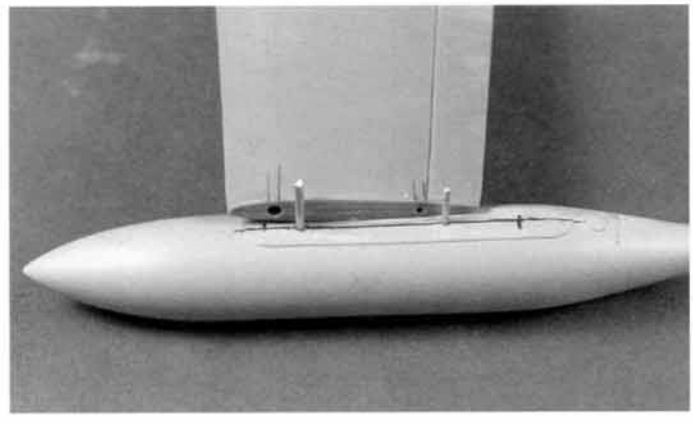


Fig. 2-10. Since resin wing tip tanks are usually fairly heavy, I recommend that you reinforce their attachment points to the wing with brass wire. First drill the holes in the wing tip tanks, set the brass rod in place, then mark and drill the holes in the tip of the wing.

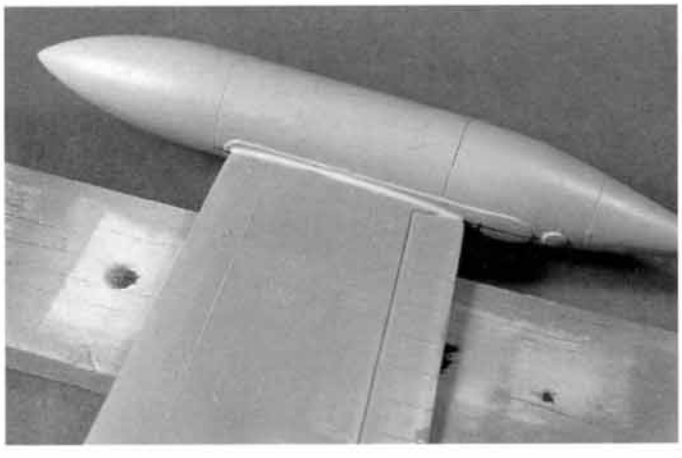


Fig. 2-11. To fill in the seam area between the wing tip tank and the edge of the wing, fill the void with white glue and contour it with a damp Q-tip.

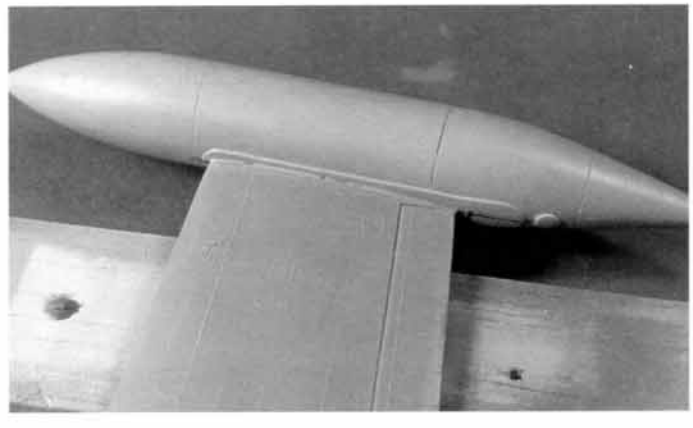


Fig. 2-12. After the white glue dries there will be small air pockets. Simply fill these with additional applications of white glue.

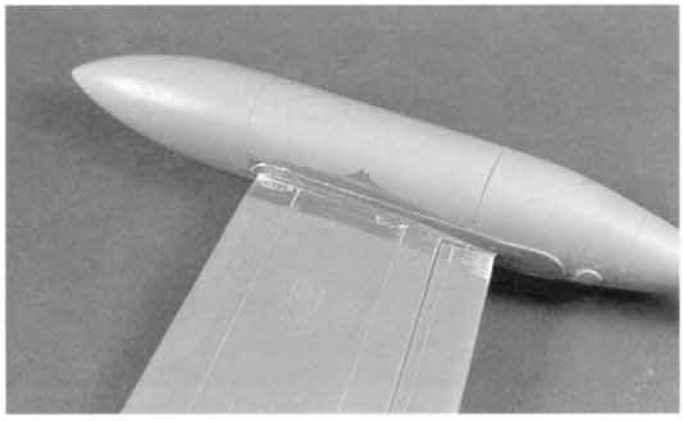


Fig. 2-13. Once you are sure that the voids and air pockets are filled, check the attachment point with Testor's silver paint.

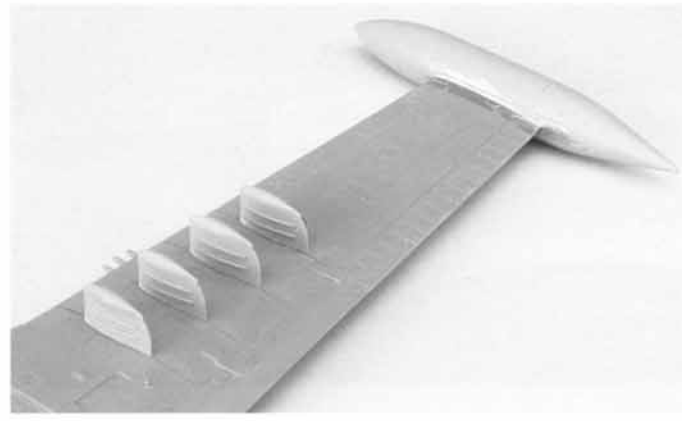


Fig. 2-14. The completely modified wing with the undercarriage details and wing tip tank are now ready to be attached to the fuselage. Photo by Glenn Johnson.

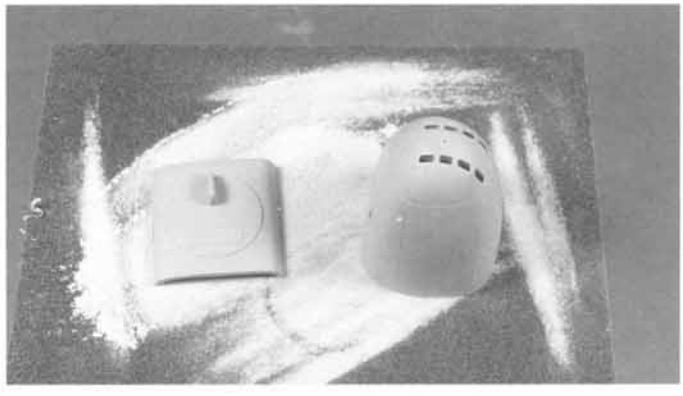


Fig. 2-15. To clean up large resin detail parts and flatten their attachment surfaces, run them across a stationary piece of sandpaper. Use a figure-eight motion or rotate the part to insure that you do not remove too much resin on one side or edge.

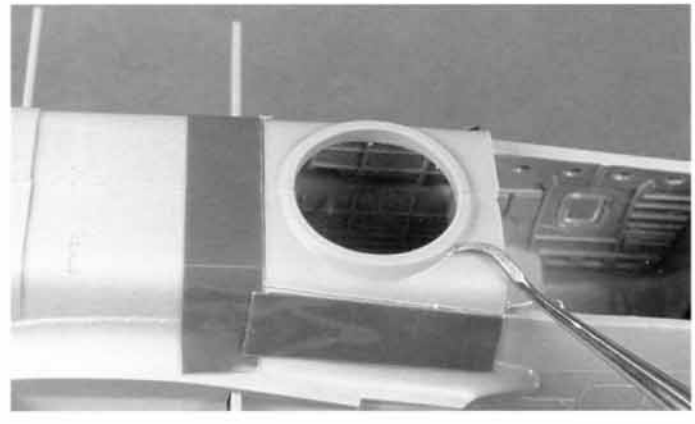


Fig. 2-16. To cut out fuselage sections, set labeling tape along the edges of cut lines and use Bare Metal Foil's plastic scriber to cut through the plastic.

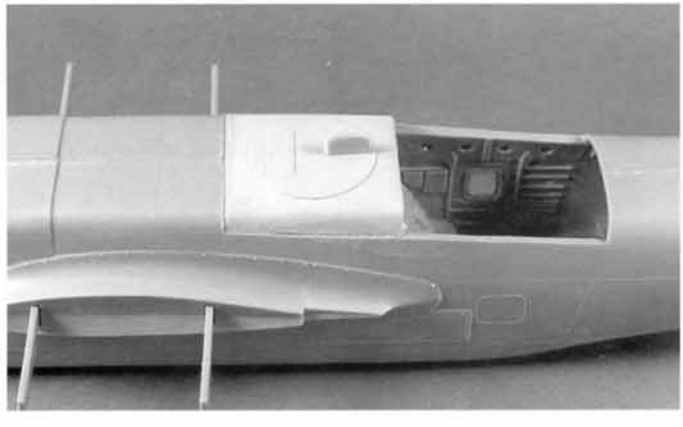


Fig. 2-17. Glue the resin part in place and fill the edges with super glue. After it's dry, sand the area and contour the shape of the fuselage.

