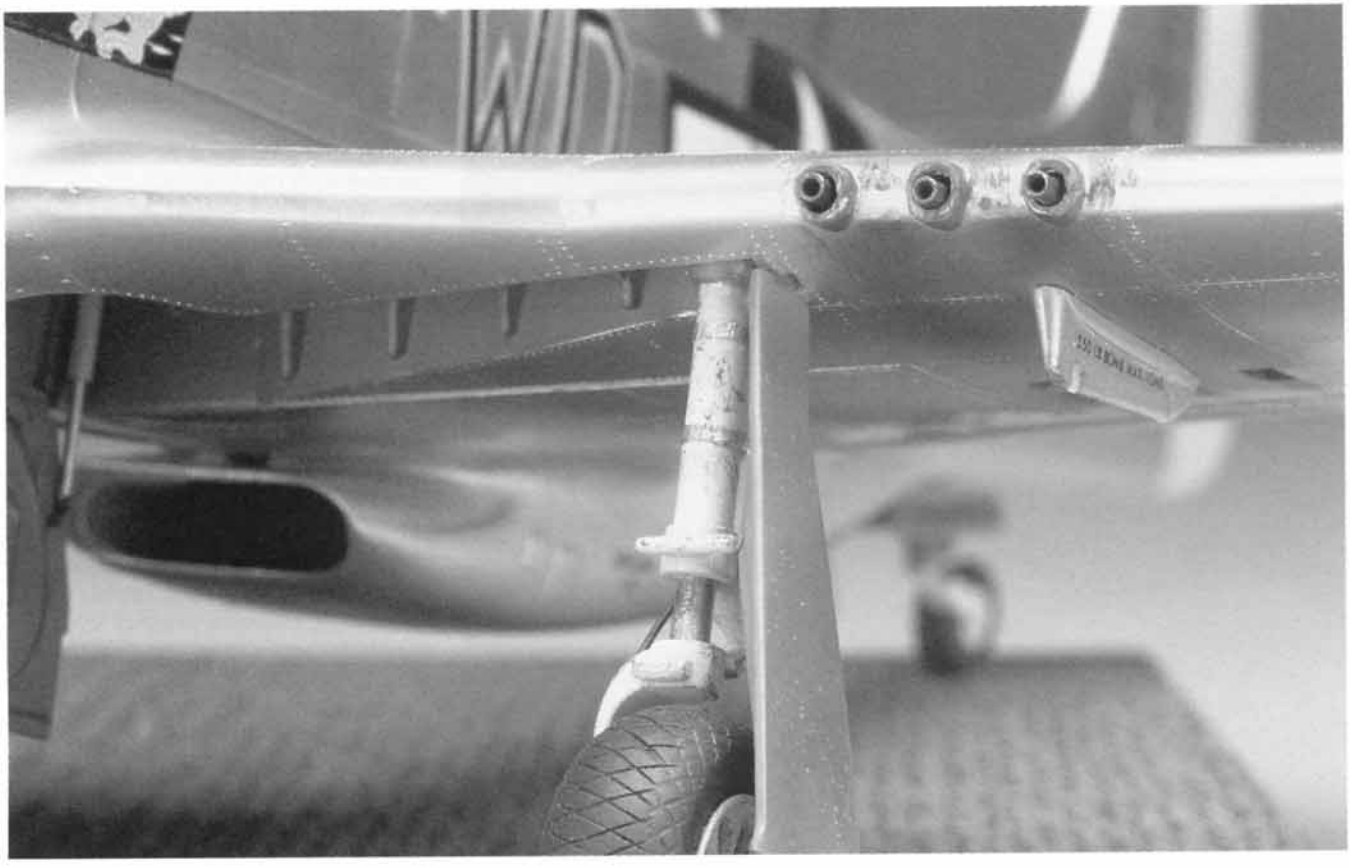
CHAPTER FIVE GUNS, FLYING WIRES, CONTROL CABLES & ANTENNA WIRES



Hollowing out the kit-supplied guns on Hasegawa's 1/32 scale P-51 adds another level of realistic detail.

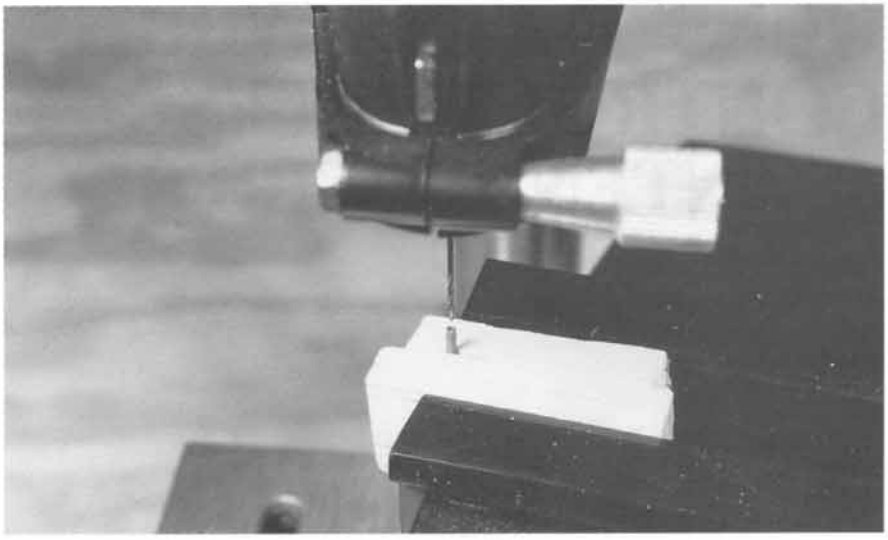
Gunsight rings, front sight posts, ammo belts, and hollowed out guns add considerable realism to your models. Even if you do nothing but hollow out the gun, you will achieve an appreciable level of detail. Biplanes are one of my favorite modeling subjects; the flying wires and exterior control cables add an extra dimension and challenge. In addition, the biplanes of the golden age of aviation—the mid '20s to late '30s—had beautiful color schemes. Modeling these aircraft requires some specific construction techniques, especially when adding flying wires and control cables.

