CHAPTER 5

GUNS, FLYING WIRES, ANTENNAS, BOMBS AND CONTROL SURFACES

GUNS

There are several things that you can do to improve the appearance of guns such as adding gun sight rings, ammo belts and a good paint job, but the single most important thing that you could do is to hollow out the barrels. Since these parts can become very fragile after drilling, especially in the smaller scales, all preparations such as scraping and sanding should be completed prior to drilling. It is important that the surface that will be in contact with the drill bit be smooth and flat so that the drill bit will not skew off to one side. I like to use a number 11 blade to remove the mold lines using very light strokes and then use a Flex–I–File to restore the round appearance of the barrel. Once the plastic has been cleaned, sanded and the tip of the barrel flattened, the part is ready for drilling.

There are two basic ways to bore out gun barrels. The first method is by hand and the second is to use a Dremel drill press and a Dremel vice. When selecting drill bits start with the diameter that you want the finished hole to be and then select several other sizes that are smaller than the finished diameter. What you want to do is slowly work up to the finished diameter because if you try to remove too much plastic at once you can collapse the plastic walls or fracture the plastic. I usually try to use every other size diameter drill bit until I get to the finished diameter.

Before we get into the drilling, you need to decide whether you will use the kits guns, make new barrels from round stock or

modify the guns and add Masters brass barrels. If you are not going to see anything except a small portion of the length of the barrel or just the tip you may want to replace the gun with round stock and save the kit part for another project. I like to use Plastruct rod for my gun barrels as their rod is always perfectly round. I cut the lengths that I need, flatten the ends with a Northwest Short Line True Sander and I always cut extra lengths, because I never get it right the first time. I then ink the tip with a black indelible marker and place an indentation in the center of the rod for a pilot hole. If the indentation is not centered you can adjust it by angling the tip of the punch.

Start drilling with the smallest bit and check the centering of the hole. If it looks good move on to the next diameter and so on until you achieve the diameter opening you want. Be sure to hold the pin vise that holds the drill bit straight. Practice builds confidence and do not be disappointed if you destroy a few lengths of plastic or end up with some rejects. If your drill bit becomes offset from the center, you can correct this by removing the plastic from the off centered side using the tip of a number 11 X-Acto blade. I then move up two drill bit sizes, which usually helps to self-correct the off centered hole.

The second method is to use a Dremel Drill press to bore out the tip. If your hands are not steady, using the press will yield good results for you. The technique for boring out plastic using a Dremel drill is the same as doing it manually with respect to using multiple drill bits and working up to the required diameter. The big difference with the Drill press is that you have to set up the part in a vice so that it is parallel and in line with the drill bit. Set up the drill press and install the first drill bit into the motor tool. Place the barrel between two strips of balsa wood so that about 1/4 inch of the barrel is protruding from between the balsa strips. Press the balsa wood strips together, and then position the sandwiched part into the Dremel vise and tighten it just enough to prevent any slippage. By pressing the balsa strips together, you will effectively push the part into the balsa, which will prevent the part from moving. Also be sure the barrel is straight. To ensure that the drill bit and part are truly centered, turn on the motor tool at its lowest speed and very carefully drill a slight indentation into the part just deep enough to see. If the indentation appears to be off center adjust the position of the vise accordingly and repeat the procedure. Also, do not forget to wear safety glasses.

Once you are confident that the bit is centered, you are ready to begin drilling. Keep the motor tool set at its lowest speed and do not let the bit come in contact with the plastic for more than a few seconds at a time. 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 also find that during drilling a thin layer of melted plastic has covered the drill bit tip. It can be easily removed with the tip of a number 11 X-Acto blades, but it is also an indication that you are drilling too fast.

For guns on bombers I recommend that you add gun sight rings and front sight aiming posts to the guns. Several photoetch manufacturers make excellent gun sight rings that can be easily installed with a small drop of super glue. To help secure the part in place, drill a small pilot hole at the location of the ring so that the rings post has a firm attachment point. Front sight aiming posts can be made from tiny lengths of plastic strip. Ammo belts can be added using Eduard's pre-painted photoetch gun belts. Masters has been producing fine quality brass machine gun barrels. The two part 30 and 50 caliber guns with separate cooling jackets are very impressive and easy to install. Another added detail is to attach lengths of clear nylon sewing thread or stretched sprue painted black with a sharpie to the back of each single gun and then attach both ends of the thread to the interior walls of the bomber. This will represent the shock cord, which held the guns in a stationary position and helped support some of the gun's weight.

When you are ready to paint the guns I recommend that you use a buffing metalizer gun metal color. Spray on two coats and polish the part with a Q-Tip. You will find that the cotton tip will only polish the larger raised surface areas resulting in a two tone appearance highlighting the gun's detail. You can also further enhance the appearance of the gun by drybrushing silver paint onto the barrel and onto the side of the guns base. The handles on machine guns were usually wood which can be replicated with a detail brush and a steady hand.

Another detail that you can add is to hollow out the shell ejection ports on fighter planes. Most fighter plane kits have very pronounced indentations in the lower wings for the shell ejection ports, but they are not hollow. To remove the plastic, drill a starter hole through the plastic and then enlarge the hole with a number 11 X-Acto blade. The outlines of the ejection ports will help 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.

FLYING WIRES

The are two challenges to building aircraft that have multiple wings, struts and flying wires. The first challenge is to ensure that the wings and struts are aligned correctly and the second one is adding flying wires and control cables. For 1/72 scale and 1/48 scale aircraft I like to use clear nylon sewing thread painted with a black or silver sharpie and I literally sew the flying wires onto the model. On 1/32 scale aircraft I like to use stiff steel wire painted with a silver sharpie.

Building biplanes requires some special construction techniques because you are dealing with multiple wing levels and wing struts that must be properly aligned. Just about every biplane I have built has had some type of minor fit problem with the struts and the upper wing, and the best way to detect these is to assemble the wings and the struts with masking tape to check the fit and to see how the wings are positioned. I usually build the fuselage and attach the lower wings first, build the upper wing and then set the struts and the upper wing with masking tape. In most instances you can solve a positioning problem by making slight adjustments to the upper wing and struts.

Another good reason to attach the struts and the upper wing with masking tape is that it will allow you to check and set the flying wire locations. Once the wings and struts are glued, there is not a lot of room to work between the wings so do the prep work before assembly. In order to do this you need to identify and mark the lower and upper termination points on the wings for the flying wires, and this can only be done with the wings set up in their correct locations.

Most 1/32-scale kits have the flying wire locations either marked or there are holes in the wings and the fuselage. Even with these marked locations it is a good idea to check your documentation to ensure that the manufacturer did not miss anything. Another important point is to be sure that when you drill holes, the angle that you drill is approximately the same angle that the flying wire will be set at on either the fuselage or the wing.

The drill bit size that you use should be slightly larger in diameter. The steel wire I use is .019 inches in diameter and the drill bit I use is a .020 - .021 inch bit (number 76/75) . This wire is readily available in hobby stores and it is usually found where the remote control aircraft parts are. The depth of the hole should be just deep enough for the wire to sit in. If the manufacturer did not provide at least a pilot hole location for the flying wires, I recommend that you consult your documentation, mark the locations and then drill the holes. Some aircraft have two sets of tandem flying wires which are evenly spaced at the connection points of the fuselage and the wing. Be sure that when you mark the locations of any tandem flying wires the spacing is the same.

Once you have finished locating and drilling the holes for the flying wires and you are ready to assemble the struts and the upper wing you will need to first paint the fuselage and lower wing. The struts and the upper wing will need to be painted separately and then attached. Keeping the upper wing and the struts separate will allow you to achieve a quality paint finish since airbrushing the underside of the wing and the interior struts after they are attached would be very difficult.

When you are ready to assemble the struts and the upper wing, position all the parts using masking tape. Be sure that you remove the paint from the gluing surfaces of the strut attachment points on the wings and the tips of the struts so that the glue will make a strong bond. When you are satisfied that the wings and struts are positioned properly, apply a drop of super glue to the lower strut locations. When the glue dries turn the model over and then glue the upper strut locations. When applying the super glue be very careful not to let the glue bleed onto the wing surfaces and remember that you only need a small amount at each location. To fill the voids where the struts attach to the wings use white glue as a filler, apply the glue with a thin wire applicator or a toothpick and then contour the glue with a damp Q-Tip. Apply touch up paint if necessary.

I cut a length of plastic strip the approximate length of a flying wire to get me started on achieving an exact length. I cut the wire slightly longer than the plastic strip and then carefully and slowly form fit each wire into place. The wires will bow at first, but that's okay. As you carefully trim a little bit of excess from its length the bow will become less and less until it is straight. At this point trim a little more so that the wire has some play in it, but still sits inside its holes. This provides for two things: you will not have to mark each wire for each location and it will compensate for the expansion and contraction of the plastic if the model is exposed to high or low temperatures. Plastic and metal expand and contract at different rates depending on the temperature.

Once you have all the wires cut, clean them with fine grit sandpaper or 0000 steel wool and then ink them with a silver sharpie. Some flying wires on late 1930's aircraft were stainless steel and you can duplicate this color by painting the wires with a chrome color. Install the wires one at a time working from the inside areas towards the outside and check the fit of each wire before you secure it in place. It is not necessary to glue the wires in place, but if you do, use tiny drops of white glue.

For 1/48 scale and 1/72 scale biplanes I use a sewing technique and nylon sewing thread. In this scale manufacturers usually did not provide location holes for the flying wires so you are going to have to mark these locations and the direction of the flying wires that emit from these holes. There are wires that are always in the direction of the wing spar (left to right) and sometimes there are wires from front to back and between the struts. It is important to set the angles of these holes so that the thread will appear straight as it comes out of each hole. Otherwise the base of the thread will have a slight angle to it. The holes that you drill need to also be drilled though the wing at each location.

When you remove a length of nylon thread from the spool it will have a tendency to coil up, because it has been tightly wound around a small diameter. Simply stretch the thread using slight pressure and it will lay straight. I always start with a length much longer than I need so that I have a lot of thread to work with. On 1/72 scale kits use black nylon sewing thread straight from the spool and for 1/48 scale kits paint the thread using a black or silver sharpie. Slice the center of the felt tip of the marker, tape one end of the thread to your work bench, stretch out the thread and then run the tip of the pen across the thread by imbedding it into the slice on the felt tip. Make a few passes, let the ink dry and then add a few more coats.

Now you are ready to sew the rigging onto the model. Using this sewing technique is especially helpful if you have multiple struts across the span of the wing and the flying wires are crisscrossed from left to right across the length of the wing and from front to back across the width of the wing.

The first rigging to add is from the front to back across the width of the wing between the struts. Cut lengths at least twice as long as you need and thread it through the appropriate holes. Secure one end with masking tape and then gently pull the other end tight and set it with masking tape. After I complete the entire front to back rigging, I check my work to insure that everything is set correctly and the thread is taught. I then apply a tiny drop of super glue onto each hole on the outer surfaces of the wings. The glue will bond the thread to the plastic almost instantly. The capillary action of the super glue will pull it into the hole making a very strong bond between the nylon thread and the plastic.

Remove the masking tape and repeat the process for the opposite side of the wing. After the glue has dried carefully cut the nylon thread flush with the surface of the wing using the tip of a new number 11 X-Acto blade and then add enough super glue to each location to fill and seal the holes in the upper and lower surfaces of the wings where the thread was cut.

For the wires that go from left to right, sew the rigging on the wings starting from the outer end of the wings working towards the fuselage. The starting point will need to be attached with masking tape and as you carefully loop the thread through the holes be sure to leave excess thread between them as you come up through the outer wing surface and then sew down into the area between the wings. A one inch loop should be just about right to work with once you have completed sewing a length of the thread. Each loop should also be secured with masking tape so that the thread remains taught as you sew. Again secure the finished end with masking tape. When you have completed all the sewing along the length of both wings carefully check your work. Correct any mistakes and be sure the thread locations and positions on both sides of the wings match. Gluing these long lengths of thread is a stepped process and here is where the loops on the outer surfaces of the wings are needed.

Secure one end of the thread with super glue, carefully pull the thread tight along the first length using the loop, re-secure the thread with masking tape and then place a drop of super glue into the hole. Now that the first length of thread is taught, remove the masking tape, apply a drop of super glue to the hole where the looped thread goes into and then repeat the process for the next length of thread. This stepped approach takes a little time to complete, but when you are done all the lengths of thread will be taught. Next trim off all the excess thread and fill the holes with super glue.

After all the glue dries carefully scrape the super glue flush with the wing using the tip of a number 11 X-Acto blade and then lightly wet sand each location using a small strip of 400 – 600 grit sand paper wrapped around a length of balsa wood so that the sanding would be confined to a small area around each hole. If the holes are located close to a wing tip you can also use a sanding stick. Check your work with silver paint, and add more super glue if necessary and sand again. Once you are satisfied with the surface, polish the surface with a 0000 steel wool pad. The steel wool will also blend in the surrounding paint. As you sand you will notice that the completed assembly is very strong and that's because the rigging is secured with super glue and the nylon thread adds strength to the finished assembly making sanding and scraping easier.

If your wing surface has canvas surface detail you can simulate this by roughing up the sanded areas with courser steel wool. Use your airbrush to remove any residual plastic dust and steel wool residue and then spot prime the bare areas overlapping slightly onto the painted surfaces. Next spray the finished coats onto the surface and again overlap. Light, thin coats will blend into the surface rendering the areas your worked on invisible.

CONTROL CABLES

Control cables were exposed to some degree on many biplanes, but as aircraft designs improved, aileron and elevator control cables were incorporated into the wings and the fuselage. As in the case of flying wires, sometimes kit manufacturers locate the holes in the fuselage and provide control horns where the control cables emit and attach to on the control surfaces and sometimes they do not.

If there are no holes in the fuselage for the tail surface control cables, mark these locations by checking your documentation and then drill these holes into the fuselage. After you start the hole I recommend that you angle the hole in the direction of its attachment location on the rudder or the elevator. This way the cable will appear as though it is angled correctly as it protrudes from the fuselage. Also be sure that the holes that you drill on both sides of the fuselage are symmetric.

For 1/32 scale aircraft you can use stiff brass wire, which comes in smaller diameters than .019 inches and for 1/48 and 1/72 scale aircraft just use nylon sewing thread. The appearance of how the control cable emits from the area of the fuselage or the wing is important as it should be straight and not appear to be curved or bent.

If you are building a 1/48 or 1/72 scale kit you can glue the control cable to the tip of the control horn and for 1/32 scale kits use a number 11 X-Acto blade to notch out the top of the control horn. Insert the control cable into the fuselage first and glue it in place. Then stretch it out across the top of the control horn and use a length of masking tape to secure it. Add a drop of super glue to the top of the control horn and then trim the thread. For 1/32 scale aircraft cut the stiff brass wire longer than is needed, slip it into the hole on the fuselage and then carefully position the other end onto the top of the control horn. It is important to not have any excess on the control horn as it will be difficult to trim the wire once it is glued into place.

Some kits have no control horns but, you can add these using tiny lengths of plastic strips. Be sure that you locate the control horns on both sides of the rudder and on the ailerons so that they are at the same locations. The edges and the tops of the control horns on 1/32 scale kits should be tapered and on 1/48 scale and 1/72 scale you can use small diameter plastic rod to simulate the control horns. After you have installed all the control cables be sure to add a touch of the appropriate paint to the tops of the control horns.

ANTENNA WIRES

Many types of propeller driven aircraft had some type of wire antenna that extended from a vertical antenna to the tail. On the other hand, jet aircraft have no antenna cables, but they do have small metal protrusions, which can receive and send all kinds of electronic signals. These protrusions can be found on the surfaces of jet aircraft as well as advanced propeller driven aircraft such as the US Navy and US Air Force Douglas A-1 Skyraider.

For antenna wire I have found that the easiest type of material to work with is clear nylon sewing thread. I recommend using this exclusively for antenna wires. I always start with a length much longer than I need so that I have a lot of thread to work with. For 1/72 scale aircraft use the clear or black thread right off the roll and for 1/48 and 1/32 scale add color to the thread to slightly thicken its appearance with a black or silver sharpie. If one end of the antenna wire attaches to the tail and most did, drill a small pilot hole. In most cases the other end will attach to a vertical antenna protruding from the upper area of the fuselage. I like to drill a small hole all the way through the vertical antenna so that I can push the thread all the way through it.

I usually glue the end that attaches to the rudder first by dipping the tip of the thread in a puddle of super glue and then pushing the thread into the hole. It's important to keep the thread as straight as possible until the glue dries, which should take less than a minute. I then run the other end of the thread through the hole in the vertical antenna, tension the thread and then tape it to the fuselage. If you need to adjust the tension in the thread simply move the tape. Once I am satisfied with the appearance of the thread I add a small drop of super glue to both sides of the antenna where the thread is, let the glue dry and then cut the thread with the tip of a single edge razor blade. I lightly sand the end where the thread was cut with a sanding stick to contour the glue and then add some touch up paint to the antenna and to the attachment point on the tail. To simulate antenna insulators just add a small drop of white glue, let the glue dry and then color it with a sharpie or a detail brush.

On modern jet aircraft, antennas usually take the shape of small, thin squares or rectangles on the fuselage. Square or rectangle shapes can be made from Evergreen or Plastruct plastic strip. Choose a thickness and width that appears to provide a scale appearance and then cut the necessary lengths using your Northwest Short Line chopper. I like to use my chopper for these types of details, because you can easily duplicate lengths when you need a lot of pieces the same size. When you attach these parts the trick is to be sure they are straight. If you have steady hands you can attach them with super glue but I like to use tiny quantities of Testors tube glue so that I have some working time to get the small part positioned correctly. If you are attaching them after the fuselage and parts have been painted, use tiny drops of white glue.

BOMBS

Every country has different color codes for their aircraft bombs. World War Two bombs were usually olive drab, black or gray and had yellow strips to signify that they were high explosive. The paint on bombs ranged from pristine to faded colors with some specs of surface rust. What was important was that their fuse assemblies were in good working order and the fins, which provided some flight trajectory were not damaged. The yellow strips could be located on the front area or in the aft section of the bomb and there can also be more than one yellow stripe.

Some kit bombs are halves with separate fins, or the fins can be attached to each half. If the bomb halves also have the fins be sure that they line up correctly. Misaligned bomb fins are very noticeable on external bomb racks. If the fins are separate and need to be assembled you need to be sure that the fins line up and that the base of the fin sits on the back side of the bomb correctly.

There are also an abundance of after market resin bombs to choose from. Resin bombs do not have seam issues and several manufacturers produce many different types of bombs all of which are beautifully cast and detailed. They all have some type of pour plug that will need to be removed so be sure to wear a dust mask and wet sand as much as possible to reduce the amount of resin dust. Some resin manufacturers also have photoetch parts associated with some of their products and these can add another level of realism to the overall appearance of your model.

Reference pictures for bomb racks on fighter planes and bombers is important and should be reviewed so that you can add details where needed. Most external bomb racks had adjusting screws to both hold the bomb straight and eliminate any movement or vibration. There were two screws on each side, one forward and one towards the back. If the kits bomb racks to not have this detail you can add it using small diameter rod and tiny disks punched out with a punch tool. There were usually instruction stencils located on both sides of the bomb racks so do not forget to add them.

The bomb racks for bombers were usually strong metal frames which held the bombs in vertical rows. Some manufacturers provide these accurately and others provide a solid length of plastic with raised framing detail. Here again check your documentation to determine if the bomb racks are accurate. If the bomb rack is framing and the kit part has a solid backing run the part across a stationary piece of sand paper to thin out the plastic until its paper thin and then cut out the remaining plastic between the framing.

