

ENGINE, LANDING GEAR, WHEEL WELL, AND ORDNANCE DETAILING



Engine detailing, such as adding push rods and wiring, when combined with a good paint job, can really enhance the appearance of an engine. While these details are easy to add they do take some time and prior planning. New push rods can be made from small lengths of brass or plastic rod, and wiring harnesses can be made from a combination of brass beading wire or stretched sprue. To make those molded-on details really stand out, use Testor's metalizer paints. I recommend that you drill the holes into the cylinders for the wires before you finish painting the engine. Once you have drilled the holes, paint the engine the appropriate colors and then give it a good coat of polyurethane gloss. Next apply

Testor's buffing metalizer paints using a paintbrush. The buffing metalizer paint is very thin and it will seep between all the cylinder head cooling rings while not covering the tips. This will give the engine a very nice overall multicolored appearance.

Adding brake lines to landing gear, as well as flattened tires and a good paint job, can really make these parts look good. Brake lines can be made from stiff brass wire, beading wire, or stretched sprue. To attach the brake lines to the landing gear use tiny strips of masking tape. Most brake lines were attached with flexible clamps and the masking tape simulates this very well. Flattened tires can be achieved with after-market resin tires or by flattening the bottom

of the kit's tires slightly with an iron. To get the right flatness to the tires I recommend that you flatten them with the iron after the landing gear have been glued into place. Simply hold the iron at the edge of your workbench and then place each tire onto the iron with a piece of waxed paper between the iron and the tire. The waxed paper will prevent the plastic from sticking to the iron. Watch the bottom of the tire very carefully because the plastic will start to soften and then flatten pretty quickly. Some kits have plastic located between the spoked areas of the wheel rims, and removing that plastic using drill bits and micro files will make the tires look a whole lot better. Another minor detail to add is

to paint the landing gear's oleos a bright silver color. The oleo is the landing gear's shock absorber. Adding other small details such as tension springs like those found on an F4U Corsair add more realism to your model. Landing gear tension springs can easily be made by using thin copper wire lengths from household multistrand electrical wire or brass beading wire, which you wind around a small diameter length of stiff wire. Just trim it to length and attach it with super glue. If the landing gear has locking framework around the oleo that is a solid piece on the kit part, simply drill out the excess plastic and then shape the part.

Wheel wells can be greatly improved by adding framing, wiring and plumbing. Just adding a few lengths of Evergreen strip stock to give the wheel well a three dimensional appearance can make a lot of difference. If you decide to add framing or ribbing, be sure to draw the locations first so that you can lay the strips in place correctly. Plumbing can be added using lengths of stiff brass wire and interior wiring can be made from stretched sprue or brass beading wire. Even if the interior of the wheel well

was nothing more than a canvas-covered opening, as the P-40 Warhawk's were, simulating even the canvas with aluminum foil can make an otherwise bland-looking opening come alive. Scratchbuilding wheel wells is not hard to do. Like all scratchbuilding projects it takes time, but the results are often worth the effort. Whenever I scratchbuild I try to use as much of the existing kit's parts as possible so that the amount of work I have to put into a particular project will be reduced. Landing gear doors are another area where a few simple additions can make a difference. Check your documentation and add framing and inner panels to the these parts. The trick is to be sure that the framing and panels are the same on identical left and right wing doors. You can also add the hinges for these doors using your Waldron punch or by just adding actuator arms.

Ordnance like guns and bombs can also be detailed. The best detail you can add to guns is to drill out the openings of the gun's tips so that they appear hollow. On fighter aircraft drill out the shell ejection ports and do not forget to add those gunpowder smoke trails across the upper and

lower surfaces of the wings. If the gun's tips are too small to drill out, replace them with small brass tubing. Even 1/72 scale diameter brass tubing can be found in hobby stores that carry HO and N scale model railroad-ing supplies. Ordnance can be dressed up by adding the fusing wires and adding instruction type decals to simulate the actual instruction stencils that were imprinted on the sides of bombs and rockets. On 1/48 and 1/32 scale kits you can also add the disks that are located on the tips of the bomb rack clamps using your Waldron punch tool. Drop tank brackets also had these small disks attached to their tips. When attaching bombs and rockets be sure that they are straight and level and that they are all in line. This is especially important with multiple rocket launch brackets on WWII and Korean aircraft, where you could have in excess of six rockets under each wing. Painting bombs and rockets cannot be overlooked, and if you take the time to add yellow stripes on bombs and paint rocket tips red with mid-body stripes of green or olive drab, you can really enhance the appearance of these parts.

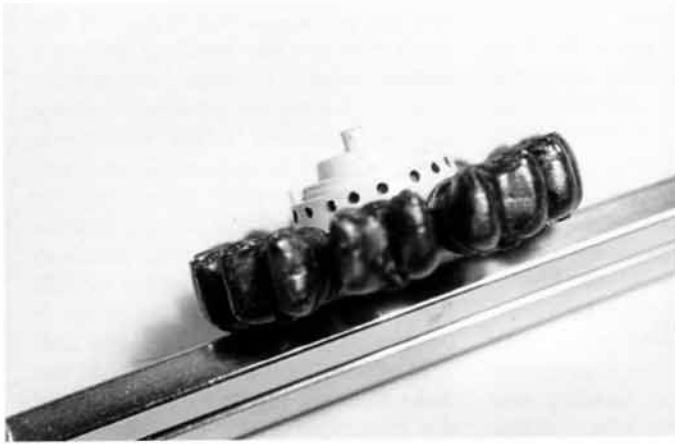


Fig. 4-1. To add push rod detail to radial engines, the first step is to drill holes around the perimeter of the engine part to accept plastic rod. Set the spacing using a pair of dividers.

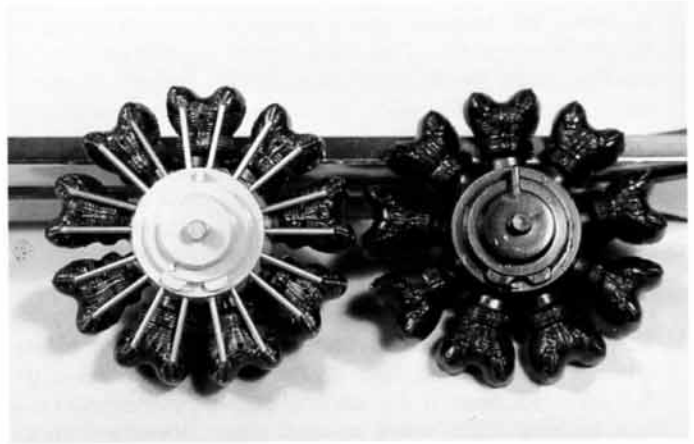


Fig. 4-2. The push rods on the left engine were individually cut, sprayed with Testor's metalizer, and then form-fit into place.

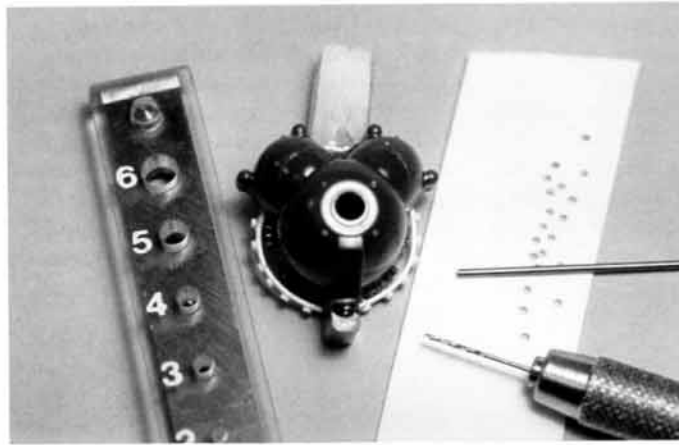


Fig. 4-3. The wiring harness on this engine part was made by wrapping a thin strip of Evergreen strip stock around its base. The individual wire rings were made with a Waldron punch tool.

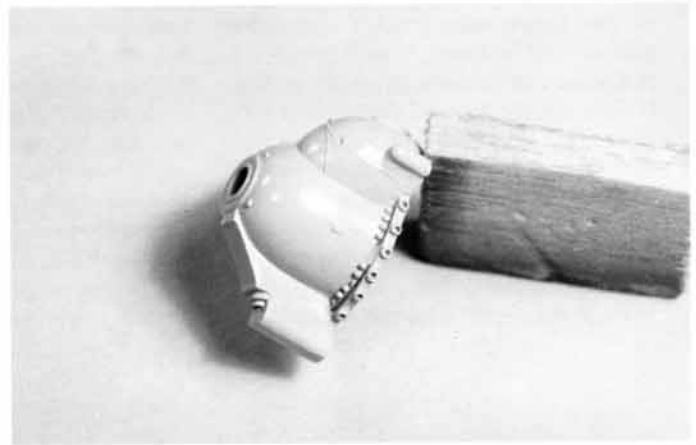


Fig. 4-4. Once the individual disks were glued in place the centers were drilled out to accept the wires.

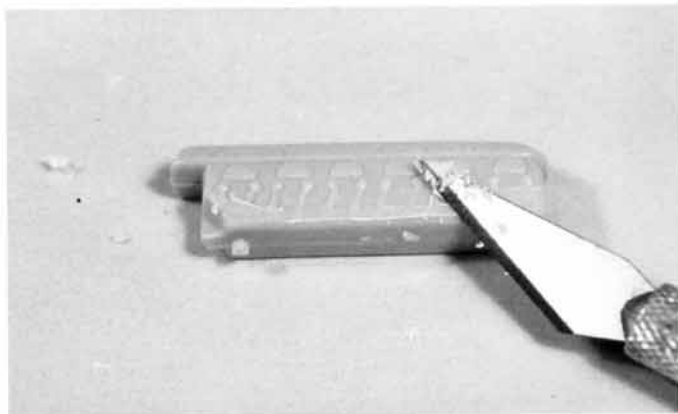


Fig. 4-5. Some kit-supplied engines need to have molded-on detail scraped off before you can add new detail.

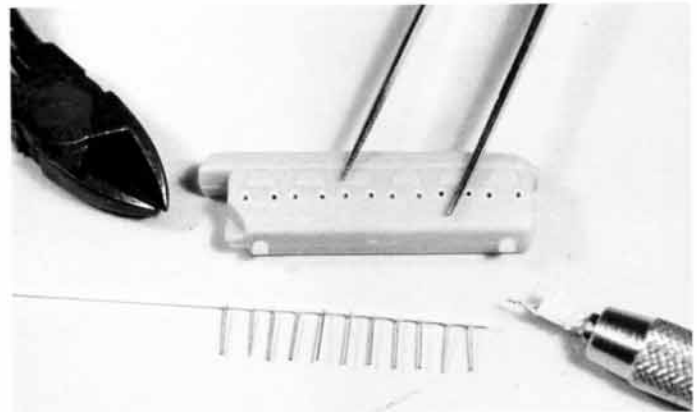


Fig. 4-6. The individual spark plug holes for this in-line engine were drilled out. To simulate the wiring harness, small lengths of brass wire were glued to a length of Evergreen rod.

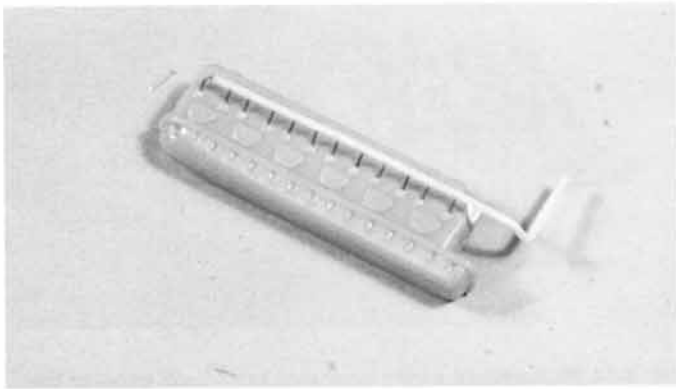


Fig. 4-7. The wiring harness brass wire lengths were cut to size and pushed into the drilled holes and then the Evergreen tubing was bent to shape. The addition of simple details like this can greatly enhance the appearance of any engine.