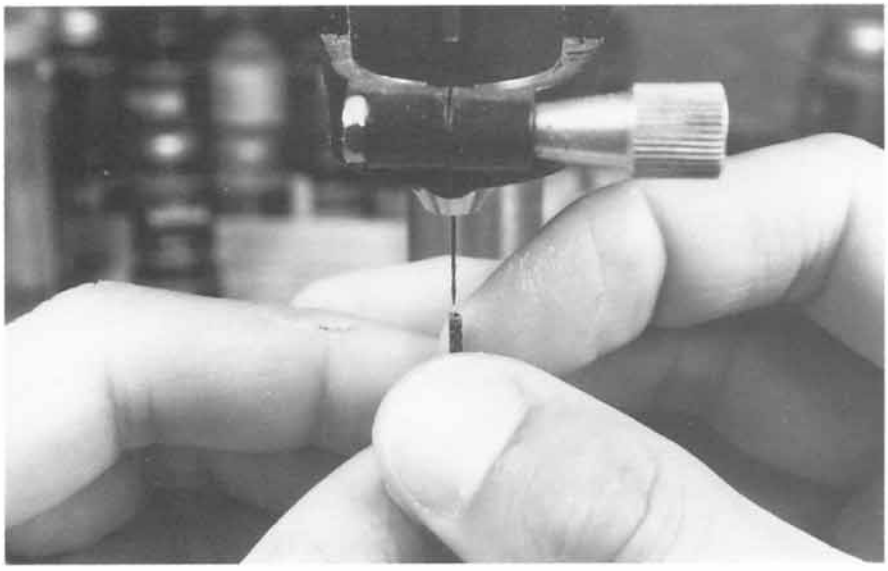
GUNS

The single most important detail you can add to guns is to hollow them out. Since these parts can become fragile after drilling, especially in the smaller scales, do all cleaning, scraping, and sanding before drilling. Don't paint the parts, though, until you have finished drilling, to avoid marring the paint finish. When you drill, be sure the surface in contact with the drill bit—in this case, the tip of the gun—is smooth and flat, so the bit will not skew off to one side.

Match the drill bit with the diameter of the part. Start with a small bit and work up to the diameter you want. Progressively increase the bit size until you have the desired opening and depth. If you use too large a bit, the plastic wall that is formed as you drill may become too thin and collapse or fracture.

Place the part between two strips of balsa wood with about ½ inch (12.7 mm) of the gun barrel protruding from the wood. Press the strips together, place in the vise, and tighten just enough to prevent slippage. By pressing the balsa strips together you will push the ridges of the gun into the balsa, which will prevent it from moving.





If you can't use the kit-supplied guns, replace them with hollow plastic or metal rod. These guns on Monogram's 1/48 scale Panther are made of brass tubing painted with Testor's Metalizer. (Model by Major Billy Crisler, USAF.)

(Left) On small scale models the contact surface for the drill bit is small, so use your drill press and vise to steady your drilling.

(Center) For large scale kits you can discard the vise and hollow out the part by punching it up to the drill bit.

Place the vise onto the drill press base and raise it to the motor tool until the bit and plastic are next to one another. This will allow you to adjust the part so it is straight and parallel with the drill bit.

Adjust the height of the motor tool above the vise. Ideally it should be adjusted so the bit will drill 1/16 to 1/8 inch (1.6 to 3.2 mm) into the plastic. Center the bit onto the plastic part. To ensure that the bit and part are centered, turn on the motor tool at its lowest speed and carefully drill a slight indentation into the part just deep enough to see. If it appears to be off-center, adjust the position of the vise and repeat.

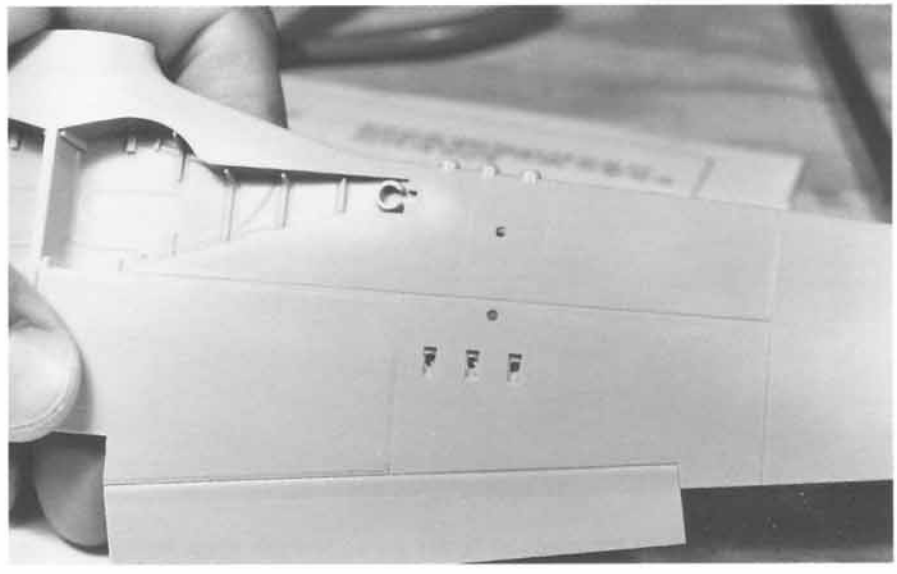
Once the bit is centered, set the motor tool at its lowest speed. Don't let the bit come in contact with the plastic for more than a few seconds at a time. Apply slight, steady pressure. If you push too hard and try to finish the job all at once you will melt the plastic and ruin the part. You may find that during drilling a thin layer of melted plastic has covered the tip of the drill bit. It can be easily removed with a knife, but it is an indication that you are drilling too fast.

Another technique is to set up the motor tool in the drill press and hollow out the part by holding it with both hands and feeding the part up to the drill bit. This works well on 1/32 scale gun barrels. If you drill off to one side, you can correct the problem by installing a drill bit in a pin vise and drilling at an angle. The shaft of the bit must touch the thicker side; as you turn the bit the plastic will be shaved off. You can also use the tip of a #11 X-Acto blade to remove excess plastic, and use a bit in a pin vise to clean up the hollow area.

You can also hollow out the shell ejection ports on fighter planes. Most fighter plane kits have pronounced indentations in the lower wings for these ports, but they are not hollow.

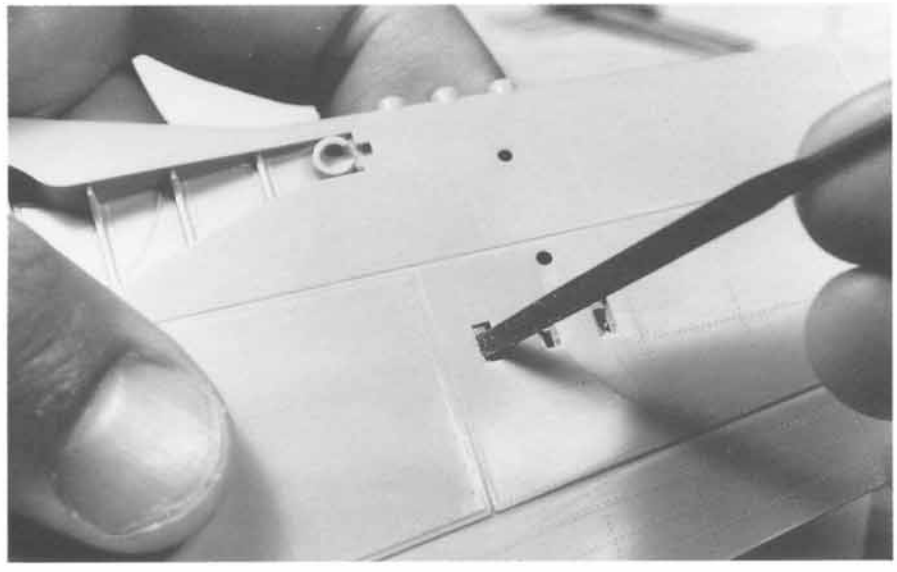
(Right) To hollow out shell ejection ports, drill starter holes into the plastic. Be sure to protect the surrounding wing area with masking tape in case you slip.