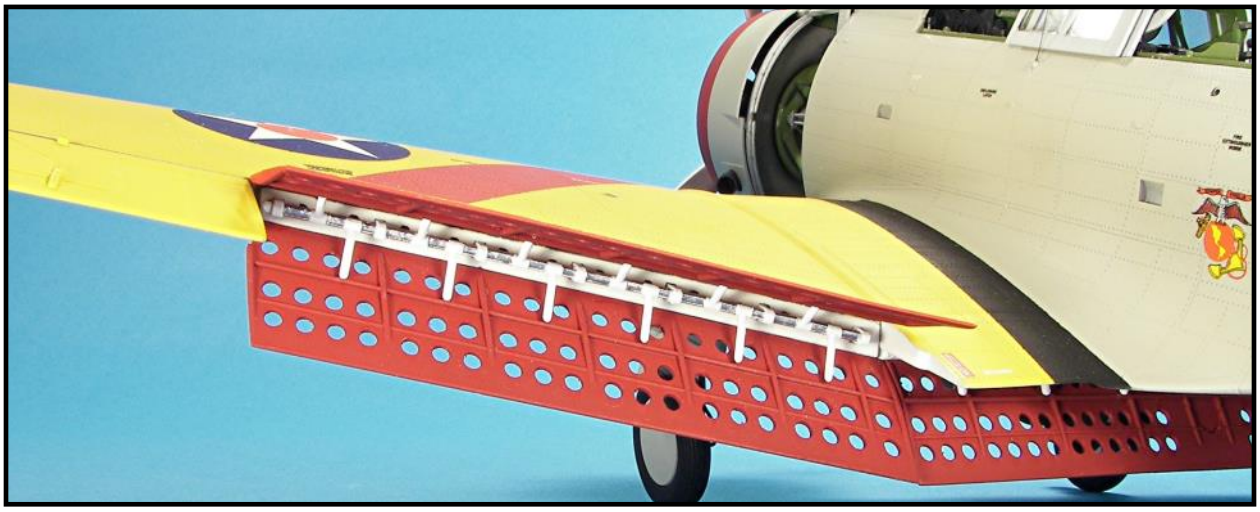
KIT SUPPLIED SEPARATE CONTROL SURFACES

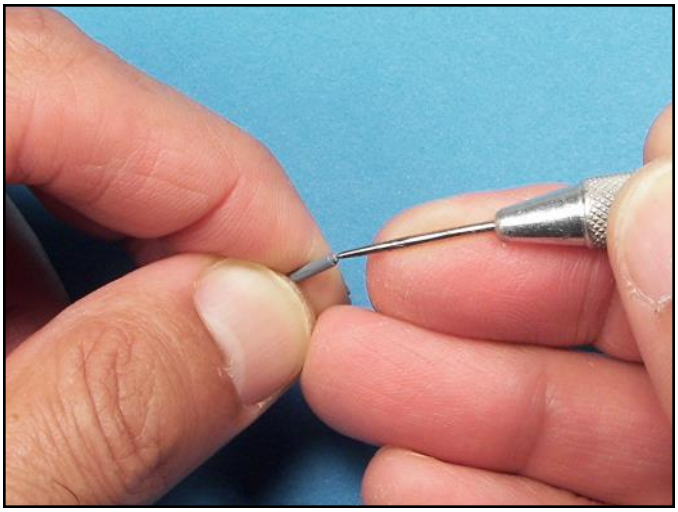
Some manufacturers provide separate control surfaces and flaps and they usually require some assembly. Be sure to test fit these parts as sometimes they do not fit correctly and will need some tweaking. In most cases the hinge openings may need to be opened up a bit or a flap may require some extra plastic laminated to one end to lengthen it and improve its fit. Most manufactures have separate control surfaces and flaps designed so that they connect to their respective locations with plastic stubs. However, some manufacturers also provide separate metal hinges for control surfaces and flaps so that they actually rotate. These metal hinges usually need to be tweaked to get them to work correctly and I recommend that you discard them as the control surfaces and flaps can sometimes be attached without them.

If the aircraft has more than one rudder be sure that they are positioned in the same direction. Elevators are usually two separate pieces and care will also need to be taken to be sure that they are both set at the same angle. Ailerons need to be set in opposite directions, but the angles need to be the same. Flaps usually rotate down and out so as to increase the surface area of the wing, but some flaps like those on a B-17 Flying Fortress just rotated down. For flaps that rotate down and out be sure that their position extension from the wings is the same for all the flaps and that their angles are also the same. For kits that have metal attachments for flaps, they usually need to be modified to get them to fit correctly and they will need to be test fitted to be sure that they are seated correctly into the plastic slots located inside the wings before the wings are glued together. Here again, all the flaps need to be positioned the same so that they have the same extension and angle.

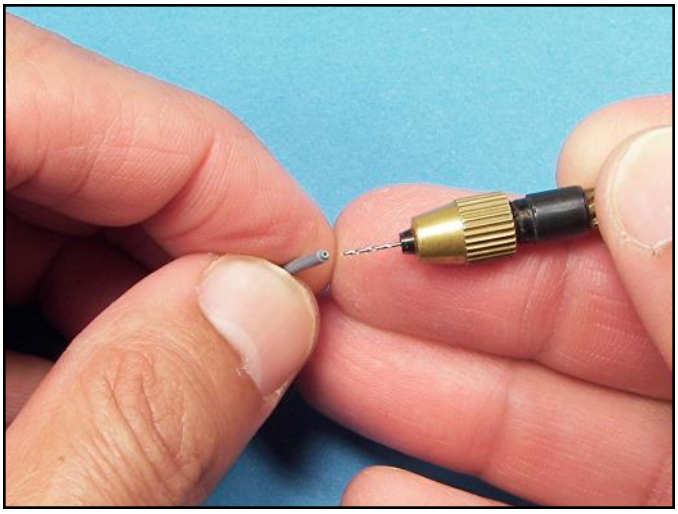
NAVIGATION, FORMATION AND LANDING LIGHTS

Most kits have clear plastic parts for navigation, formation and landing lights, but not always. If the kit has clear parts for the wing navigation lights and the formation lights paint the undersides of these parts with gloss colors and glue them in place with white glue. If the landing lights are separate, paint the back side silver or white. If there are no clear parts for the wing lights, you will need to mask these areas and airbrush them red and green. The tail light is usually well detailed and small so use a detail brush to paint it white. Formation lights usually have raised rings and if you use a round toothpick to apply tiny amounts of paint at a time the paint will puddle inside the ring. Leading edge landing lights usually have a clear part but no light lens. HO scale model railroad lenses are perfect for landing lights and they come in different diameters so they can be used for any scale.





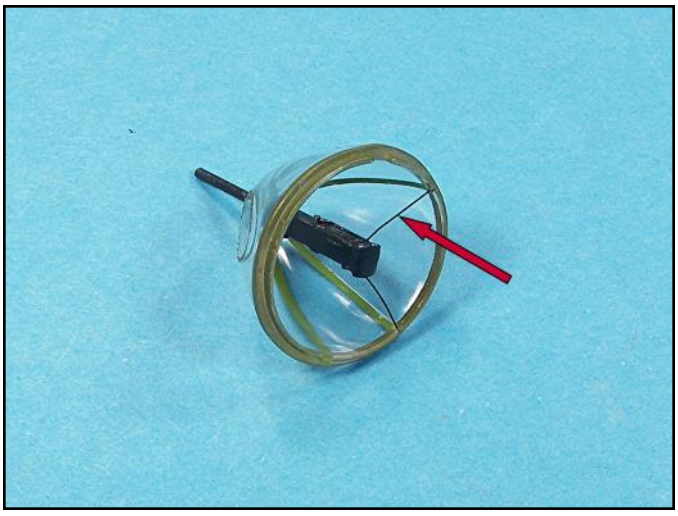
To hollow out the end of gun barrels, first indent the tip to create a pilot hole for the drill bit. This will prevent the drill bit tip from skipping across the surface of the plastic.



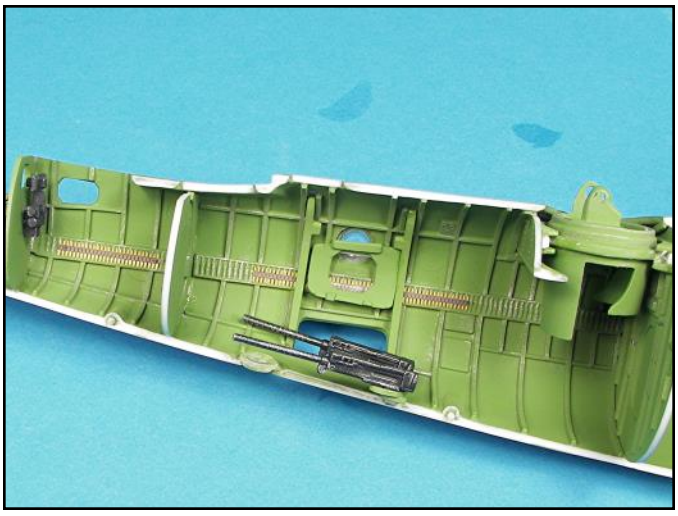
I like to start drilling with a small drill bit to check the centering of the hole and then work up to the drill bit that has the correct diameter.

This machine gun barrel looks much better with the tip hollowed out.

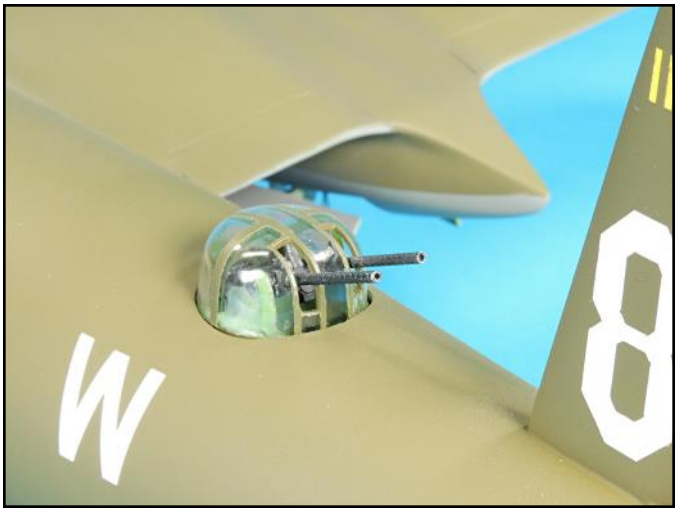
Some older kits use white plastic and the best way to work with them is to prime them first. This highlights the mold seam and any other imperfections that will need to be corrected.



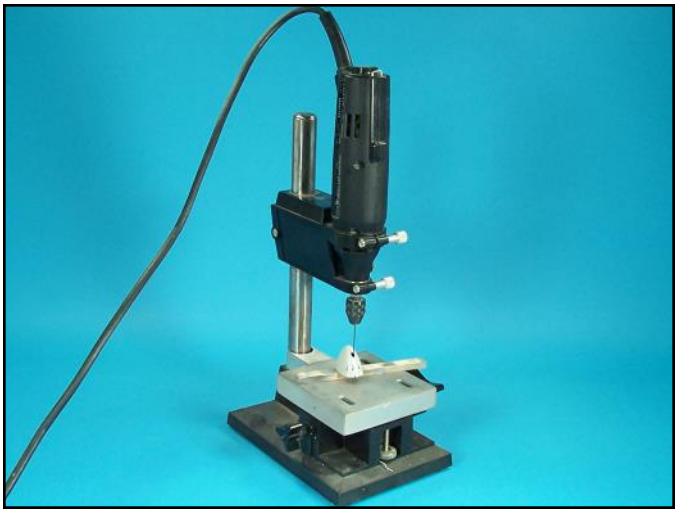
The nose guns were held in place with shock cord, which can be simulated with stretched black sprue.



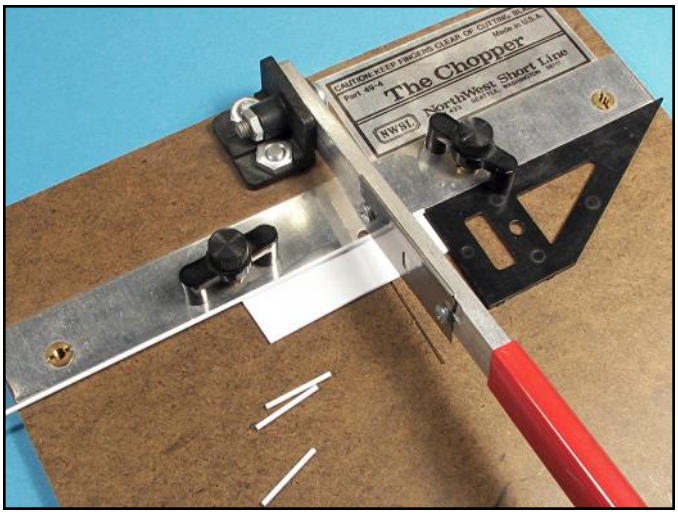
The guns on this B-26 were airbrushed gun metal and then drybrushed with silver paint to highlight the edges and the guns cooling jackets. The gun belts are Eduard pre-painted 50 caliber belts.



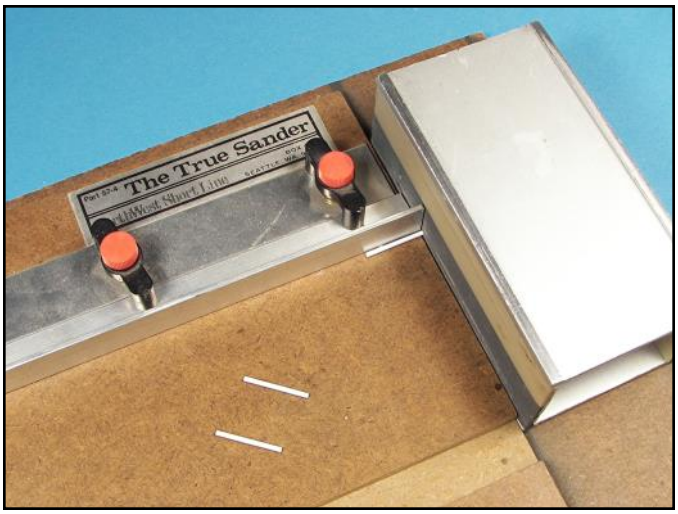
The 1/48 scale 50 caliber guns on this B-26 look much better with some silver drybrushing and hollowed out tips.



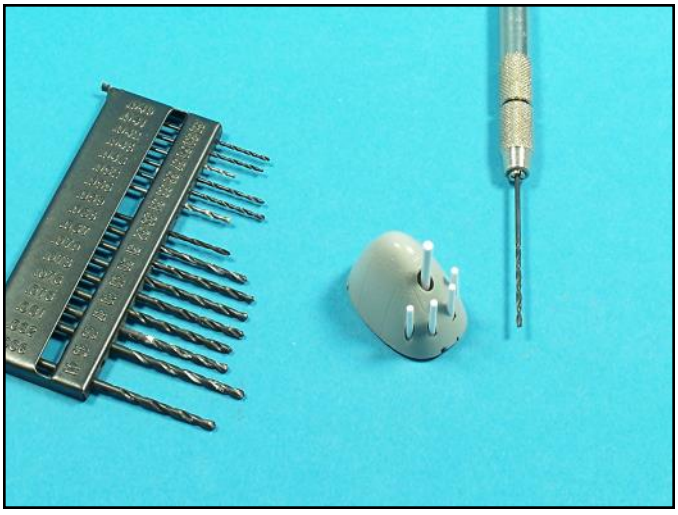
This Dremel drill press was used to center the holes for the plastic rod that will replace the kit supplied gun barrels for a 1/32 scale P-38 lightning.



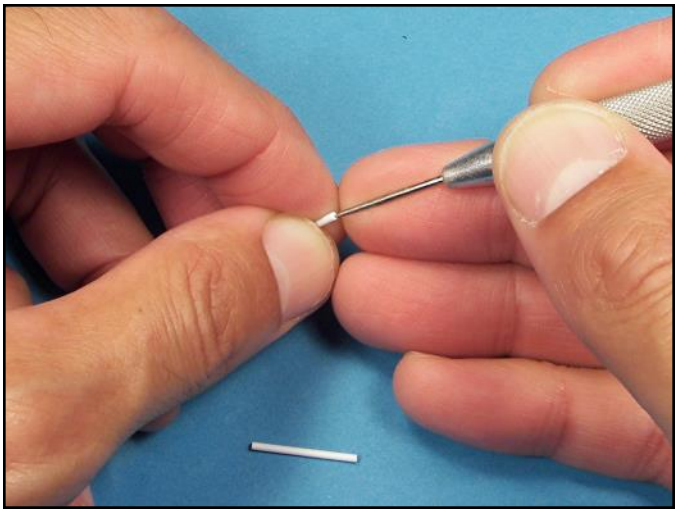
The plastic rod for the P-38 replacement gun barrels were cut to the correct lengths using a Northwest Short Line Chopper.



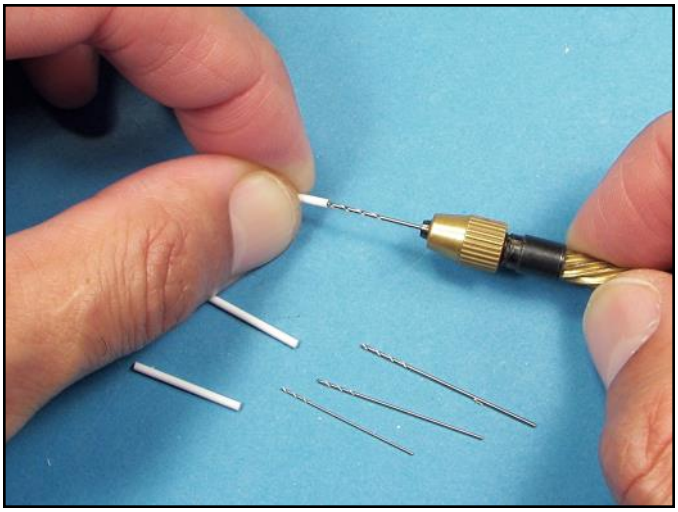
The tips of the rod lengths were flattened using a Northwest Short line True Sander.



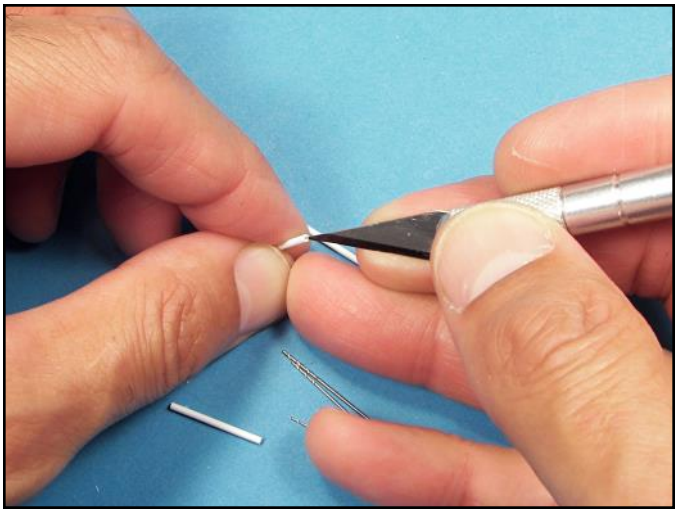
The new P-38 gun barrels are getting a centering check to be sure that they look good.