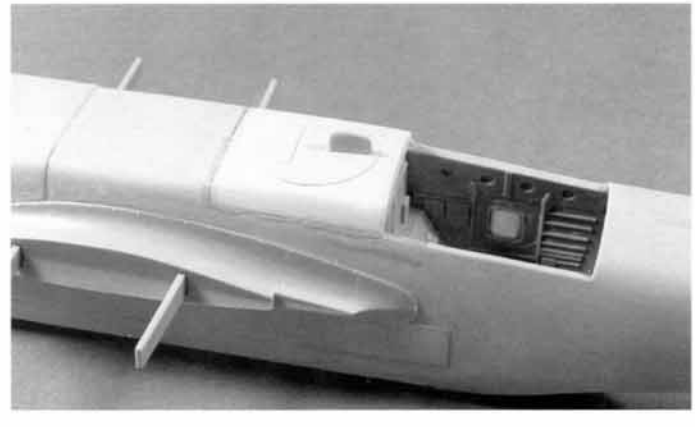


Fig. 2-18. Additional coats of super glue will most likely be necessary in order to fix the tiny cracks and voids around the inserted part. Be careful when sanding resin, as it is much softer than plastic and consequently it sands very easily.

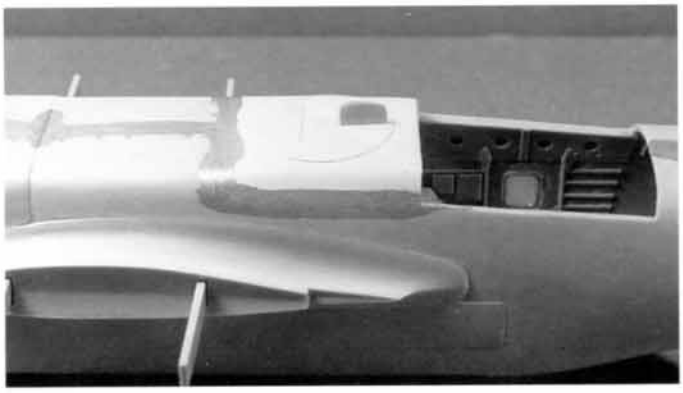


Fig. 2-19. A final check with Testor's silver paint should always be done after major surgery on either fuselages or wings.

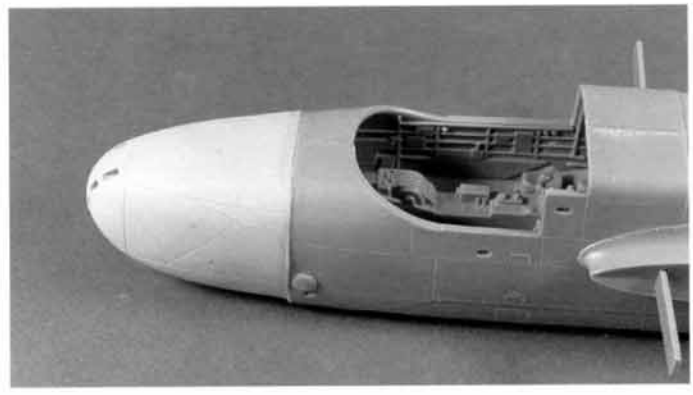


Fig. 2-20. The new nosepiece on this Monogram A26 has been glued into place. The shape of the nosepiece and the fuselage at the attachment point are slightly different along the left and right sides, and will need some heavy sanding work to contour them correctly.

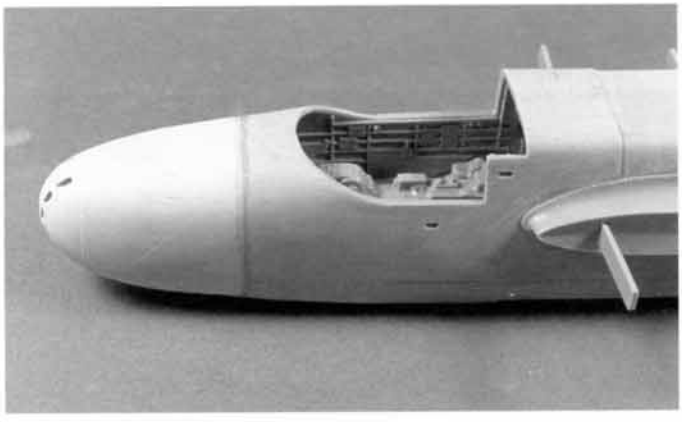


Fig. 2-21. The fuselage and new nosepiece have been contoured and additional super glue has been added around the seam line to fix any remaining problems. Note that the raised panel lines on the surface of the kit's fuselage have been sanded off.

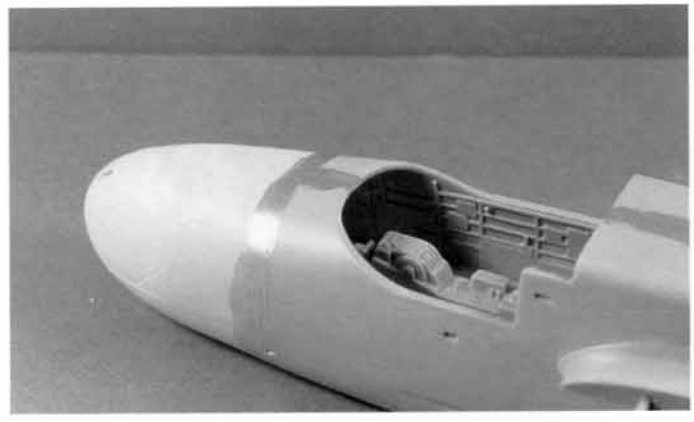


Fig. 2-22. As a final check, here again Testor's silver paint has been applied to the seams to be sure there are no remaining cracks or voids.

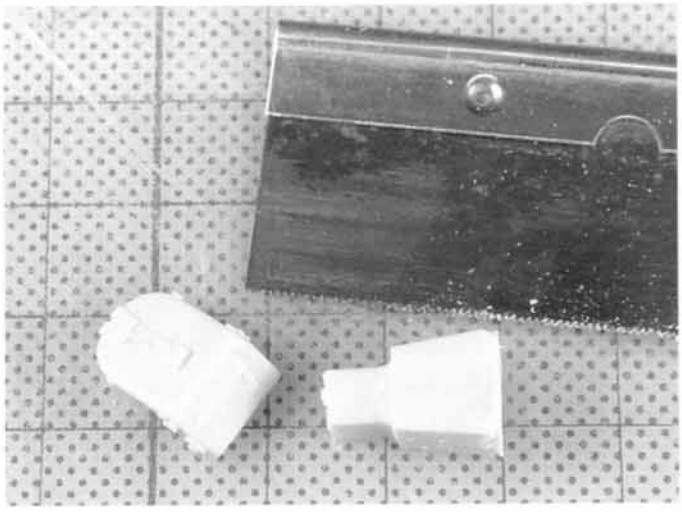


Fig. 2-23. Large resin cockpit detail accessories such as seats usually have large pour plugs, which are easily removed with a razor saw.

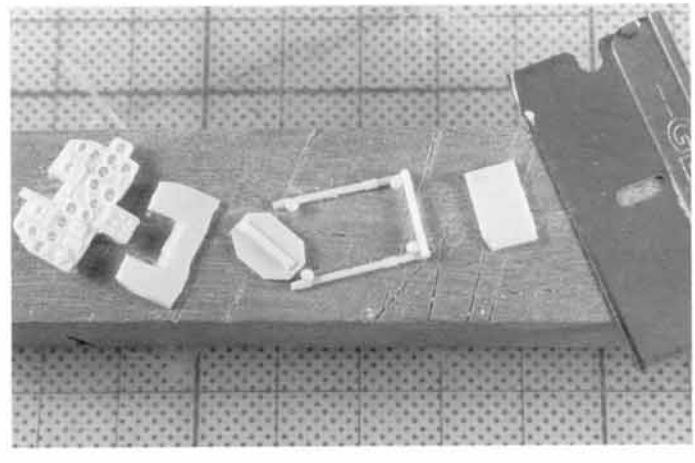


Fig. 2-24. Remove the pour plugs and reinforcing bands from smaller resin parts, using a sharp, single-edge razor blade on a hardwood block.

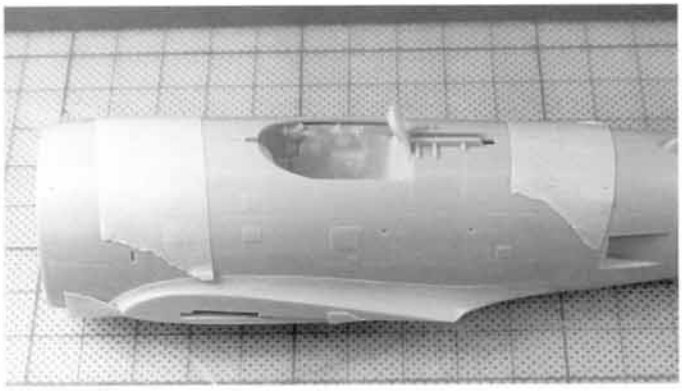


Fig. 2-25. Once the resin cockpit parts have been cleaned up, tape them together, insert them into the fuselage, and tape up the fuselage to check the fit. This is the time to note any adjustments or changes that need to be made to the resin parts to get them to fit correctly.