Fig. 4-8. In order to add wiring details to this engine, corresponding holes were drilled into the engine cylinders as well as around the rim of the engine case.

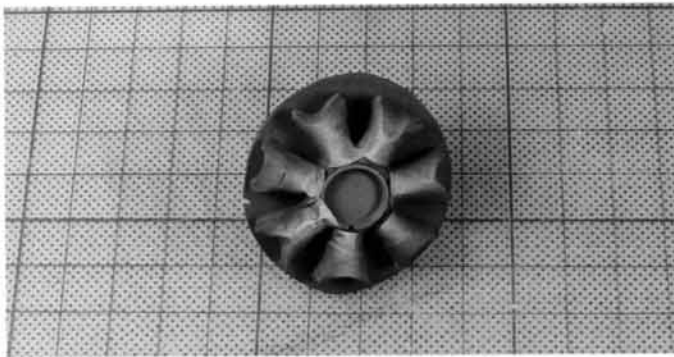


Fig. 4-9. The next step is to paint the engine. Here the background disk for this engine part has been painted interior green and the cylinder heads masked.

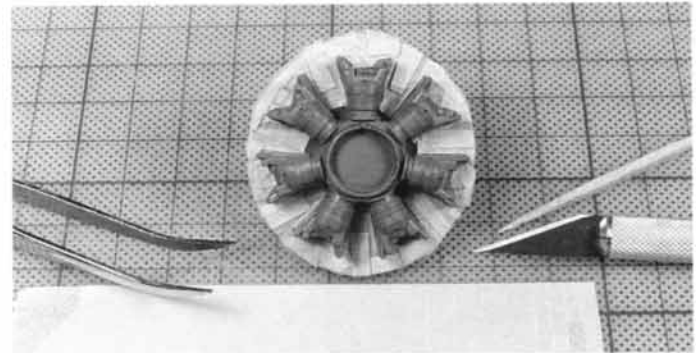


Fig. 4-10. Now the background disk has been masked and the engine cylinders will be painted light gloss gray.

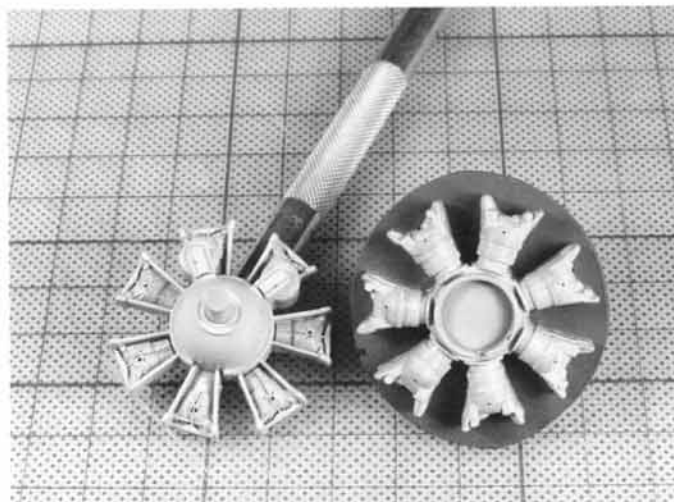


Fig. 4-11. Both of these engine parts have now been painted the base colors and they are ready for painting the individual cylinders.



Fig. 4-12. The individual cylinders were painted with a small flat brush using Testor's buffing metalizer paints. The buffing metalizer paints are much thinner; when applied with a brush the paint will seep in between the ridges of the individual cylinders, resulting in a nice two-tone effect. This only works when applying the metalizer paints to a gloss surface.

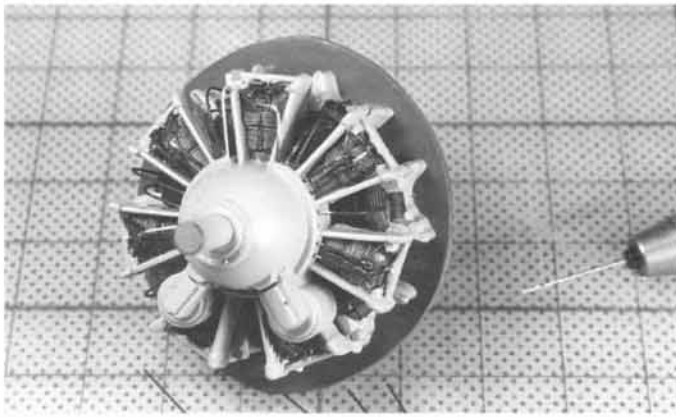


Fig. 4-13. The individual brass wire lengths are cut and form-fit into place and then secured with Elmer's glue. Even though the individual brass wire lengths were pre-painted, the form-fitting process usually scrapes some of the paint off, resulting in some touch-up work.

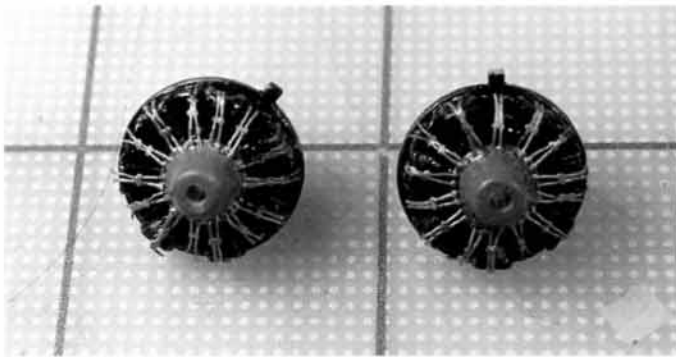


Fig. 4-15. Here the photoetched wiring harnesses have been added, and in combination with good painting these engines look much more realistic.



Fig. 4-17. A combination of wiring, surface detail, and painting on this 1/32 scale P47 have resulted in a very realistic engine. Model by John Ficklen. Photo by Glenn Johnson.

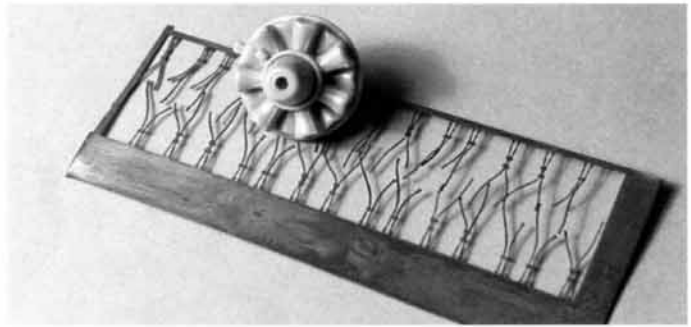


Fig. 4-14. Photoetched wiring harnesses can greatly enhance the appearance of engines that do not have much surface detail.

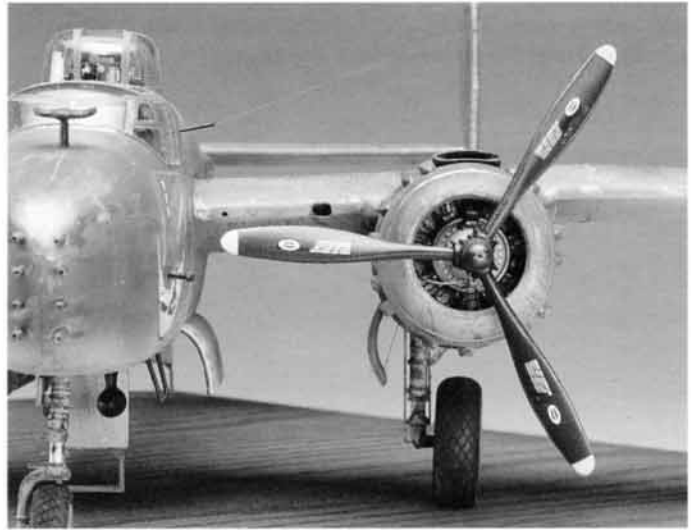


Fig. 4-16. The small lengths of wire added to the engines of Monogram's 1/48 scale B-25 greatly enhanced the overall appearance of the model.

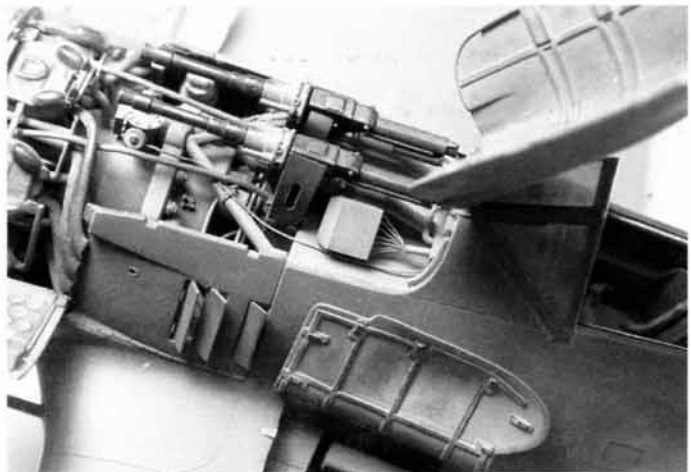


Fig. 4-18. Wiring and plumbing galore adorn the interior engine compartment and machine gun bay of this 1/32 scale Hasegawa FW-190. Model by John Ficklen.

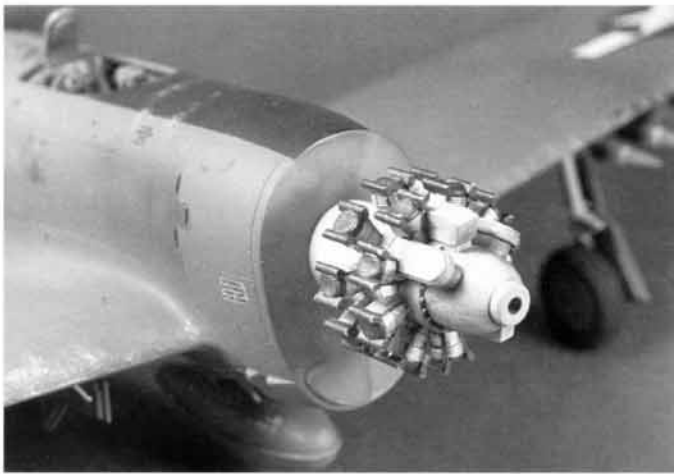


Fig. 4-19. Even if you have no plans to add wiring or other details, a good paint job in combination with weathering will help enhance an aircraft engine. The sooty effect on this aircraft engine was achieved with pastel dust.



Fig. 4-20. Sometimes jet engine aircraft have intakes with flaws or seams that are hard to fix. As an alternative, make an intake cover plug, which all jet aircraft have, and insert it into the intake to hide the flaws. Photo by Glenn Johnson.

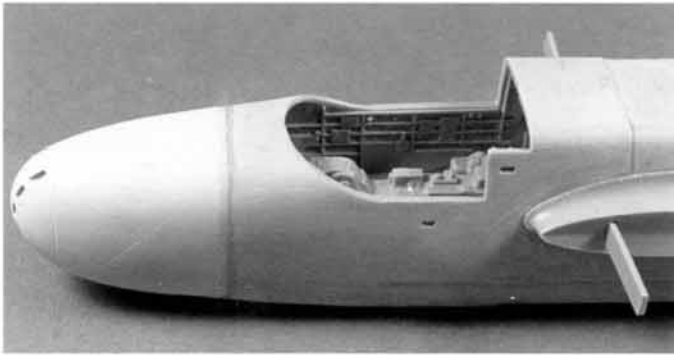


Fig. 4-21. To replace simulated screening with real screening for engine intakes, the first step is to remove the plastic. By drilling multiple holes into the surface you will greatly facilitate the removal of the plastic.

