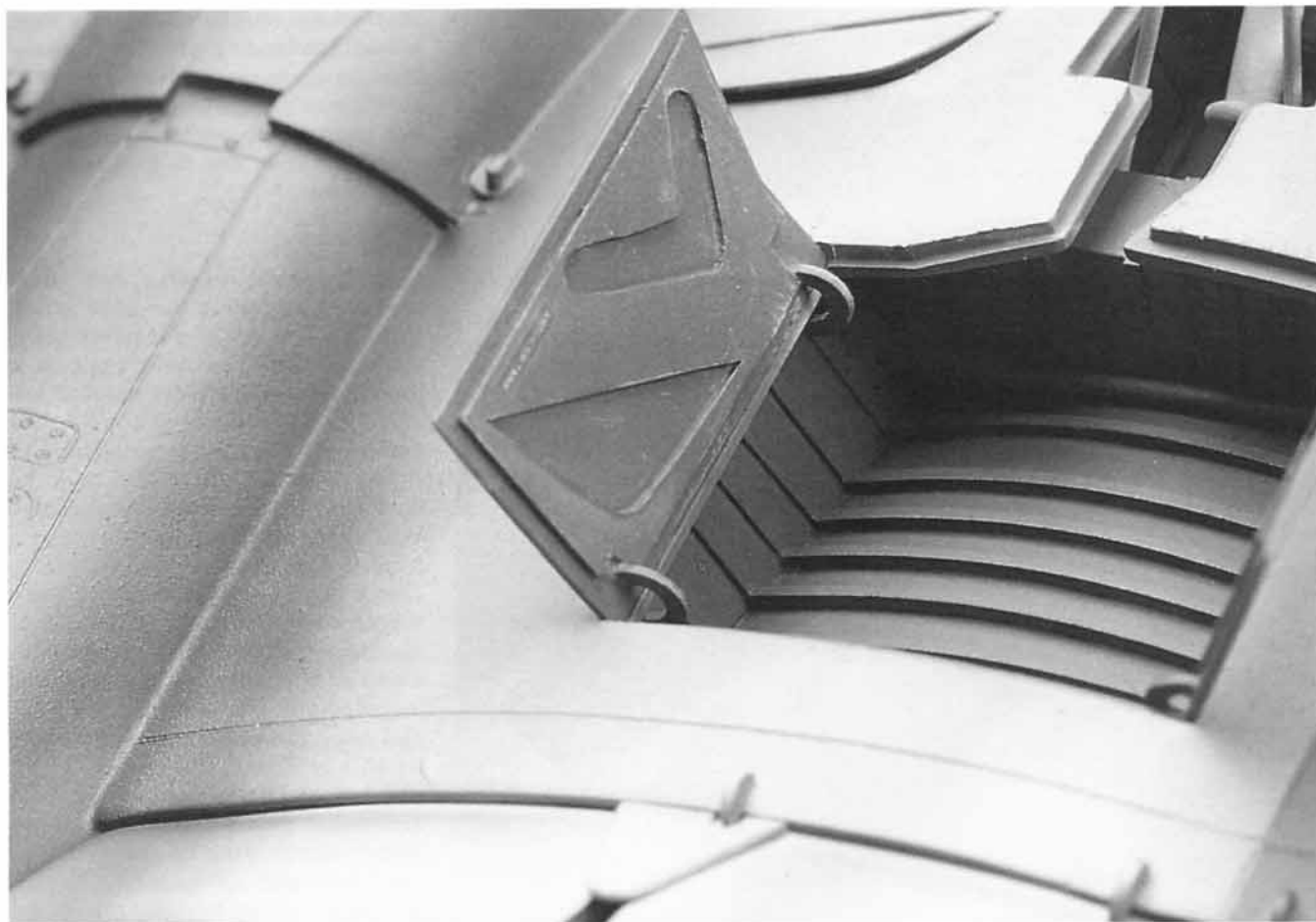


LANDING GEAR, BAYS & DOORS



The landing gear bays on Revell's 1/32 scale Corsair are pretty much void of detail, but the addition of plastic sheeting and strip stock turned them into highly detailed replicas.

Detailing landing gear is not as time-consuming as working on cockpits and engines, but many modelers overlook these areas because they spend so much time on the big stuff. Landing gear bays and doors, for instance, are sometimes overlooked. In the smaller scales you can get away with painting detail on the insides of the doors, but 1/48 and 1/32 scale aircraft call for extra work.

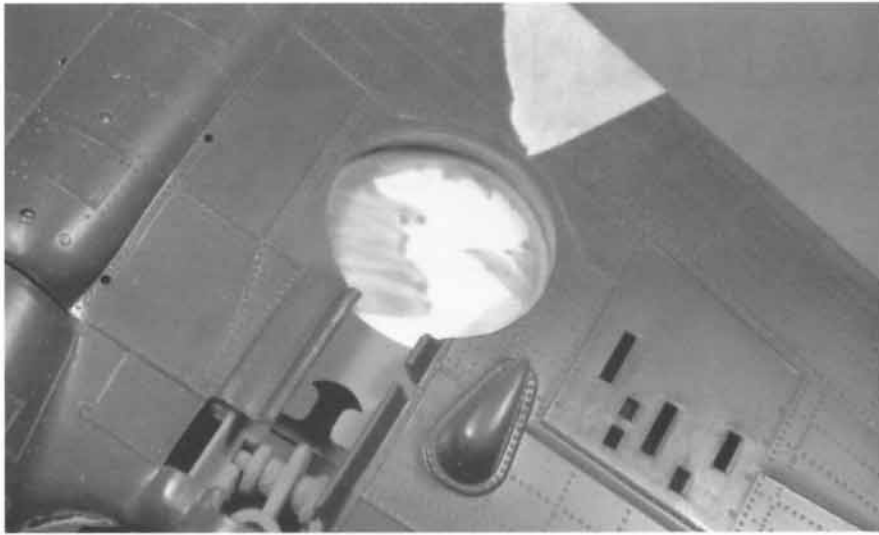
Detail provided by manufacturers for landing gear bays varies widely. If the model has no landing gear bay, you can build one and add as much detail as you want. To con-

struct the box accurately you will have to draw the area to be boxed in on the inside of the upper wing. I recommend attaching the sides of the new landing gear bay to the upper wing, because it is easier to add detail to the boxed-in area if it is attached to the upper rather than the lower wing. To accurately draw the outline of the lower wing's opening onto the upper wing, tape them together and draw the outline, using a lead pencil with its lead long enough to allow you to follow the edge of the opening accurately. Since most landing gear bays are larger than the opening on the

lower wing, enlarge the drawing on the upper wing slightly.

