

CHAPTER FOUR

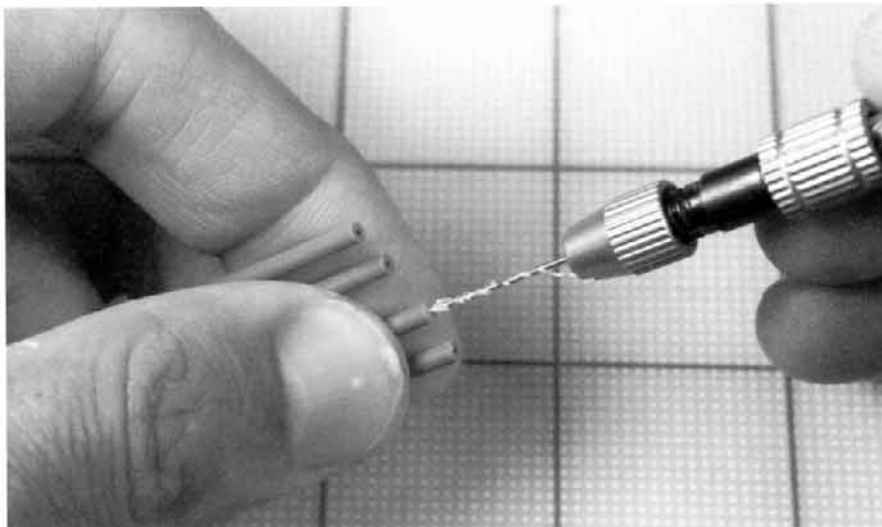
GUNS, CRANES, CATAPULTS, SMALL BOATS, RADARS, MASTS, AND RIGGING

Many parts provided in ship model kits can be improved to some degree or replaced altogether. Gun barrels can be hollowed out and blast shields added. Torpedo tubes, depth charge racks, and missile launchers can be modified and enhanced. Photoetched parts such as crane arms and catapult framing greatly improve the model's appearance. Search lights can be hollowed out and clear lenses can be added, and the multitude of small parts like range finders and radars can be enhanced using photoetched parts and strips of plastic. Real chains and enhanced anchors can also be added as well as modified masts.

BORING OUT GUN BARRELS

Guns come in many different construction configurations. Turret guns can consist of just the turret and a number of barrels molded together, or the barrels can be separate and the turret made of up several individual pieces, as in some Heller ship kits. Smaller-caliber guns can be molded as one piece or several small pieces, depending on the scale and manufacturer. While all can be enhanced to some degree, boring out the barrels is by far the most significant improvement to make.

The first step in boring out guns is to concentrate on removing seam lines and correcting any flaws or problems you identify. Once the barrel is bored out the tip will become fragile, so do all the rough work first. All gun parts, whether they are made of plastic, white metal, or resin, have seam lines around the barrels and the bases, so remove these first. When working on them be careful not to distort the shape of the barrel. This is easy to do, especially on small scale parts. Also keep in mind that gun barrels are tapered and larger guns like those on cruisers and battleships have steps along their lengths as well as being tapered. I remove the seam



A twist drill makes drilling out gun barrels by hand easy, but you have to be mindful of the position of the drill bit.

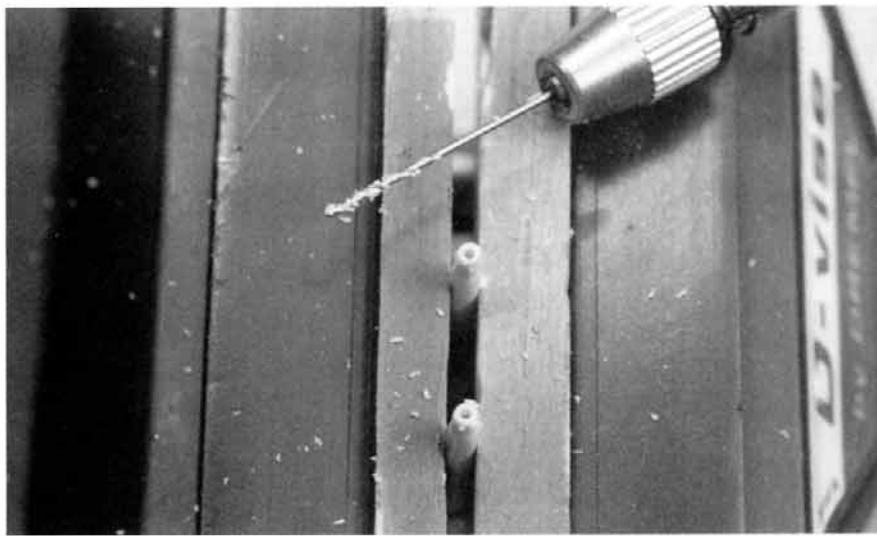
line with a number 11 X-Acto blade. I usually scrape from the base outward and my scraping is very light. If you hold the blade at about a 45-degree angle and move it across the surface of the plastic it will peel off the seam line with very little pressure.