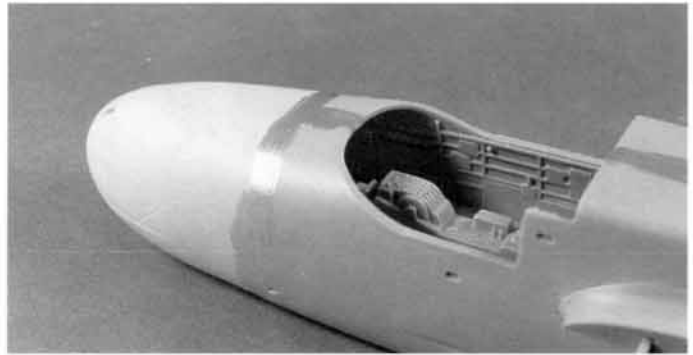


Fig. 4-22. The next step is to use the tip of a no. 11 X-acto blade and cut the plastic between the drilled holes.

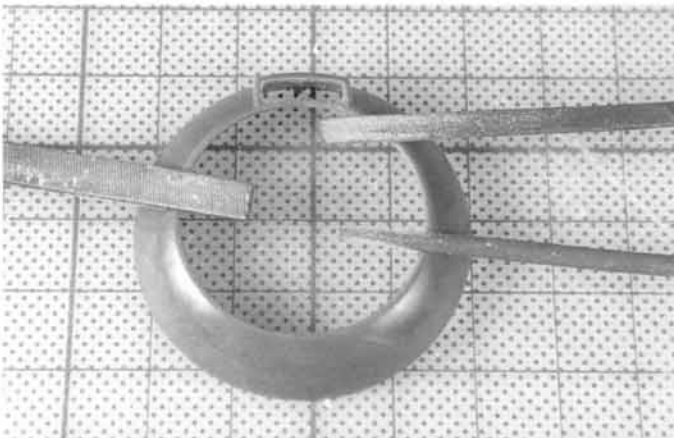


Fig. 4-23. To remove the remaining plastic, shape the opening and thin the edges using micro files.



Fig. 4-24. Cut the screening to shape, insert it into the opening for the backside of the part, and glue it into place with a small amount of super glue.

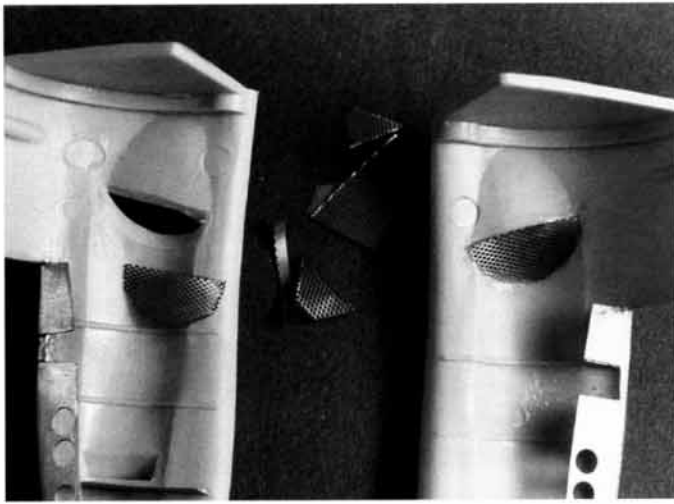


Fig. 4-25. To enhance the appearance of the air intakes on AMT's A-20G Havoc, screening was cut to shape and then glued into place on the back side of the openings.



Fig. 4-27. To make new air intakes for this F4F, Evergreen channel stock was used. The plastic was softened by placing it against a 100-watt light bulb and then pushing against the interior cone shape of the cowling to shape it. The edges of the labeling tape acted as a locating lip for these parts as they were being form-fit into place.



Fig. 4-29. Here the finished air intakes have been trimmed to size.



Fig. 4-26. To improve the appearance of large air intakes, such as the ones found on Revell's 1/32 scale F4F Wildcat aircraft, remove the molded-on air intakes. Such large molded-on detail can be removed by slowly peeling away the plastic with a no. 11 X-acto knife and then sanding the surface flat.

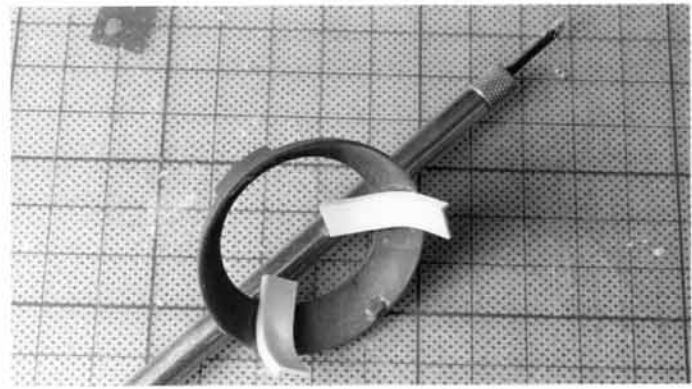


Fig. 4-28. Here the new air intakes have been glued into place. The excess length made it easy to install them and once the glue is dry they will be cut to the correct length.



Fig. 4-30. The appearance of the engine breather holes on this 1/72 scale P-40 were greatly enhanced by drilling out the individual holes. This is yet another example of how a simple modification can greatly enhance the realistic appearance of any scale model.



Fig. 4-31. The molded-on air outlets for this 1/32 scale F4U Corsair were removed with Bare Metal Foil's plastic scriber. The openings were then shaped with micro files.

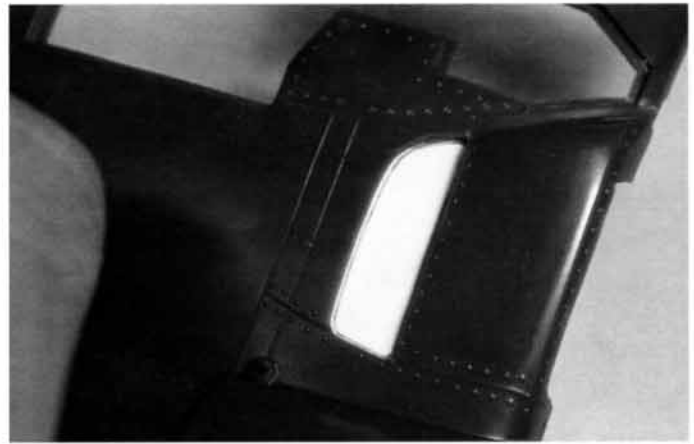


Fig. 4-32. To scratchbuild a new vent opening, simply tape some plastic sheeting to the inside area of the opening and draw the outline onto the sheeting.



Fig. 4-33. Here the new part was cut from the plastic sheeting, shaped, and installed. This air outlet opening is more realistic in its appearance.



Fig. 4-34. Drilling out the exhaust ports is another simple enhancement that you can make. These exhaust ports are being drilled out using a Dremel drill press, although they could have just as easily been drilled out by hand.



Fig. 4-35. Hollowing out engine exhaust ports on kit-supplied parts makes a big difference in their overall appearance.

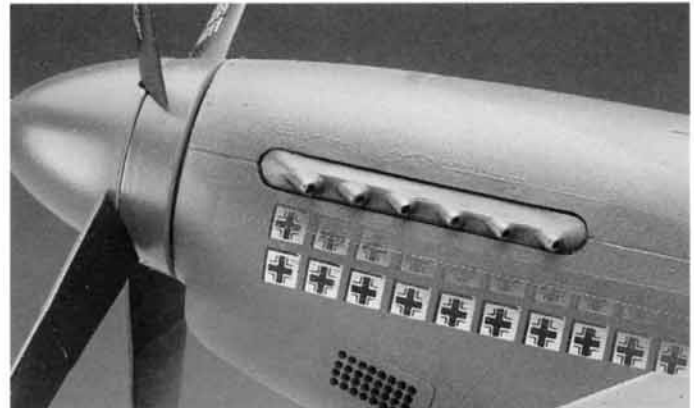


Fig. 4-36. The combination of drilled-out breather holes, drilled-out exhaust ports, and exhaust stains and weathering on the nose area of this P-51 Mustang makes for a very realistic scale model. Photo by Glenn Johnson.



Fig. 4-37. Sometimes just deepening the exhaust ports can greatly enhance their appearance. These 1/48 scale A-20G Havoc exhaust ports will look a lot better once the inside areas are painted black and the cowlings are installed.

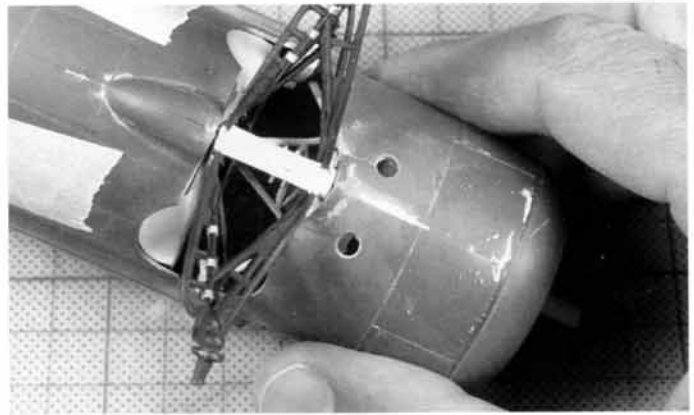


Fig. 4-38. Sometimes kit-supplied exhaust ports just beg to be replaced. This is especially true of exhaust ports that are molded onto the fuselage, as on Revell's F4F Wildcat. Here the molded-on exhaust ports have been drilled out.

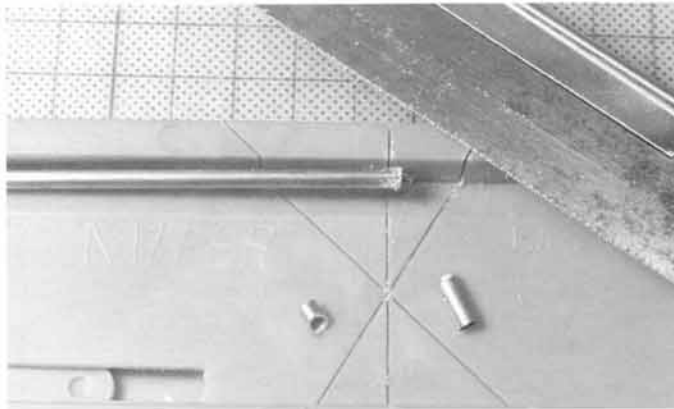


Fig. 4-39. New exhaust ports can be replaced with either brass or plastic tubing. The exhaust ports for this Revell F4F are being scratchbuilt from brass tubing and cut with a miter box and a razor saw.

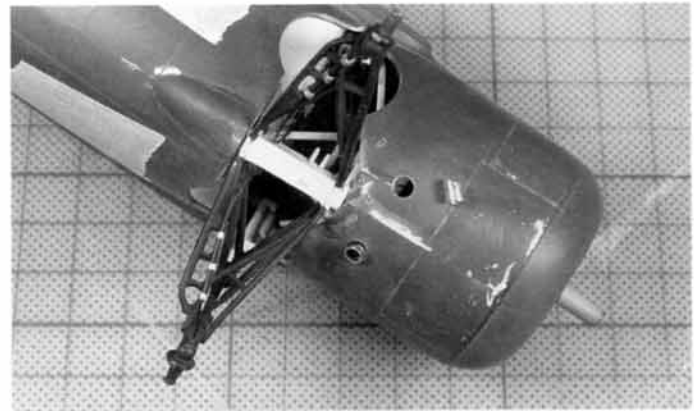


Fig. 4-40. Check the angles of the new exhaust ports to ensure that they follow the contour of the fuselage.