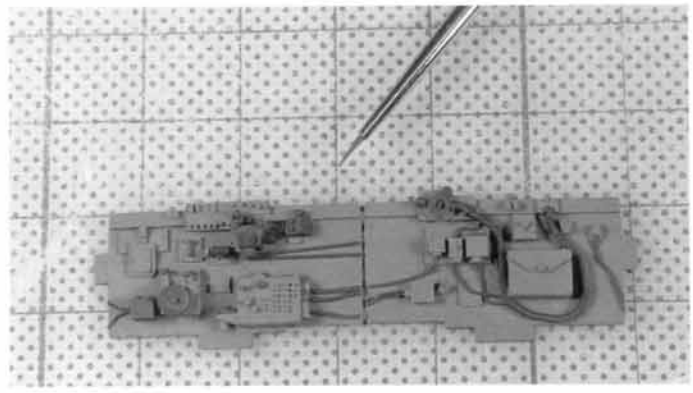


Fig. 2-26. Meteor Productions resin detail set for Academy's 1/48 scale P47N has beautiful interior detail. The first step in highlighting these parts is to paint the base interior color and then start picking out the raised surface details with a small detail brush. Even the wiring on this detail set can be painted because it has a high enough relief to allow the paintbrush to paint the wire's surface.

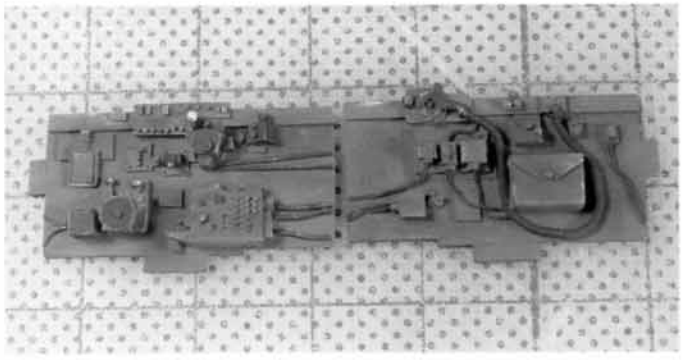


Fig. 2-27. Additional details such as the throttle handles and switches have been painted lighter colors. The edges of the box shapes have been drybrushed with dulled Testor's silver paint, and then the surfaces have been given a light dusting of pastel black for a weathered effect.

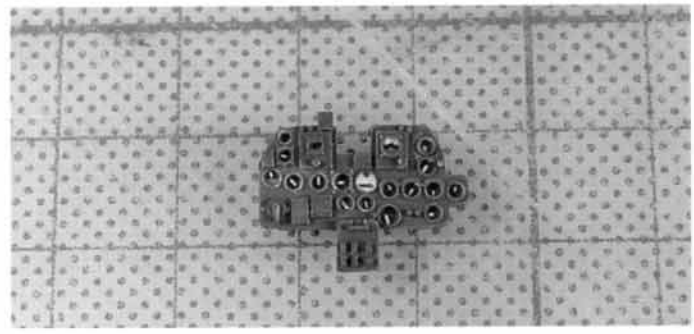


Fig. 2-28. The console on Meteor Productions P47N is beautifully done. It is easy to paint the individual dials with a detail brush because of the raised relief of the individual instruments. A light drybrushing with Testor's silver can really highlight these types of parts.

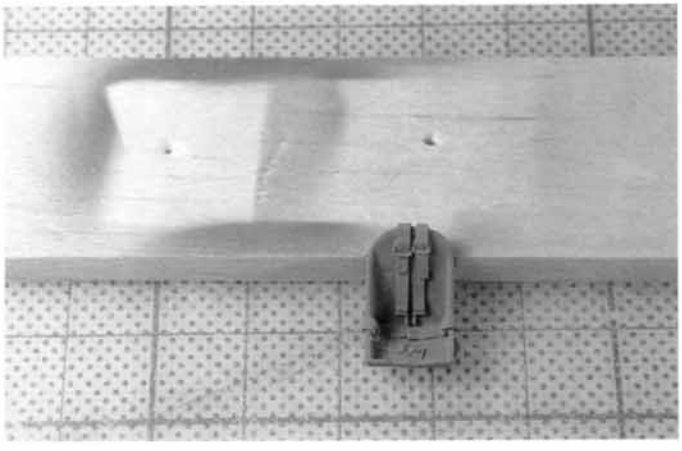


Fig. 2-29. The first step in painting a resin seat is to spray the entire part with the color of the seat.

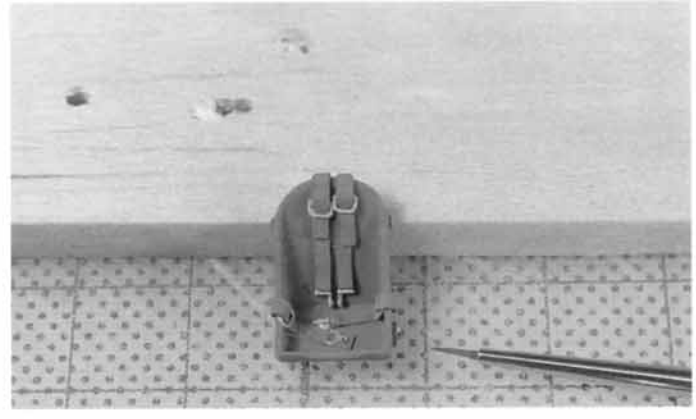


Fig. 2-30. The second step is to paint the seatbelts the correct color. Here again, the seatbelts are raised high enough from the seat to allow easy painting. Next you need to paint the buckles on the adjusting rings on the seatbelts.

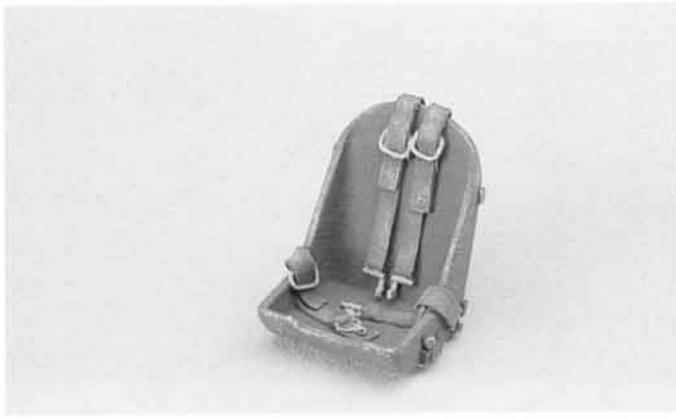


Fig. 2-31. The last step is to weather the seatbelts with a lighter shade of brown, and add dulled silver paint to the edges of the seat to simulate paint wear. Photo by Glenn Johnson.

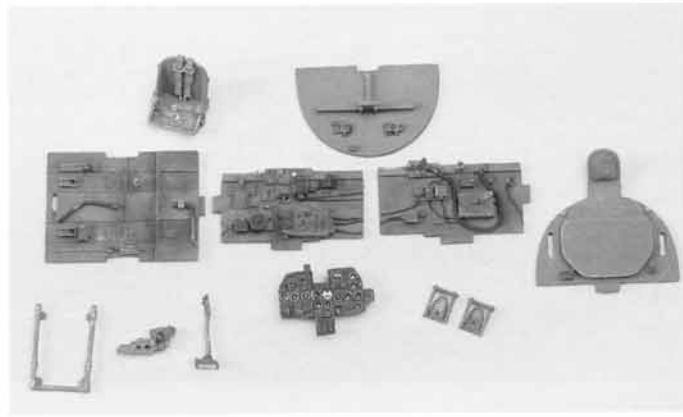


Fig. 2-32. All the resin parts from Meteor Productions for the beautiful P47N detail set have been cleaned, painted, and detailed and are ready to be installed. Photo by Glenn Johnson.

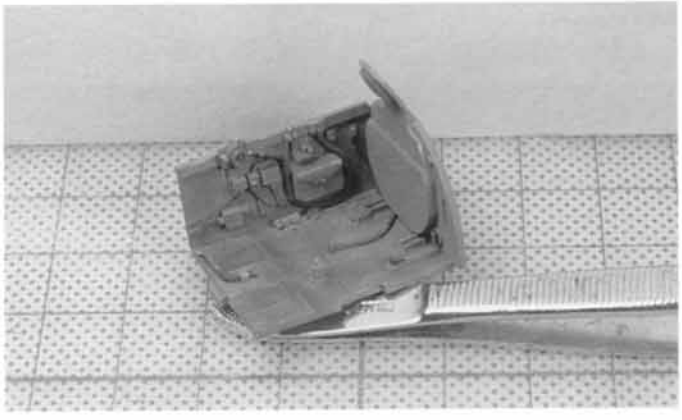


Fig. 2-33. To begin assembling the resin cockpit, work in stages. First set the back and either the right or left side.