(Center) Once you enlarge the holes, use micro files to remove the remaining plastic and shape the openings.



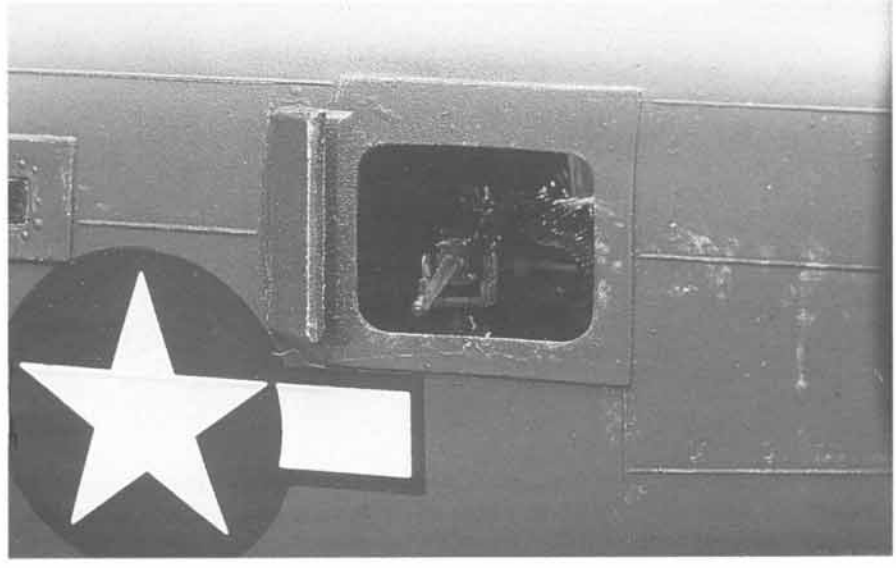
Drill a starter hole and enlarge it with a #11 X-Acto blade. The molded plastic sides of the ports will provide a guide for the knife blade, but be careful not to damage these areas. Once the holes are enlarged, you can use your micro files to remove the remaining plastic.

For guns on bombers, I recommend adding gunsight rings and front sight aiming posts to the guns. Model Technologies makes excellent gunsight rings which are easy to install with a small drop of super glue. Front sight aiming posts can be made from stretched sprue. Ammo belts for the single guns in the nose or along the fuselage of a bomber can be added by using the 1/48 scale gun belts from Monogram's Huey Hog kit. Because they are in a double row, the kit's ammo belts must be split in half. Given some additional scraping, shaping, and painting, they make a fine addition.

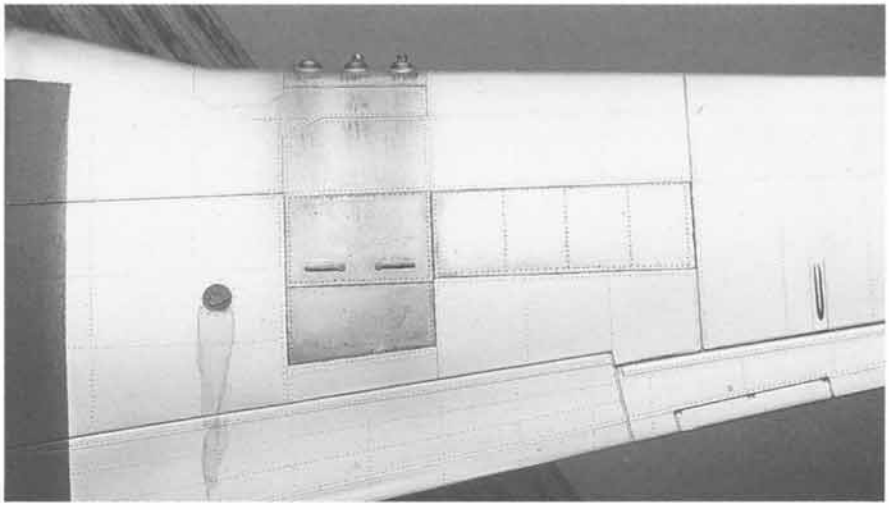


Another detail is to attach the middle of some thin clear stretched sprue to the back of each gun and attach both ends to the interior wall of the bomber. This represents the bungee cord that held the guns stationary and helped support some of the weight. If you are planning to expose the gun bay areas of fighter planes with guns in their wings, add gun trigger cables to each, as well as cable sensors for counting the number of rounds remaining. The gun locations on aircraft kits such as Hasegawa's 1/32 scale F6F Hellcat or P51 also beg for added detail such as wiring and gun trigger cables.

When you are ready to paint, use Testor's buffing Metalizer gun metal. Spray on two coats and polish with a Q-Tip. The cotton tip will polish only



On this 1/48 scale B-24 machine gun the front sight post is made from stretched sprue. (Model by Richard Boutin, Sr.)



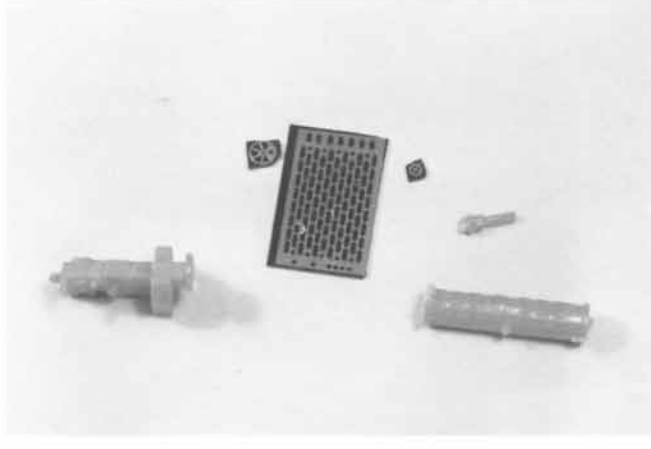
Gunpowder marks streak the wings of fighter planes and can range from subtle discolorations to heavy stains. The best way to replicate these is with diluted water-based paints applied with an airbrush.

Fighter aircraft that operated from dirt fields usually had covers over their gun ports to protect them from dust and dirt which could jam the guns. Small cuts of masking tape make excellent covers.