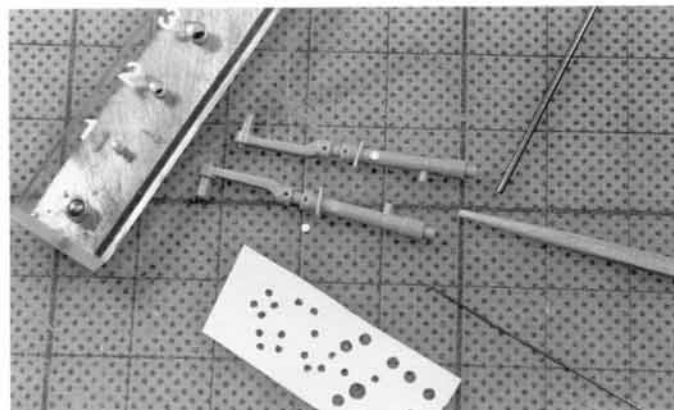


Fig. 4-41. Landing gear are notorious for having punch-out indentations, but these are easily fixed with a Waldron punch tool, some thin sheet stock, and a drop of super glue.

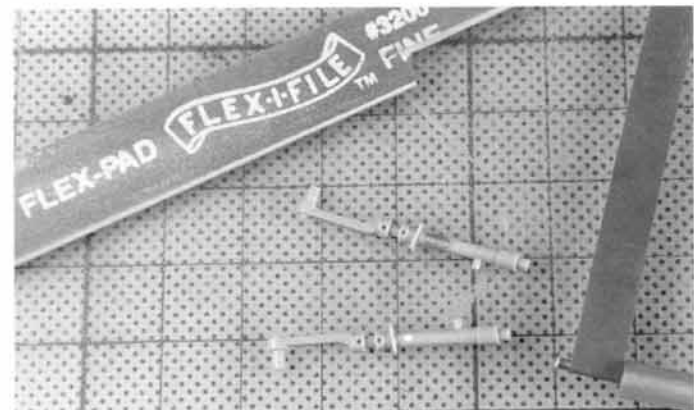


Fig. 4-42. To smooth out the small plastic disks and to remove the seam lines along the sides of the landing gear, scrape the seam lines flat using a no. 11 X-acto blade and then use a Flex-I-File sanding stick and sander to contour the shapes of the landing gear.

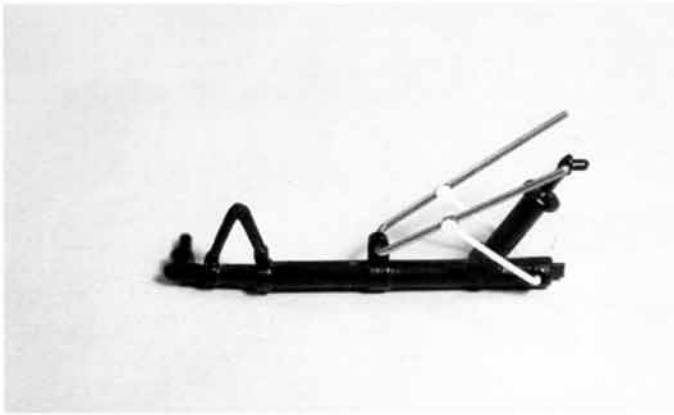


Fig. 4-43. Some landing gear like this 1/32 scale example need additional details. The bent brass rod will also add to the strength of the landing gear.

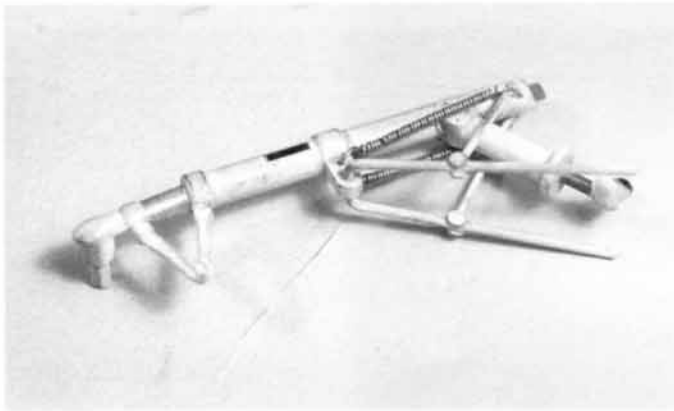


Fig. 4-45. The springs were cut to length and then glued to the landing gear after it was painted and weathered.

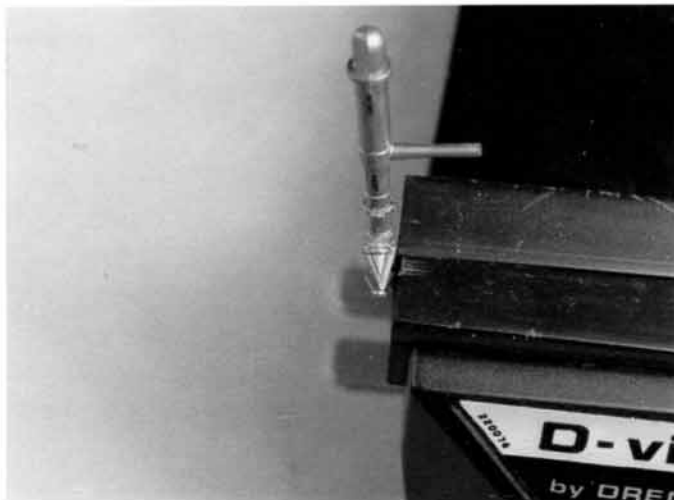


Fig. 4-47. The leaf spring on this 1/48 scale landing gear should not be a solid piece, but that can easily be fixed. The first step is to draw the outline of the area of plastic that will be removed.



Fig. 4-44. Many different types of landing gear have large springs as part of the gear mechanisms, and these are easy to duplicate with soft brass beading wire wrapped around a stiff length of wire.



Fig. 4-46. The final product looks great once it is installed; and combined with landing gear wheel well and door details, the overall appearance can be dramatic.

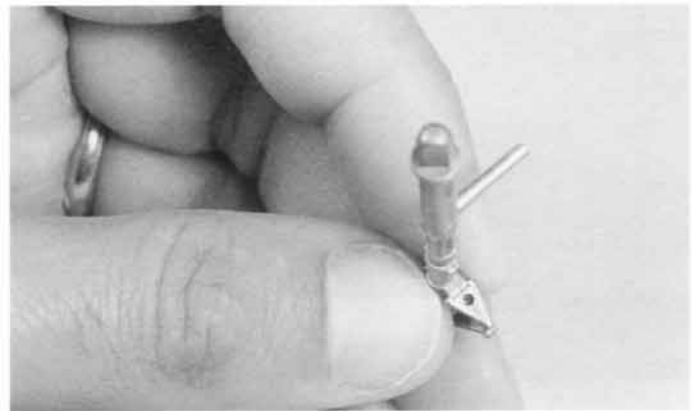


Fig. 4-48. Next, drill a series of holes inside the area to be removed so that you can work the tip of a no. 11 X-acto blade into the holes to remove the remaining plastic.

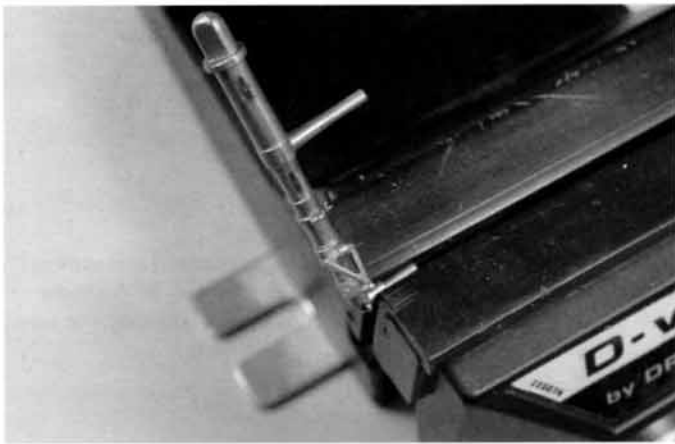


Fig. 4-49. The last step is to use a micro file to shape the area. Now the landing gear has a much more accurate-looking leaf spring.

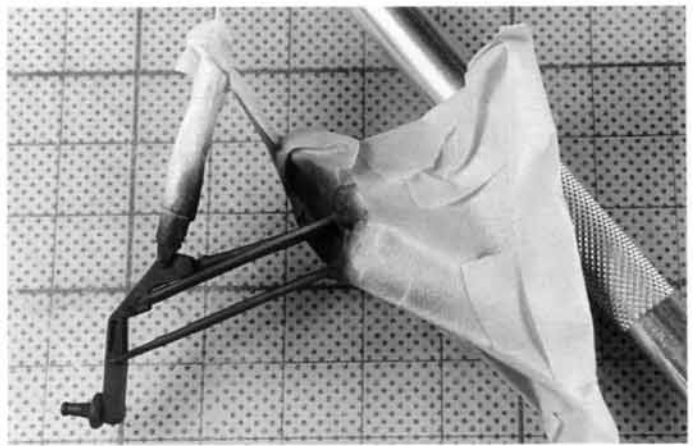


Fig. 4-50. Some landing gear assemblies were multicolored, and when the landing gear is as complex as an F4F Wildcat's was, the masking can be a bit tricky. The secret is to mask one side at a time and use small strips to build up the masked area.

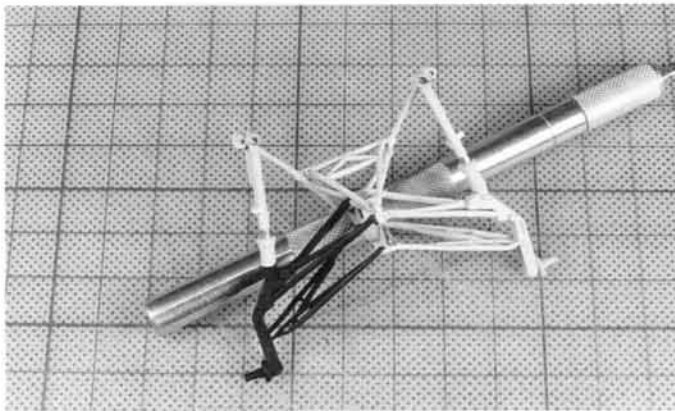


Fig. 4-51. Now one side is complete and the other side will be masked and painted.

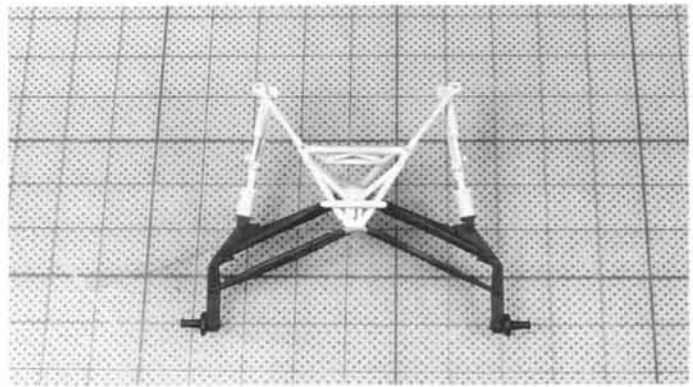


Fig. 4-52. The painted two-color landing gear looks great and it's all because of careful masking. Also note the silver color applied to the oleos.

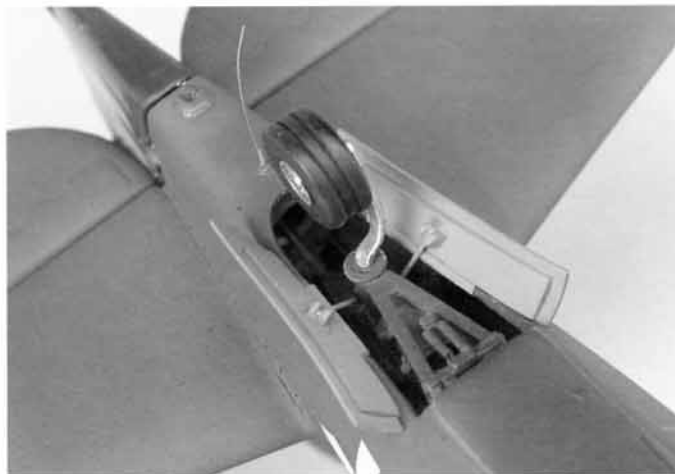


Fig. 4-53. Do not forget to add details to the rear landing gear. Springs, cables, and extra parts make this landing gear almost a model in itself. Model by John Ficklen. Photo by Glenn Johnson.