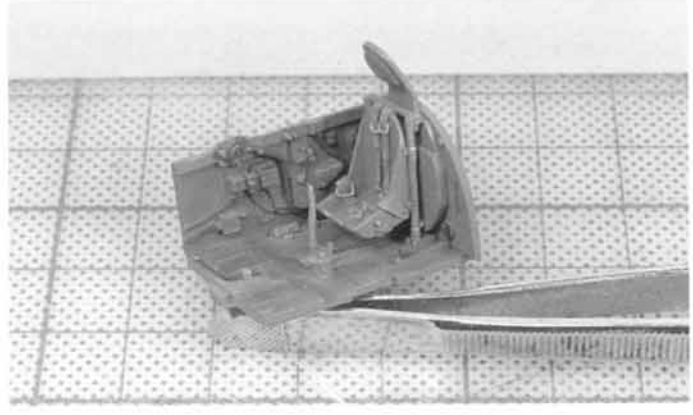


Fig. 2-34. Then add additional interior details such as the seat frame, seat, and control stick.

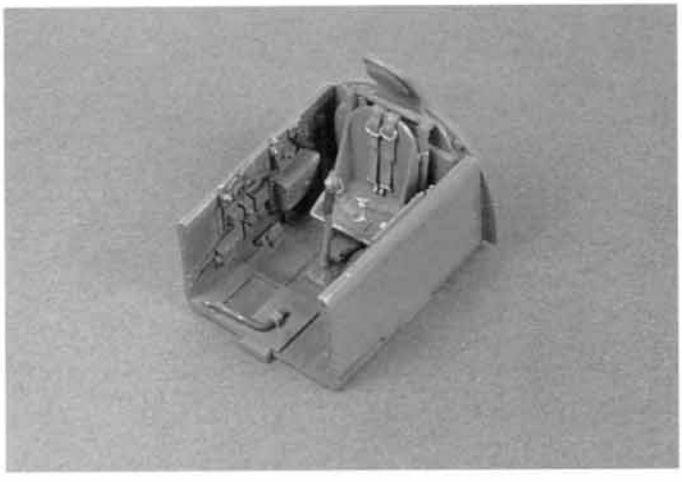


Fig. 2-35. The next step in building up a resin cockpit is to add the other side. To ensure good glue joints be sure to scrape the paint off the gluing surfaces.

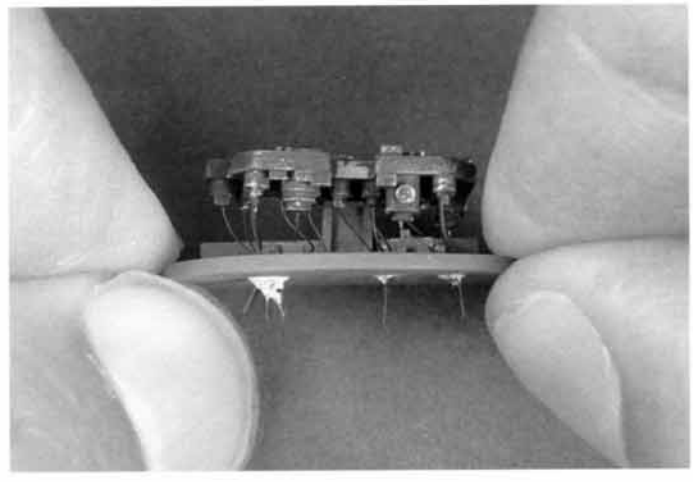


Fig. 2-36. Since the back side of a P47N console is exposed, wiring needs to be added to the back of the console. In 1/48 scale this was done using clear nylon sewing thread that was painted after it was installed.

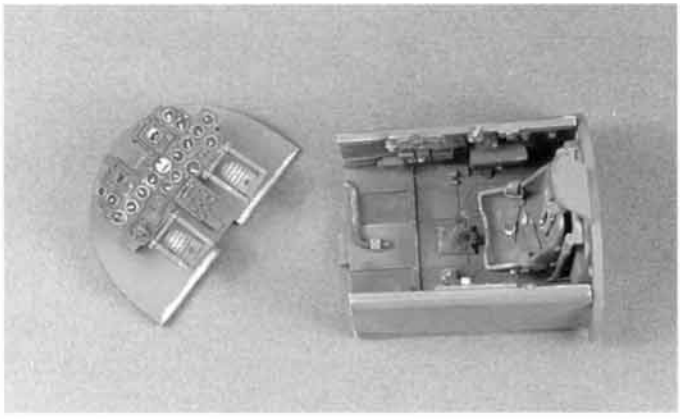


Fig. 2-37. The last step in assembling the cockpit is to put the forward cockpit console wall into place.

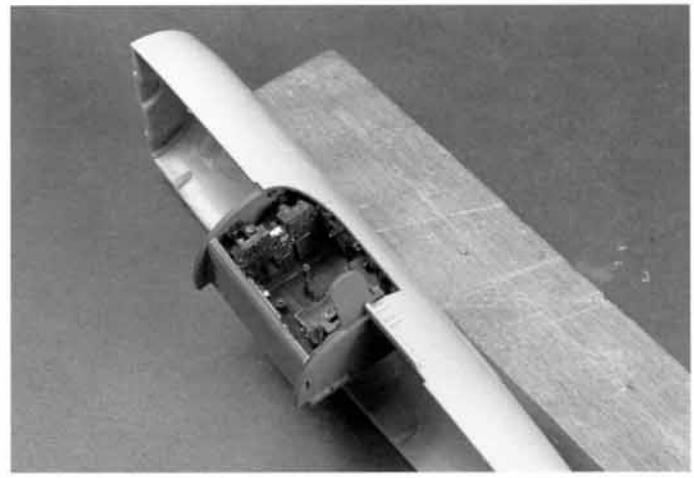


Fig. 2-38. Install the resin cockpit into the side of the fuselage in the same way as if it were a kit-supplied part.

Fig. 2-39. The last step in the assembly of this P47N interior is to add the gunsight, which you do after painting the model, adding decals, and applying weathering. The new cockpit interior greatly enhances the appearance of this model.

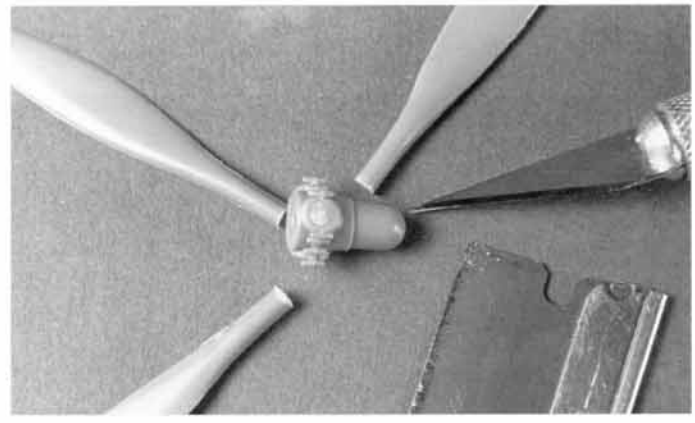


Fig. 2-40. The first step in attaching new white-metal propellers to a plastic propeller hub is to cut the plastic props carefully from the hub using a sharp knife. Be careful to ensure that you have a flat cut.

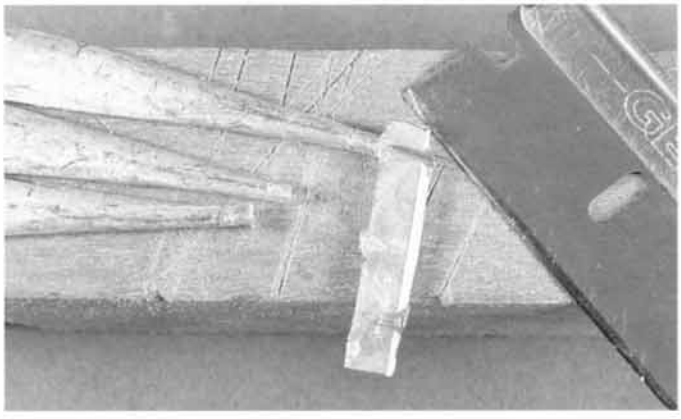


Fig. 2-41. To remove white-metal parts from their trees simply cut them off using a single-edge razor blade on a hard surface. The metal is very soft and easily bent, so be careful.

Fig. 2-42. To clean up the surfaces of white metal, sand them with a Flex-I-File sanding stick. To fill in cracks or holes in the white metal simply apply some super glue as a filler and sand smooth.

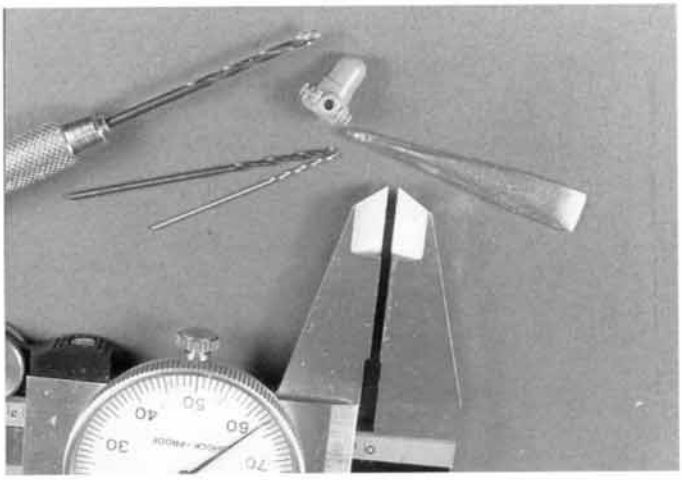


Fig. 2-43. To determine the diameter of the base of the white-metal propeller, use calipers to measure the diameter and then drill the appropriate size opening into the propeller hub. To help set the tip of the drill bit correctly, punch the center of the drill area.