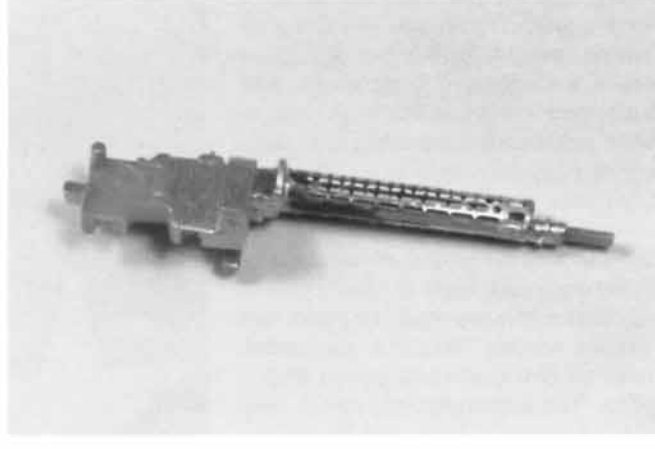
the larger raised surface areas, resulting in a two-tone appearance. This will also highlight the cooling hole detail along the gun barrel. Ammo belts need two separate colors—the shells were brass and the bullets were a dull bronze. Metal ammo drums were usually flat black, gray, or interior green, while those found on B-17s were wood. Be sure to add weathering to the interior areas where guns are located. These areas had stains from gun lubricant and cleaning solvent, as well as gunpowder.

BIPLANE FLYING WIRES & CONTROL CABLES

Biplanes require special construction techniques because you are dealing with multiple wing levels and wing struts that must be properly positioned. Many biplane kits have fit problems with the struts and the upper wing; the best way to detect this is to assemble the wings and struts with masking tape to see how they fit and how they are positioned. I usually build the fuselage and attach the lower wings first. Next I build the upper wing, and finally set the struts and upper wing with masking tape. In most instances you can solve a positioning problem by moving the upper wing, but doing so may also affect the struts. Both wings must be positioned correctly with respect to the fuselage. For this reason I recommend that you use masking tape to get set up correctly before you glue the struts and the upper wing.



Photoetched parts for World War I guns, available from IPMS, are worth the investment. The back half of this 1/28 scale gun was used instead of scratchbuilding the entire rear assembly.



The fully assembled machine gun, complete with its barrel and sights, is now ready for a good coat of Testor's Metalizer paint.

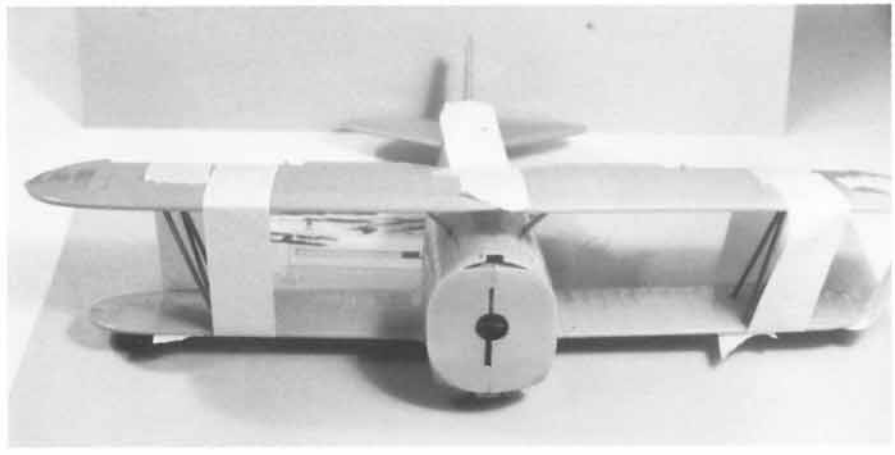
Biplanes need special attention, especially when you are checking the fit of the wings and struts. This biplane is getting an initial fit check to ensure that the wings will sit correctly.

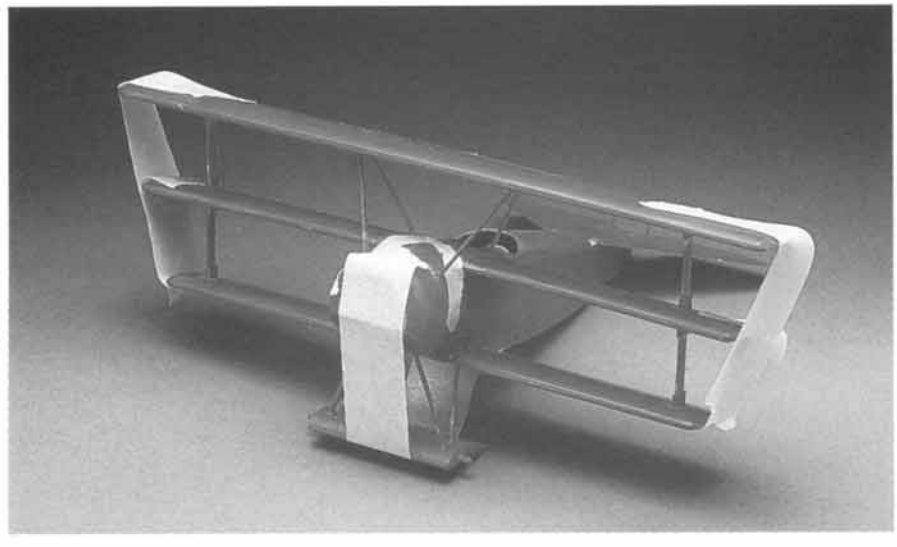
Another good reason to attach the struts and upper wing with masking tape is to examine how to install the flying wires. Once the wings and struts are glued, especially on 1/48 and 1/72 scale kits, there is not a lot of room to work between them; it's a good idea to see how tough it's going to be to get flying wires installed in areas such as between the fuselage and upper wing. In addition, if the manufacturer did not mark locations where flying wires need to be, you will have to do it.

To do this, coordinate the lower and upper wing termination points for the flying wires. This can only be done with the wings set up in their correct locations. Most 1/32 scale kits have the flying wire locations marked or have holes in the wings and fuselage. Even so, it's a good idea to check your documentation.