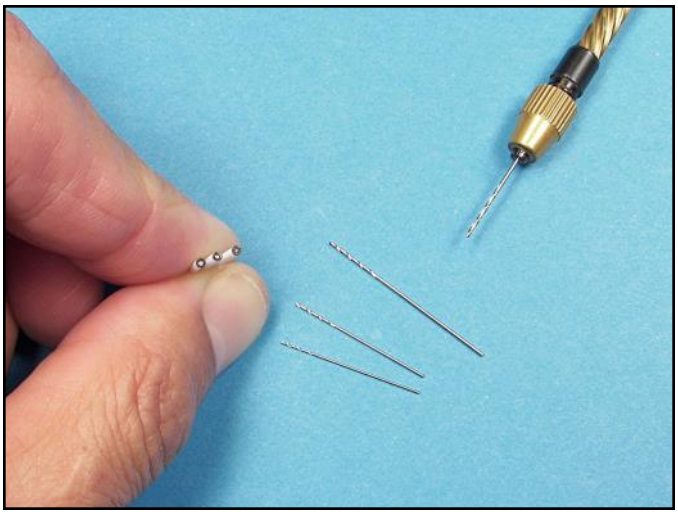
The tips of the barrels were then center punched for the drill bits.



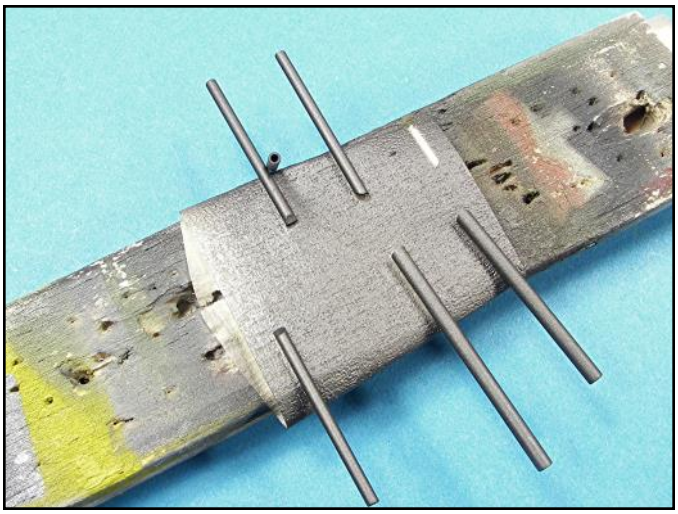
The tips of the barrels were then drilled out starting with a small drill bit to check the centering of each hole.



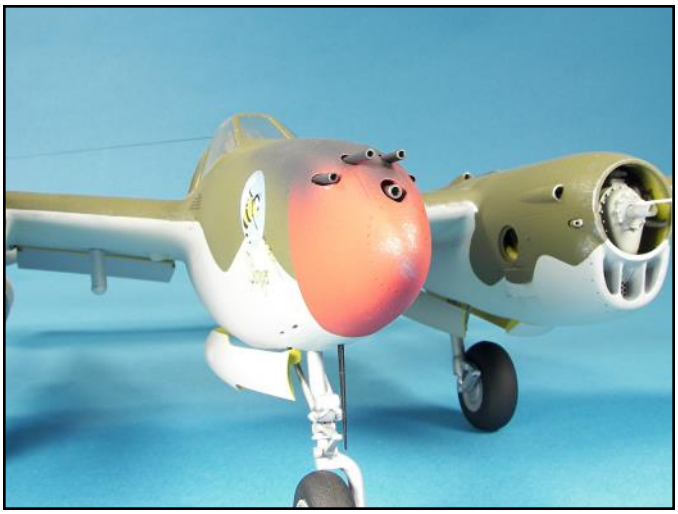
If a hole is off-centered you can correct it by using the tip of a number 11 X-Acto blade to remove the off-centered plastic. Use a larger bit to create a new, centered hole.



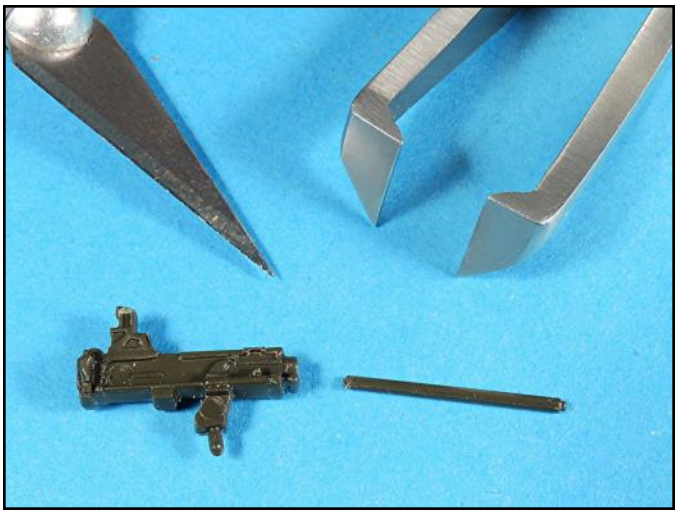
Here are the stages of drilling using progressively larger drill bits. Coloring the tip with a black indelible marker helped to center punch the tiny surfaces of these barrels.



The gun barrels were airbrushed with a buffing gun metal metalizer color. The barrels were then polished with a Q-Tip.



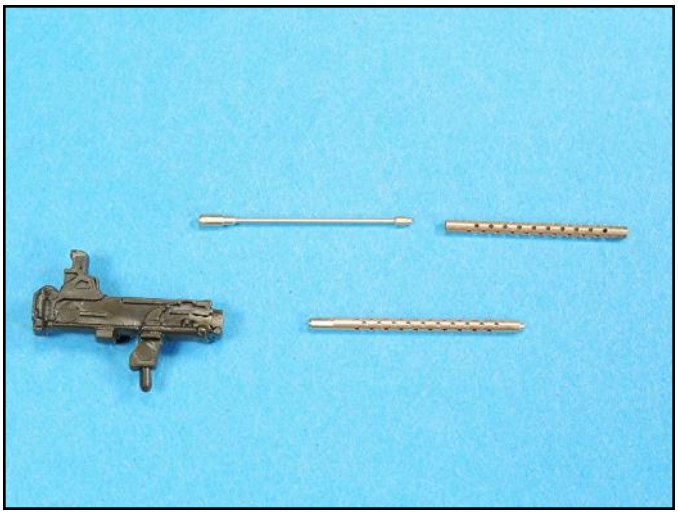
With careful drilling by hand and working up to the diameter opening you want to achieve using progressively larger bits, you can achieve very thin walls.



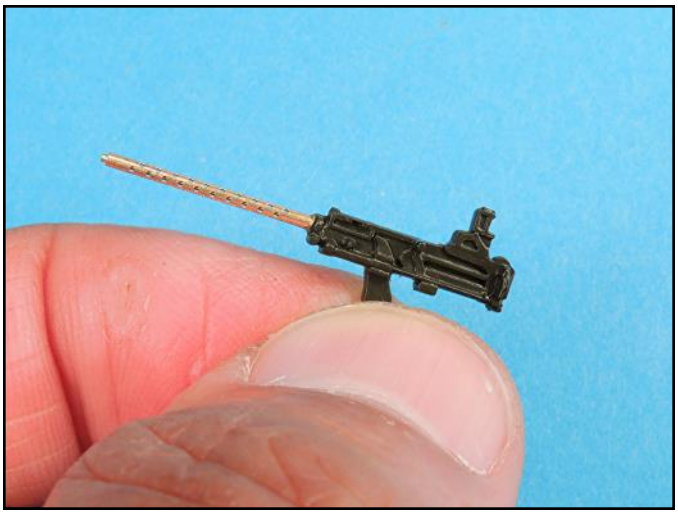
The first step in preparing a machine gun for a “Masters” 2 part brass barrel is to carefully snip off the plastic barrel at its base and then cut the surface of the plastic smooth.

With the flat surface center punched, it was initially drilled out with a .021 inch (number 75) diameter drill bit. The hole is about half way to its final diameter.

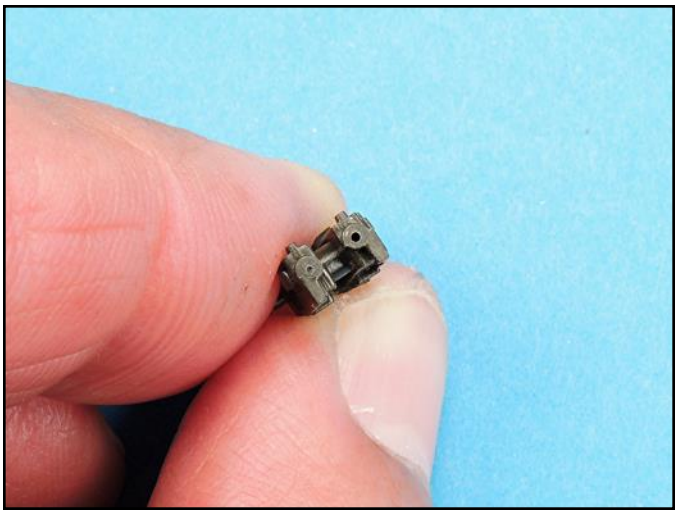
The final diameter for the Masters barrel is .039 inches (number 61), which is slightly larger than the diameter of the brass barrels base.



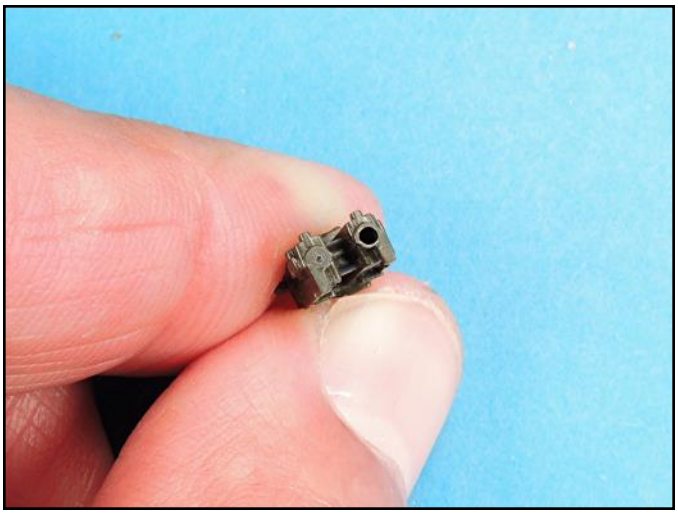
The brass parts were soaked in thinner for a few minutes to remove any cutting lubricants. The centers of the cooling jackets were also reamed out with a .026 inch bit (number 71) to remove any tiny brass burs.



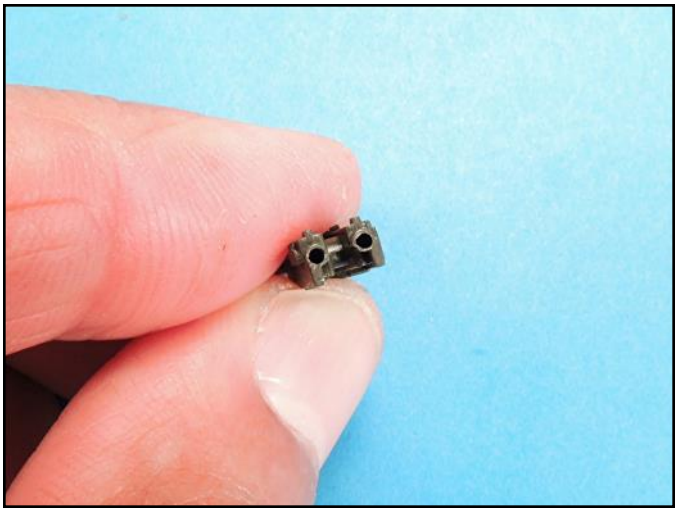
The barrel and cooling jacket were super glued together. A small amount of white glue was placed inside the hole and then the barrel was positioned. After the white glue dried a tiny drop of super glue secured the brass to the plastic.



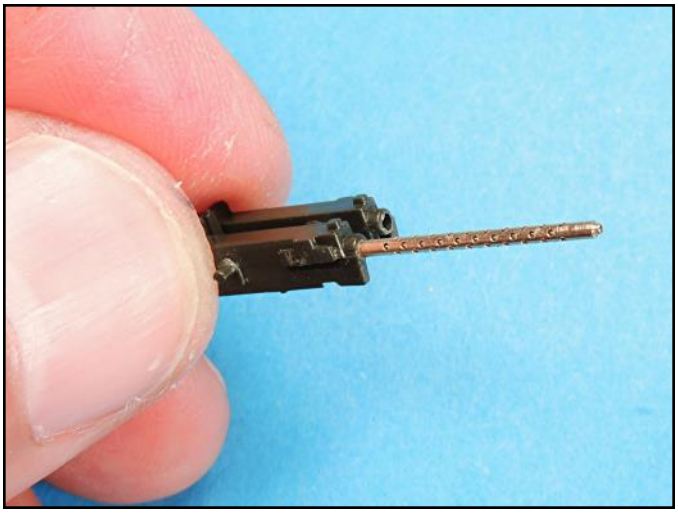
For duel machine guns, careful drilling to ensure that both brass barrels will be positioned correctly is very important. The pilot holes were set first and then one hole at a time was drilled out.



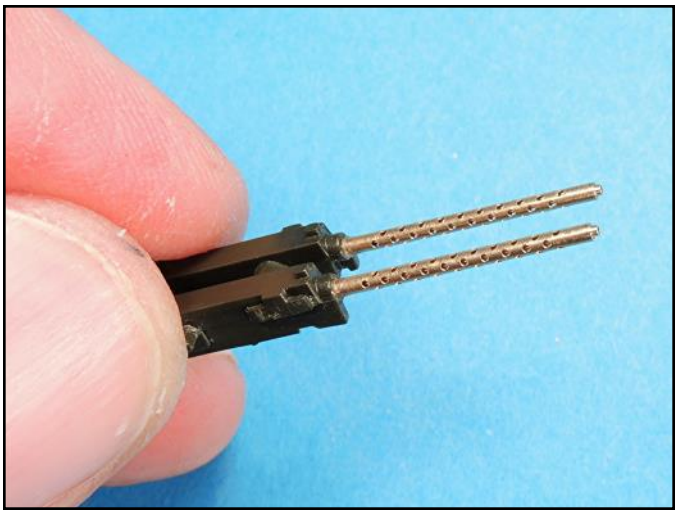
Careful drilling and using progressively larger drill bits from .021 to .039 inches in diameter can achieve very thin plastic walls. The drilling has to be done manually so that no heat is generated, which can melt the plastic.



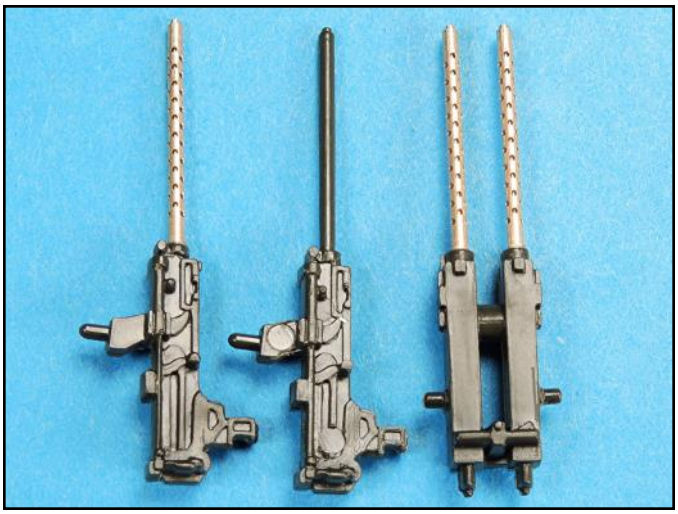
The second hole was dilled out and now this dual 50 caliber machine gun is ready for its two part brass barrels.



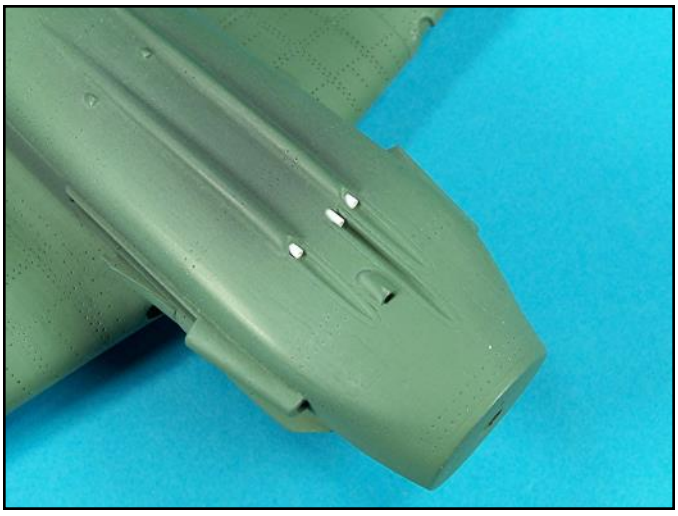
The first barrel is set in place with white glue so that minute adjustments can be made to its positioning.



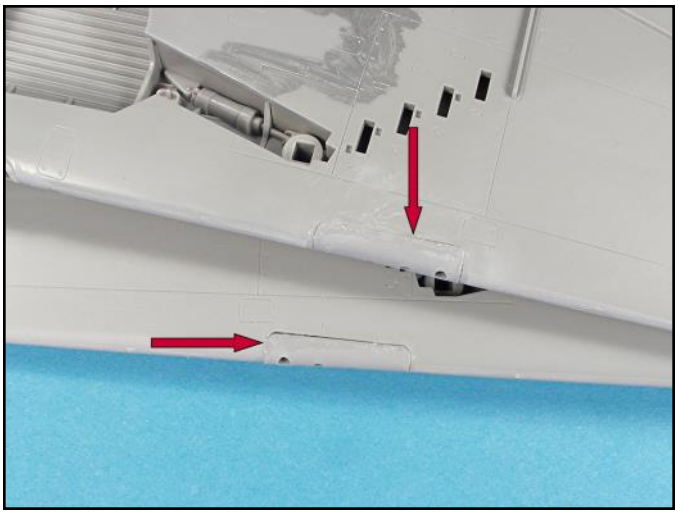
The second barrel is then white glued into place and both barrels get a final adjustment to be sure they are straight. Once that is achieved, the barrel's bases get a tiny drop of super glue to secure them in place.



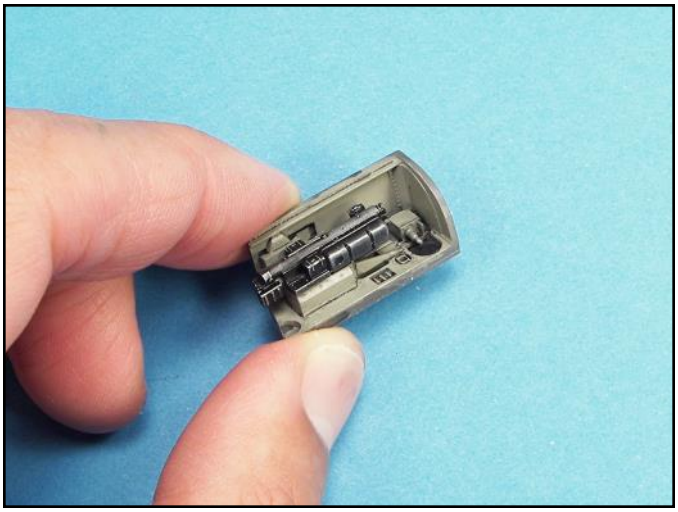
The masters two part brass barrels are an amazing product and greatly enhance the appearance of machine guns. On these guns, Eduard's pre-painted 50 caliber ammo belts will be added to further enhance their appearance.