Fig. 4-54. Hydraulic brake lines are easy to add with some stretched sprue or brass wire. Some lines were made from flexible hoses and others were made from tubing, so be sure to check your documentation.



Fig. 4-55. Thin strips of masking tape simulate the clamps that are usually used to attach the brake lines to the landing gear. And when painted silver, they help enhance the appearance of the landing gear. Photo by Glenn Johnson.



Fig. 4-56. The landing gear on this P-47 look great with brake lines. Model by John Ficklen. Photo by Glenn Johnson.

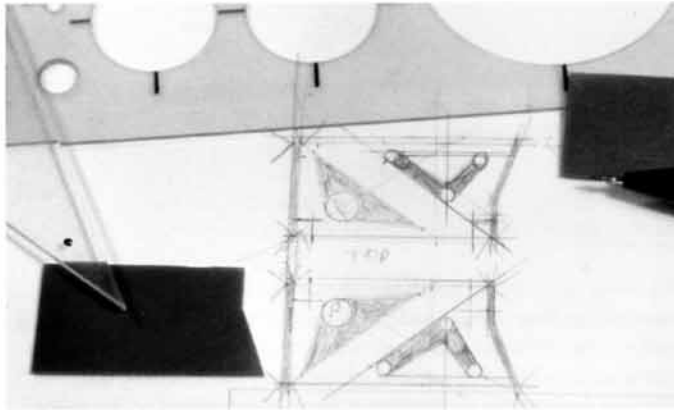


Fig. 4-57. The first step in detailing landing gear doors is to draw the parts that you need to make.

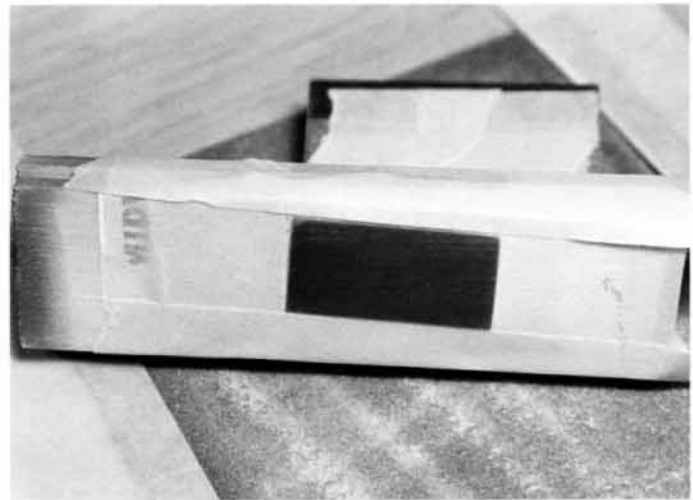


Fig. 4-58. Landing gear doors are usually too thick. To thin them, tape them to a length of balsa wood and then run the part across a stationary piece of sandpaper. Be sure that the sticky side of the tape is covered.

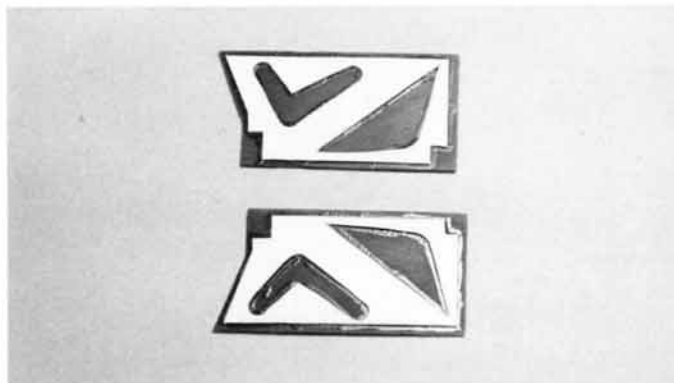


Fig. 4-59. The interior plastic on these landing gear doors was cut out and then glued into place.

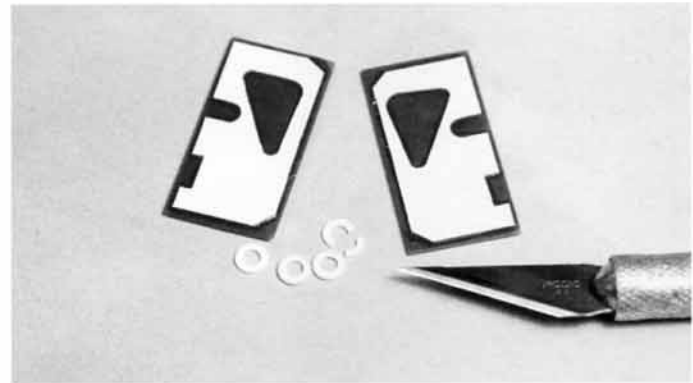


Fig. 4-60. Circular hinges can be made by using two different size Waldron punches and then cutting the resulting doughnut-shaped disks.



Fig. 4-61. Once the doors have been painted and weathered and the hinges have been added, they really enhance the appearance of this F4U's landing gear wheel well. Photo by Glenn Johnson.

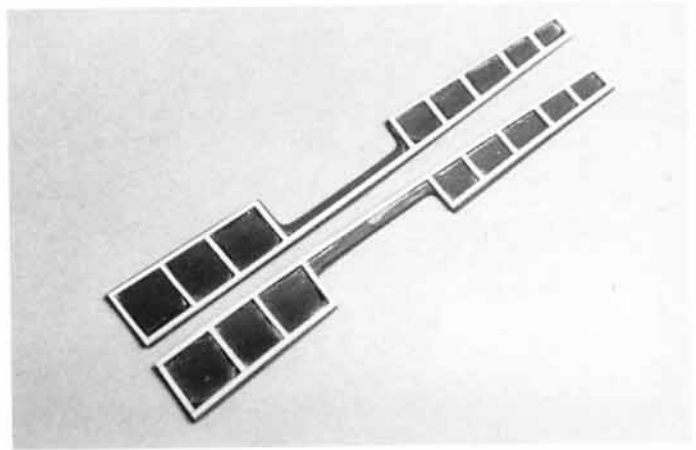


Fig. 4-62. Framing can easily be added to the inside of landing gear doors, but the secret to getting both sides to look the same is to draw lines where the strip stock will go and then carefully glue them into place.

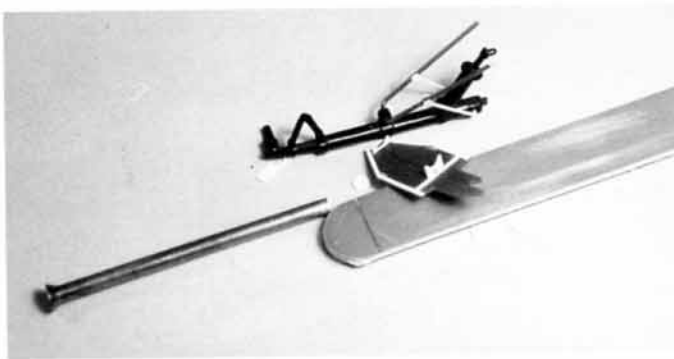


Fig. 4-63. Support framing for wheel well doors that attach to the landing gear can also be made by punching a hole into a length of sheet stock and then cutting around the hole to get the correct shape for the support frame.

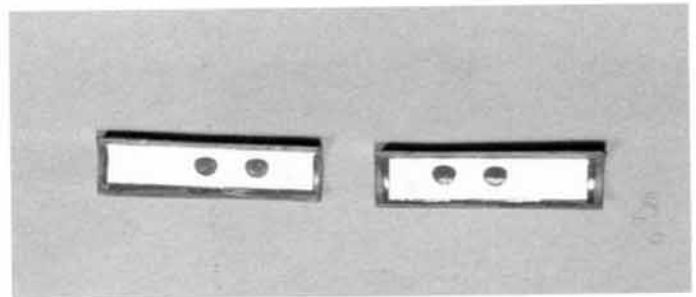


Fig. 4-64. Just adding small lengths of sheet stock with holes punched in them to the inside area of an otherwise bland-looking surface can enhance its appearance. To get the inner sheeting to conform to the curved surface of the door, the sheeting was pressed against the door using a small wood dowel of the same diameter and then glued into place.

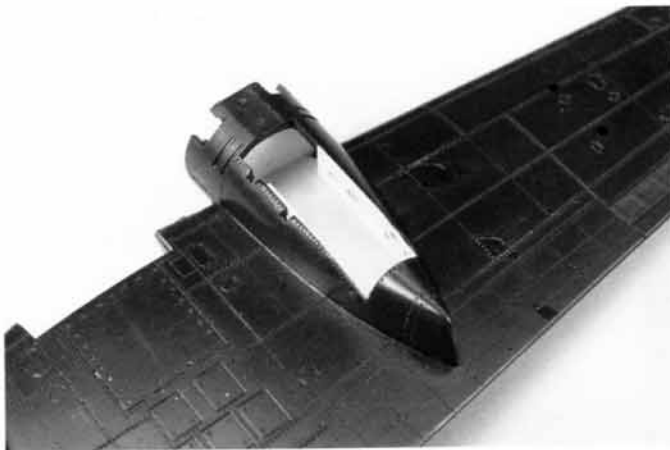


Fig. 4-65. Even on 1/72 scale kits, if you add nothing more than some sheet stock with holes punched into it you will improve the appearance of a wheel well.

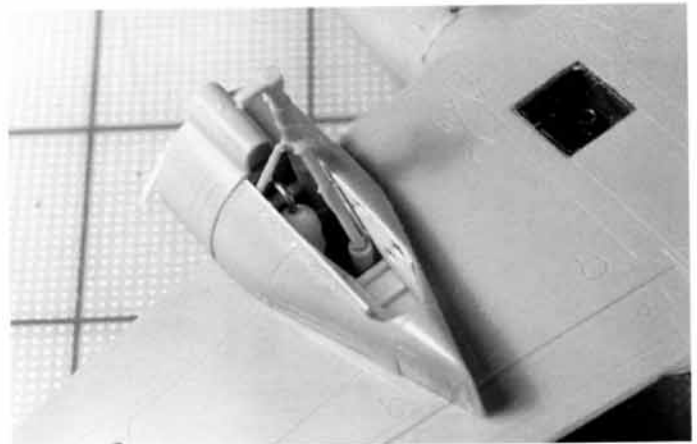


Fig. 4-66. This 1/72 scale kit not only has sheet stock, but also has added framing, cylinders, and tubing. Model by Scott Weller.

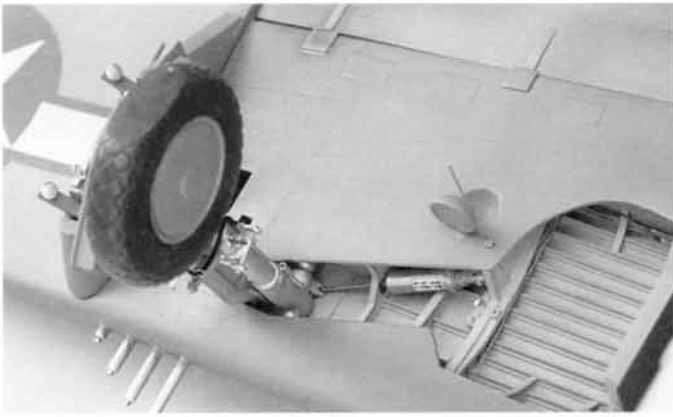


Fig. 4-67. 1/32 scale models have always been perfect for adding a lot of detail to a landing gear area that is readily visible to the eye, and this P-47 is no exception. Model by John Ficklen. Photo by Glenn Johnson.