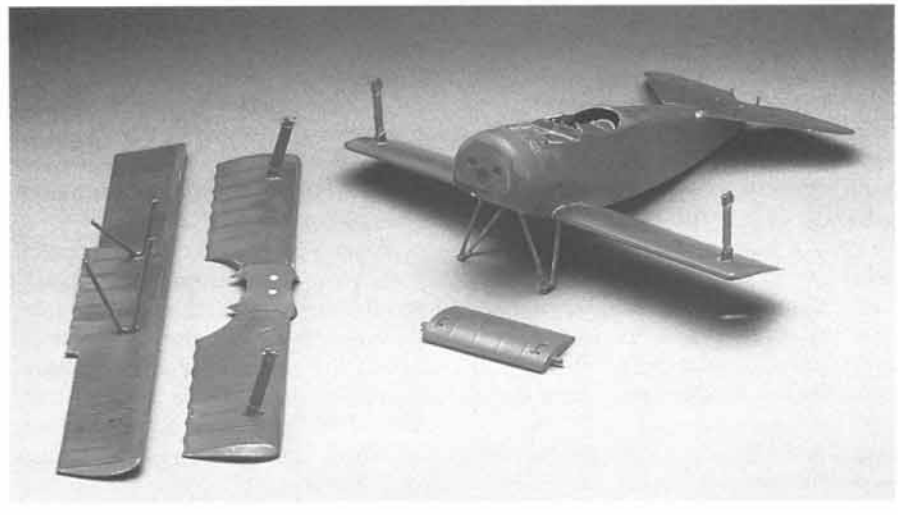
If you have no documentation you can still install flying wires following these general guidelines: The flying wires on the struts from the fuselage to the upper wing are usually crisscrossed. The flying wires are always crisscrossed parallel to the fuselage, and sometimes perpendicular to it. Normally, two sets of flying wires connect the upper and lower wings on both sides of the fuselage, and two wires make up each set. One set usually runs from the forward part on the lower wing near the fuselage and terminates at the outer section of the forward end of the upper wing. The second set starts from the forward end of the outboard area of the lower wing and terminates at the midsection or outboard end of the upper wing close to the fuselage. These two sets of wires can't be located along the same line or they will be bent around one another, so be careful how you locate them. Use dividers to set the distances between pairs of wires.

Some manufacturers set up their models to accept thread as the flying wire rigging; there are tabs where the wires go. A good example of this is



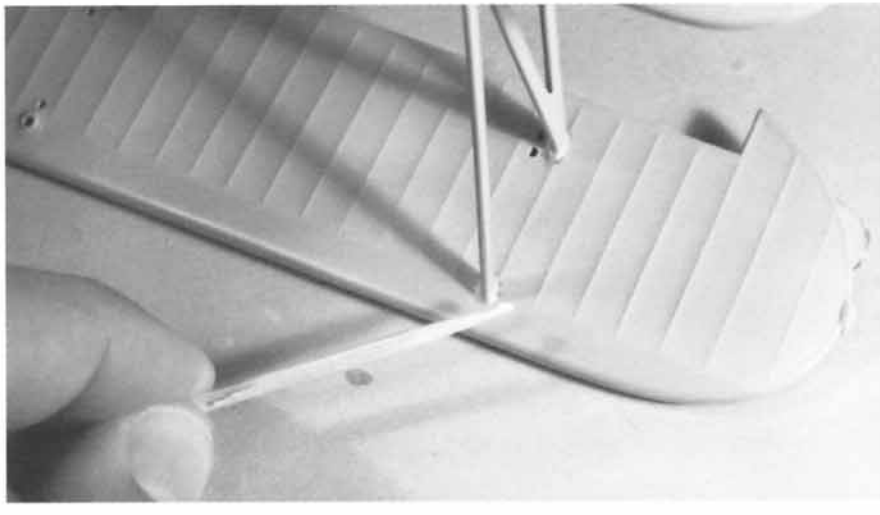


When you are ready to attach struts to the wings, tape the parts together, position the wings and struts, and glue them in place with super glue applied with a thin wire applicator.



Once the struts are glued in place, it's easier to work with the subassemblies and then reassemble the wings.

If the kit has no locations for flying wire, you can add them without much effort. The addition of flying wires on Glenco's Grumman Duck really help make this old kit worth the building time.



Elmer's glue makes excellent filler for wing struts, especially if there are large voids to fill.

Monogram's F3F Grumman Gulfhawk, which has both tabs and holes. The best thing to do in this case is remove the tabs and use the holes for the flying wires. Don't use thread for any applications; it collects dust, which is just about impossible to remove.

When you are ready to assemble the struts and upper wing, first paint the fuselage and lower wing, then glue them together. Paint the struts and upper wing separately and then attach them. Keeping the upper wing and the struts separate will allow a quality paint finish, since airbrushing the underside of the wing and interior struts after they are attached is difficult. This useful technique creates a problem if you are building a triplane, however. Keeping the mid and upper wings separate until after you paint the fuselage and lower wing assembly means that you will have to do some good fit work on the mid wing—you will not be able to do any filling and sanding after it is attached.

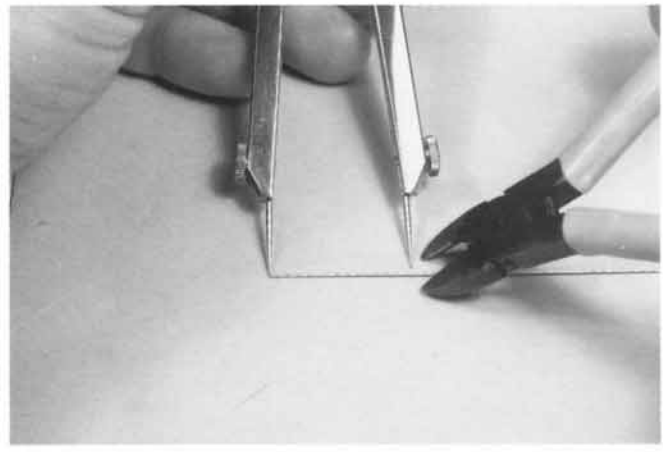
When you are ready to assemble the struts and the upper wing, position all the parts with masking tape. Remove paint from the gluing surfaces of the strut attachment points on the wings and the tips of the struts. When the wings and struts are positioned, apply a drop of super glue to the lower strut locations with thin wire. When the glue dries, turn the model over and do the upper strut locations. Be careful not to let glue bleed onto the wing surfaces—you only need a small amount at each location. To fill the voids where the struts attach to the wings use Elmer's glue or Kristal Kleer as filler and a toothpick as an applicator. Paint the filler the same color as the wing.

Now you can add flying wires. The best material for flying wires is real wire. Most hobby stores carry three-foot (1m) sections of piano wire. You can also order stainless steel wire from Small Parts Inc. or use thin spool wire. For 1/32 scale kits I recommend gauge 74 to gauge 77; for 1/48 and 1/72 scale, gauge 77 to gauge 79. Piano wire or the stainless wire is ideal for all scales because it is stiff and will not sag. For 1/48 scale and smaller, use spool wire if the lengths of the flying wires are no more than 3 or 4 inches (76.2 to 101.6 mm). Spool wire is easy to straighten, but it is not stiff, and lengths of more than four inches tend to sag. If you use it, simply stretch a length by holding the ends with pliers and pulling in opposite directions. You will see the wire straighten and feel it stretch slightly.

Use dividers to measure the distance between the end points of the flying wire. Be sure to add approximately ⅛ inch (3.2 mm) so you will never cut the initial length too short. Next, form-fit the wire into its location. If it is too big, cut a small length off the end of the wire, test fit it, and cut again. I usually get the correct fit on the third or fourth try. The wire should be straight, so check your work. If you are not careful you can get a slight bow that may not become apparent until you install the other wires. Test-fitting flying wires is tedious, and as you add wires it gets even more so because you have to work around those already installed.