Removing this seam will leave a small flat surface along the barrel, so you must reshape it. I use a combination of Flex-I-Pads, sanding sticks, and the X-Acto blade for this and rotate the barrel as I sand and scrape it. During this process you can distort the step in a barrel, but it's easy to fix. Simply run the knife blade towards the base of the barrel up to the step and then slice the thin layer of plastic you cut by running the blade along the side of the step. Once you have cleaned and shaped all the barrels you are ready to hollow them out.

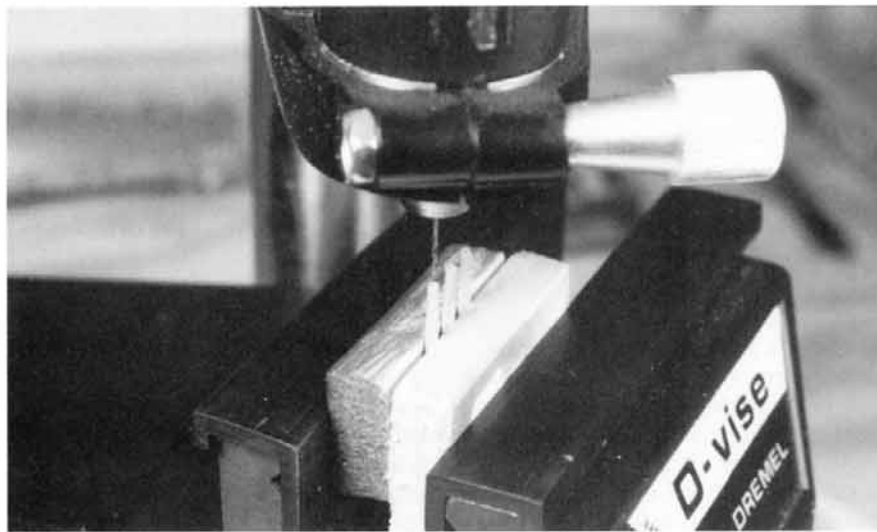
Boring can be done by hand or using a Dremel drill press stand and a motor tool. In either case, you must indent the tip of the barrel so the drill bit will have a pilot hole. Before you do this, be sure the surface of the tip

is smooth and flat so the bit will not skew to one side. I use a thin sewing needle held in a pin vise, focus a lot of light on the end of the barrel so I can see what I am doing, and carefully press the tip of the needle into the end of the barrel. If my hands don't feel steady and the barrel can be fitted into a vise, I sandwich it between strips of balsa wood and indent the surface. If you are really off you can press a new one, but you get only two or three shots at this. If you miss after three tries, sand the surface smooth and try again. You don't need to press very hard, and a slight indentation will do the trick.

If you want to hand-drill barrels you can either hold the part on one hand and use a pine vise to drill, or you can insert the part into the vise and use a twist drill. Twist drills require two hands—one to hold the drill in place and the other to move the drill slide up and down. Using a twist drill is quicker, but either will do the job. Hand drilling works well for injection-molded plastic, white metal,



Sandwiching the gun barrels between balsa strips helps your drilling efforts.



Small scale gun barrels can be hollowed out with a Dremel drill press. The trick is to make sure the barrels are sitting straight, and to drill slowly enough that you don't melt the plastic.

or resin, although you need to add just a little more pressure when drilling into white metal.

Start with a small bit like a number 75 and drill in about $\frac{1}{16}$ " inch. If the bit is off center you can correct this somewhat when you go to the next higher drill size. What you are trying to achieve is the effect of a hollow gun barrel, and the depth you drill into the plastic depends on the scale of the kit. For big battleship guns on 1/350 kits you would want to drill deeper, while 1/700 scale gun barrels may only require a slight indentation.