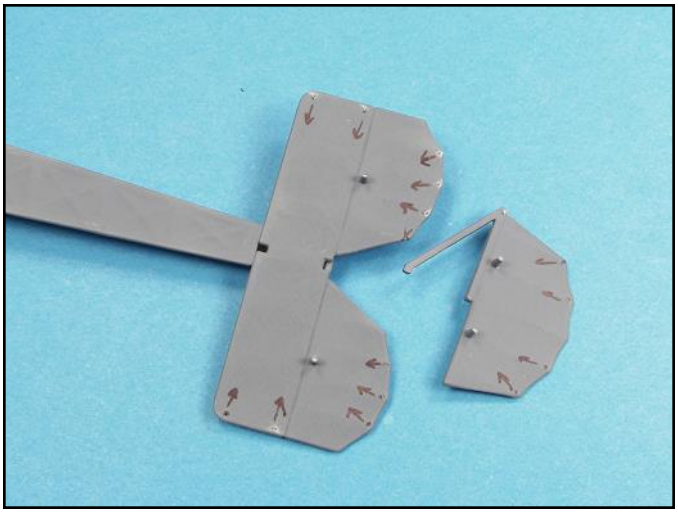
Plastic rod is test fitted into the cowling openings of this Mig-3 to ensure that they sit correctly and have the proper lengths.



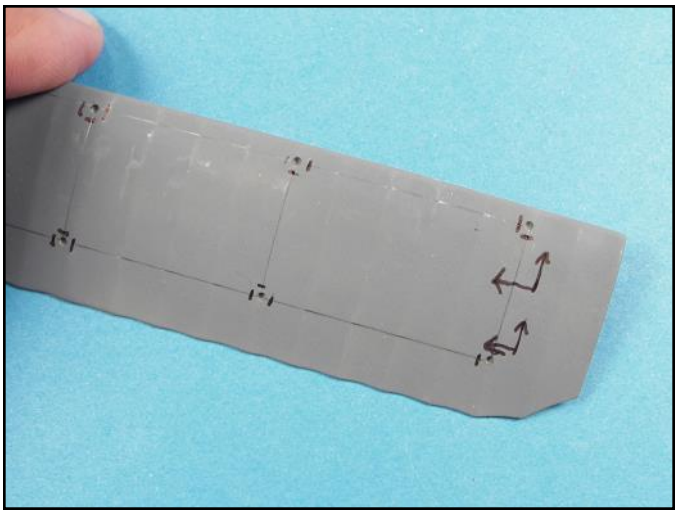
The leading edges of these P-47 wings had separate parts for the machine guns. These separate parts did not fit well so the guns were added during the final stages of assembly and after all the aircrafts surface painting was completed.



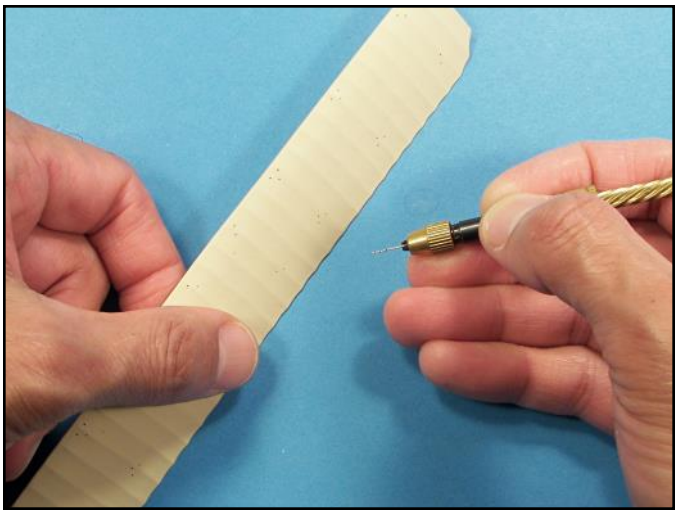
This resin machine gun base and compartment were all one piece. Here is where careful painting, masking, detail painting and buffing makes all the difference. The detail buffing was achieved with Tamiya tiny shaped cotton tips.



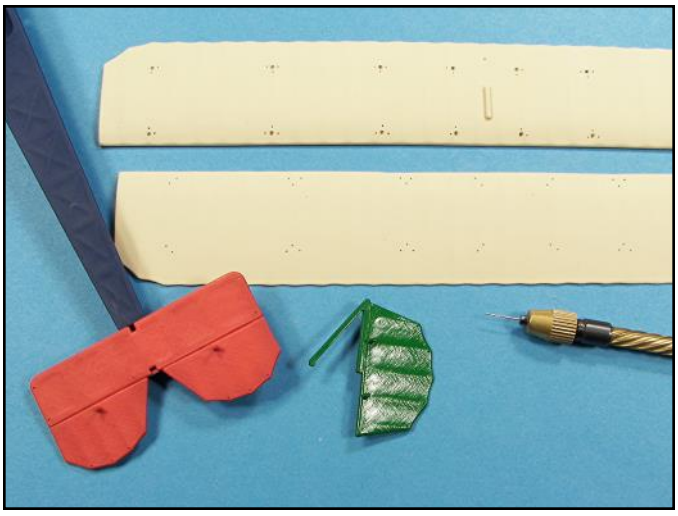
Flying wires on biplanes should be carefully planned. The holes drilled for the wires need to be angled so that the material used for the wires will be straight. Arrows help set the angle locations.



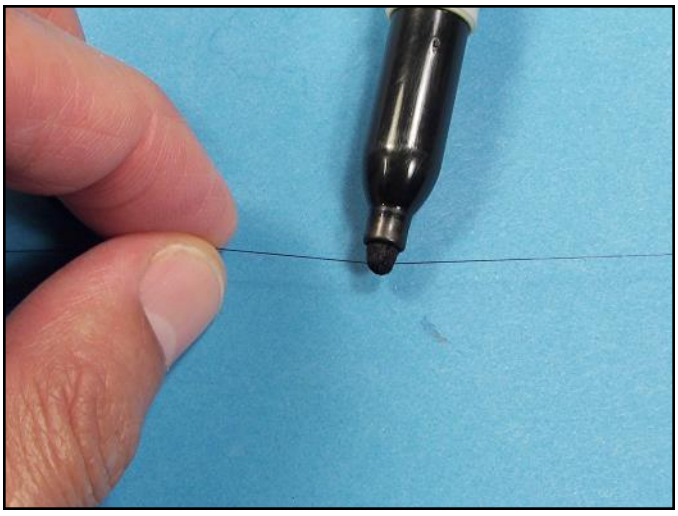
Setting the locations of the flying wires on the wings is especially important. There are sets of wires from front to back and left to right between each strut. Here again the holes need to be slightly angled.



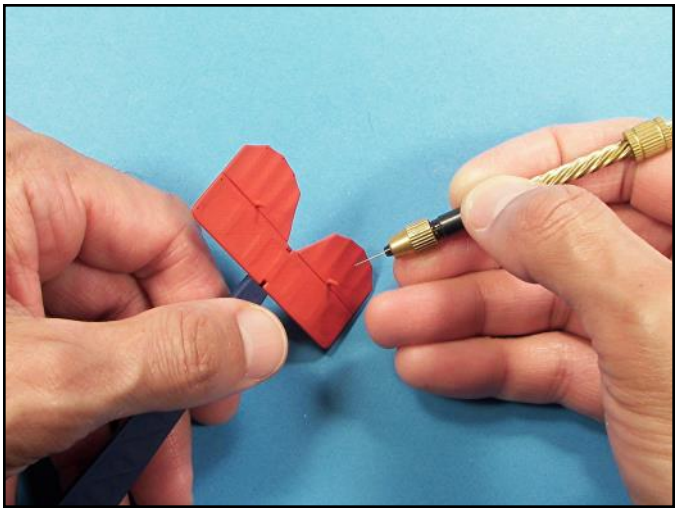
After the wings are airbrushed the holes should be re-drilled as paint can clog the tiny openings. For this 1/48 scale biplane the holes were drilled with a .0145 inch (number 79) bit.



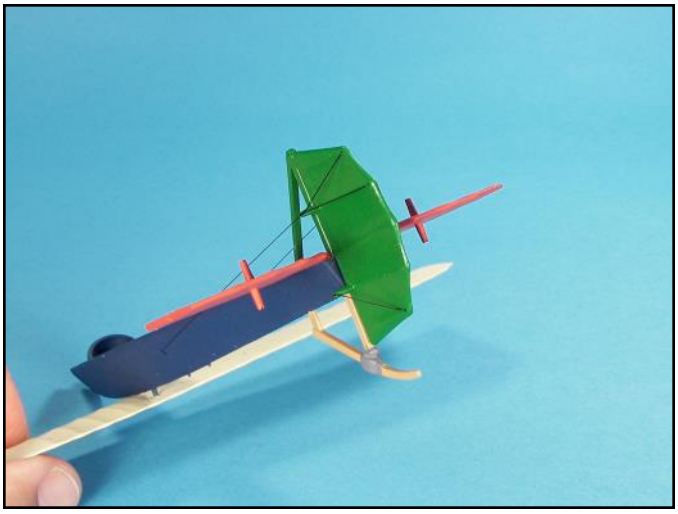
For the flying wires between the wings and on the tail surfaces, the holes were drilled completely through the wings.



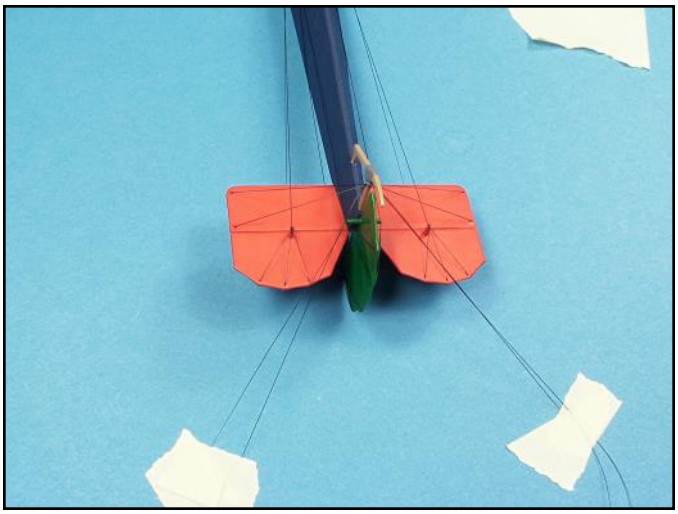
For 1/48 scale biplanes I use nylon sewing thread inked with an indelible marked. The sewing thread is also stretched to straighten it before inking it.



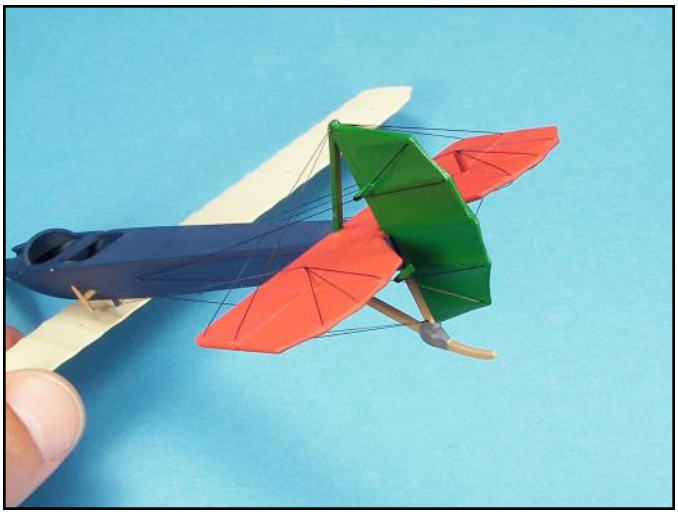
The control surface horns were notched at their tips to accept the control cables. Some additional holes were drilled through the tips of the control surfaces for additional wires.



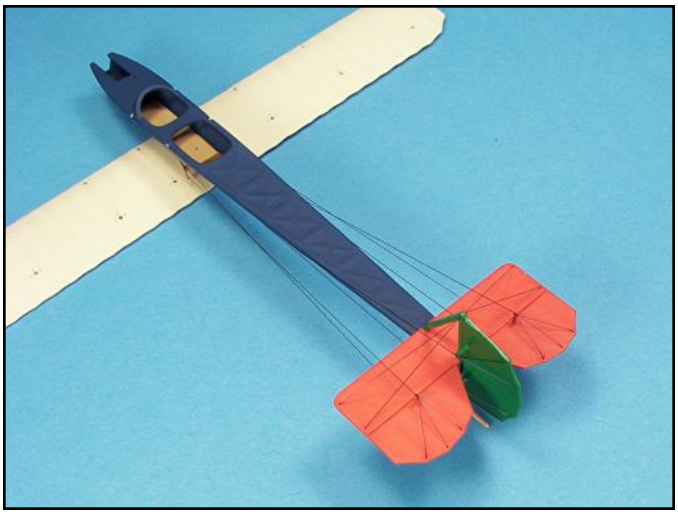
Note how tight the wires are. This is achieved by having holes drilled through the control surfaces so the inked thread could be sewed through them and then super glued into place.



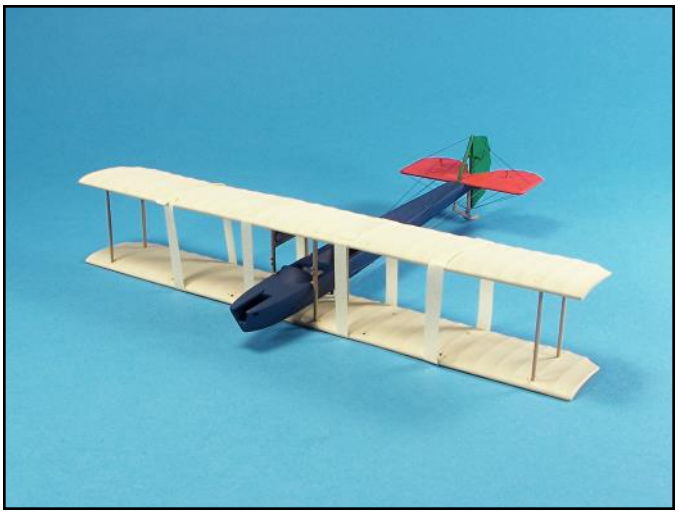
To help keep control wires and flying wires taught, use lengths of masking tape to set them in place. Apply tiny drops of super glue at their termination points and then carefully trim off the excess.



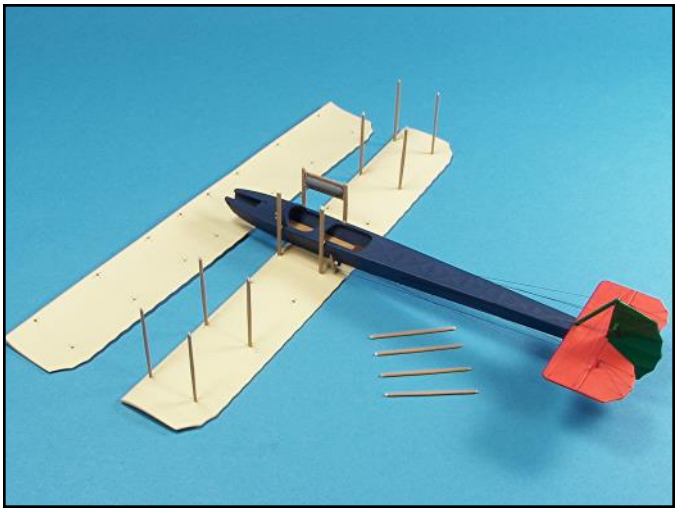
The control wires should be tight and positioned in the same locations on both sides of each control surface.



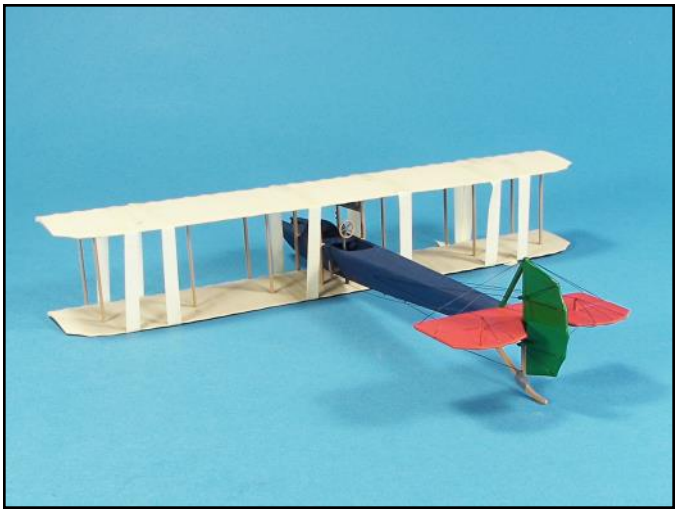
With the rudder and elevator control surface wires completed, its time to start working on the wings.



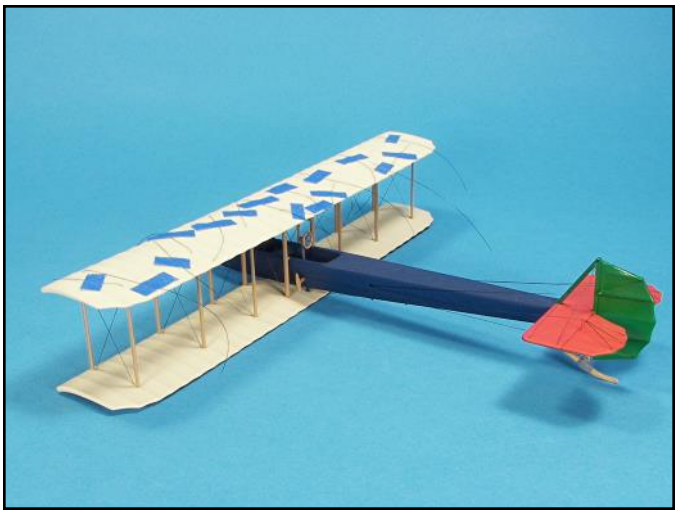
The struts and upper wing were carefully positioned and then lengths of masking tape were used to ensure the struts were tightly seated into their positioning holes in the wings.



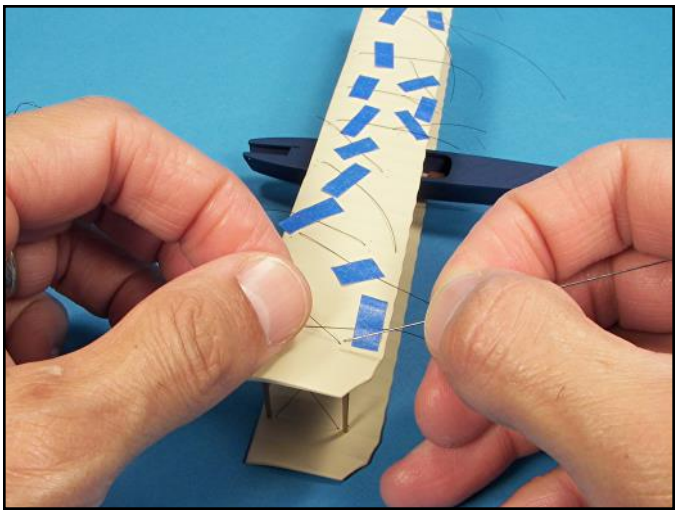
Positioning the struts is a stepped process. With the outer struts completed and glued to the lower wing is time to set the remaining struts.



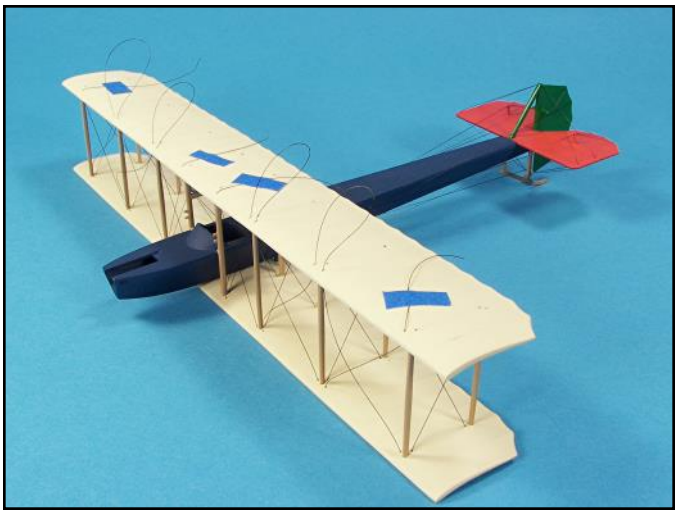
Here again lengths of masking tape were used to position the remaining struts and the upper wing. At this point everything is glued into place with tiny drops of super glue.