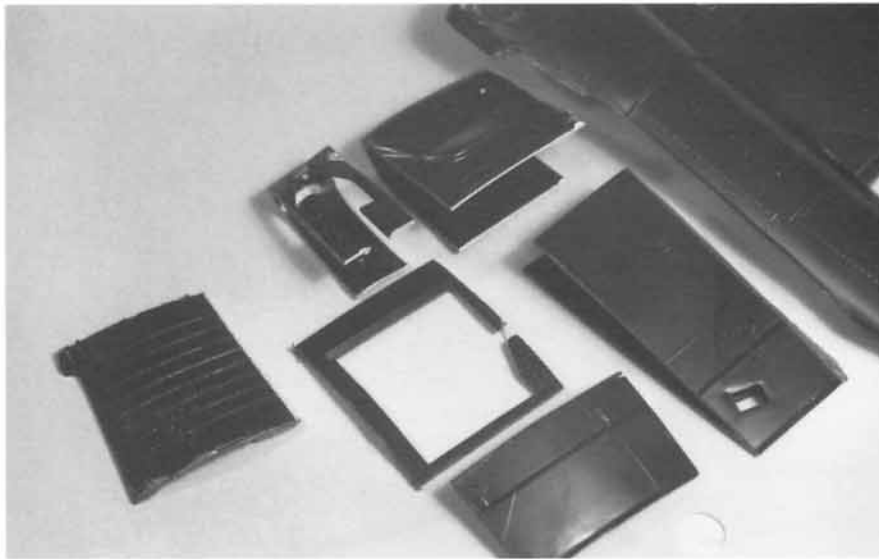
Now determine the interior contours of the sides of the landing gear bay that run from the leading edge to the trailing edge of the wing. Since wings are tapered, the sides are different shapes, so you will have to measure and cut two separate sections. The most accurate method for determining interior wing contours is to cut up a second model and use it as a form guide for the interior areas.

Draw the locations of the sides of the landing gear bay onto the outer surfaces of the second model's wing,



(Left) Even if you only add some sheet stock to form an interior landing gear bay, you will improve your model's appearance. It certainly looks better than just having a hole on the underside of the wing.

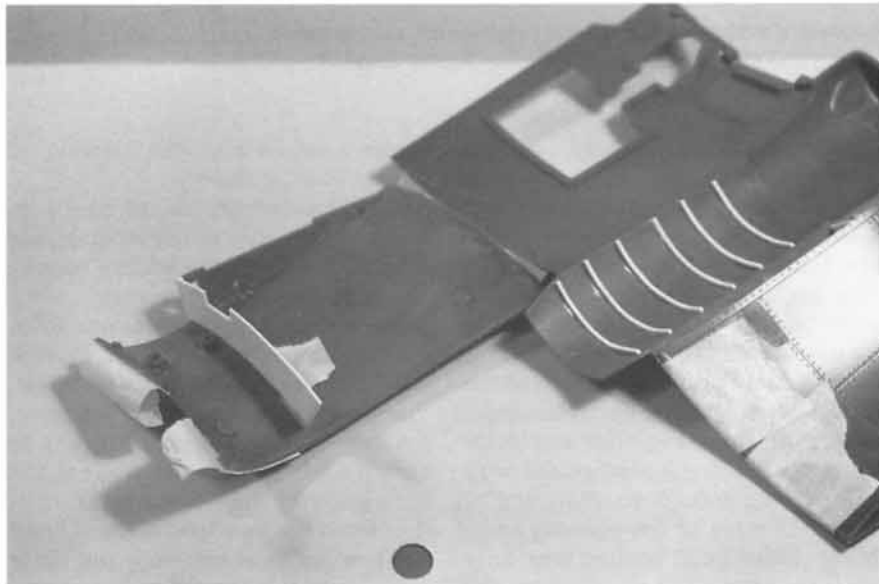
(Center) Using a second kit to get the exact interior wing contours for the areas around the landing gear bay is easier than trying to form-fit these types of scratchbuilt parts. The wing on this kit has been cut up, so interior contours along cut lines can be transferred to sheet stock.



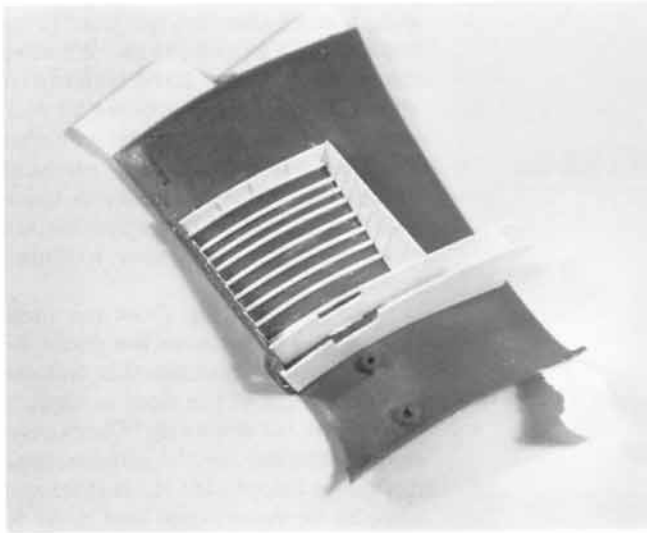
glue the wings together, and cut it into sections along the lines with a razor saw. Run a grease pencil along the edge of the cut line, impress it onto sheet stock, and cut out the part.

To check the fit of the interior section use small pieces of tape to hold the part in place and tape the leading or trailing edge of the wing so you can open and close it like a hinged box. This will allow you to check the fit and make any adjustments. The interior part should fit almost perfectly. Once you have both sides of the new landing gear bay installed you can easily do the front and back areas, because their exact heights will be defined for you. All you have to do is transfer the measurements with a pair of dividers to some sheet stock, cut out the required shape, and install it.