I recommend installing wires as you cut them to their proper length. In most instances, once you cut a wire to its correct length and install it, it will not fall out if you have a tight fit. If you are working with pairs of wires, installing both before you glue them

Use a pair of dividers to measure the approximate length of flying wires.



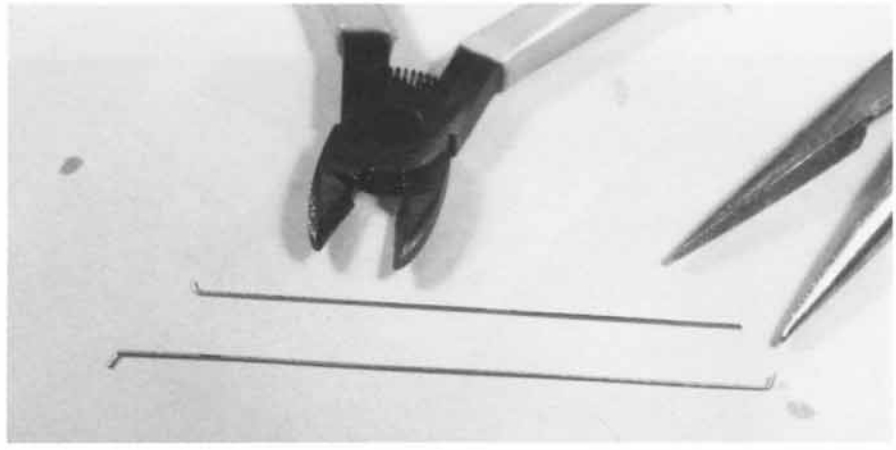
Once you know the correct length, measure a piece of wire, add about 1/8 inch (3.175mm) just to be sure, then cut.

keeps you from mixing up the corresponding holes—which is easy to do if the wires are close to one another. Use Elmer's white glue on all wires.

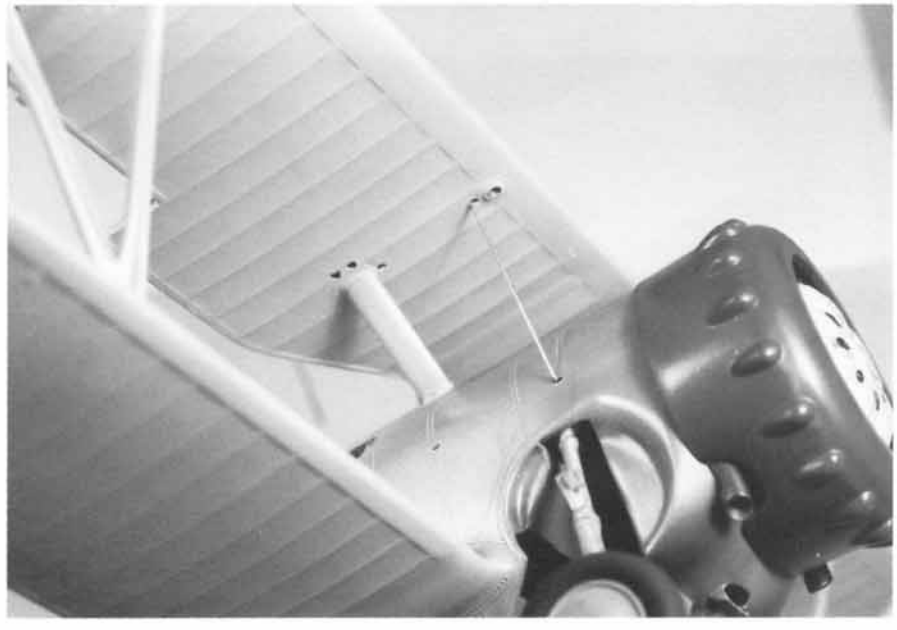
A final note: If you are using piano wire you will need to sand it to remove surface rust and then paint it. Don't use water-base paints on wire because the paint's carrier, water, will cause the wire to oxidize and discolor. Stainless steel wire does not need to be painted because it does not rust.

CONTROL CABLES

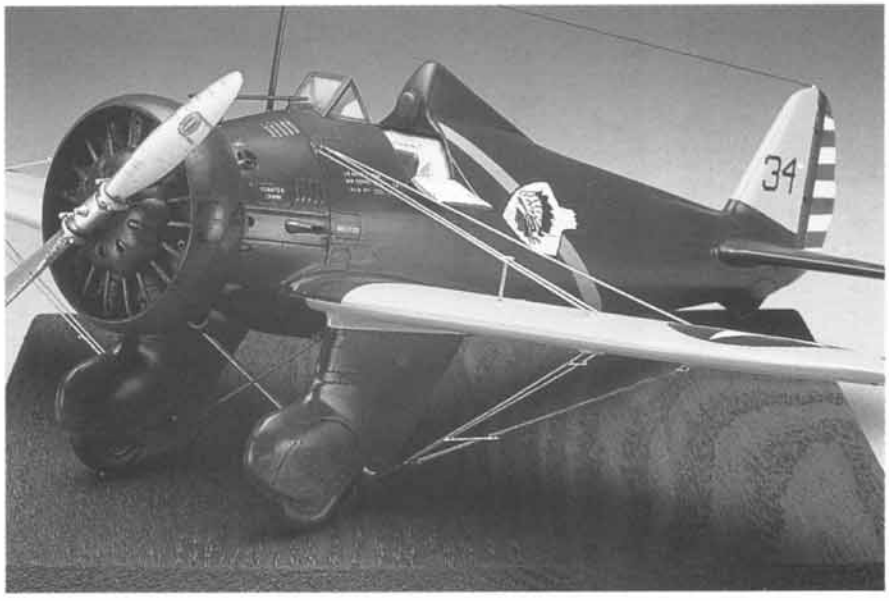
Control cables were exposed on many biplanes, but as aircraft designs improved, aileron and elevator control cables were incorporated into the wings and fuselage. As with flying wires, sometimes kit manufacturers locate holes where control cables emerge and sometimes they don't. Revell did an excellent job providing these holes on their 1/28 scale biplane kits and in supplying control horns (external appendages on a control surface that the cables attach to) for the control surfaces. The old 1/48 scale Aurora kits, which Monogram has recently reissued, had control horns on the control surfaces but no locations for control cables on the



Sometimes you have to bend the end of a wire to get it to sit correctly in its location; otherwise the wire may have a slight bow in it.



Set each wire in place and let the glue dry before doing the next one. This means a long assembly process, but doing it ensures that you won't knock a wire out of position before it has a chance to dry.