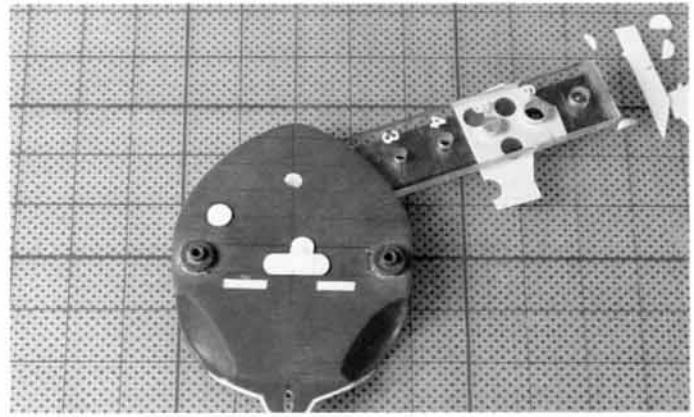


Fig. 4-68. The first step in detailing the firewall on Revell's 1/32 scale F4F Wildcat is to begin adding the chain drive disks. Here is another good example of using Waldron's punch tool to scratch-build parts.

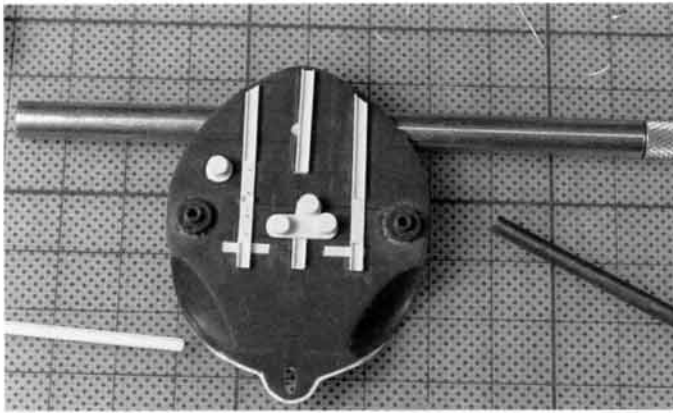


Fig. 4-69. Here the chain drive disks are complete, and small lengths of Evergreen channel stock have been modified and then attached to the firewall. Also note the small strip of plastic added to the bottom of the firewall to fix a spacing problem.

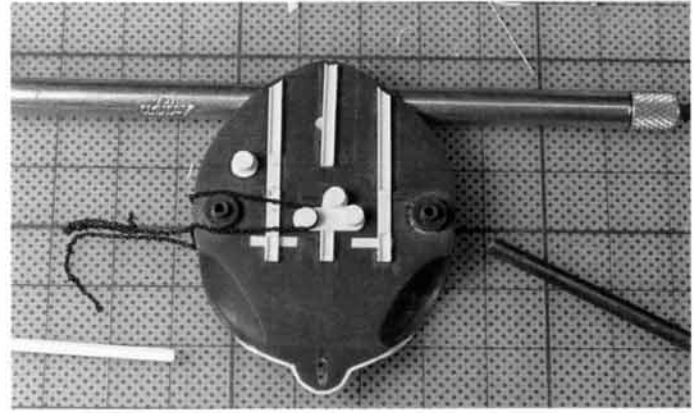


Fig. 4-70. Next, the three individual lengths of chain must be measured and cut. The chain, which is HO scale model railroad detailing hardware, can easily be found in well-stocked hobby stores.

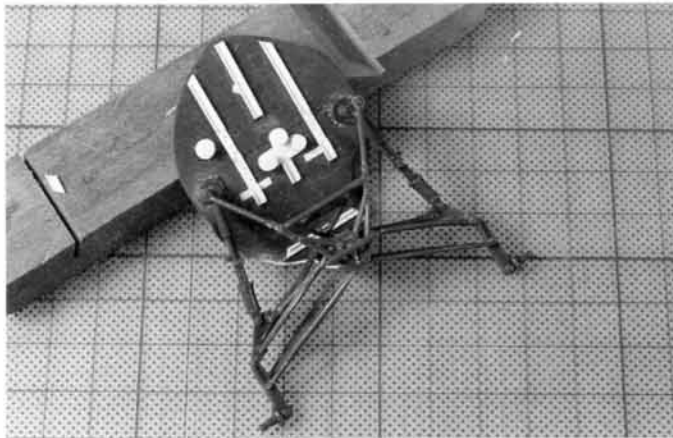


Fig. 4-71. The finished scratchbuilt firewall details get one last fit check with the landing gear to ensure that everything looks good.



Fig. 4-72. Here the firewall has been installed and painted and the chain has been added. The chain really enhances the interior area of the landing gear bay, besides providing a high level of accuracy.

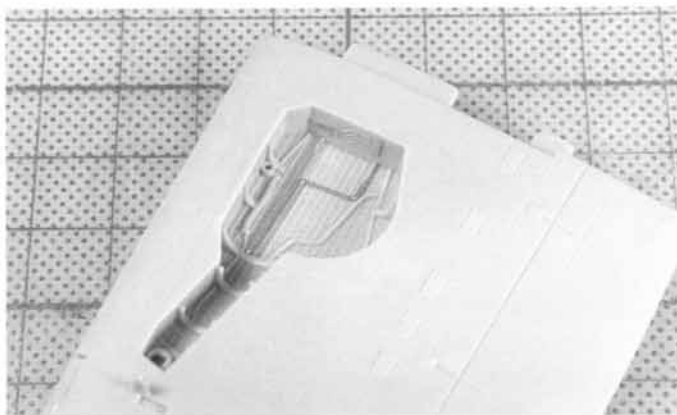


Fig. 4-73. Even adding small lengths of bent brass wire and photoetched plumbing can enhance a wheel well. The photoetched part came from Teknics 1/48 scale landing gear plumbing set.

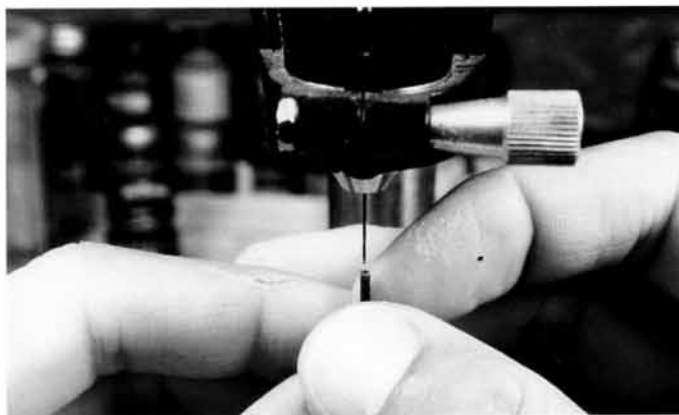


Fig. 4-74. Hollowing out the tips of machine gun barrels can easily be done using a Dremel drill press.

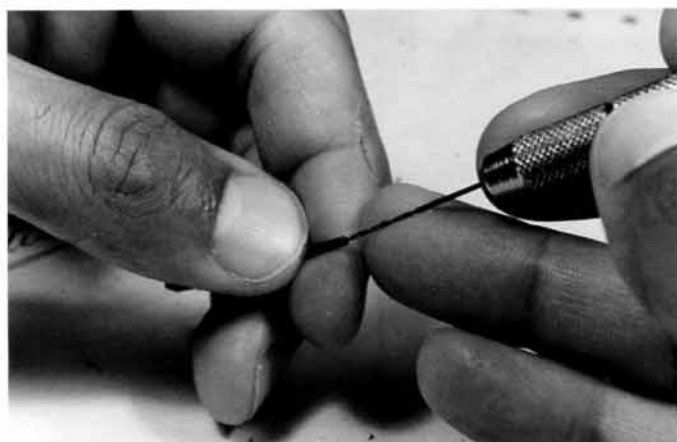


Fig. 4-75. You can also hollow out large-scale guns by hand using a pin vise.

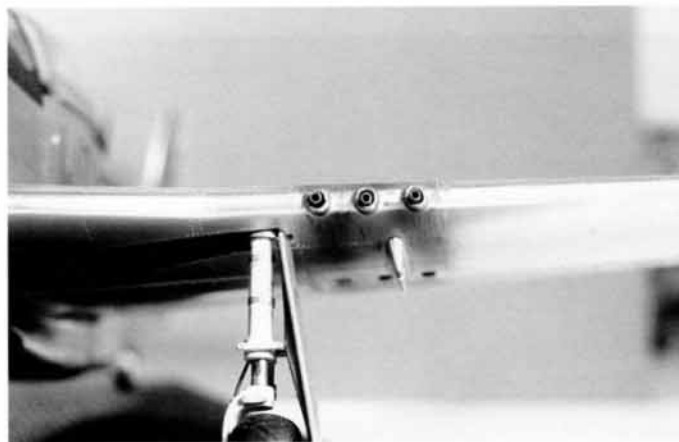


Fig. 4-76. The kit supplied machine guns on this P-51 Mustang were hollowed out with a pin vise. To get the edges thin, the tip of a no. 11 X-acto blade was slowly rotated around the hole to peel away the plastic.

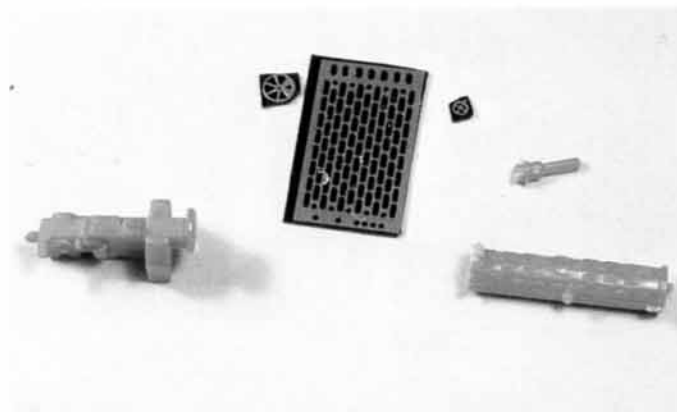


Fig. 4-77. WWI machine guns can be enhanced by using photoetched parts in combination with kit-supplied parts.

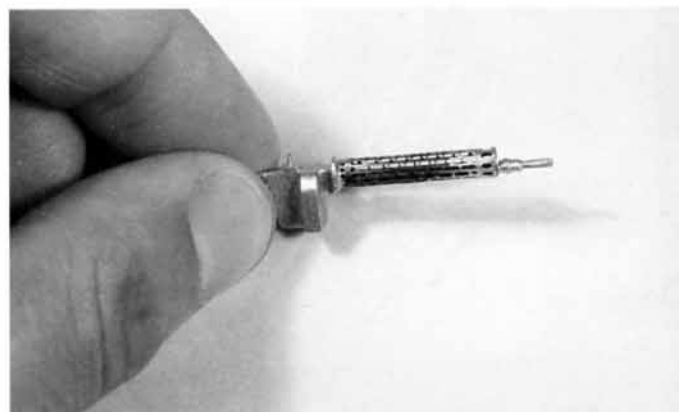


Fig. 4-78. Here the photoetched parts have been assembled and silver paint has been used to check for any cracks and flaws.

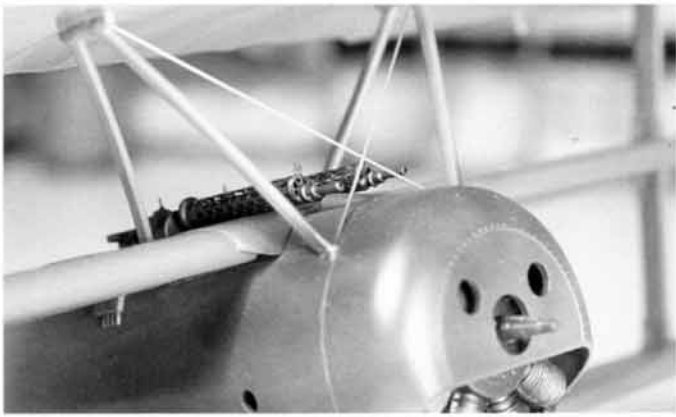


Fig. 4-79. The machine guns on this WWI triplane have been painted with Testor's gun metal and polished with a Q-tip. The combination of these photoetched parts and the kit's parts is a real eye-catcher.