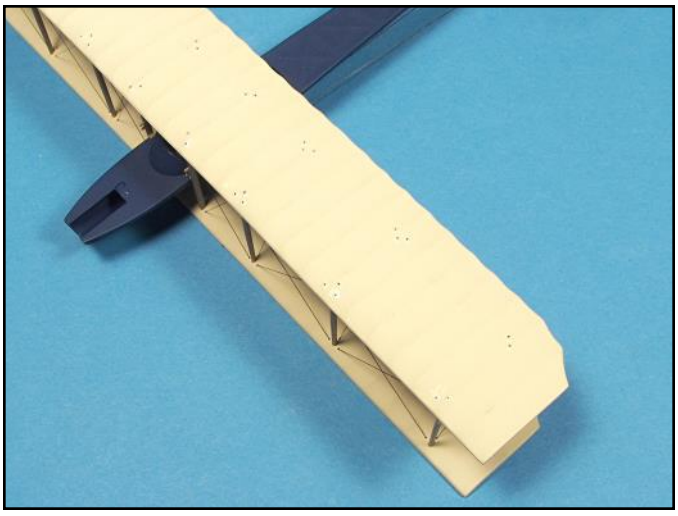
The flying wires running from front to back were sewed into place first. Masking tape was used to hold the lengths of nylon thread in place and keep all the lengths very tight.



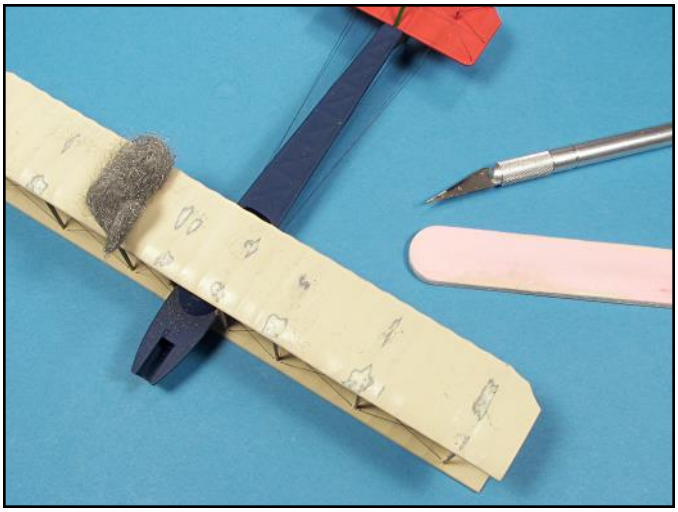
Tiny drops of super glue were applied to each opening with a .019 inch stiff wire. These lengths were then cut at the base of each opening with the tip of a number 11 X-Acto blade. All the tape was then removed.



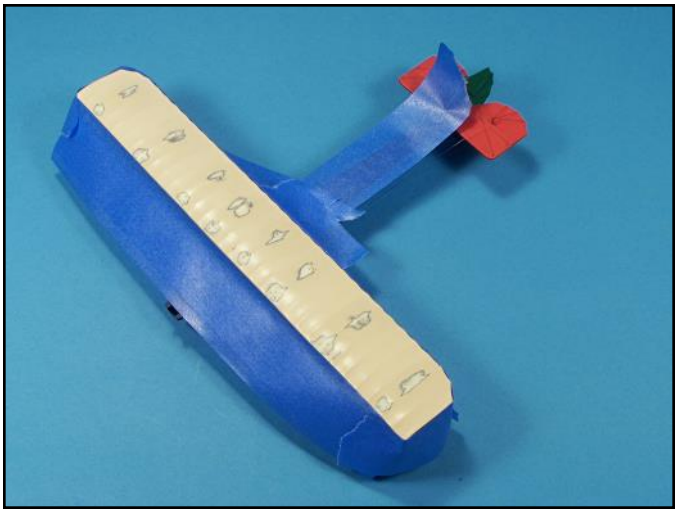
The flying wires from left to right were then sewed into the wings. Note the loops. Here again masking tape was used to keep all the lengths straight. Once they were glued, the excess lengths were cut off on upper and lower wings.



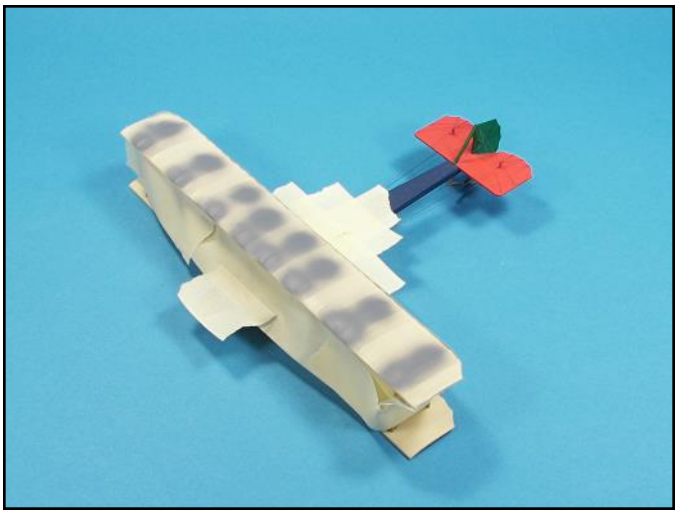
Each flying wire hole on the upper and lower wing was carefully trimmed again so that no stub protruded from the wings surface.



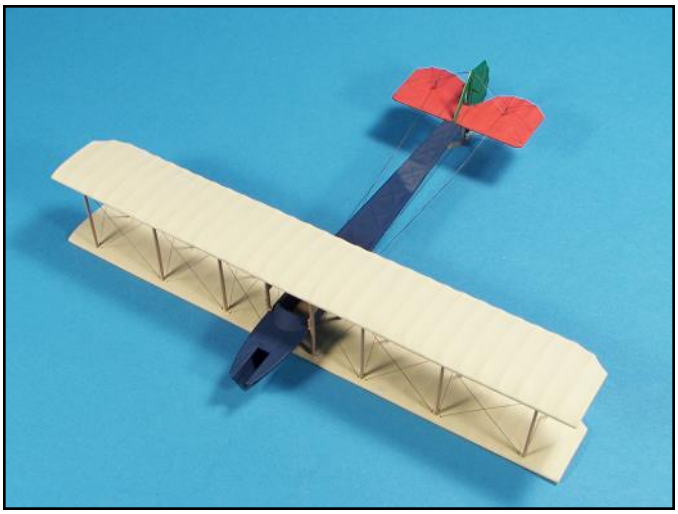
The areas where the holes were located were carefully wet sanded with a sanding stick, checked with silver paint and then the surfaces were polished with 0000 steel wool.



The wings and fuselage were carefully masked. The blue masking tape did not stick well to gloss paint so I had to re-mask with my regular masking tape.

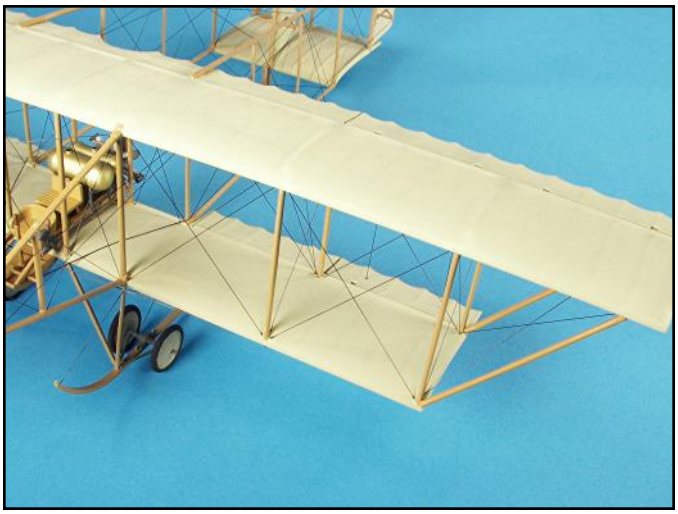


The surfaces were primed and then given two coats of the finished color.

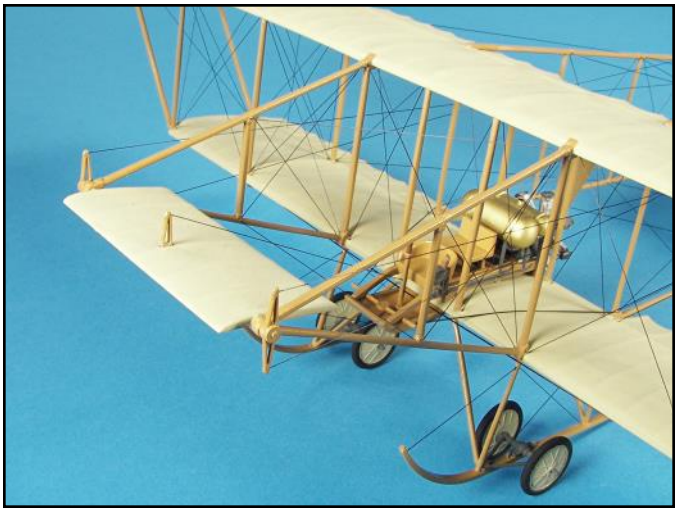


The wing surfaces look great and the addition of the nylon thread that was sewn between the upper and lower wings added great strength to the assembly making it easy to handle.

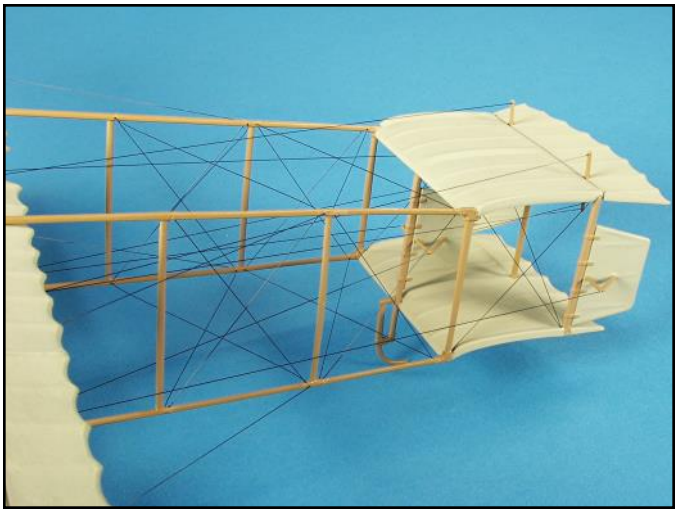
All the flying wires are tight and there are no odd crimps at their bases thanks to the angled holes that were drilled into the wings. The finished model is a great representation of a 1911 Avro biplane.



The flying wires between the upper and lower wings on this 1/48 scale Boxkite were achieved using the same sewing technique as the Avro biplane.

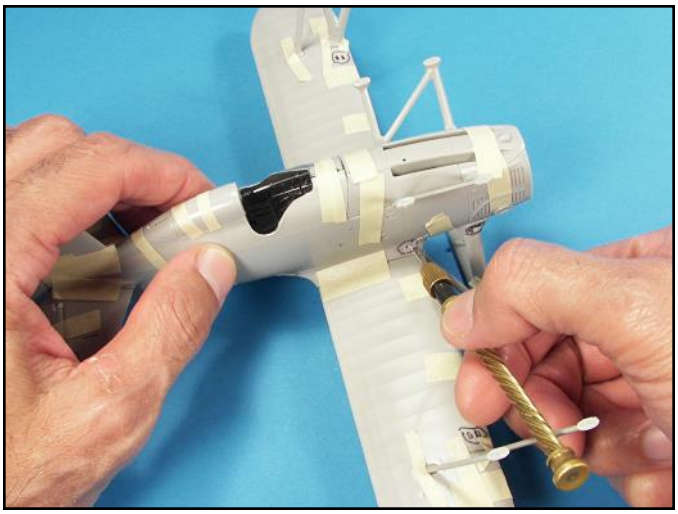


The control wires on the Boxkite were positioned by carefully notching the tips of the control horns. The notches were achieved using the tip of a number 11 X-Acto blade.

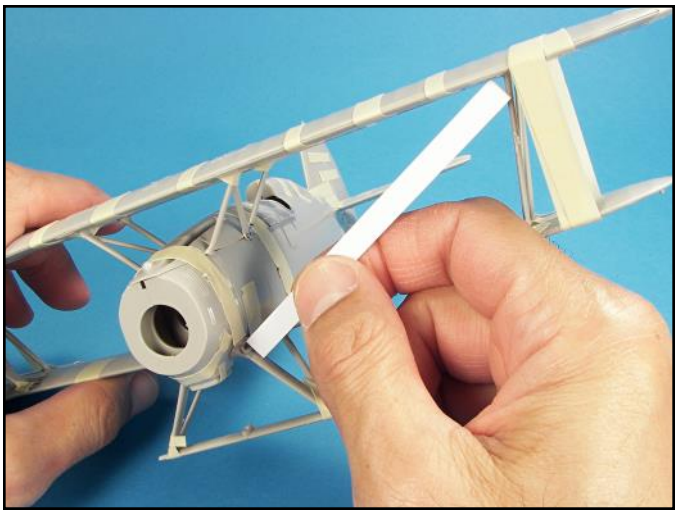


The rigging between the framing was achieved by drilling .0145 inch (number 79 brill bit) holes through the framing and sewing in the rigging. Care had to be taken to not distort the framing.

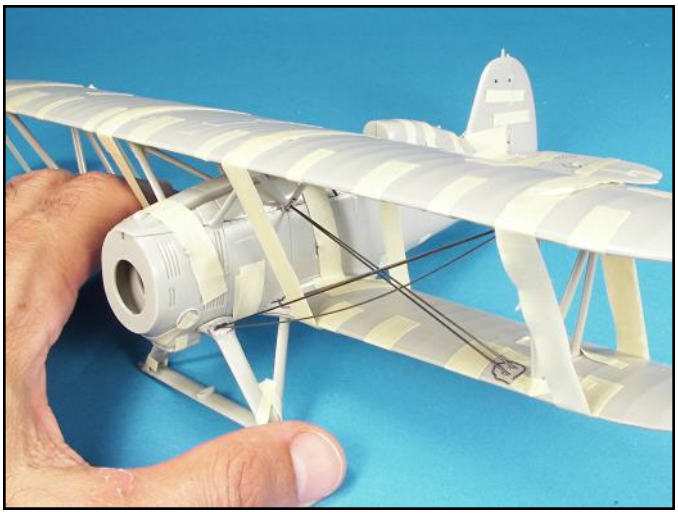
Test fitting biplanes also allows you to mark the flying wire locations and drill the holes at the correct termination points and angles.



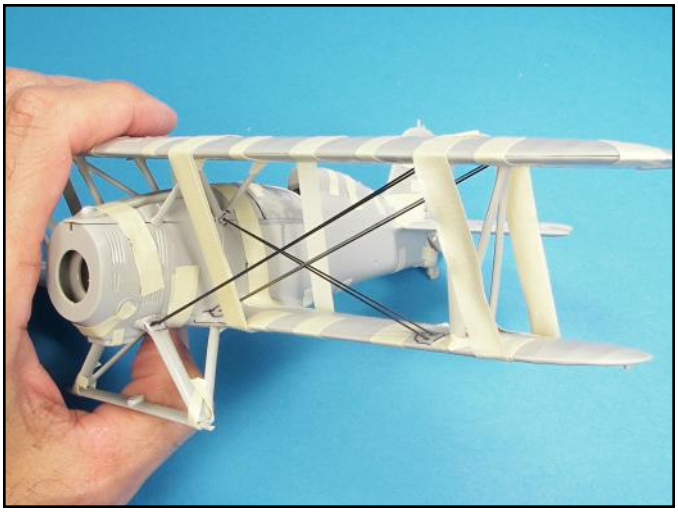
Individual holes were drilled out and made slightly larger than the diameter of the wire that will be used. There were two sets of wires for each location so it was critical for the spacing between the wires at each location to be the same.



To get an approximate length for each flying wire you can use a length of plastic strip.

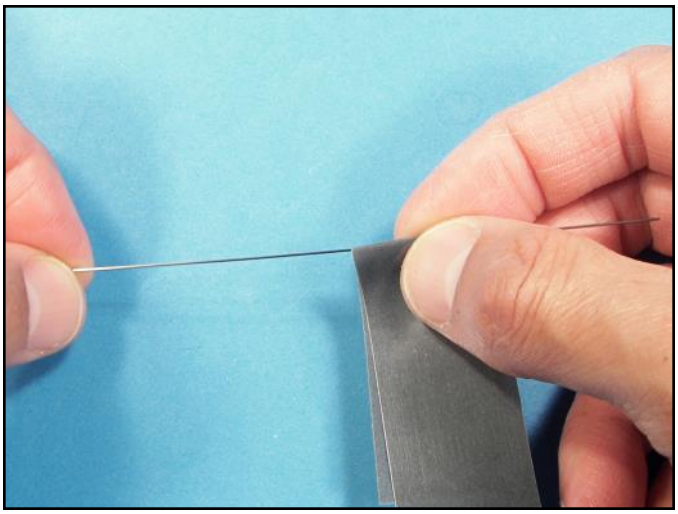


The wires are cut longer than needed and form fitted into place one at a time. This last wire is bowed and little by little the wire will be shortened until the bow is gone.

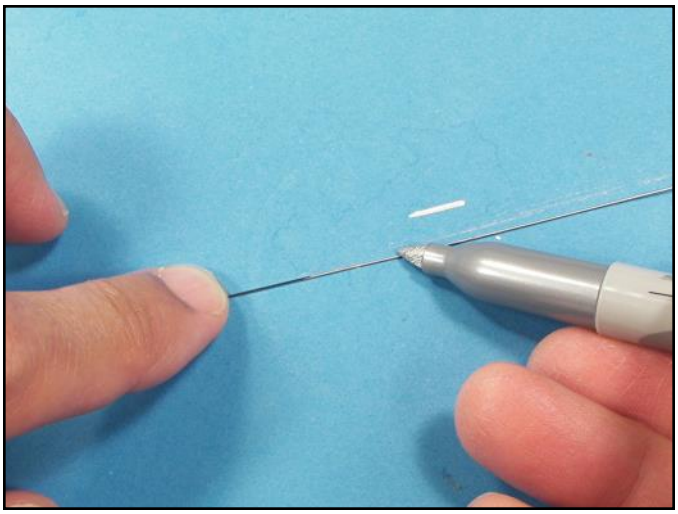


The depths of the holes that were drilled are slightly different so the wires need to have a little bit of play in them so that you do not have to mark each wire for each location.

Note that the spacing between each set of wires is the same for the fuselage and wing locations. The wire I like to use is .019 inches in diameter and is the same type of steel wire used in radio controlled aircraft.



To prepare the wires for painting run them through fine grit sandpaper or a 0000 steel wool pad to clean the surface and remove any tiny rust spots.

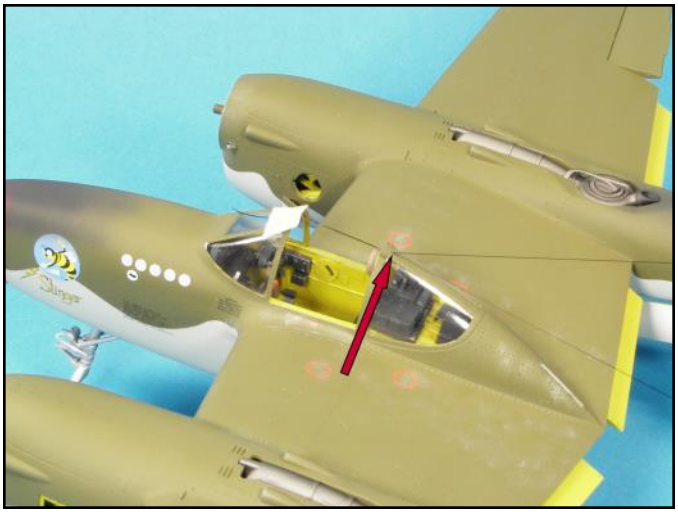


The easy way to paint the wires is to use a silver indelible marker. Once the wires are dry give them a coat of clear flat or gloss.