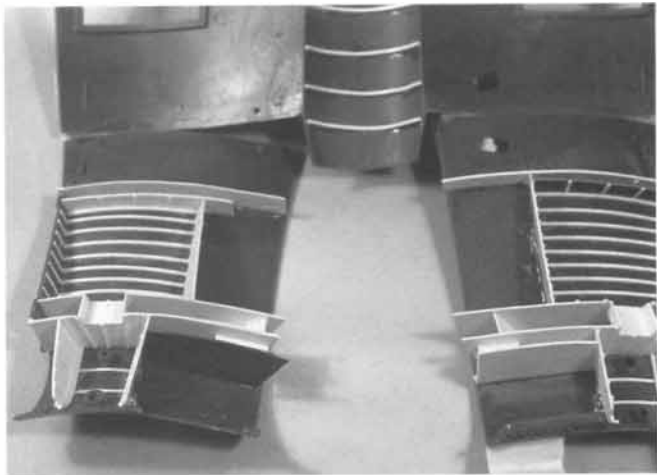
Since cutting the wing area of the second model puts a lot of stress on the glue joints, you may want to install some interior bracing so it won't flex once you cut it. When installing braces, be careful not to change the shape of the wing by installing one that is too big, and be sure to use super glue. Also, cut the area closest to the fuselage first, transfer the shape, cut it out, test-fit it, and then cut the wing along the outer location. Since the thickness of the plastic may vary between wings, and since one wing may have an interior contour slightly different than the



Before you start adding interior parts, draw their locations on the inside of the wing area. Add one part at a time and check the fit of each part.



As you build up the landing gear bay, you can start adding other interior parts such as framing.



The landing gear bays on this Corsair have been completed. Adding one part at a time and duplicating your work on both wing areas as you go will help ensure that both areas look the same.

other, cut up both wings and fit each one individually.

If your model has its landing gear bay within the fuselage, follow the same procedure, except you would be cutting the second model's fuselage instead of the wings. Some older jet kits have no landing gear bays, but they can be easily added using this technique.

Once the boxed-in area is complete you can add interior framing along the sides, front, and bottom. Use a small section of sheet stock with one straight edge to draw lines wherever you want to install framing. Doing so will ensure that the strip stock is evenly spaced and straight. There is no set size for each scale, but I recommend installing plastic strips that look accurate. Cut long lengths so you can position them correctly, and use a thin wire applicator to apply glue.

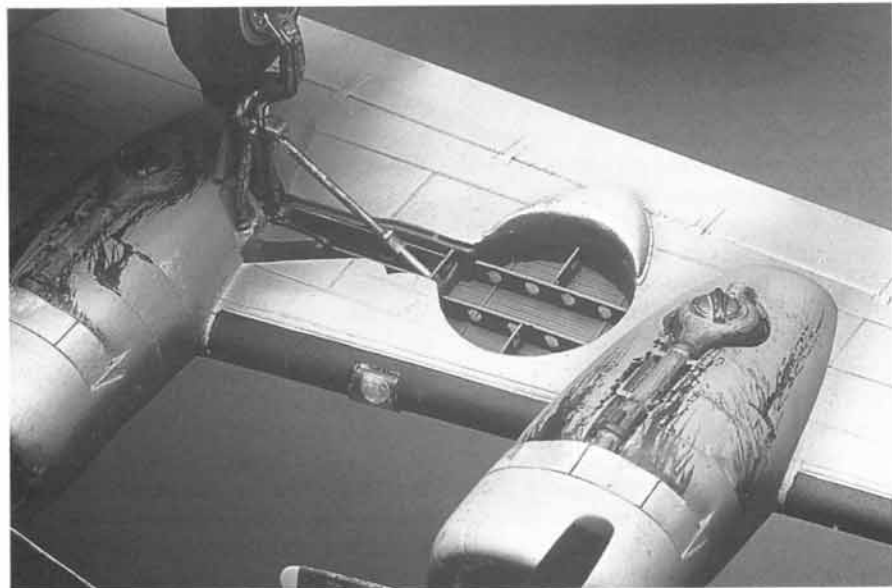
Once you have the sides installed you can form-fit the strips along the bottom. Form-fit them tightly one at a time and glue where the bottom framing meets the side framing. The super glue will seep

along the underside of the bottom strip, securing it. When the framing is complete, paint the area and add weathering. Give landing gear bays a dusting of various colors of pastels, then seal with a clear flat finish.

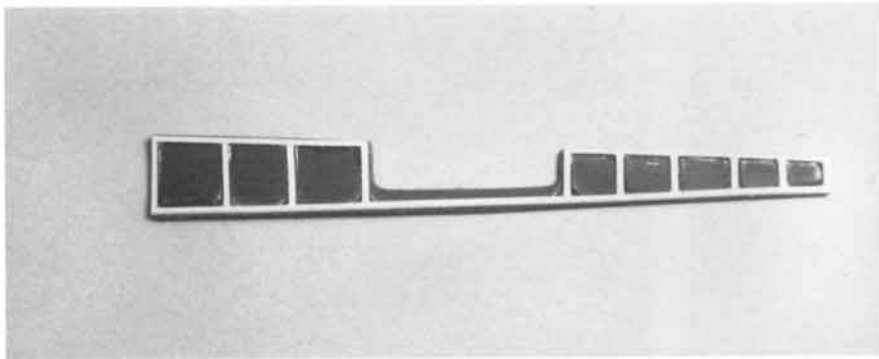
The last step is to add interior piping. You can use Evergreen rod, stiff wire, or thin solder. If you run several lengths close together, make them different sizes for the added effect of depth. Whether you are running piping from front to back or left to right, drill holes through the sides of the landing gear bay and slide the tubing into place through the holes.

This looks realistic and you don't have to be accurate when you cut the rod lengths. Paint the lengths before you install them. If they are all the same color, use different shades. For small paint jobs like tubing, use water-base paints because they dry quickly. You can mix the various shades of paint in a bottle cap, clean it out, and mix another shade. Finally, apply a dusting of pastel on the piping.

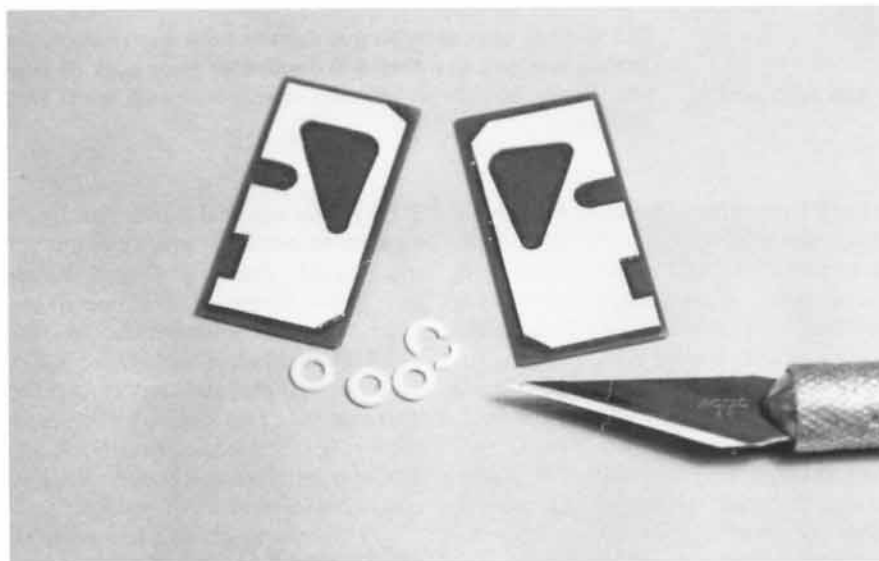
If the manufacturer has supplied a landing gear bay but it cries out for additional detail, you can add it the same way you added piping detail to a scratch-built box. If you need to add