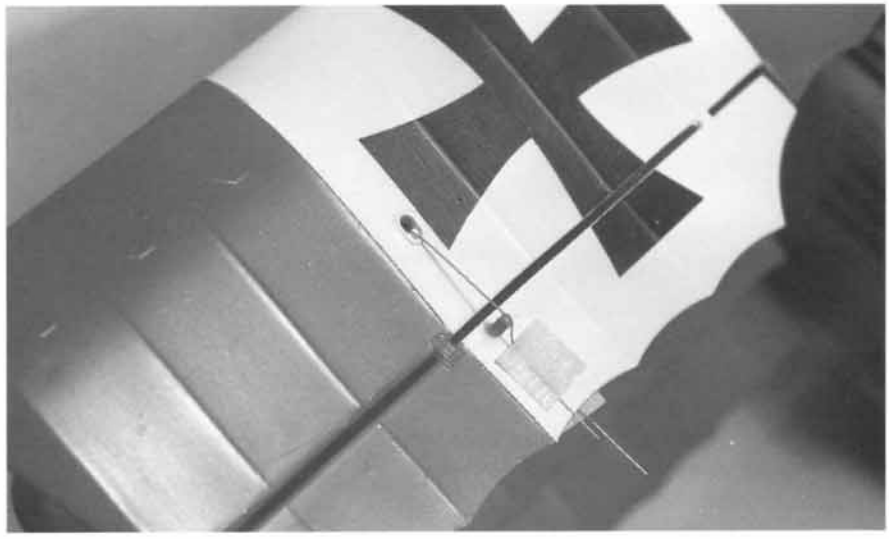
Hasegawa's 1/32 scale Peashooter has pre-drilled holes for flying wires. Because of the unusual wire configuration, this model makes an excellent display piece.

fuselage or wings. Matchbox supplied control horns for the tail surfaces on its 1/32 scale Tigermoth, but no hole locations on the fuselage.

If there are no holes in the fuselage for the tail surface control cables, mark them by checking your documentation and drill them into the fuselage. After you start the hole, angle it in the direction of its attachment on the rudder or the elevator. This way the cable will appear angled correctly as it emerges from the fuselage. Be sure the holes on both sides of the fuselage are symmetric.

For control cable material I use stretched clear sprue because it responds well to heat. The exact thickness you need depends on how successful you are at stretching the plastic, so use your best judgment. If the thickness looks good, use it. When I am ready to install the stretched sprue, I thread the wire through the holes in the fuselage and pull it so there are equal lengths on both sides. Glue one side of the stretched sprue to the corresponding control horn using a drop of Elmer's glue. After it dries, pull the other end tight and glue. If you are building a 1/32 scale kit, notch the tops of the control horns so the stretched sprue will ride in the notch. This makes it easy to hold the sprue taut, since you can pull it past the control horn and tape it to your workbench.

On smaller scale models you will have to glue the sprue as best you can and use the blown-out match trick to get it taut. Light a wooden match, blow it out, and quickly position the tip about ½ inch (12.7 mm) below the sprue. The hot smoke from the match



(Left, center) When attaching control cables, you can use masking tape to hold them while the glue dries.

(Bottom) Once the glue dries, cut the sprue and apply a small drop of Elmer's to hide the cut tip. After the glue is dry, paint it to blend in with the control horn.

If you have a problem positioning the control cable on top of the control horn, notch the tip so the sprue will ride in the notch.

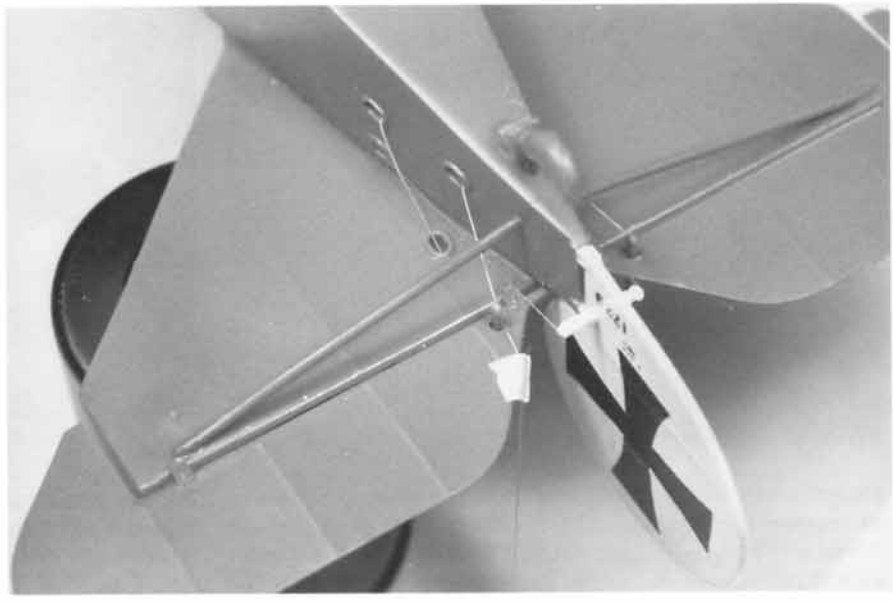
will cause the plastic to tighten. Be careful not to melt or distort the plastic, which is easy to do if you get too close with the match.

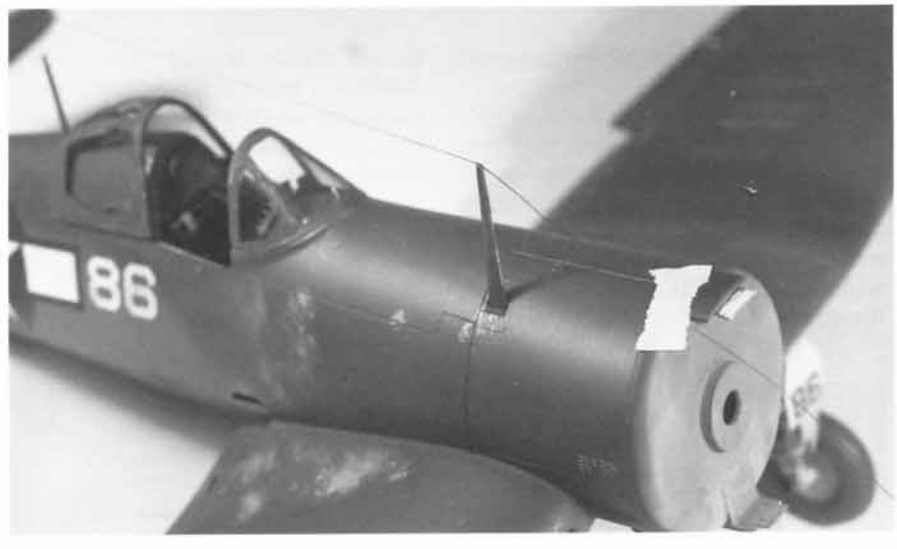
If the model has no control horns you can make them from plastic stock, but be sure to locate them on both sides of the rudder and ailerons at the same locations. The edges and the tops of control horns should be tapered; on 1/48 scale and 1/72 scale you can use small plastic rod to simulate them. Remember that control cables for ailerons emerged from the upper and lower surface of the wing. Elevators had four control cables emerging from the fuselage (two per side), and rudders had two cables emerging from the fuselage (one per side). After you have installed all control cables, add a touch of paint to the tops of the control horns so the cable tips and Elmer's glue can't be seen.