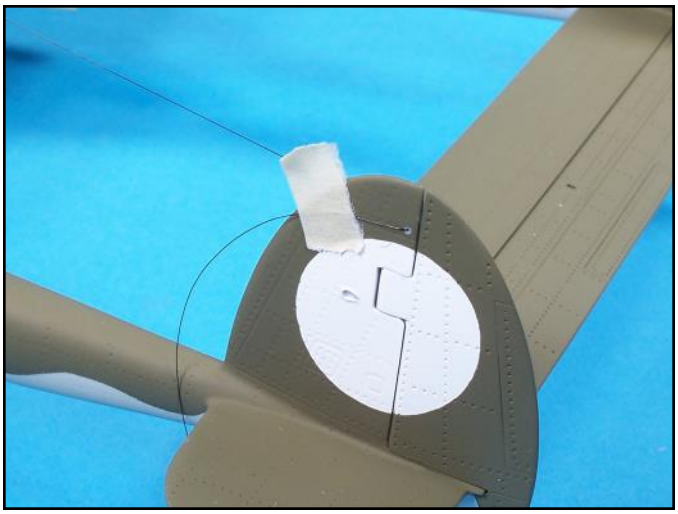
This 1/32 scale aircraft was rigged 25 years ago. The wire has not sagged, but there are tiny surface rust spots on the wire because I did not paint it.

This 1/32 scale Hasegawa Peashooter was built over 30 years ago and the steel wires are still stiff with no sagging and the silver indelible marker color has not faded and there is no surface rust.

The antenna wires for the P-38 emitted from the top of the canopy and connected to the inside upper areas of the rudders. The wire is nylon sewing thread inked with a black indelible marker.



To replicate this antenna arrangement I drilled a hole through the top of the canopy with a .016 inch drill bit (number 78) to accept the wire. The long lengths were taped to the forward canopy to keep them taught.



A .0145 inch hole was also drilled through each rudder and the antenna wire was attached with a tiny drop of super glue on the outside of the rudder and the top of the canopy. The excess was cut off and touched up with a detail brush.

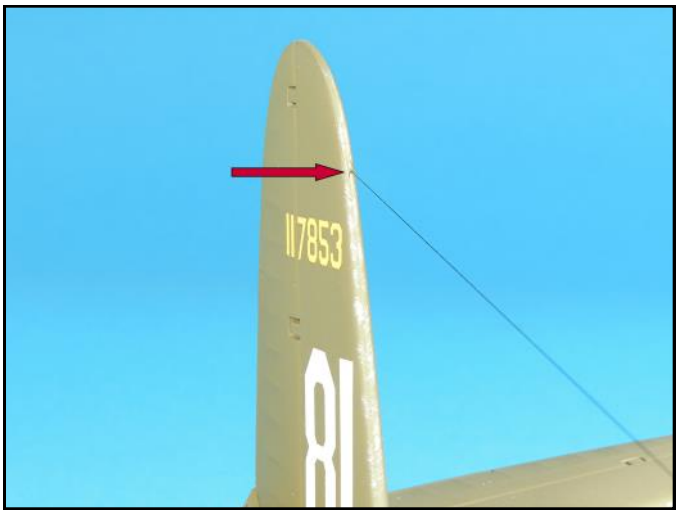
On this SBD, the antenna stub was drilled through with a .0145 inch drill bit (number 79). Inked nylon sewing thread was pushed through the hole and super glued into place.

The thread was attached to the tip of the forward antenna post. A .0145 inch hole was drilled into the antenna base plate on the fuselage and a length of thread glued into place. The thread was then glued to the horizontal length.

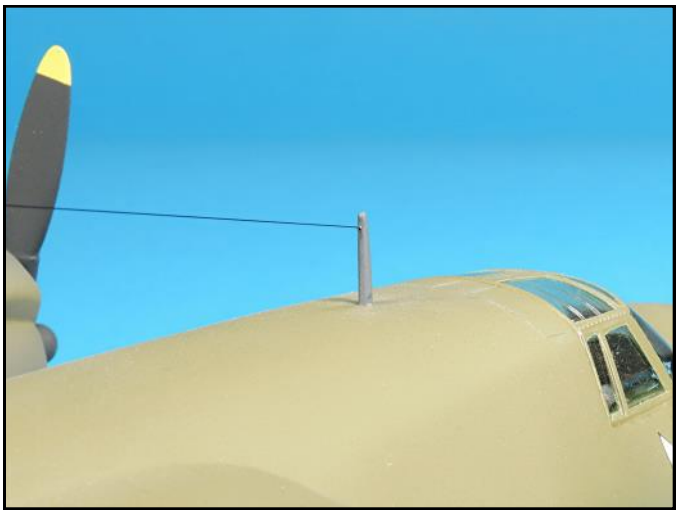
On this P-47 a .0145 inch hole (number 79) was drilled into the leading edge of the tail.

A .0145 inch hole was drilled through the base of the antenna and then the length of inked nylon sewing thread was glued into place. The insulator was made from a short length of hollowed out .025 inch rod.

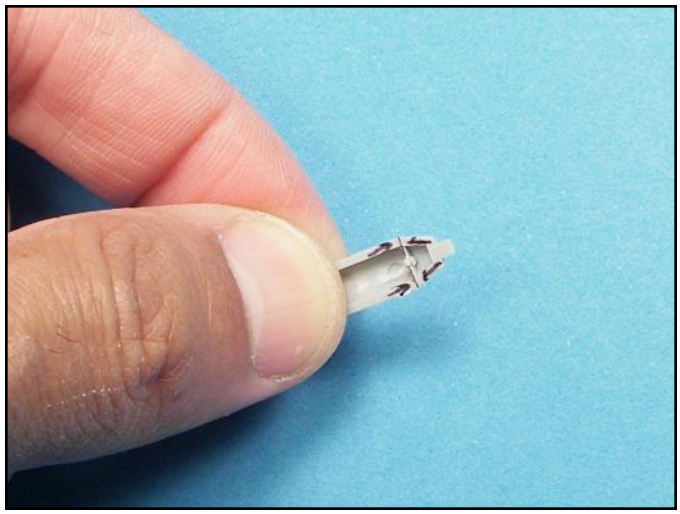
These two antennas were attached to the fuselage halves and mismatched. They were cut off and stubs attached to them for a stronger attachment to the fuselage. The post had a .0145 inch hole drilled through its tip.



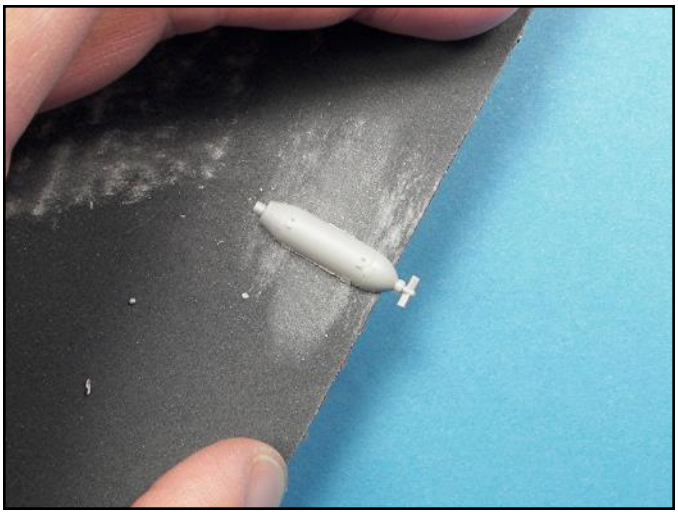
The same size hole was drilled into the tail and the inked thread was super glued into place.



The thread was slipped though the hole in the vertical antenna and made taught with a small length of masking tape. A tiny drop of super glue was applied to the tip and then the excess was cut off.

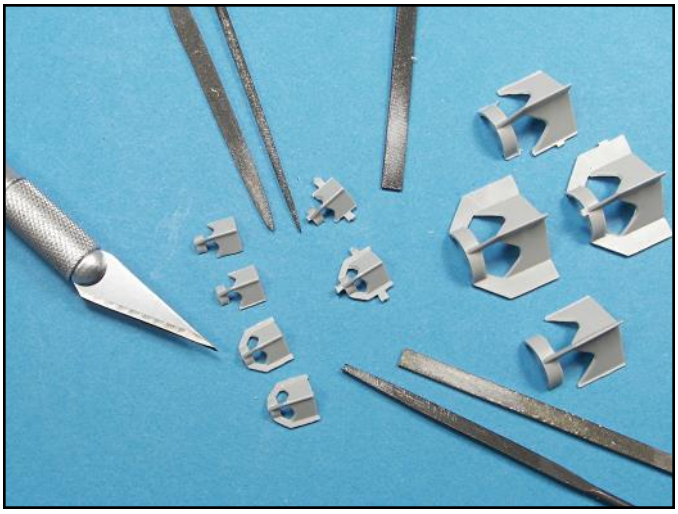


When assembling bombs check the gluing surfaces. There are usually stubs that will need to be removed.



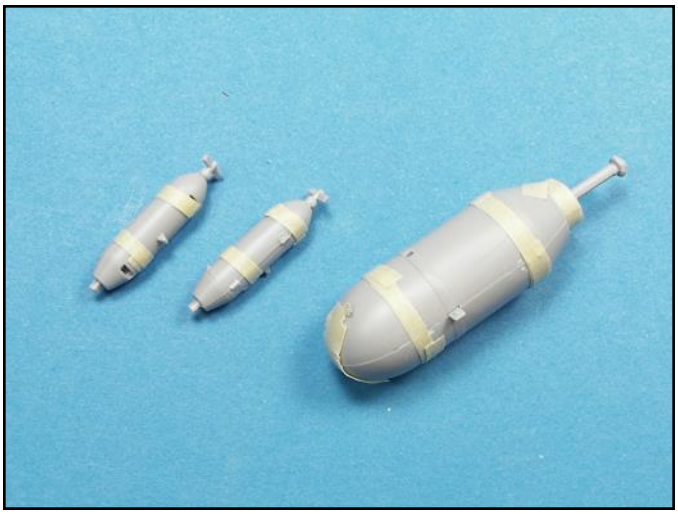
The bomb halves that have complete fuses on one half have to be sanded with the fuse area off the edge of the sandpaper.

Bomb halves that are just flat can be run across a stationary piece of sandpaper to remove any irregularities on the gluing surface. Be sure to test fit the bombs together.

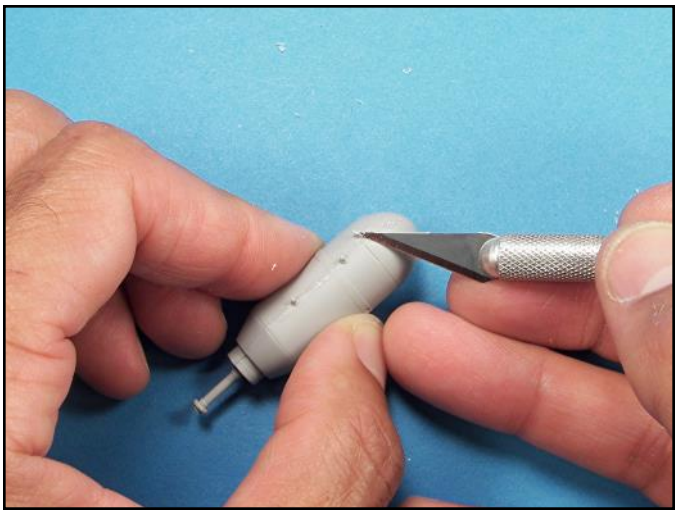


Some bomb fins are two pieces. Carefully remove and sand smooth the tree attachment points. Run the gluing surfaces across wet sandpaper to smooth them out.

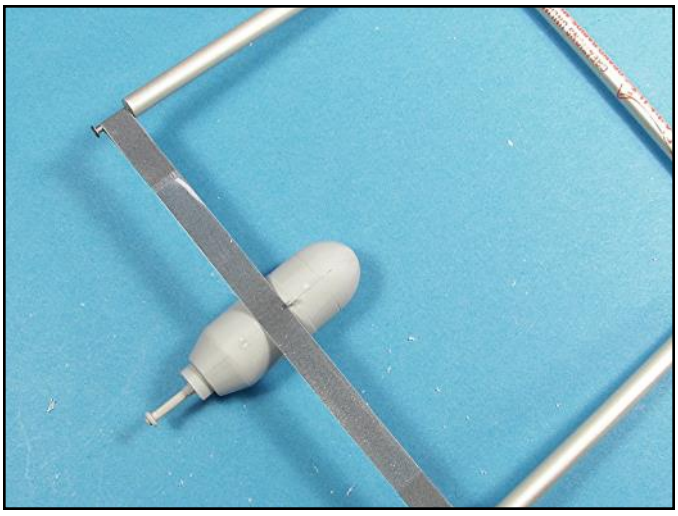
This bomb fin is assembled and the seams have been scraped smooth and the plastic polished with 0000 steel wool.



The bomb halves are taped together with thin strips of masking tape. A tiny bead of super glue was run across the seams with a .019 inch diameter wire applicator. The capillary action of the glue will provide a strong bond.

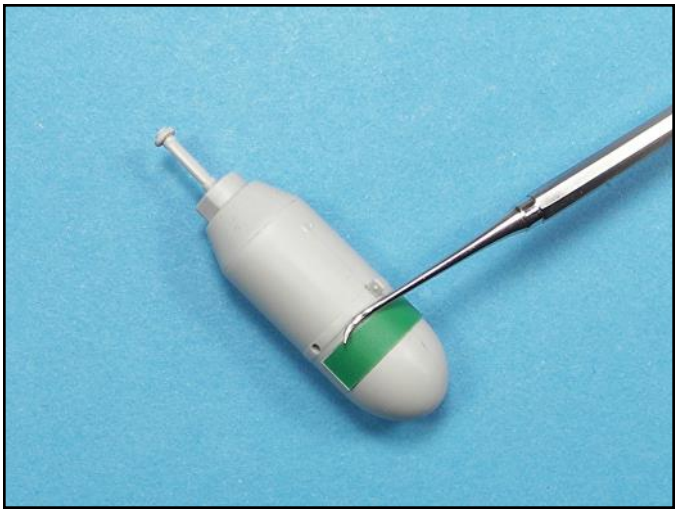


The seam lines were carefully and lightly scraped with a number 11 X-Acto blade held at a 45 degree angle.



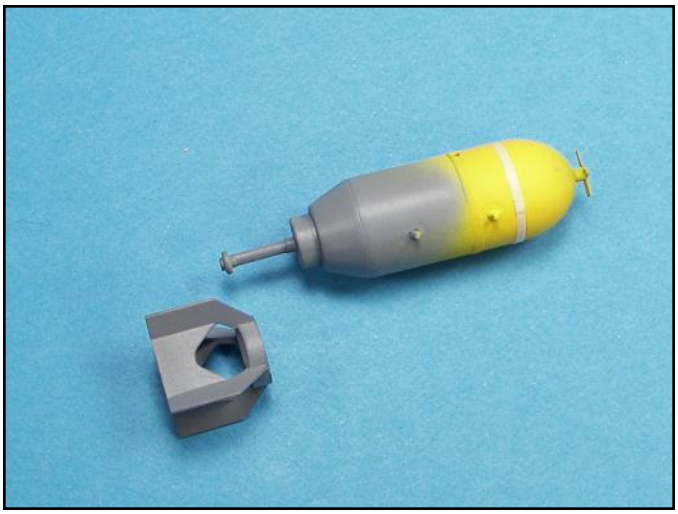
The curved surfaces of bombs requires a Flex-I-File sander to remove the flattened surfaces where the seams are and restore the curved shape of the bomb.

The plastic is polished with 0000 steel wool.

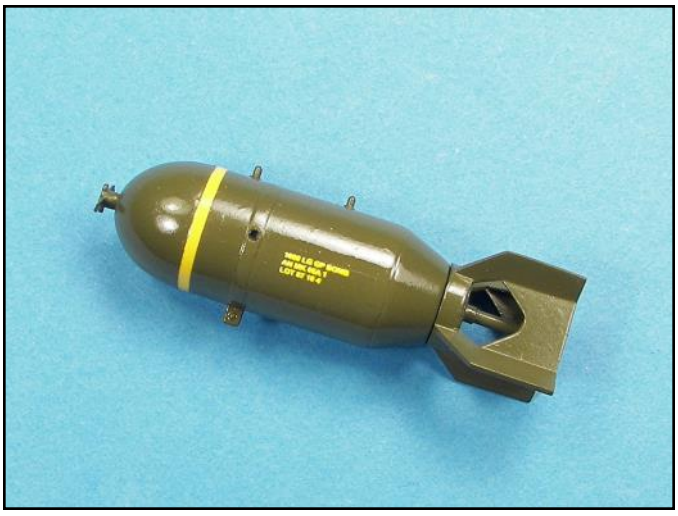


This 1000 lb. bomb has an engraved line that was marred when the seam was scraped. To restore the line use labeling tape as a guide for a panel scriber.

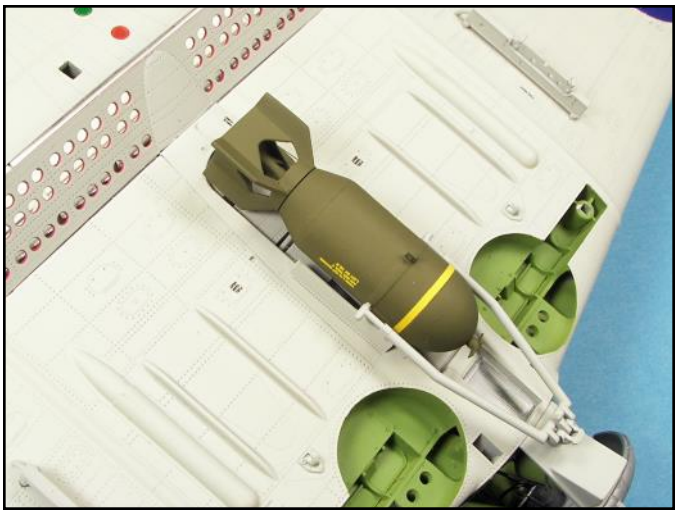
The base of the fins need to also be flattened so that they will fit correctly on the bombs.



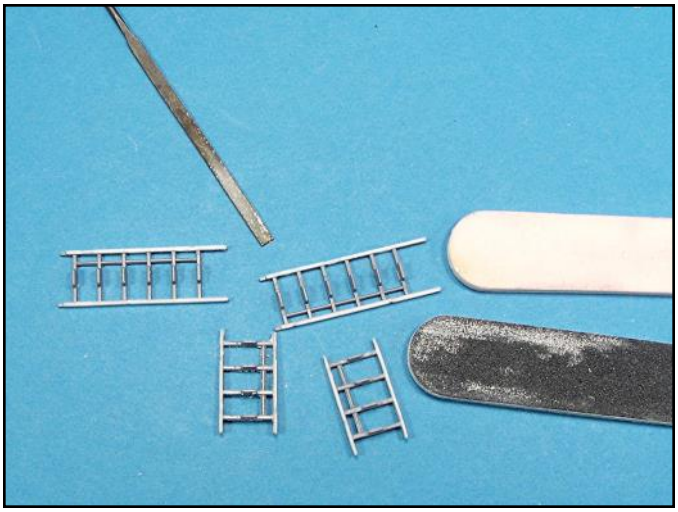
The forward areas of bombs are painted the striped color and then masked with a thin strip of masking tape. Be sure the tape is evenly spaced along the diameter of the bomb.