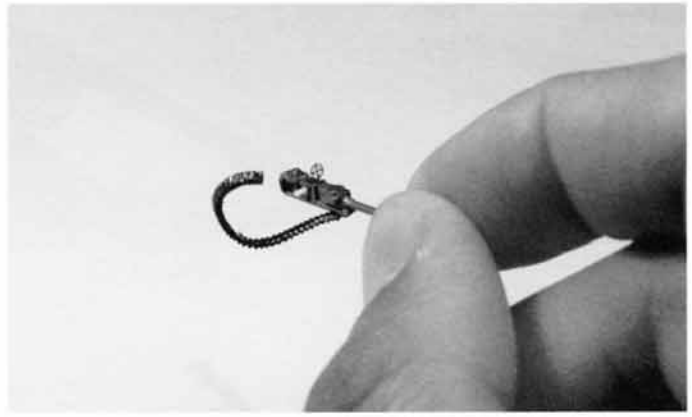


Fig. 4-80. This 1/48 scale waist gun for a 1/48 scale B-25 has been enhanced with a photoetched gunsight ring, a slightly larger charging handle made from plastic rod, and a machine gun belt cannibalized from a 1/48 scale Monogram Huey.

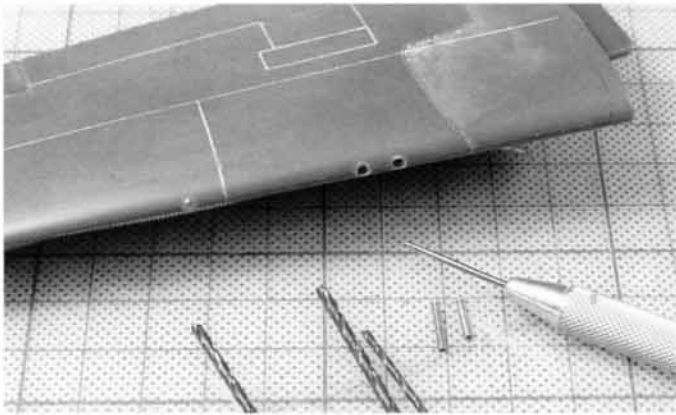


Fig. 4-81. The first step in installing brass or stainless steel tubing in wings to simulate machine gun barrels is to drill oversize holes in the leading edges of the wings.

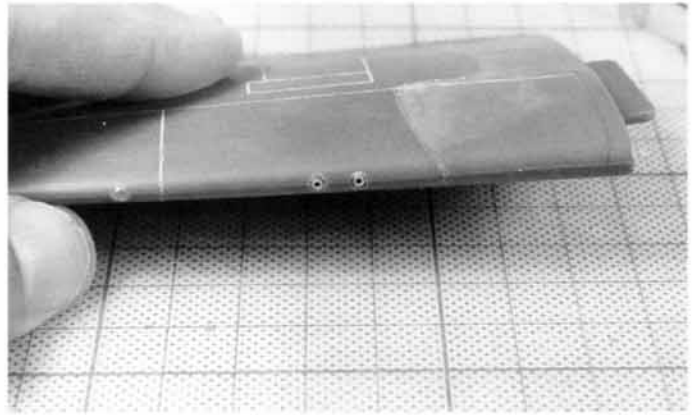


Fig. 4-82. Here the two brass rod lengths are being checked to ensure that they seat correctly in the holes.



Fig. 4-83. The nose guns on Monogram's 1/48 scale Panther were replaced with stainless steel tubing. This is another good example of how adding these types of minor details can enhance the appearance of a model. Model by Maj. Billy Crisler. Photo by Glenn Johnson.

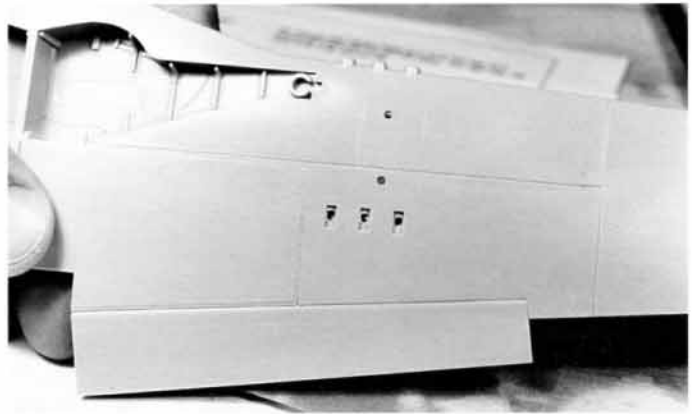


Fig. 4-84. Don't forget to drill out machine gun shell ejection ports. And the best way to remove the plastic is to start by using a drill bit.

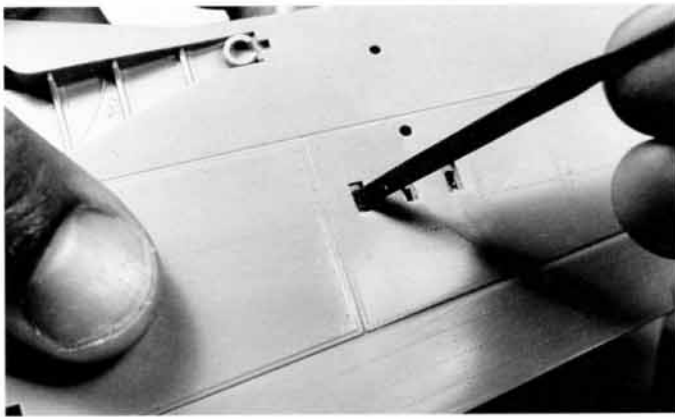


Fig. 4-85. Once you have removed the excess plastic from the ejection port opening using the tip of a no. 11 X-acto blade, shape the opening with micro files.

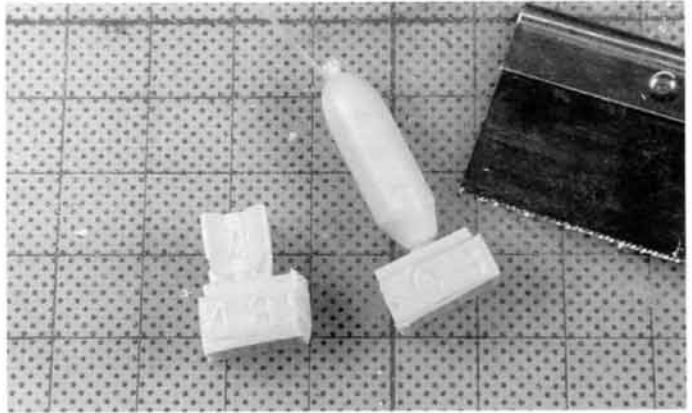


Fig. 4-86. It's easier to separate the bomb casing from the fin before you attempt to remove the parts from their pour plugs.

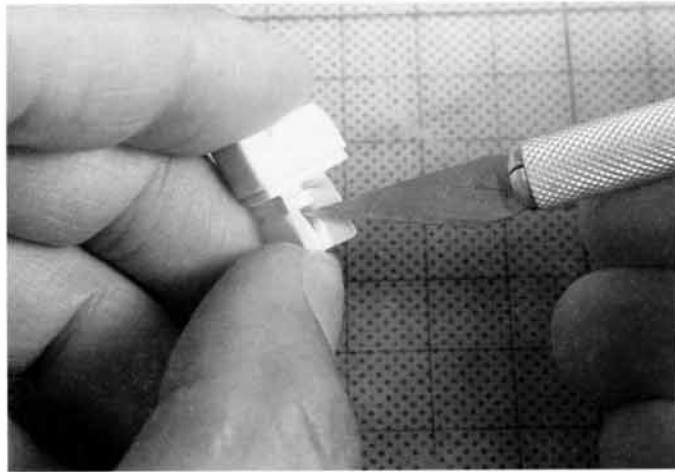


Fig. 4-87. Before you remove the bomb's fin from the pour plug remove the excess flash from the fin's framing using the tip of a no. 11 X-acto blade.

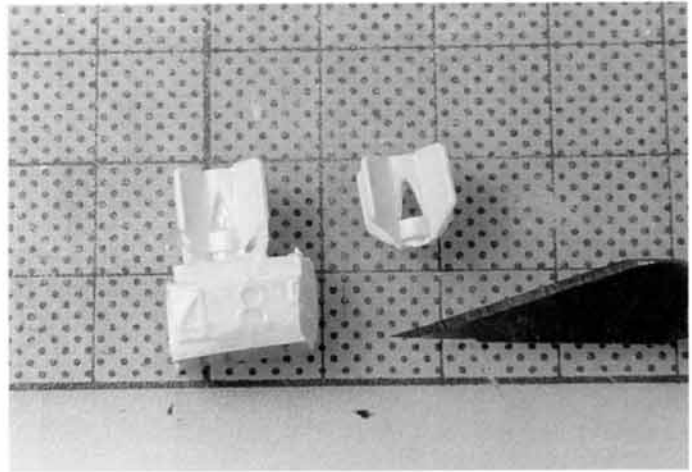


Fig. 4-88. Once the flash is removed from the fin you can separate the fin from its pour plug.

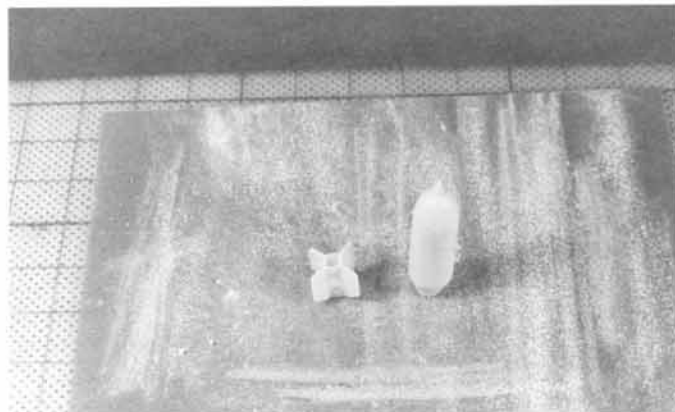


Fig. 4-89. To flatten the surfaces where the pour plugs were located, carefully run the base of the fin and the base of the bombshell across a piece of stationary sandpaper.

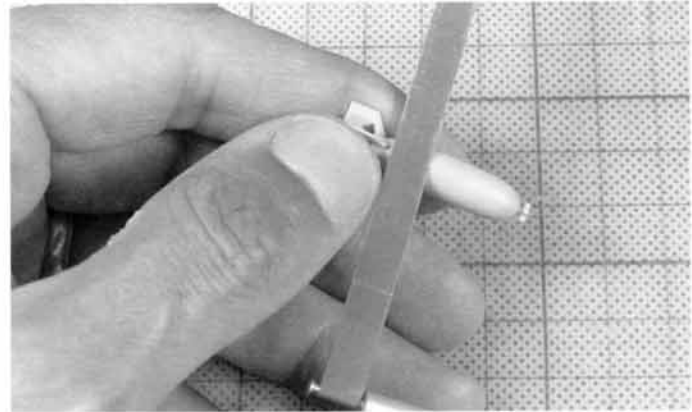


Fig. 4-90. Flex-I-Files work great to contour the connection point between the bombshell casing and the fin, and also to smooth the surface of the bomb.