Sometimes all you have to do to improve the appearance of a landing gear bay is add some extra plastic to the kit-supplied-detail. The framing was form-fitted into place and the holes were punched using Waldron's punch tool. (Model by Richard Boutin, Sr.)



The addition of some strip stock can greatly enhance the appearance of a wheel well door that has no detail.



The new interior sheeting for the landing gear doors is attached by running a bead of super glue around its perimeter with a thin wire applicator. The hinges were made with Waldron's punch set.

framing, be consistent with the locations of the strips. Sometimes manufacturers supply molded framing that is not high enough or is not accurate. You can add additional framing by form-fitting individual pieces, but again, be consistent. The best way to glue these pieces is to set them in place and put a small drop of super glue at each corner. Once the glue is dry, run a bead along the contact area to blend the two together.

Wiring and piping detail that has been molded into the landing gear bay can be difficult to paint. Even if you do a superb job, it may not look quite right. In these instances I paint the entire area one color and apply a lighter wash of the same color to high-

light the molded detail. Additionally, I select a different color pastel to further highlight these details. To create a good perception of depth and help offset the appearance that the cabling and tubing are molded into the plastic, add some additional piping and cabling painted a different color or a much lighter shade of the color of the interior area of the bay. You are trying for a three-dimensional effect, and additional detail will go a long way toward this.

If the landing gear doors have no detail, you can add some sheet stock or strips. The doors of actual aircraft landing gear have either a framing covered with thin metal sheeting or a sandwiched sheet with an outer skin

and an inner skin that has been drop-formed by a heavy press. Whether the aircraft doors have framing or inner sheeting, thin the doors for realism. If they have flat surfaces, run them across a stationary piece of sandpaper. If they are curved, use a wooden dowel of the appropriate diameter with sandpaper wrapped around it.

To add framing, draw the locations of the strips onto the door. Be sure the outer framing that follows the perimeter of the door is slightly offset from the door's lip. Check your documentation for the approximate design and duplicate it. It does not have to be exact—you just need to approximate the appearance.

Run a bead of super glue along the contact surface of the strip, and set it along one of the lines you've drawn. Plan your gluing so you can use extra-long strips as much as possible, since they can be cut to size once the glue has set. After you have placed all the strips, paint the inner doors the correct color and lightly weather them using pencil pastels and a flat brush.

If the doors have an inner sheeting, chances are there are circular or elongated perforations in it. On actual aircraft these holes add strength and reduce weight. Place the door onto the sheeting you want to use and trace the outline. If the doors are curved, tape a piece of sheeting around the same wood dowel you used to thin the part and trace. This will give you the exact size. Next, draw the locations of any holes onto the area you traced, using templates and triangles. For any half-circles or circles, select a template size that is the same as a Waldron punch. Waldron's punch set can be used on 1/24 to 1/72 scale doors. Although using it might not give you the exact size, no one will notice and it sure makes cutting easier.

Once you have the drawing set up on the outline, cut it out and punch or cut out the holes. Run the new part across some fine sandpaper to eliminate burrs and remove sanding fuzz from the holes. Place it on the inner surface of the landing door and run a bead of super glue along the perimeter of the combined parts. Be sure the contact surfaces are clean.

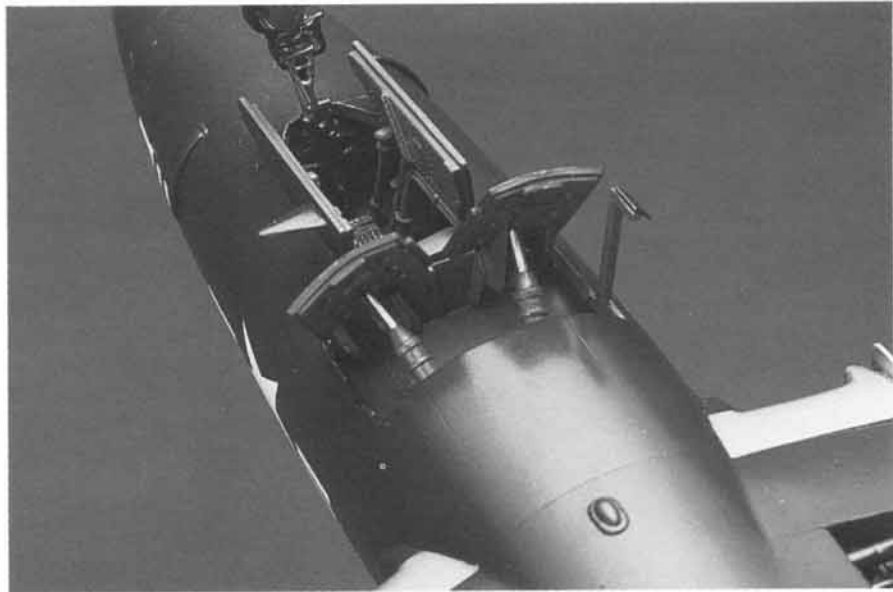
After the glue has dried, sand the sides smooth. The glue should have seeped far enough along the contact surface area between the parts to hold them tightly together. If a section bulges out, drill a small hole through the surface of the inner sheeting and place a drop of glue on the hole. Once the glue is dry, run the surface across sandpaper to smooth it. Paint the inside and then weather as necessary.

The inside of landing gear doors never gets direct sunlight so paint does not fade, but these surfaces usually have lubricants, fluids, and dirt on them from the landing gear, so add this type of weathering. Even modern jets suffer from dirty interiors.

A final note: Whether you are drawing framing or location holes, set up the actual door on the sheet stock outline to locate framing or holes accurately. To do this, set your triangles as you did for making consoles.