The bomb was airbrushed olive drab, given a clear gloss coat and the bombs decal applied.



The finished bomb was then airbrushed with a clear flat to restore the flat olive drab color. Note how clean the bomb looks and the sharp demarcation line between the yellow and olive drab colors.



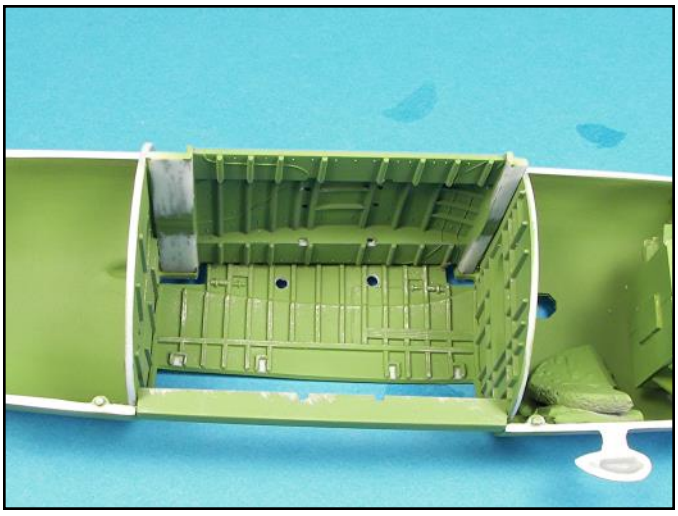
These 500 lb. bomb racks had a lot of mold pinch outs on the framing that needed to be carefully scraped smooth and then sanded.

These 500 lb. bombs were primed and then the bombs were glued together. Each bomb half also had half a fin. When glued together there was a misalignment of the fins that required careful scraping and sanding.

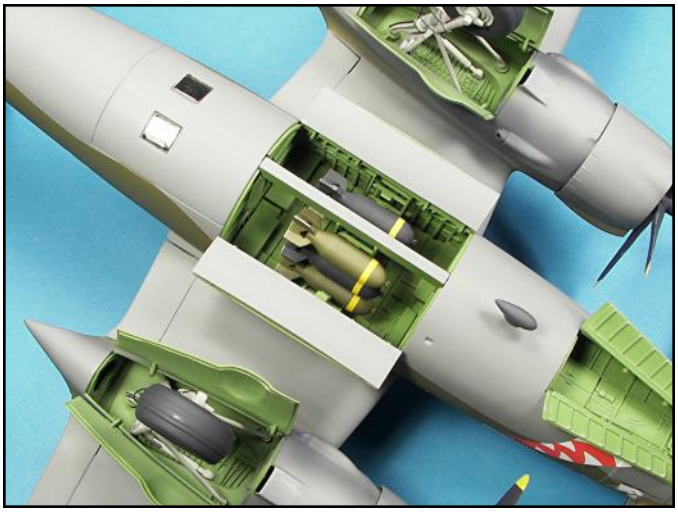
These 500 lb. bombs have been masked and they are ready for their final coats of paint.

The bombs were painted olive drab and black to differentiate between the types of bombs they are.

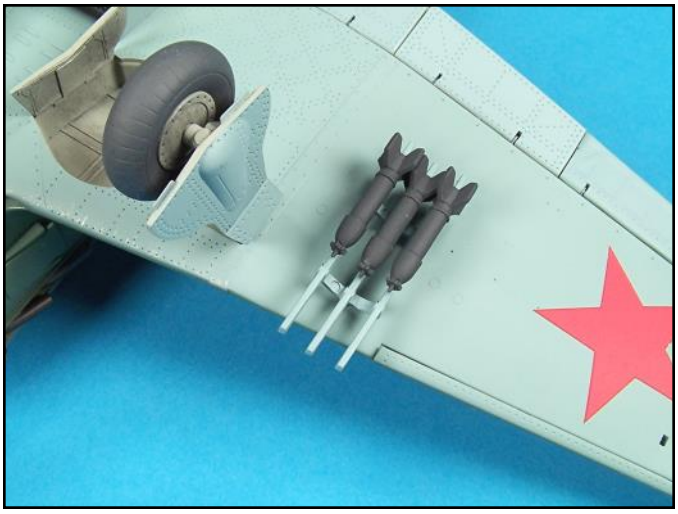
This B-26 bomb bay is getting a test fit for both the parts and how well it will fit inside the fuselage.



Note the drybrushing with silver paint and the paint that was removed where the wing tabs will be attached too. This helps ensure that the wings have a strong bond between plastic surfaces.

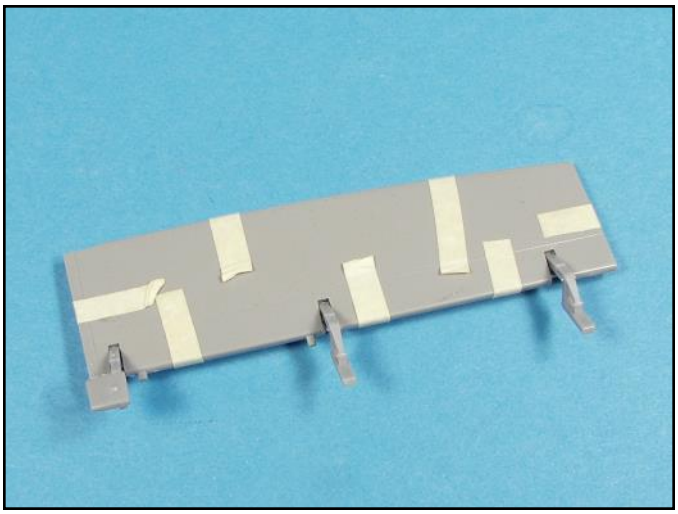


With the bomb racks also dry brushed and the bombs installed, the variance in colors really makes this B-26 bomb bay stand out.

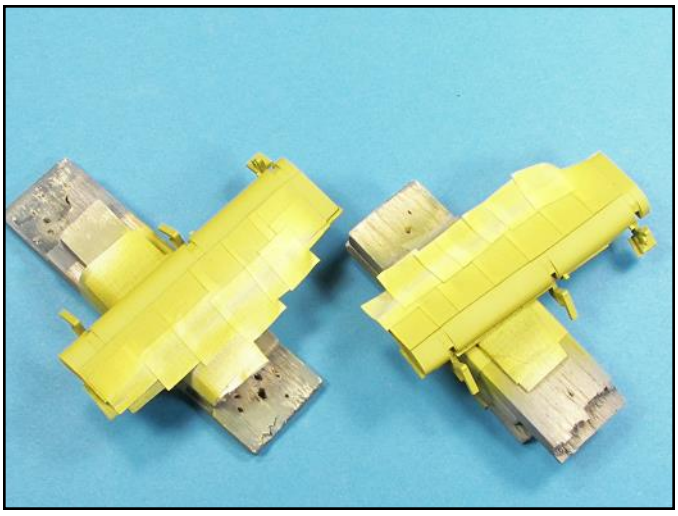


These Mig-3 rockets were simple to clean up and paint. However, the tips should have been painted a white, red or yellow color. The rails should have also been drybrushed and given a dirty appearance.

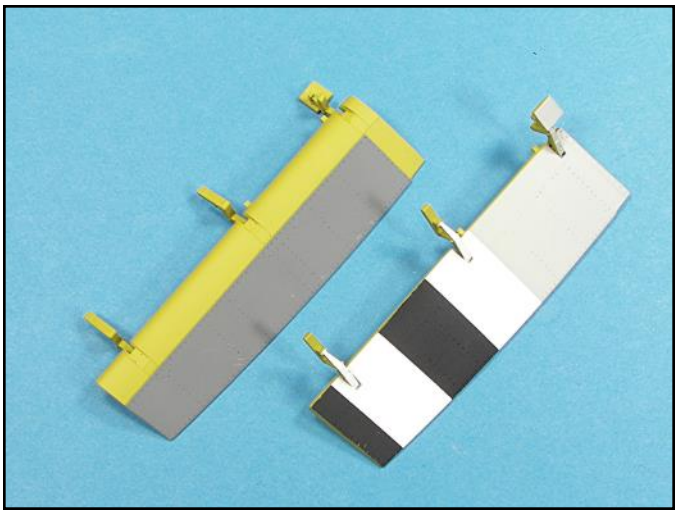
Separate kit supplied flaps should also be test fitted to be sure that they fit into their locations correctly.



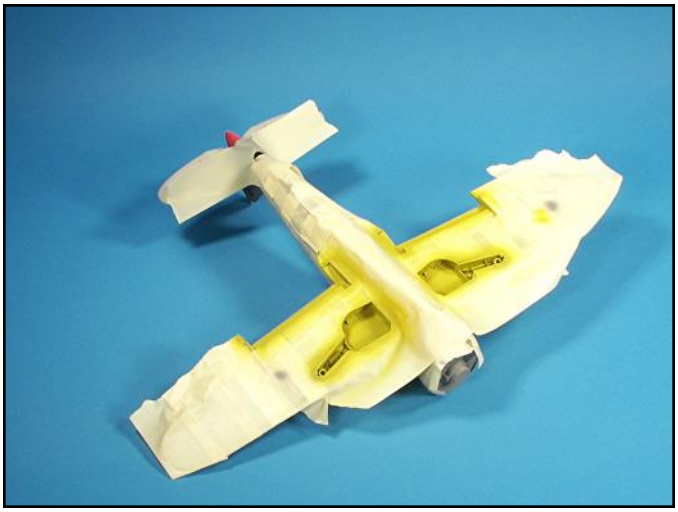
The extension mechanisms on this P-47 flap were carefully glued into place and then the part halves were taped together. A tiny bead of super glue was applied along the seam line and then scraped and wet sanded smooth.



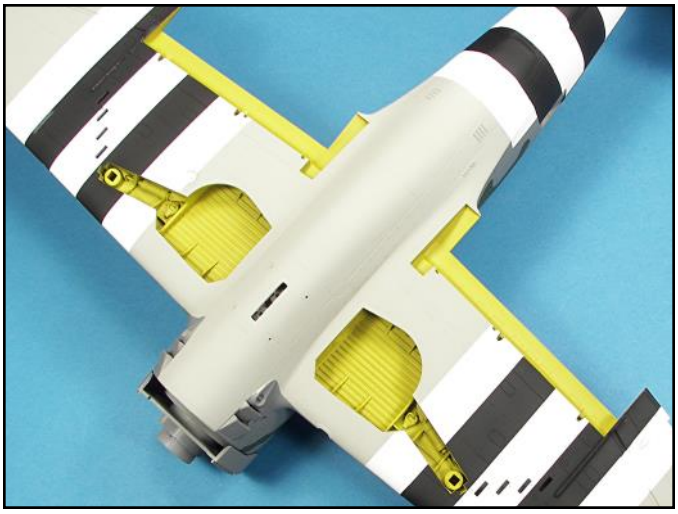
Flaps that will be extended require careful airbrushing, masking and more airbrushing and masking.



Note how sharp the demarcation lines are between the colors on these P-47 flaps.



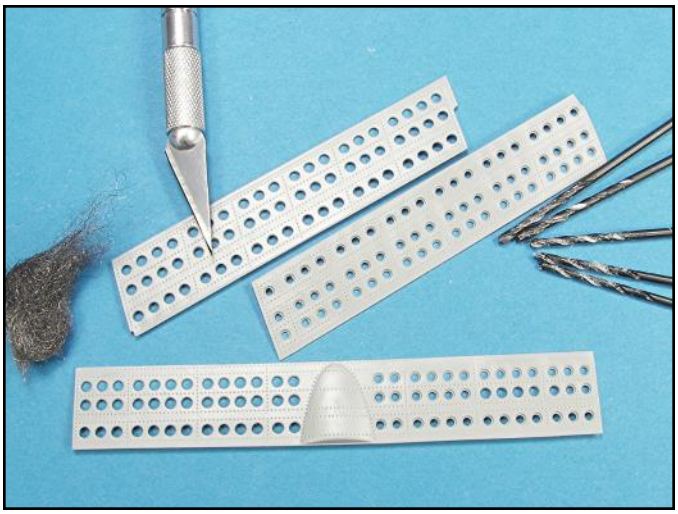
The flap areas on the trailing edge of the wings were carefully masked and then airbrushed at 15psi.



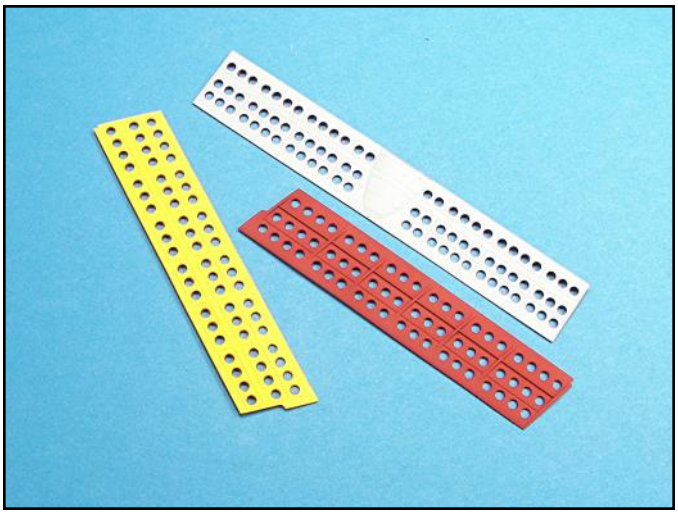
The interior flap areas and the landing gear bays have a nice, clean coat of zinc chromate. Thanks to careful masking there was no paint bleeding on the underside wing areas.

The dropped flaps look pretty impressive. Note the green camouflage section on the flap.

These control surfaces have been given a coat of silver paint on their seams to check for any remaining flaws. Note the parts numbering on them.

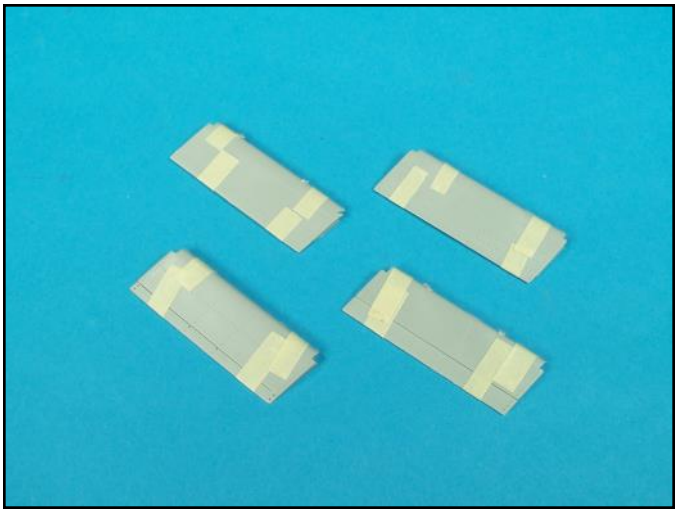


These dive brakes needed to be cleaned up. To remove the flash from the perforations a drill bit was used.

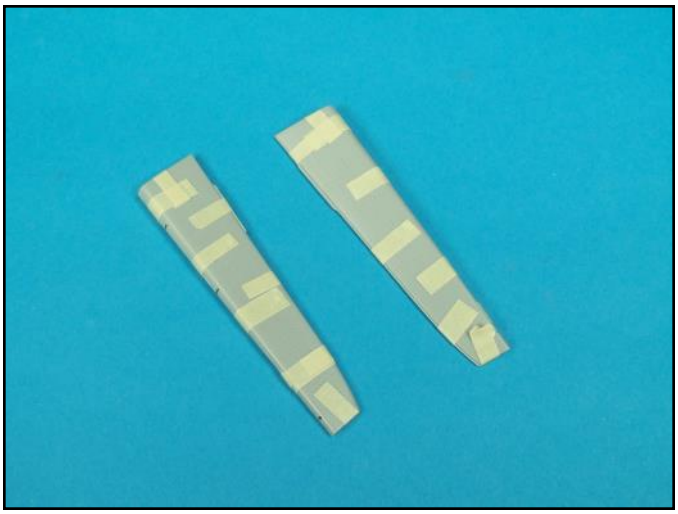


These SBD dauntless dive breaks are now ready to be installed.

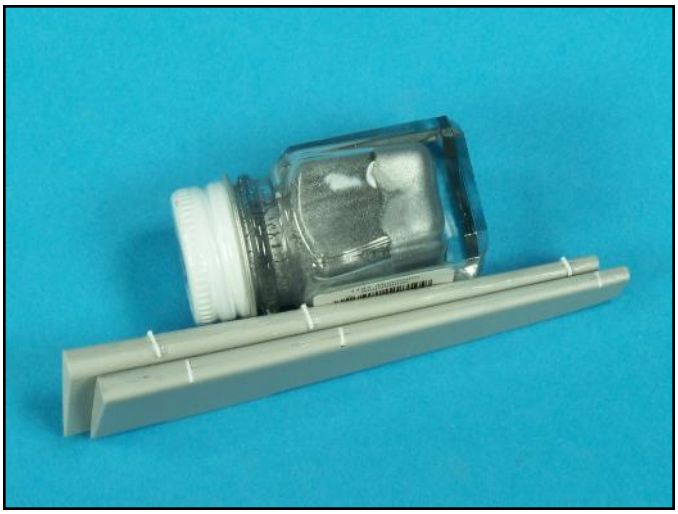
These rudder and outer tail sections for a P-38 were test fitted and then glued together.



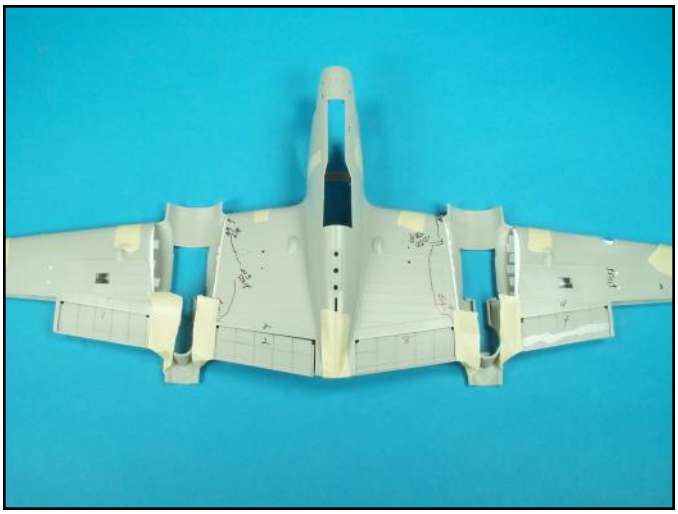
These P-38 flaps will need some seam work due to the way these parts were designed.



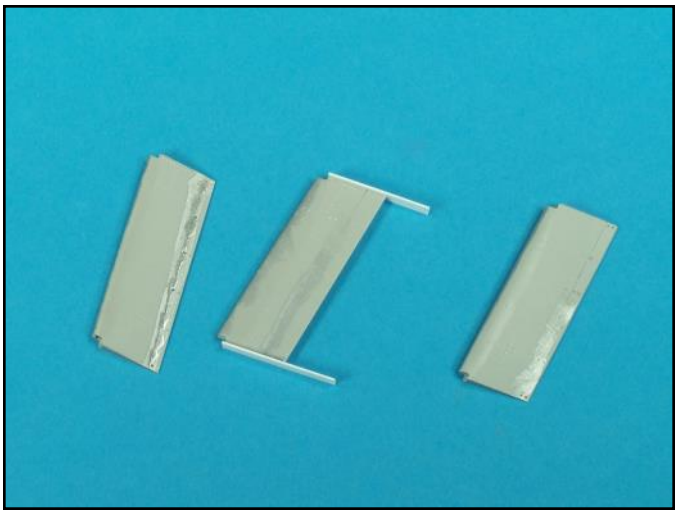
These P-38 ailerons will also need to be slightly modified so that they look accurate once they are attached.