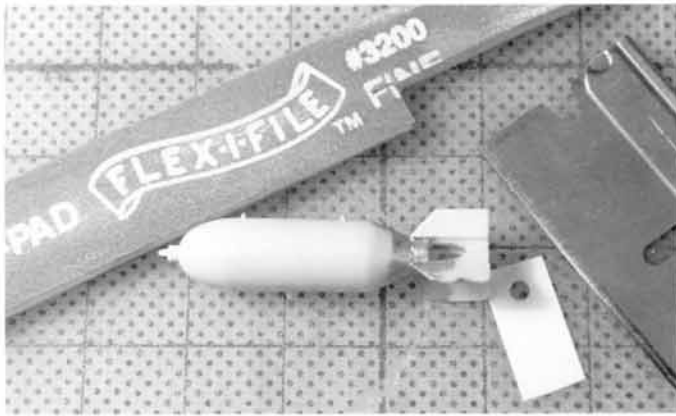


Fig. 4-91. Because the resin fins are so thin they will occasionally break off, but the fix is easy. Just take a small piece of sheet stock, cut it to shape, and glue the new fin in place.



Fig. 4-92. Assemble all the ordnance such as bombs and rockets that you plan to use on an aircraft, clean them up, and paint their base colors all at the same time. Photo by Glenn Johnson.

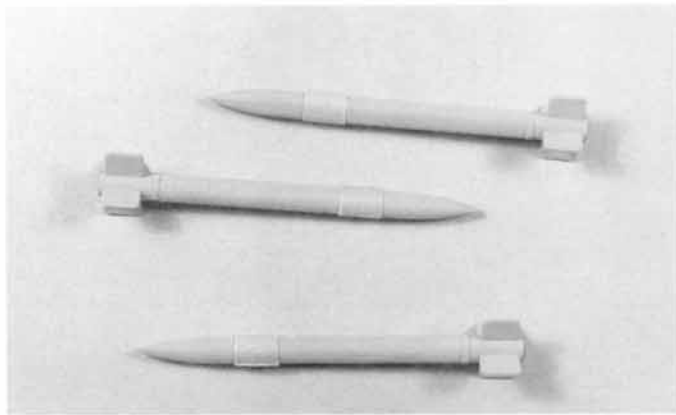


Fig. 4-93. Rockets usually have colored tips and then stripes along the body. Simple masking with thin strips of masking tape is all you need to make these multicolor parts. Here the outlines of the rockets' painted tips have been masked and the remaining body of the rocket will be covered with a larger piece of masking tape.

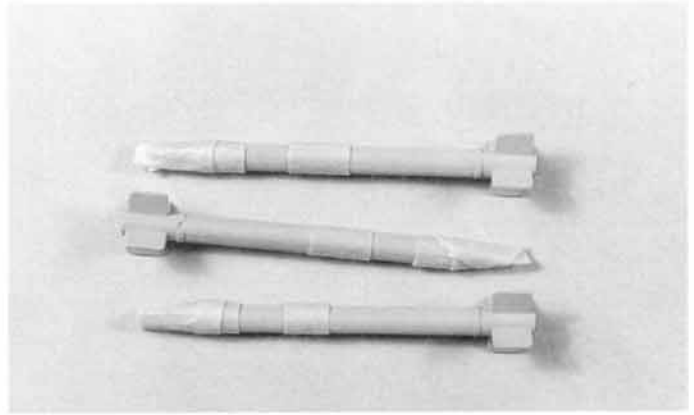


Fig. 4-94. Once the tips have been painted, mask them over and begin locating the stripes.

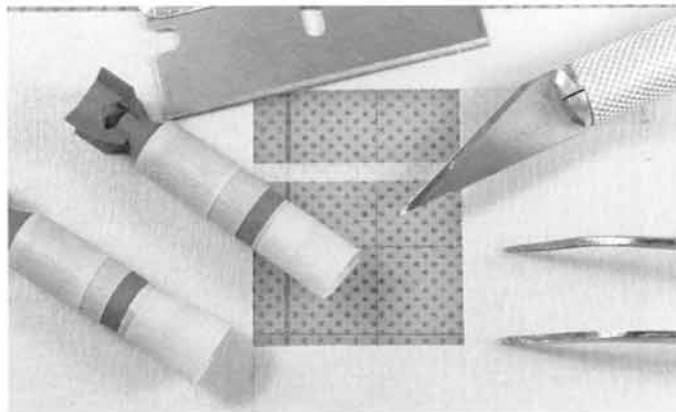


Fig. 4-95. Don't forget to add the yellow stripes on bombs, which is easy to achieve with masking tape.



Fig. 4-96. These bombs and rockets have been painted and they're ready for the next step. Photo by Glenn Johnson.

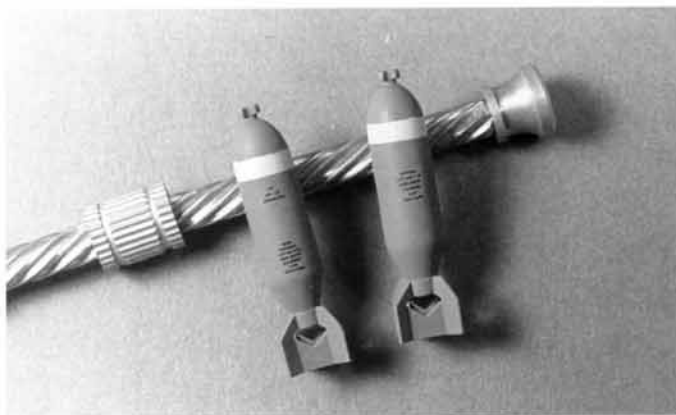


Fig. 4-97. Bombs usually have instruction stencils on them, so don't forget to add this small detail.

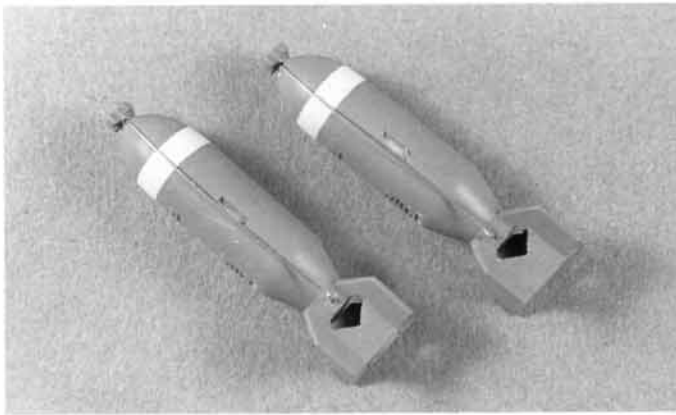


Fig. 4-98. Bombs also have fusing wires and this detail is easy to add using small lengths of brass beading wire.

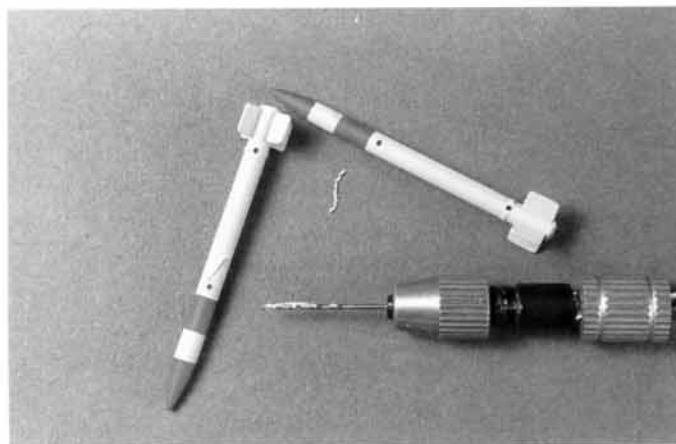


Fig. 4-99. Individual rocket parts usually need to have their locating pin holes slightly deeper so the rockets will sit on the pedestals correctly.

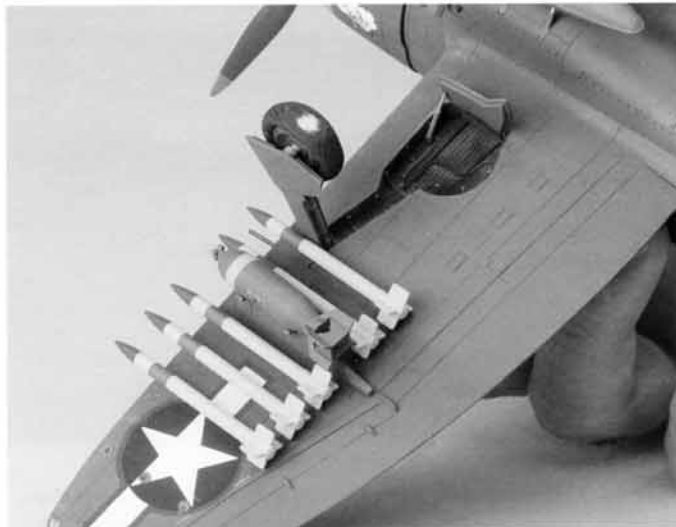


Fig. 4-100. Be sure that your rockets are parallel to the wing and to each other. Photo by Glenn Johnson.



Fig. 4-101. The combination of bombs, rockets, and four potent 50-caliber machine guns packs a heavy punch. Photo by Glenn Johnson.



Fig. 4-102. Another good example of bombs and rockets with different base and stripe colors. Also note the instruction decals on the pylons. Model by Maj. Billy Crisler. Photo by Glenn Johnson.

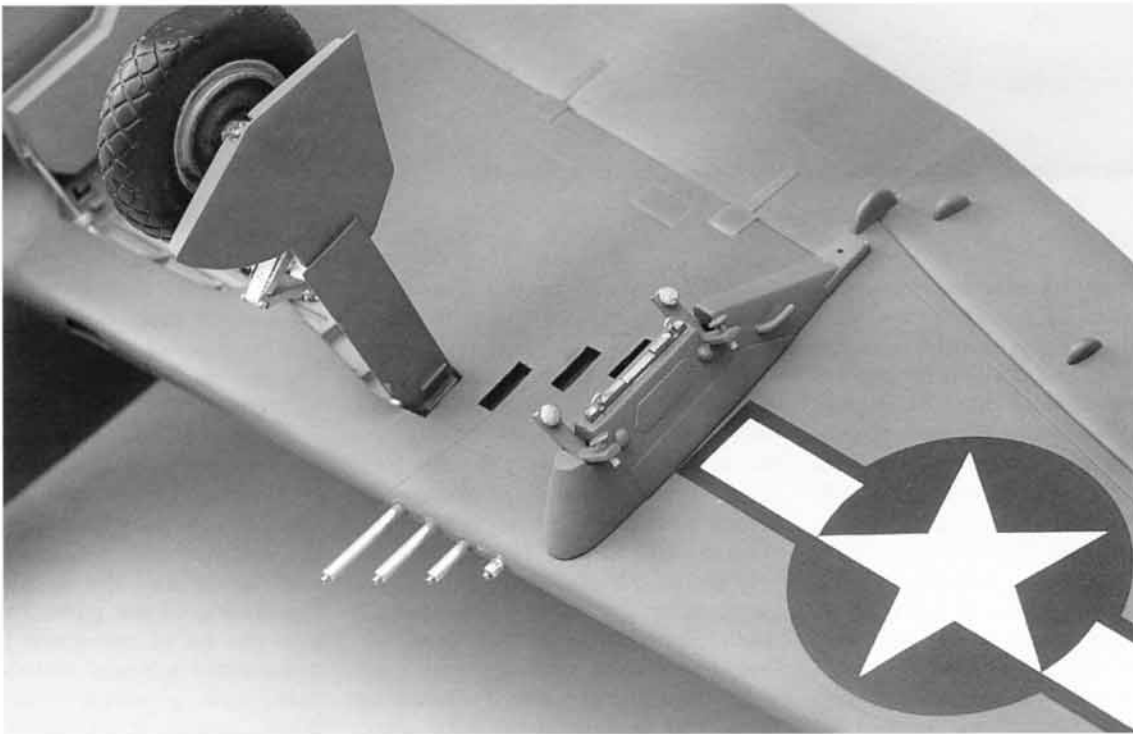


Fig. 4-103. If you decide not to add ordnance but to retain the pylons, be sure to add detail to these parts. Model by John Ficklen. Photo by Glenn Johnson.