The last details to add to landing gear doors are the door actuators. They can either be mechanical arm devices that act like hinges, or hydraulic actuators with extending arms. For hinge-type actuators use strip stock of various sizes to build up the arms. Each door normally would have at least one hinge-type actuator. If the actuators are hydraulic, they are easy to make out of various size plastic tubing, plastic stock, or wire, depending on the scale.

For 1/24 and 1/32 scale kits you can use hollow tubing and solid rod, while 1/48 and 1/72 scales require



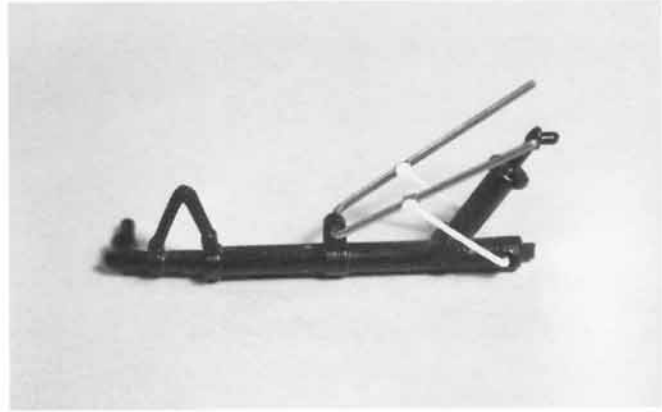
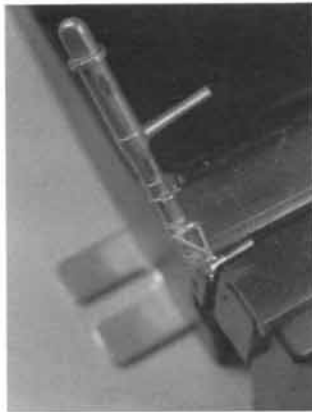
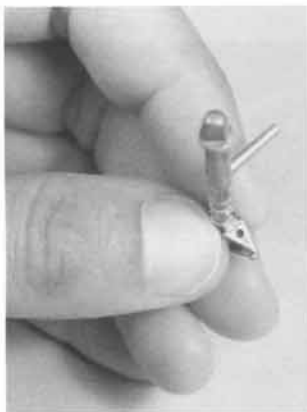
Monogram packed a lot of detail into their 1/48 scale F9F Panther. Although extra detailing is not really needed, a careful paint job can highlight all the details, such as the actuator arms. (Model by Major Billy Crisler, USAF.)

small diameter plastic rod and wire. For large scale kits use hollow tubing for the outer section and insert solid rod into the hollow tubing. If you have to use solid rod and wire, drill a pilot hole into the rod to give the wire a positive seating. You are trying to achieve an effect, and you may have to sacrifice some realism and accuracy when installing these parts.

LANDING GEAR STRUTS & WHEELS

The first step in detailing landing gear struts is to remove seam lines

and fill in ejection marks and dimples. If the strut has scissor-type framing that extends outward around the oleo (shock absorber) and connects the upper and lower strut, check your documentation to see if it is made of solid pieces of metal. Chances are this scissor-type device, which is designed to add strength to the landing gear strut, is made of metal framing. Draw the framing onto the solid sections and cut out the excess plastic. Start with a pilot hole, enlarge it with a #11 X-Acto blade and shape it with micro files.



The first step in removing small amounts of plastic is to drill a pilot hole. The interior plastic will be removed so that a frame is formed.

Sometimes you just can't salvage landing gear parts and you have to scratchbuild them. A combination of wire and plastic rod has been added to this landing gear.



The oleo on this 1/48 scale B-24 was painted with Testor's metalizer paints and polished with a Q-Tip. A coat of clear gloss was added for an extra shine. (Model by Richard Boutin, Sr.)

Prepare the strut and any other parts for painting, and mask the oleo portion of the strut. The oleo is the airplane's shock absorber. It pushes up into the strut and is usually a shiny metal, which can be represented with Testor's Metalizer paints. I usually use three shades of the same color paint for struts. Although this requires a lot of masking, the results are worth it. The area above the oleo gets one shade, the area below the oleo gets the second, and any remaining parts, such as landing gear strut supports, get the third. The tones should be subtle, but viewers should be able to pick up detail on the landing gear through color differentiation. Mask the lower area when you paint the upper strut area. Then let the paint dry and reverse the process.

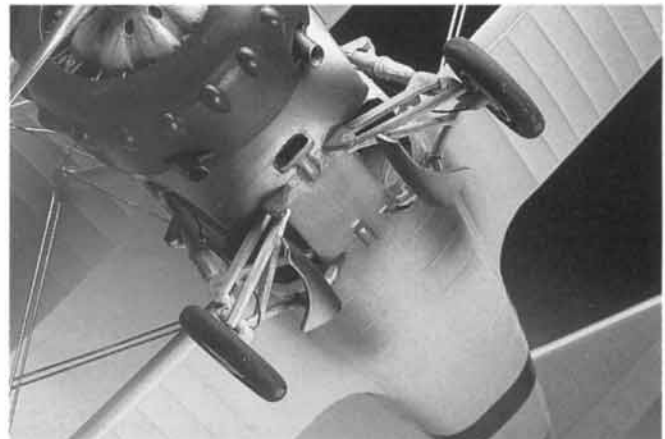
Additional landing gear strut pieces can be painted separately.

Once the struts and accessories are painted, remove the tape from the oleo area and mask the entire strut. Airbrush the oleo with Testor's aluminum buffing Metalizer. After the paint is dry, use a Q-Tip to polish the Metalizer, then carefully remove the tape. Next, attach any additional parts to the struts. To position the parts correctly, you may have to fit the strut into its wing location and then attach the parts to the strut.

Next, identify how hydraulic brake lines are attached to the landing gear strut. To make brake lines I use black plastic sprue stretched over a candle for flexible lines, and piano wire for stiff metal hydraulic lines, such as the ones on a B-25. The brake

lines usually terminate near the axle or somewhere on the backside of the wheel hub. I locate the termination point, drill a small hole, place a small drop of Kristal Kleer or Elmer's white glue in the hole and insert the brake line. If the brake line is flexible, bend the end toward the strut after the glue has dried so it follows the length of the strut. The majority of brake lines are attached to the landing gear struts with thin flexible clamps like those on the cooling hoses for your car's radiator. You can simulate them by using a thin strip of masking tape laid over itself one time. There are usually two or three of these clamps on each strut. I always work from the brake line termination point up towards the top of the strut so I can work out any excessive slack in the line. Apply a small drop of super glue at the point where the tape ends. Paint the tape with Polly-S aluminum colored paint.