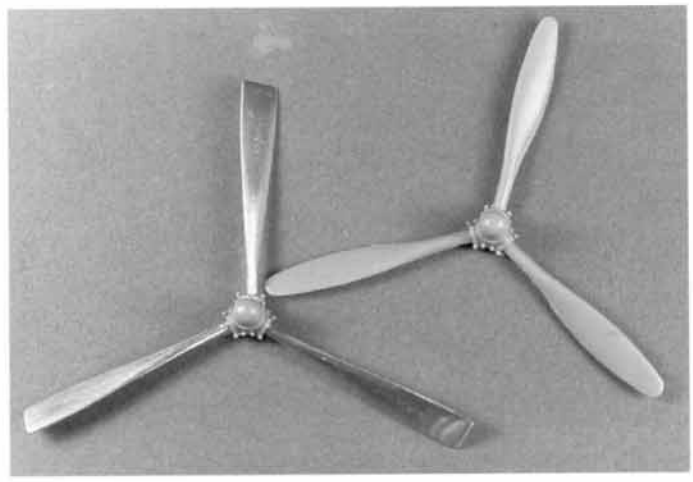


Fig. 2-44. The individual propeller blades were attached with super glue. When gluing them in place, be sure that they are all angled the same with respect to the hub. The new propeller looks very different from the kit-supplied one.

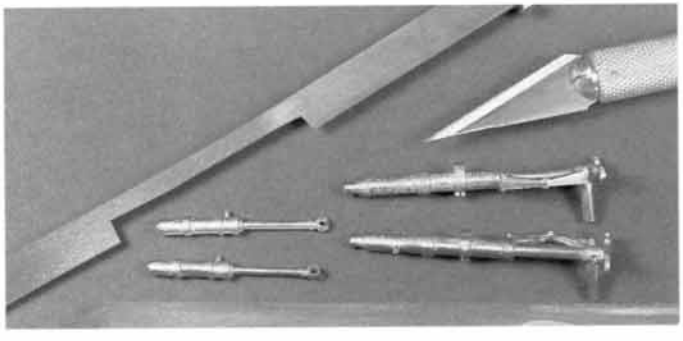


Fig. 2-45. White-metal detail parts such as landing gear sometimes have seams just like plastic ones do, and you can deal with them the same way as plastic parts. Carefully scrape the seams off and then sand the surfaces smooth using a Flex-I-File.

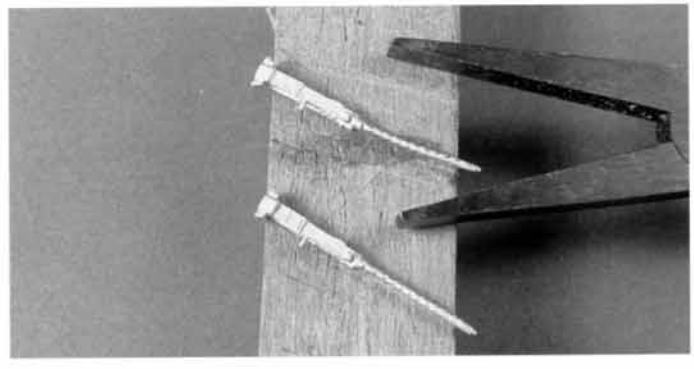


Fig. 2-46. These beautiful white-metal 50-caliber machine guns are made by Koster Aero Enterprises, but like most white-metal parts they are usually bent. Have no fear, as they always straighten out. Here the gun barrel was straightened out by rolling the barrel end along a raised, hard, flat surface and then finishing the job using flat-nose pliers.

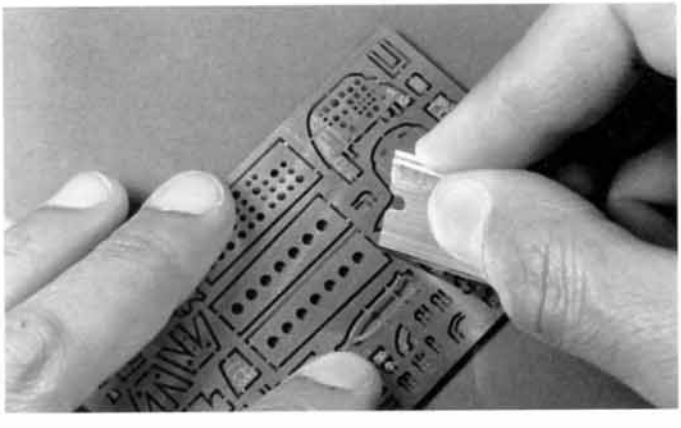


Fig. 2-47. Brass or stainless steel photoetch should always be cut on a hard surface like a glass plate using a sharp knife or razor blade. Be prepared to go through a lot of knife blades when using photoetch.

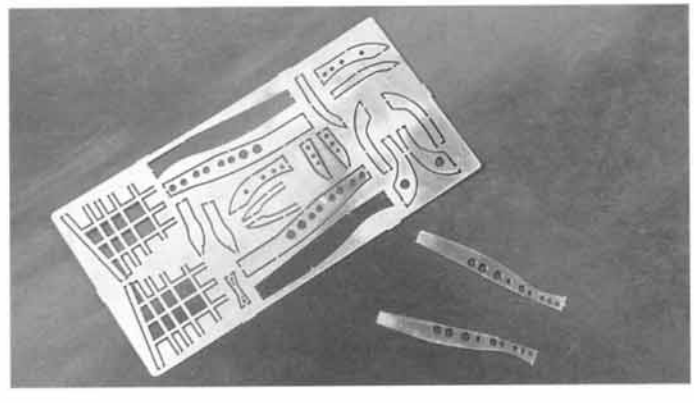


Fig. 2-48. Photoetch also needs to be cleaned. The easiest way to do this is to run the parts across a stationary piece of fine-grit sandpaper.

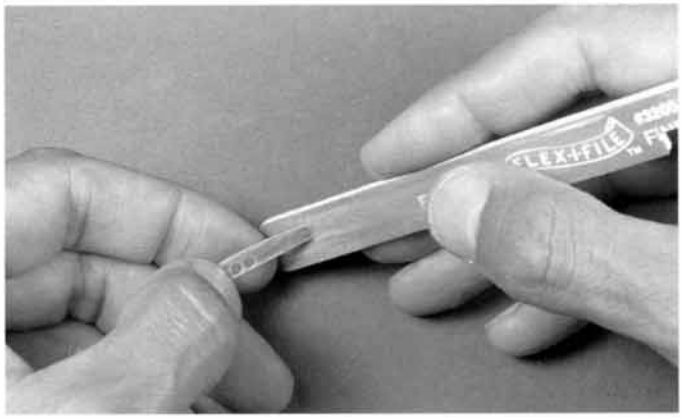


Fig. 2-49. The stub edges also need to be removed on photoetched parts, and the best way to do this is to run the edges across a Flex-I-File sanding stick. If the edges of the photoetch are the gluing surfaces be sure to also run sandpaper across them.

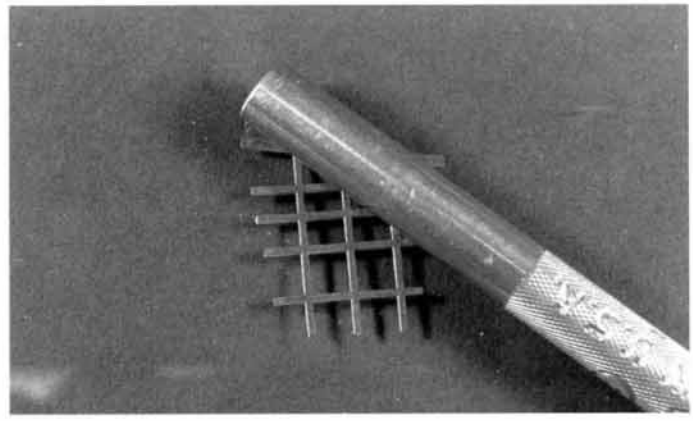


Fig. 2-50. Photoetched parts can be flattened out by running a round dowel across them on a hard surface. You may have to flip the part over several times to get it really flat.

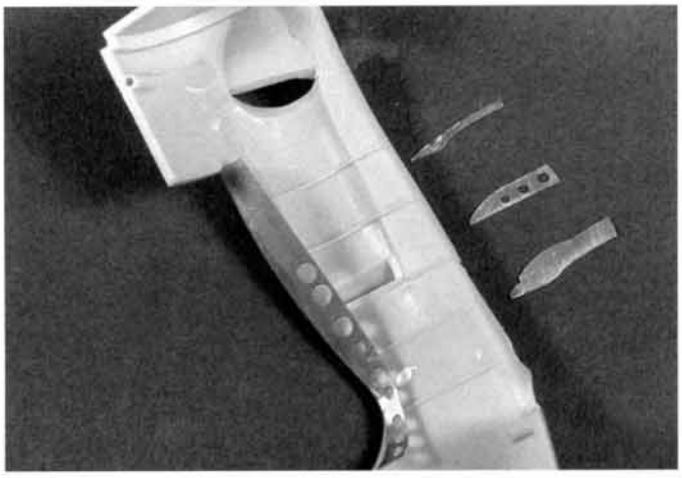


Fig. 2-51. Eduard's 1/48 scale photoetched detail parts on the wheel well of AMT's A-20G Havoc are just about ready to be installed. Super glue works best to attach photoetch to photoetch or photoetch to plastic.