ANTENNA WIRES

All propeller-driven aircraft had some type of wire antenna extending from a vertical antenna to the tail. These antennas also served as receivers for radio direction equipment, so even if the aircraft did not have a radio, it may still have had some direction-finding gear. WW I-era planes did not have radios or electronic gear, so don't add any antennas to these models. On the other hand, jet aircraft have no external antenna lines or cables because of the speed of the aircraft.

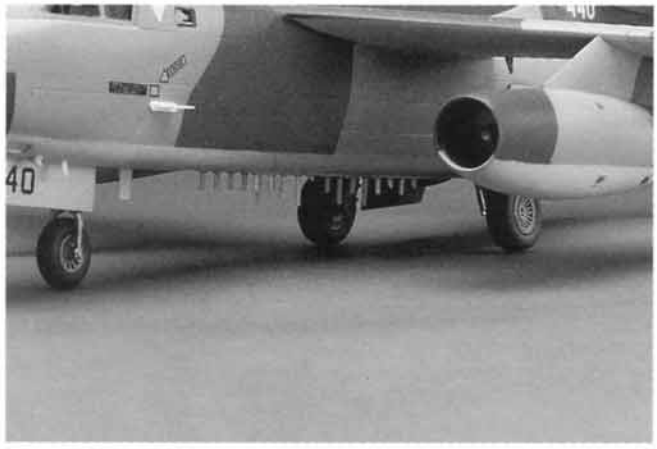
Make antenna wires from clear sprue, stretched and installed the same way as control cables. You may have to drill a hole into the upper area of the leading edge of the rudder or in the fuselage and wings, as is the



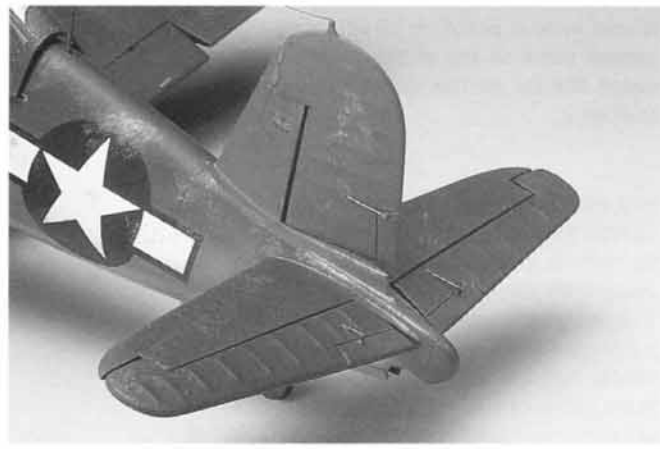


Cable-type antennas are attached just like control cables, except that you are usually not working in confined areas.

The secondary antenna (vertical wire) on this Corsair was positioned by gluing it to the fuselage first, then taping the upper end to an adjustable lamp positioned so the stretched sprue lengths touched. This technique ensured that both the horizontal and vertical antenna wires would be taut.



Modern antennas are usually small protrusions or small square or rectangular shapes. The multiple antenna arrays on Testor's 1/72 scale Douglas B-66B, which was converted to an EB-66E, were made from thin sheet stock. (Model by Major Billy Crisler, USAF.)

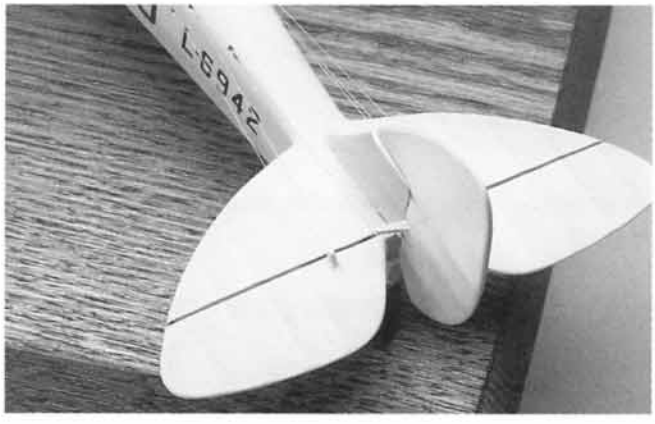


Another nice touch is to remove the molded-on detail for trim tabs and add the control cables and horns. The tail surface of Revell's 1/32 scale Corsair looks much better with these details added.

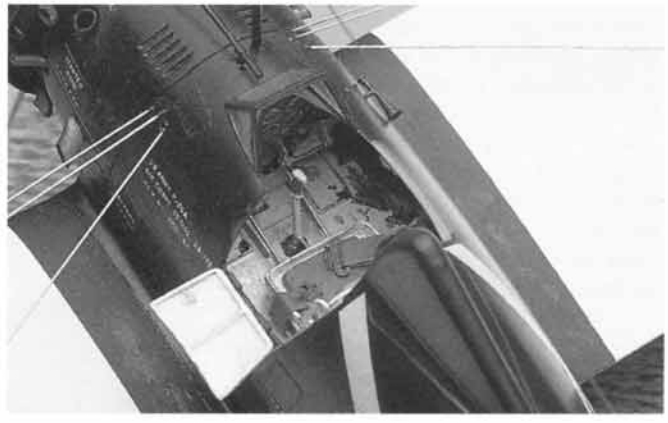
case with the B-17 Flying Fortress and the P-40 Warhawk.

Start from one location, apply the Elmer's glue, let it dry, and glue the other end. It is a lot harder to get the sprue taut during gluing, so get it as tight as possible and use the blown-out match trick. This will only work on stretched sprue of small diameter—on thicker lengths the plastic will distort or melt. You have to develop a feel for stretching sprue; I recommend that you practice and keep your successful practice runs for future projects.

On modern jets, antennas usually look like small, thin squares, rectangles, or large bumps on the fuselage. Thin sheets of stock cut to size using square or rectangular templates are all you will need for these. The trick is to attach them straight—this is especially critical if you have a series of them. To create bumps, use scrap stock and shape with sandpaper. Attach both the square or rectangular and bump-type antenna with super glue and paint wherever plastic sprue touches either a vertical antenna or the model.



Although Matchbox supplies control horns for its 1/32 scale Tigermoth, you have to drill the holes in the fuselage. The control cables are clear sprue, and they are attached to the control horns with Elmer's white glue.



A detail that modelers sometimes miss is adding the control cables to the rudder pedals and the control stick.