The last step is to add weathering and oil leaks. Dust the entire landing gear with a dark pastel color, and airbrush a coat of Polly-S clear flat to seal the pastel dust. Be careful not to get the clear flat finish onto the oleo because it will dull the shiny appearance of the paint. Oleos usually have hydraulic fluid stains that start at the top and streak downward. Simulate this effect with Polly-S oil-colored



Hydraulic brake lines were added to Monogram's 1/32 scale F3F.

(Right) Oleos leak hydraulic fluid, so don't forget this subtle detail. Thinned water-base paints work best for this.

(Center) For spokes that are clean and uniform, clean the excess plastic from the inside of the wheel.

paint applied with a small brush. Finally, position and glue the landing gear struts into place without the wheels.

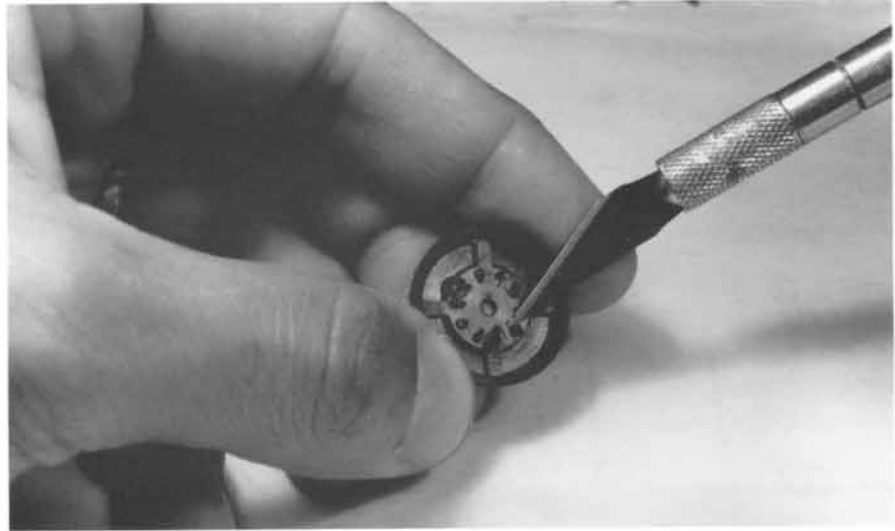
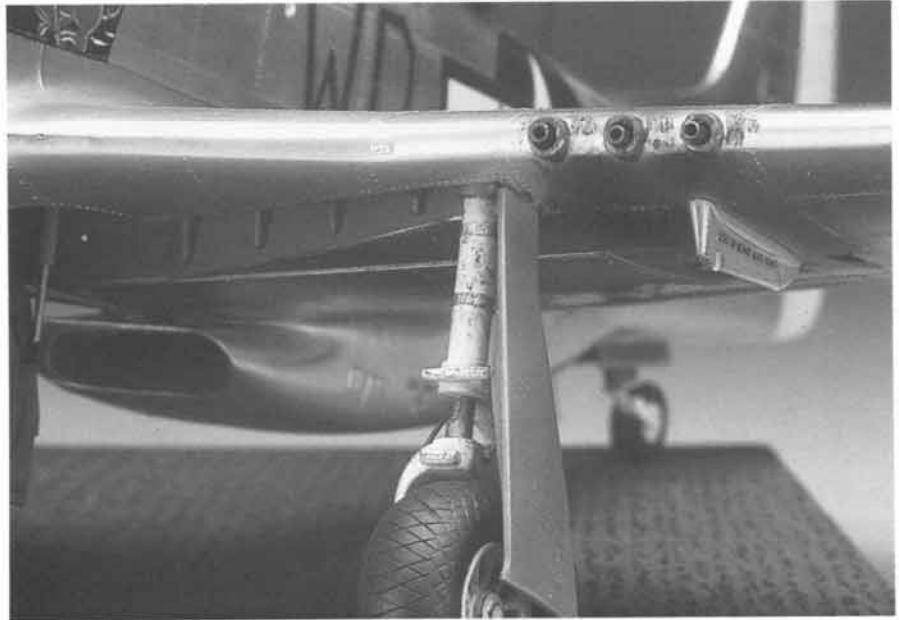
Most main landing gear wheels don't have solid wheel hubs, but kit manufacturers are forever molding solid wheel hubs with indented spoke detail or molding round or oblong indentations. You'll need to remove the plastic between the spokes.

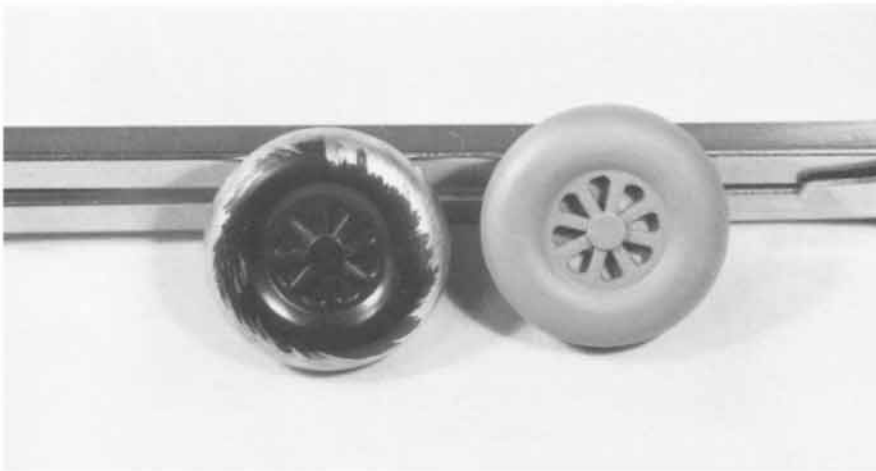
Begin by drilling a starter hole in the area to be removed and enlarge it with a #11 X-Acto blade. The raised plastic that represents the spokes will guide your blade, but be careful not to gouge these areas. Use micro files to shape the outline of the hollow area and smooth out the sides. These files are especially helpful for the curved portions of the hollow area. After you have finished removing the plastic, clean off the excess on the inside of the wheel.

For hubs with round indentations use a drill bit of the same diameter as the indentation. Since the plastic is usually thick, deepen the indentations with a drill bit and pin vise and finish drilling with a motor tool. Oblong holes are a little harder, and if you're working in 1/48 or smaller, just drill them out with a bit that will cover the oblong shape.