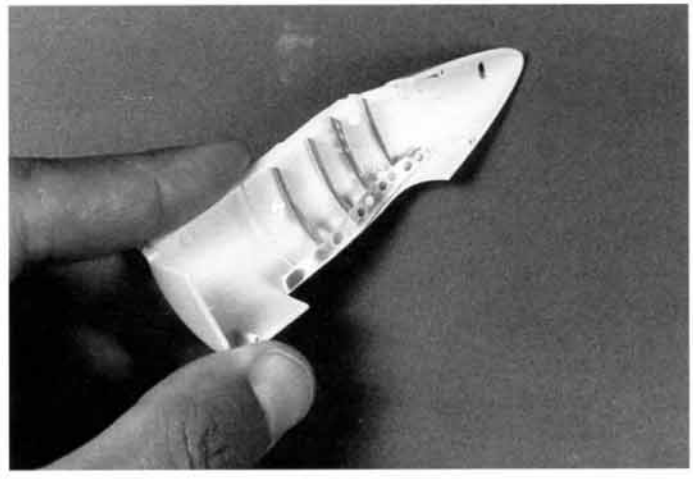


Fig. 2-52. The photoetched framing parts have been attached and the part is now ready to be painted. Be sure when gluing these types of detail parts that they are all straight.

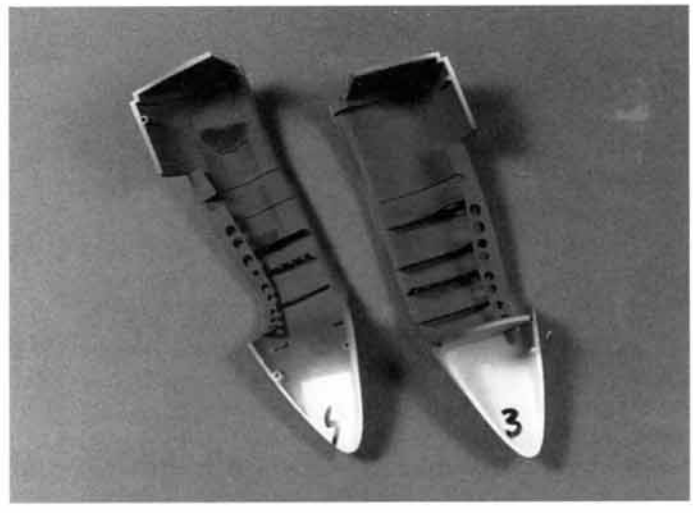


Fig. 2-53. The brass detail parts have been added to the left and right halves, the interior has been painted, and it is ready to be closed up. While photoetched detail sets can add a lot of realism to an aircraft model you need to be careful when installing them. Check the fit of all surrounding parts to ensure that the photoetch does not interfere with them. The lip framing on these detail parts had to be cut on one side and notched on the other to allow for the landing gear frame to sit correctly.

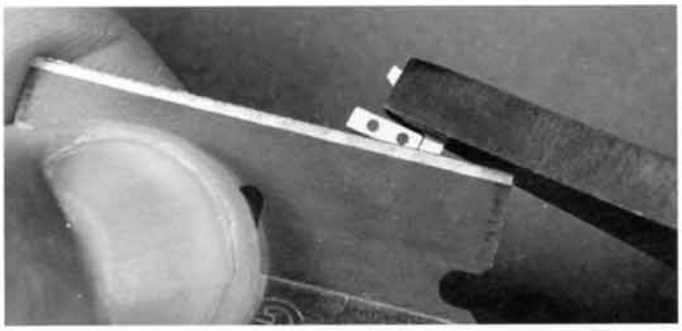


Fig. 2-54. Photoetched cockpit detail sets, especially the Eduard's series, have a lot of small parts that need to be bent into box shapes. The easiest way to ensure good bend lines is to position the part in a set of flat-nose pliers along the bend line and then bend the part using a single-edge razor blade.

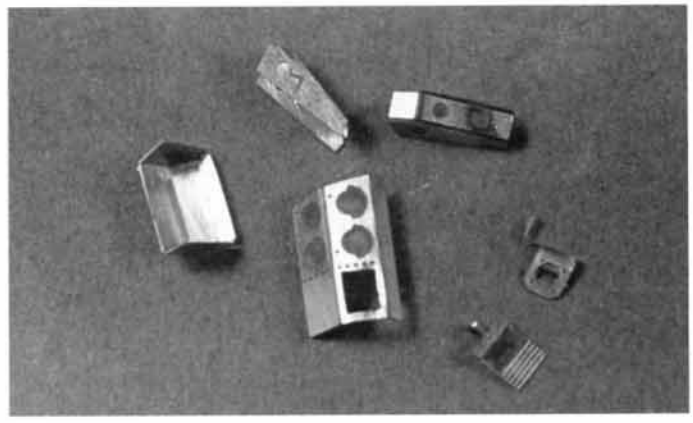


Fig. 2-55. These box shape parts were all bent into shape using a combination of single-edge razor blades, flat-nose pliers, and a set of tweezers. The tweezers were used to make fine adjustments.

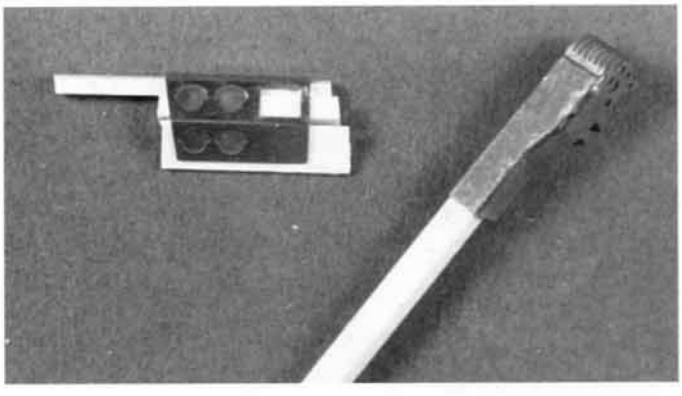


Fig. 2-56. Photoetched box shapes can be very fragile. To make them stronger add lengths of Evergreen strip stock to the inside areas. The plastic will also act as a good gluing surface for the individual parts.

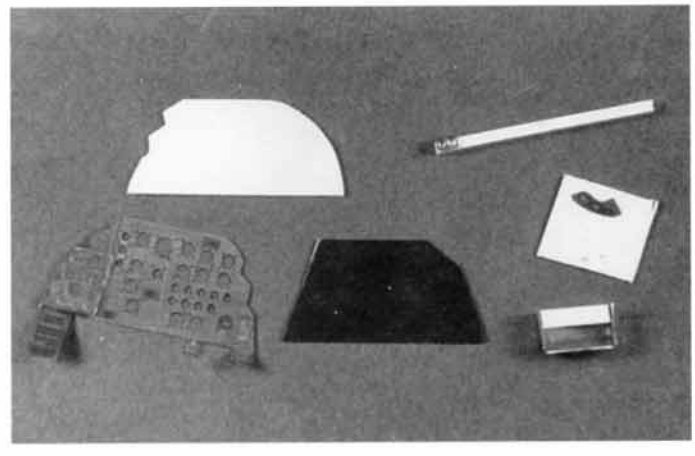


Fig. 2-57. To get the instrument dials on a clear acetate sheet to stand out, cut a backing for the console using white plastic and then sandwich the acetate between the photoetched console and the white plastic backing.

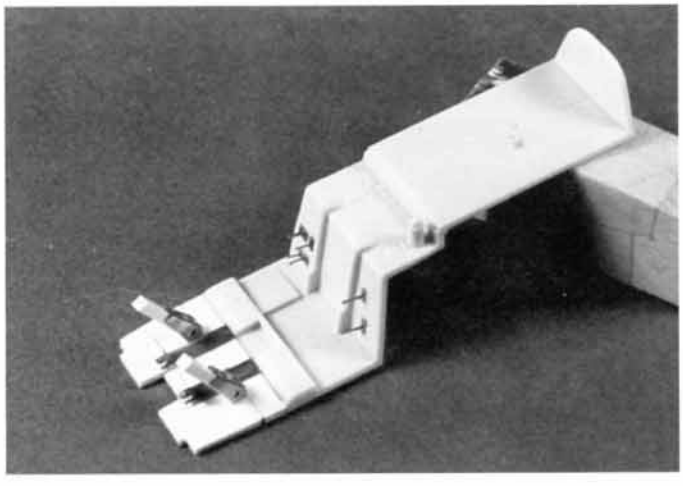


Fig. 2-58. Building up a cockpit using photoetched detail sets is done pretty much the same way as any other detailing project. Work in stages and always check your work. The initial interior parts have been installed on the cockpit flooring of this A-20G Havoc.