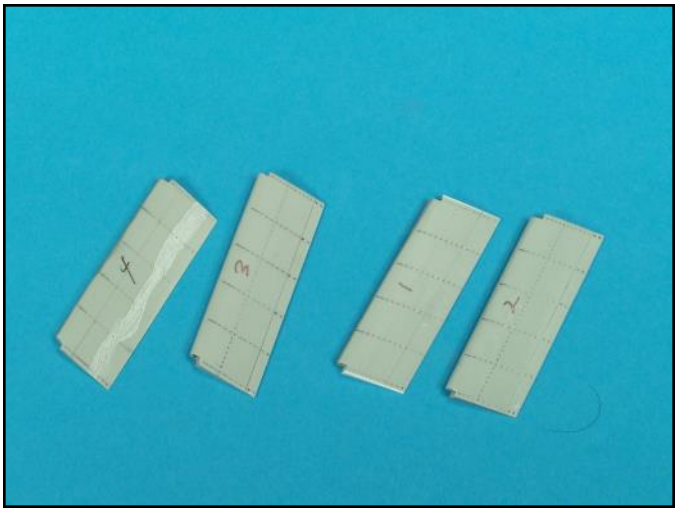
There were indentations for hinges on these ailerons, but there were some issues with the way the kit was designed. The indentations for the hinges were filled and wet sanded smooth.



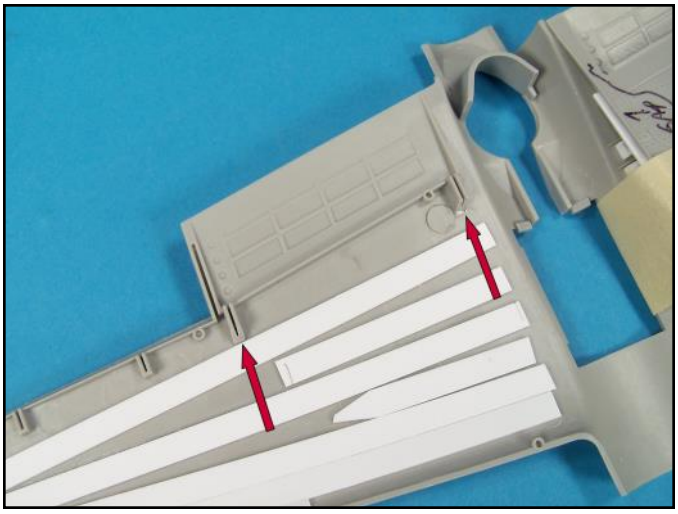
The test fitting of the flaps on this P-38 showed that one of them was slightly short.



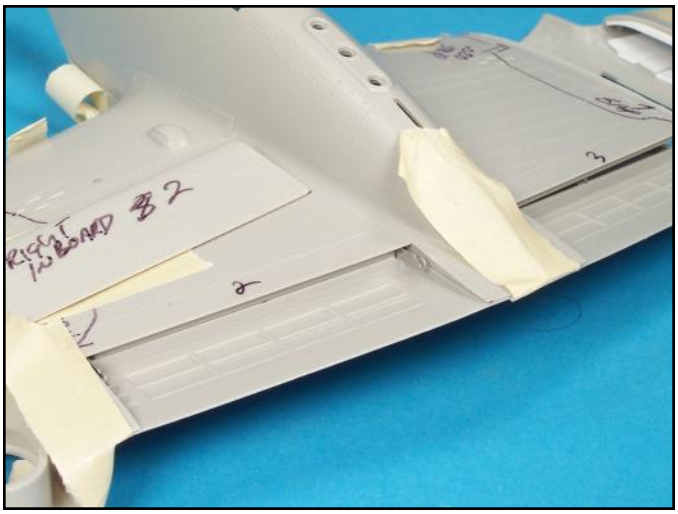
The seams on the flaps have been filled with super glue. The short flap had plastic strips glued to both ends.



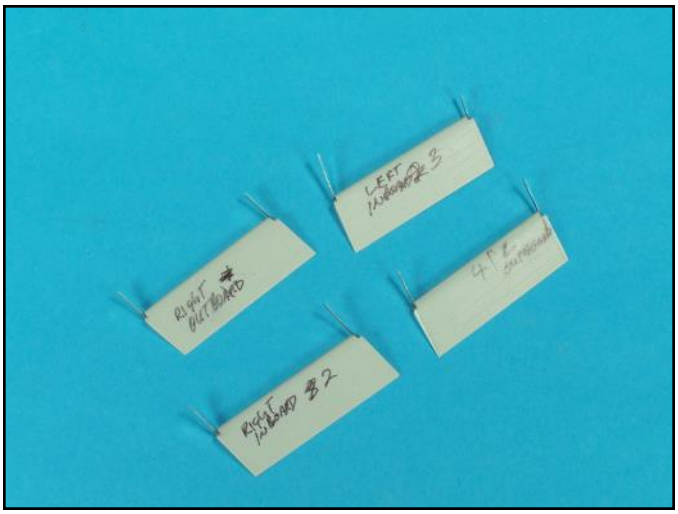
The flaps were marked and pencil lines were drawn to help restore the rivet detail.



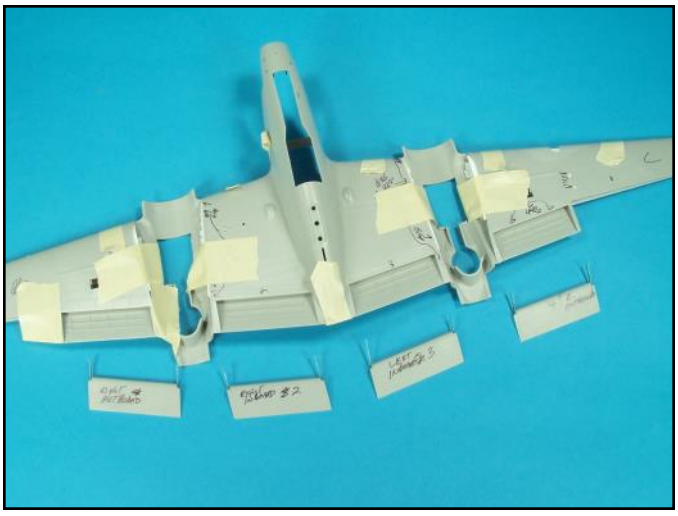
The ends of the slots for the metal tabs for the flaps were cut off so that the assembled flaps could be slid into place once the wing was assembled.



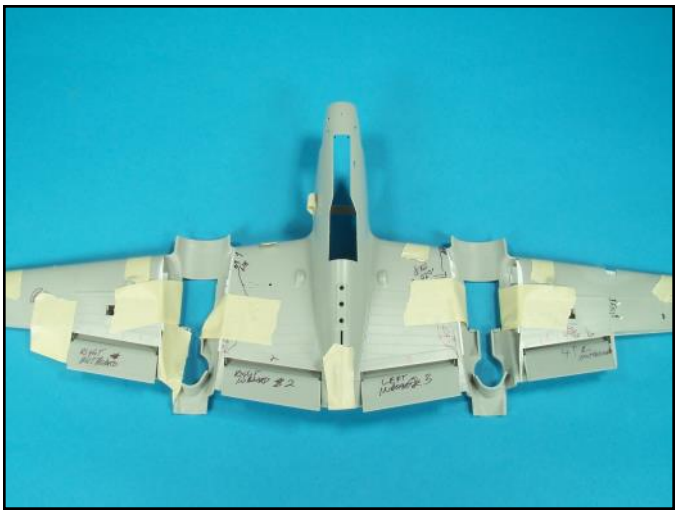
The metal tabs for the flaps were test fitted to be sure that they slid in and out.



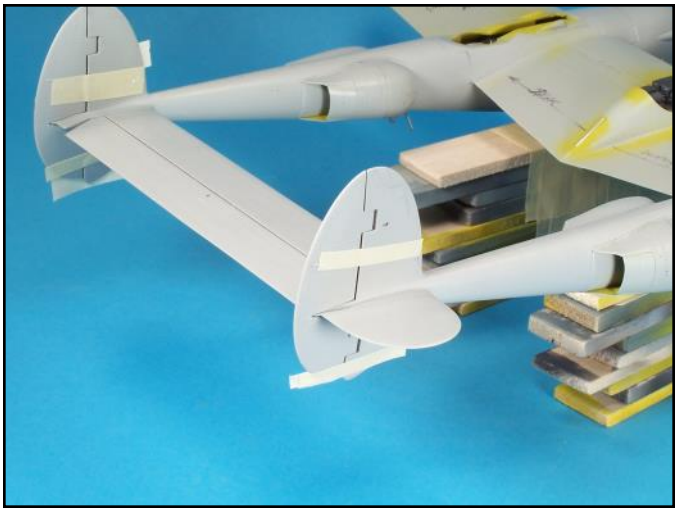
One set of metal tabs were super glued into place on a flap. The angles of each metal tab were then duplicated on the other three flaps.



Note that the flaps have all been marked.

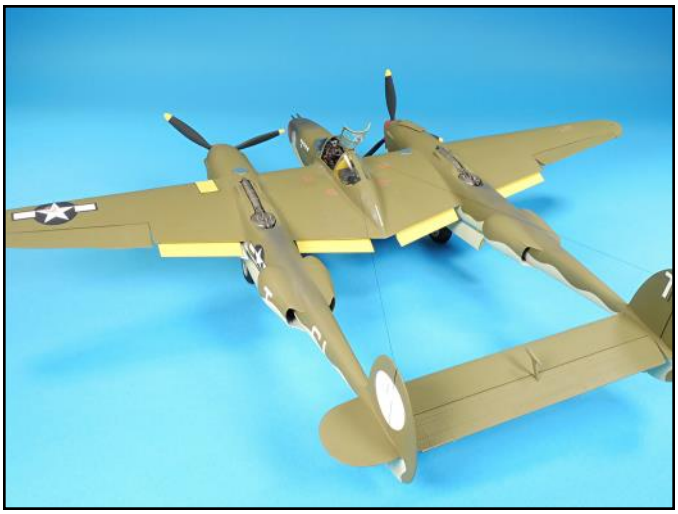


The assembled flaps were test fitted to ensure they slid in and out easily and that the flap angles were all the same.

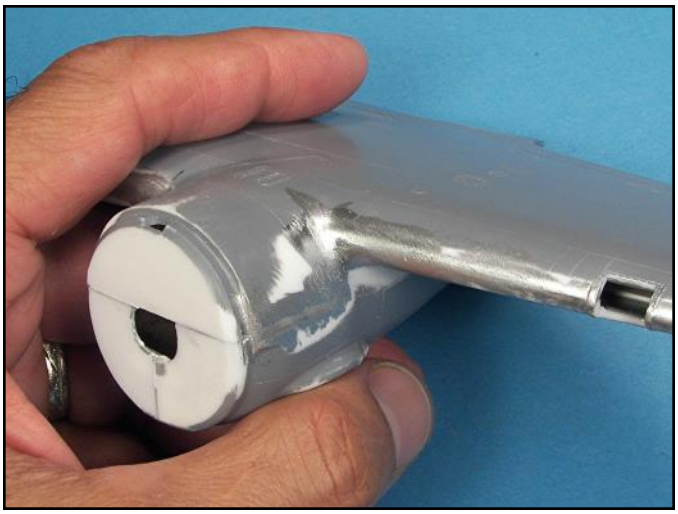


The rudders of this P-38 were positioned with tape and then tiny drops of super glue were applied to the hinges.

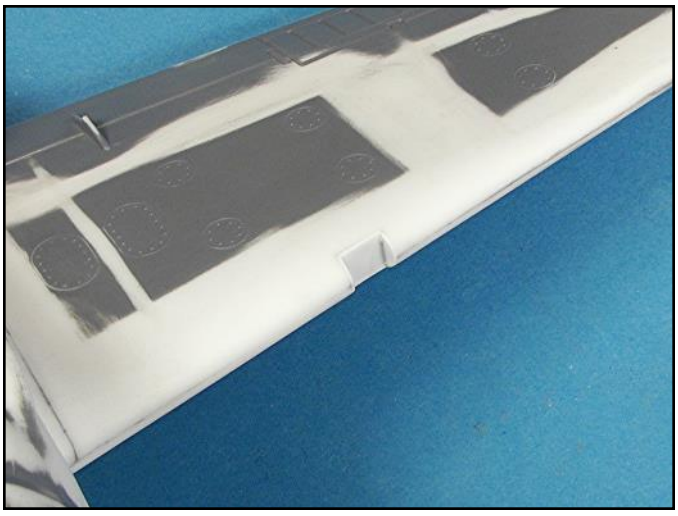
These P-38 flaps have been positioned and then glued into place. When installing multiple flaps be sure they are all set at the same angle.



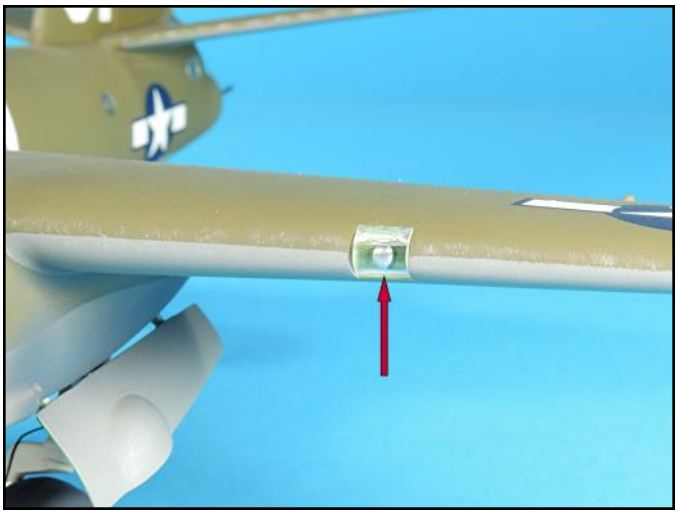
With the flaps set partially open they look very realistic.



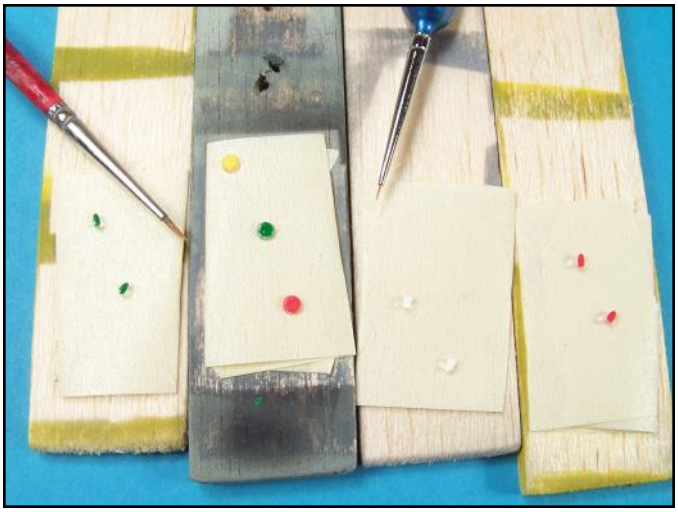
The landing light on this B-26 wing was just an opening and not very accurate.



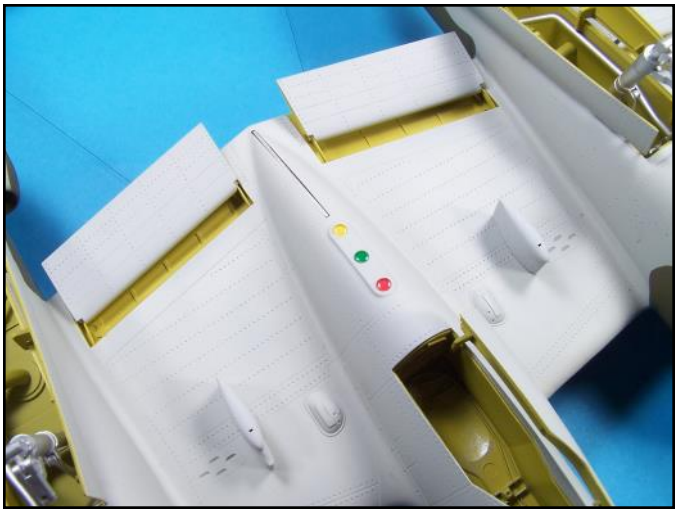
The opening was boxed in with strips of plastic and then cut and sanded smooth to match the leading edge contours.



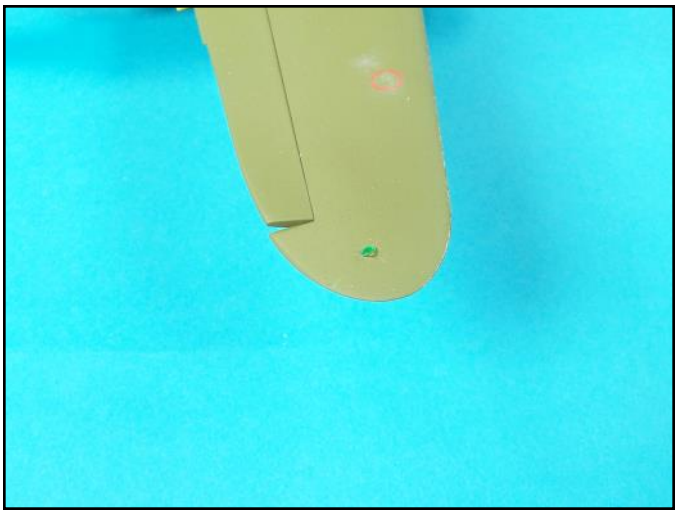
An HO scale model railroad light was glued into place to represent the landing light. Note the slight mismatch between the leading edge of the wing and the clear part.



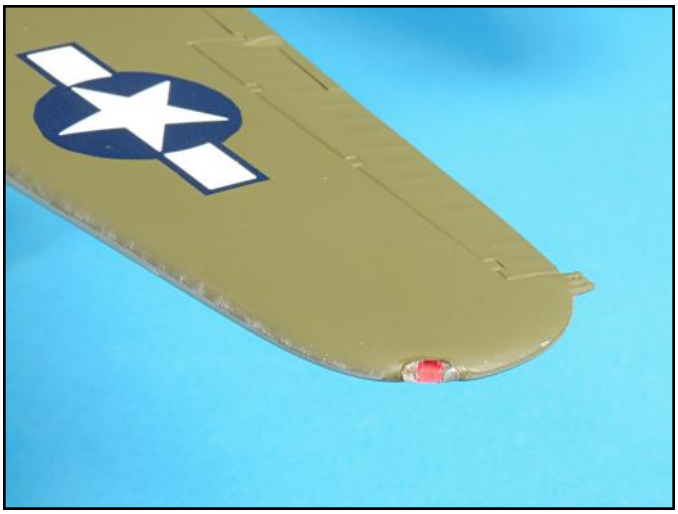
These formation and wing lights were painted from their backsides with gloss colors.



The formation lights were glued into place using white glue.



This wing light was also glued into place with a tiny drop of Elmers white glue.



Note how the paint does not cover the entire backside of the clear lens. This simulates the red bulb that sits inside the clear covering.

There were no separate clear parts for the navigational lights on this P-47 so they had to be painted onto the tips of the leading edges of the wings. Red is always on the port side and green is on the starboard side.

The support framing for this F6F Hellcat fuel tank was thick and out of scale so it was modified and smaller supports added. Attention to these little details can really improve the accuracy and appearance of your aircraft.