For 1/32 scale kits you can get the oblong shape using a combination of drill bits, cutters, and micro files. First, punch an indentation in the center for positive seating and drill out as much of the plastic as possible with a bit that will touch the narrow distance of the oblong shape. This will leave small portions of plastic on both sides which can be removed with a micro file. Install the motor tool in a drill press; then you can control the cutting action by moving the wheel along the base of the drill press.

You can deal with odd-shaped areas by starting a pilot hole and then enlarging it.





(Left) The completed wheel, primed and ready to paint, is a far cry from the stock part supplied by the manufacturer.

(Center) The spoked wheels on this 1/32 scale Corsair add another element of realism to the overall effect of the model, thanks to a small investment in drill bits and micro files.



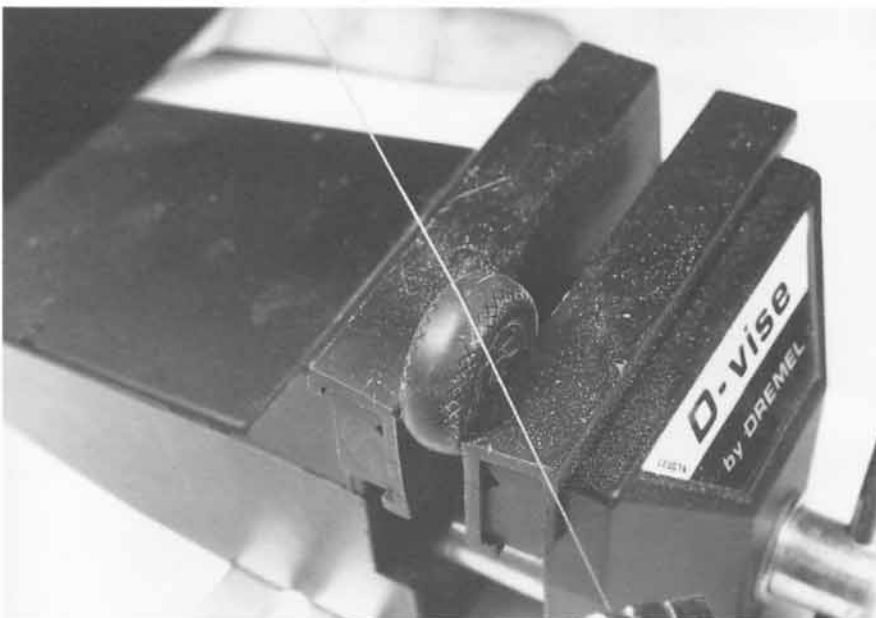
Once you have completed both sides of a wheel, sand the gluing surfaces smooth by sliding the part along sandpaper; then glue them together. When you glue, be sure the spokes or holes on both wheel halves match so you can see through the hub.

After the glue has dried, scrape the seam with a #11 X-Acto blade and sand smooth. Check your work by painting the area with silver paint. If you find any cracks, apply super glue and sand smooth. Unfortunately, doing this also removes any tread detail the manufacturer may have provided along the seam line, but it can be replaced. Place the wheel in a vise between two pieces of balsa wood to protect the plastic and take a thin razor saw or jeweler's saw and cut the tread detail back into the wheel.

For 1/32 scale and larger kits, use either the razor saw or the jeweler's saw, but for 1/48 scale and smaller use the jeweler's saw. Replacing or cutting new tread is slow work, and you must rotate the wheel continually in the vise.

Be careful to match the tread patterns. Because the new tread will be deeper, use the existing tread as a guide. Cut these areas deeper to match. When you are done, remove the wheel and sand with 600 grit sandpaper to remove plastic burrs.

Apply a coat of primer to the entire wheel. After it dries, mask the rim. Don't paint the rim black because you will have a hard time covering it, especially with a light color. Next, take a round toothpick or a .5mm lead pencil and run the tip around the edge of the rim where it meets the tire. The tape will stick to



This tire would look pretty strange with the center section of tread missing. Jeweler's saws are excellent tools for replacing tread detail.

(Right) When replacing tread detail, make sure the lines match and the depth of the cuts are uniform.

(Center) To get sharp lines between the rim and the tire, place a section of masking tape over the rim and push the tape down along the rim with a toothpick.