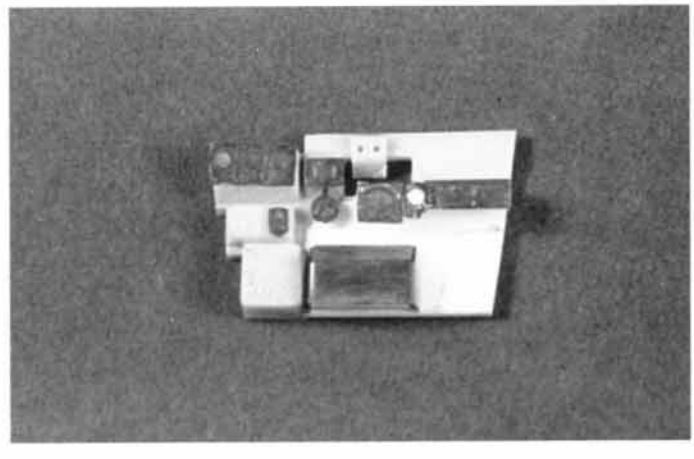


Fig. 2-59. The photoetched parts have been glued to the right side of the cockpit. This part also had to be modified to accept these small photoetched parts.

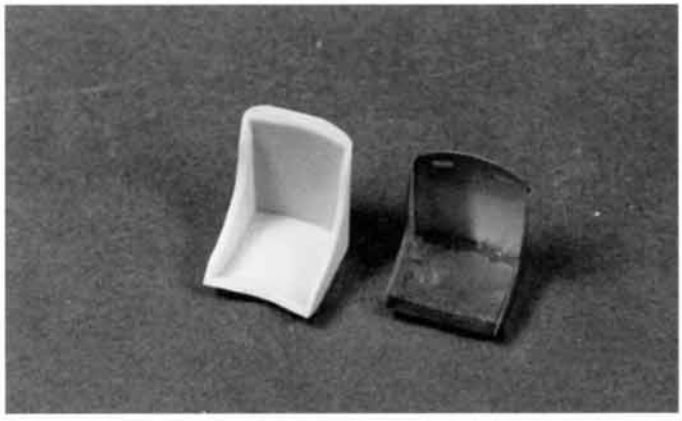


Fig. 2-60. Photoetched seats are also a marked improvement over the thicker, out-of-scale kit-supplied seats. To assemble these photoetched seats run a bead of super glue along the seam lines after you bend them into shape.

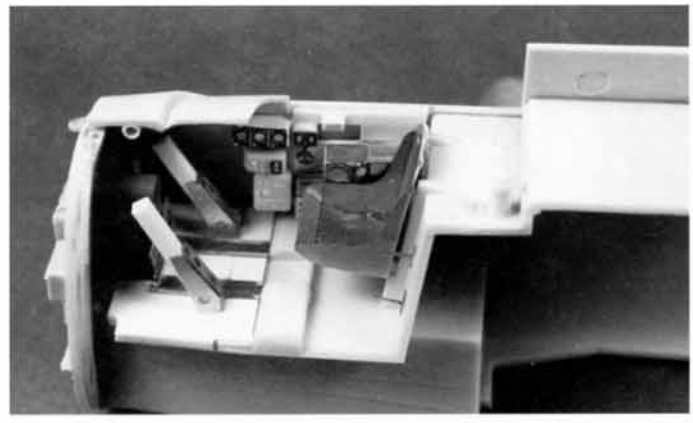


Fig. 2-61. Here the new cockpit with its interior photoetched details is getting a fit check to ensure that all the parts fit together and do not interfere with one another.

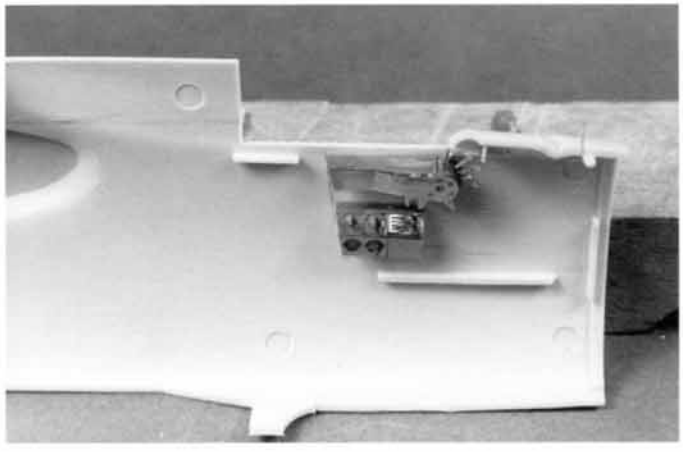


Fig. 2-62. The left side photoetched parts have also been installed and they are ready to be painted and detailed. At this point the fuselage halves are ready to be closed up with masking tape as a final fit check for all the added parts.

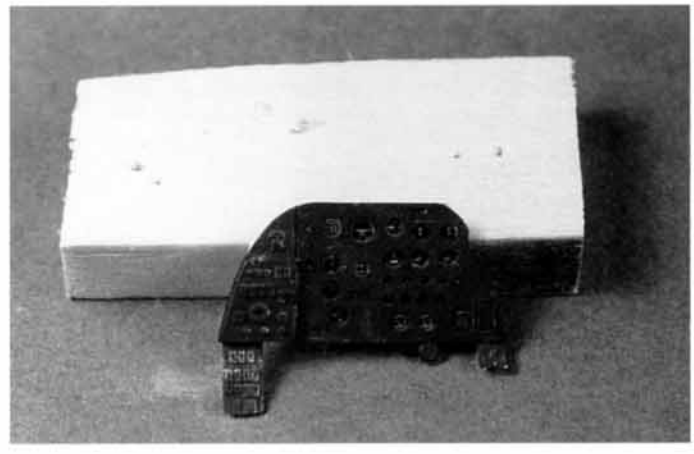


Fig. 2-63. The completed photoetched console has been assembled and the left surface has been drybrushed to highlight some of the surface detail. Notice how the instrument dial details stand out.

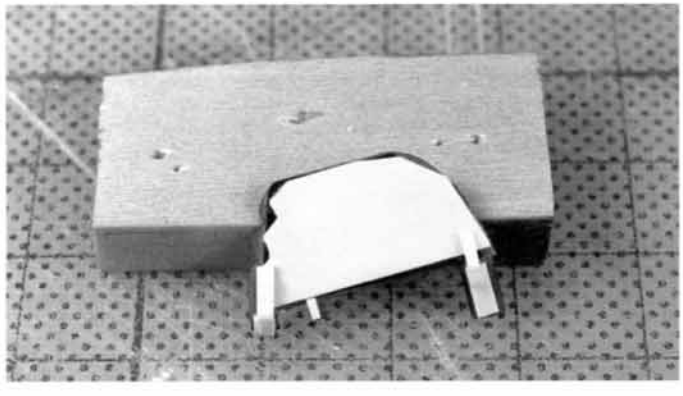


Fig. 2-64. The photoetched console's backing has a .01-inch-thick piece of sheet plastic, which serves to highlight the instrument details and strengthen the photoetch. Also note the additional strips of plastic which reinforce the photoetched switch plates.

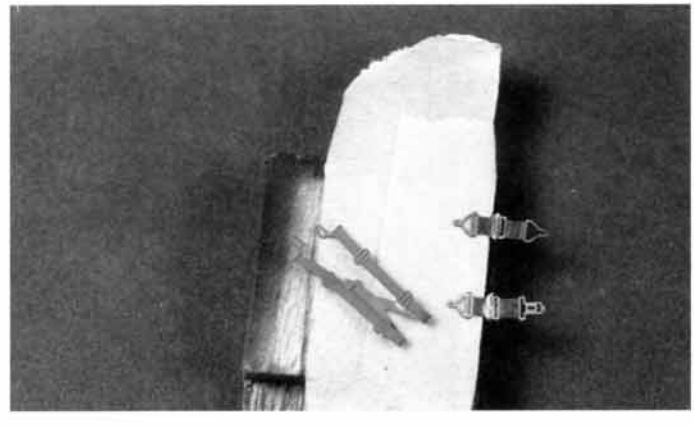


Fig. 2-65. Photoetched seatbelts take some concentration to paint because there is not a lot of relief between the belts and the harness hardware. These parts need to be carefully bent into shape so that they will fit snugly onto the seat.

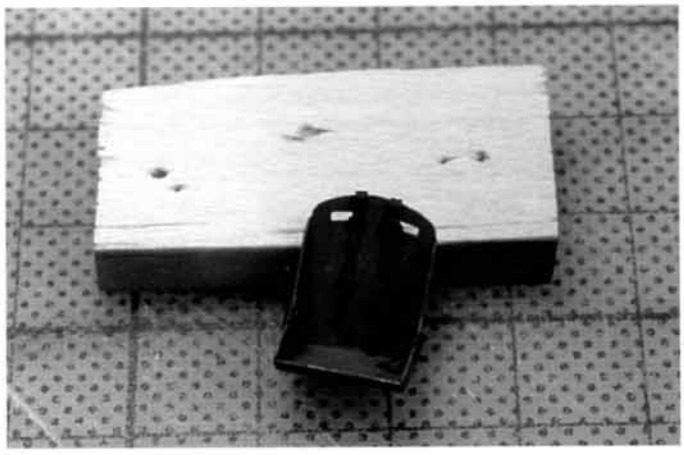


Fig. 2-66. The completed photoetched seat looks good now that it has been painted and weathered and the seatbelts have been added. The seatbelts were attached with white glue.

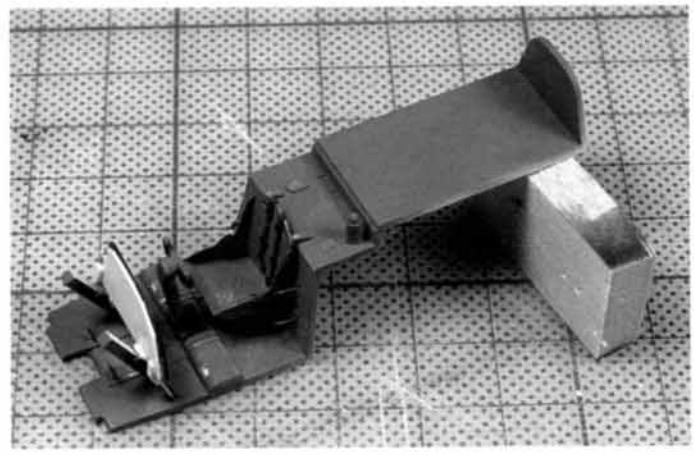


Fig. 2-67. The cockpit interior is starting to take shape with the console, control stick, and seat added.

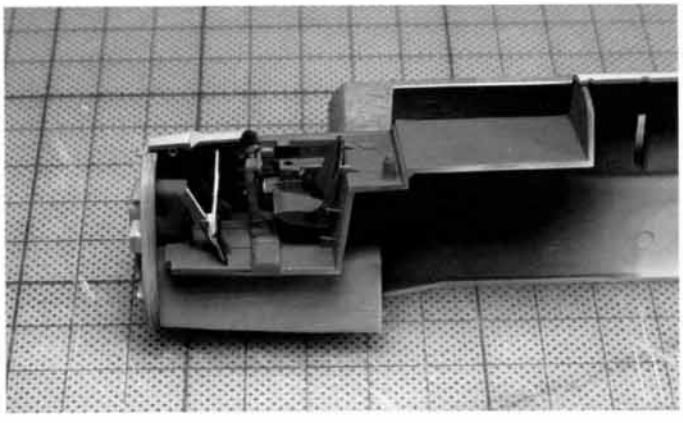


Fig. 2-68. The cockpit is just about complete. All that is left is to paint the left side and then glue the fuselage halves together.

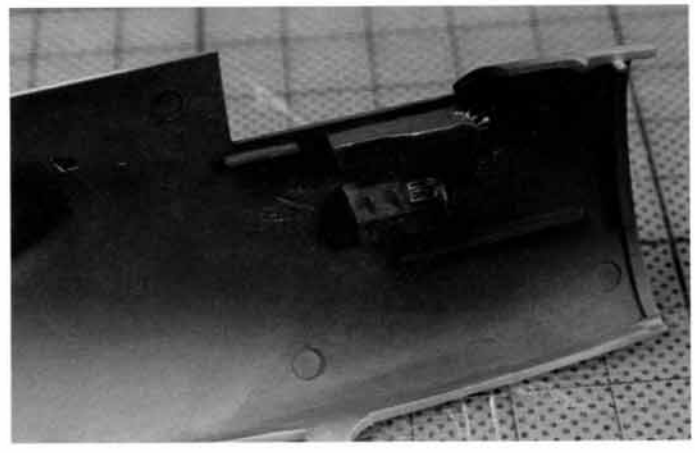


Fig. 2-69. The detail on the left side of the cockpit was picked out by drybrushing and by painting the lever handles different colors.

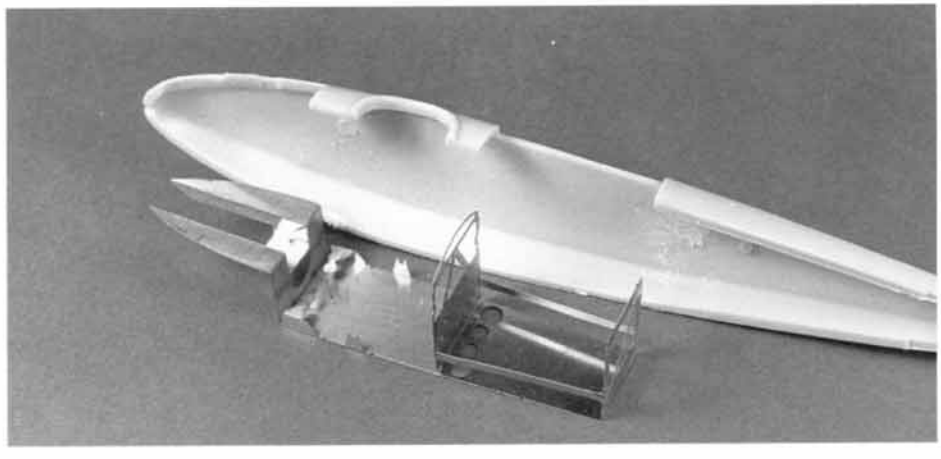


Fig. 2-70. Eduard's 1/48 scale multimedia aircraft kits also contain a lot of photoetched parts. While they are easy to build up you need to check the fit of all the parts as you proceed with the buildup of the kit. Minor adjustments to the photoetch are usually necessary to get them to fit correctly. Model by Bill Teehan.

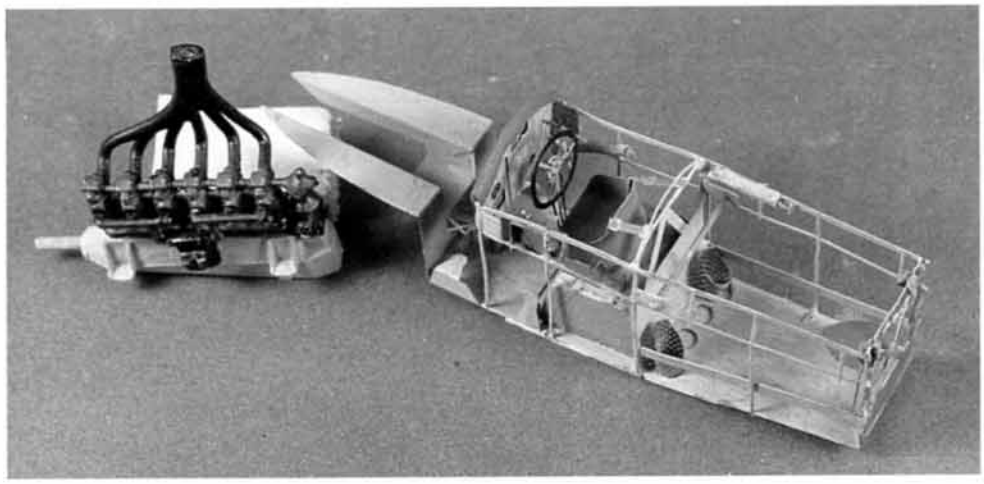


Fig. 2-71. The completed photoetch interior and the white-metal engine on Eduard's 1/48 scale multimedia Albatross C-III are ready to install into the fuselage. Note how all the individual parts have been carefully painted. Sometimes you will also get a wavy appearance to the photoetch on long thin lengths. There is not a whole lot you can do about this type of problem, but in this case it will not really be noticeable once the fuselage is closed up. Model by Bill Teehan.

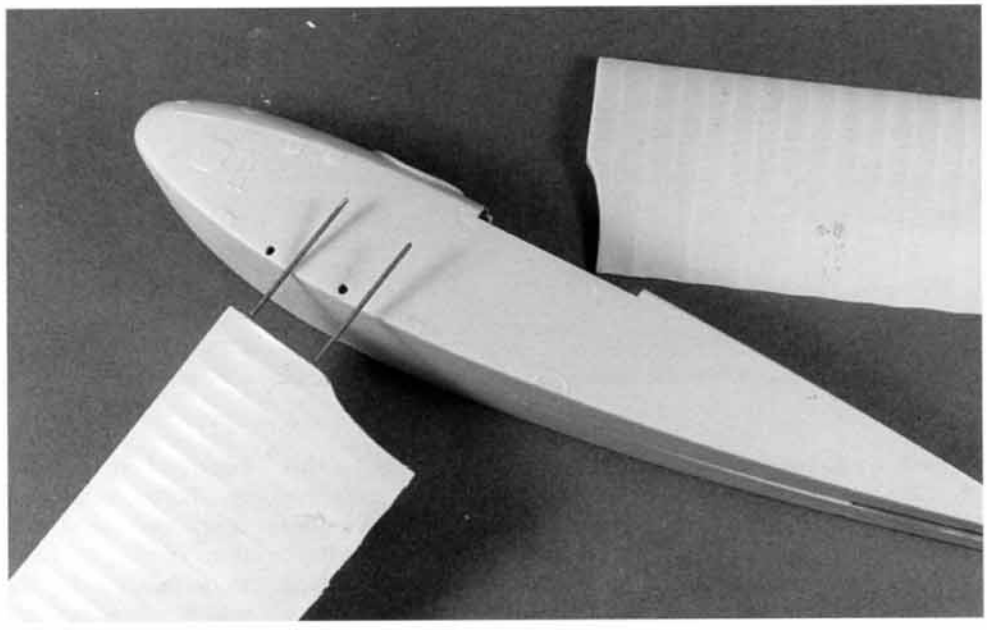


Fig. 2-72. Some resin multimedia kits do not have good attachment points for the wings so you need to make them. Two lengths of stiff brass wire are all you need to fix these problems. Model by Bill Teehan.