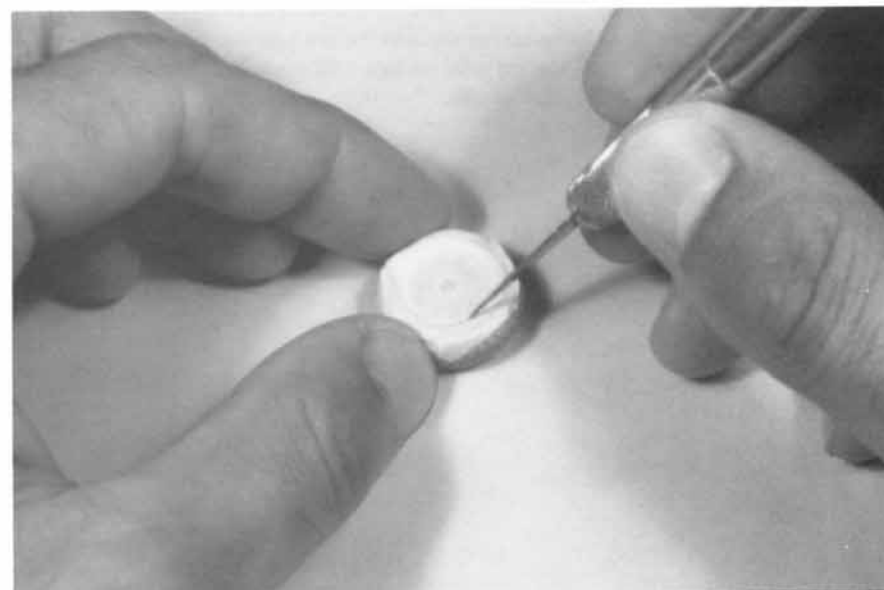
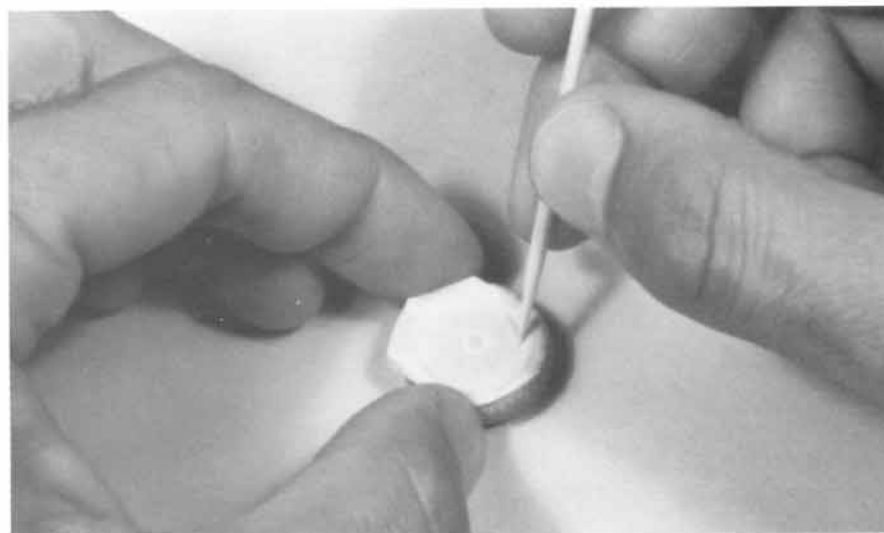
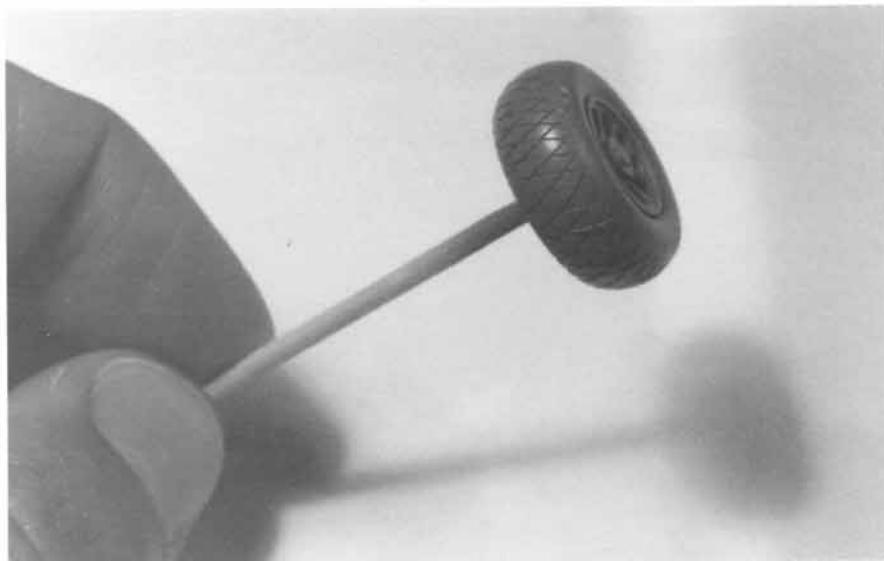
the rim and define where tire meets rim. Carefully run a #11 X-Acto blade along the base of the rim using the rim as a guide. It is important that the blade runs along the base of the rim where it meets the tire. Remove excess tape and run the toothpick around the rim again to ensure that the tape is sticking. Repeat the procedure for the other side and airbrush the tire with flat black with some white mixed in for a dark gray.

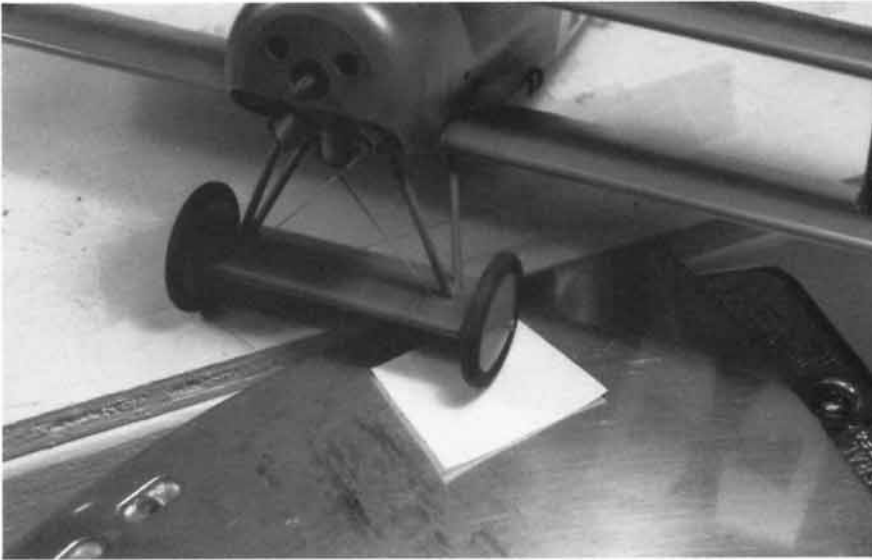
After the paint has dried, remove the tape and mask the side of the wheel, but be sure it overlaps the tire. Again, trace the rim with a round toothpick or .5mm lead pencil, and cut it around the base of the rim. This time remove the tape that covers the rim and run the toothpick around the remaining tape one more time to ensure that it is sticking. Repeat the procedure for the other side. Cover any areas of the tire that aren't masked. Paint the hub the required color, let dry, and carefully remove the tape. Look for a fine demarcation line between tire and rim. Since you painted the lighter color last, if any paint bled over it will be the lighter onto the darker, which can be fixed easily with a detail brush. To add a touch of dirt to the hubs, apply a dusting of black pastel with a soft brush, then airbrush a coat of clear flat to seal.

After you have finished the tires, scrape the paint off the strut axles and position the tires on the axles. Once you have a proper alignment, carefully turn the model over and place a drop of super glue on the contact surface between the strut axle and the wheel rim.

The last step is to flatten each tire slightly so it appears to be supporting weight. I use an iron for this.

Once the tape is in place, run a pencil around the edge of the rim for a cut line.





Tires can be given a bulged or flattened appearance by placing them onto a hot iron, but this effect needs to be very subtle. Don't leave the plastic on the iron too long, or you will end up with a flat tire instead of one that appears to be supporting the weight of the aircraft.

To prevent the plastic from sticking to the iron put a small piece of butcher's waxed paper between the tire and the iron. The waxed side of the paper should be touching the plastic. Lay the iron next to the side of your workbench so the side is flush with the bench. Position the model, one wheel at a time, onto the iron and watch the wheel as it begins to soften and lose its round shape. Putting some pressure on the wing area directly above the landing gear helps the wheel bulge out, but be very careful not to let it flatten too far or it will look like a blown-out tire. Don't forget to flatten the tail wheel.



If you don't have sharp lines between the rim and the tire you will ruin the realism, so be careful when painting. The landing gear on this 1/32 scale P-51 also has weathering, which can sometimes hide minor flaws.