There are three good reasons to start small and work up to larger bit sizes. First, if the initial hole is off center you can correct it to some degree with a larger bit simply by angling the bit toward the thicker side and slowly straightening it as you turn. Second, if you are going to use a Dremel drill press stand and a motor tool to hollow out the barrels, you want to be careful not to cut so much plastic at one time that the barrel walls collapse. Third, working up to larger bits allows you to judge whether the one you just used has

hollowed out the barrel just right. Go slowly and think about what you want to do before you do it.

If you decide to use a Dremel drill press stand and a motor tool, make sure the barrel is sitting straight in the vise. To check this you need to have about half the barrel's length protruding from between the balsa strips. The drill bit and barrel should be side by side so you can check it from the front and the side. If it isn't straight, loosen the vise and adjust the barrel. When you are ready to drill, line up the drill bit so the tip sits in the pilot hole. This can be tedious, so check and recheck before you start drilling. Here again, start with a small bit and work up to the hole diameter that appears to be in scale.

The bit will generate a lot of heat, so go slowly and only have it in contact with the plastic for a few seconds at a time. This technique works well for injection-molded plastic or resin, but I don't recommend it for white metal because of the possibility of metal shavings becoming airborne. Regardless of what type of material you are drilling, always wear safety glasses to protect your eyes.

Sometimes, no matter how hard you try you drill off center. To fix this carefully carve out the excess plastic on the side that needs it using the tip of a number 11 X-Acto blade. Use a new blade for this and shave off small layers at a time. This is all a matter of feel, so go slowly and don't gouge the plastic. Once you have removed the excess you can use a larger bit to recenter the hole.

Not all barrels can be hollowed out. I have had good success with large-caliber guns up to 1/700 scale, and even some medium-caliber guns like 5-inch guns, but trying to drill out small-caliber guns, even in 1/350 scale, is very hard. In these instances, instead of drilling, cut the tip of a black permanent marker so it is flat, and touch the tip to the end of these small barrels after you have finished painting them.

GENERAL GUN ENHANCEMENTS

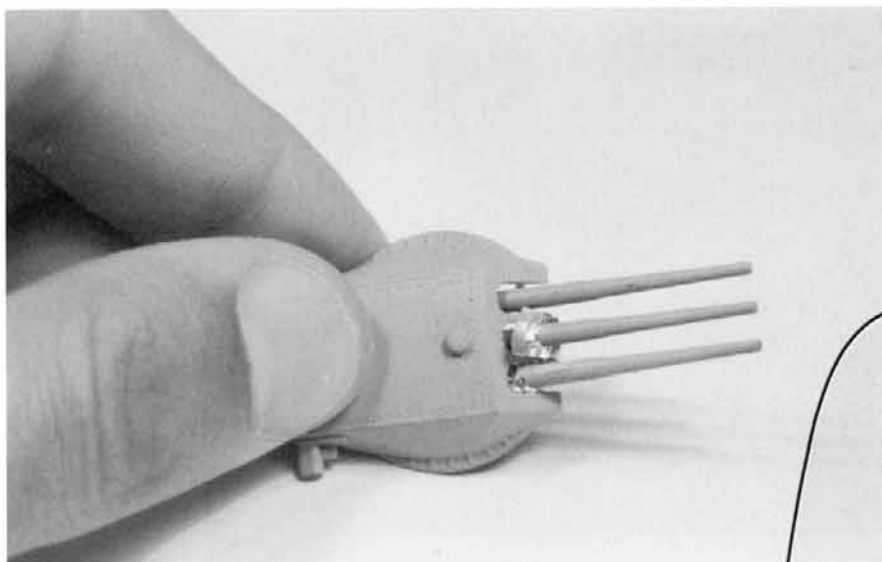
Blast bags. You can also enhance guns in other ways. If your kit does not have molded-on blast bags for the turret guns and you want to add

them, a little aluminum foil and some white glue are all you need. Use the foil as backing behind the gun barrel and use the white glue to make the blast bag. First assemble the turret and glue the barrels into place. Use a Waldron Punch Tool to make some holes in a small sheet of aluminum foil with a punch size that is slightly larger than the barrel diameter. Cut out small square pieces around each hole (be sure each square is slightly larger than the turret opening for the barrel), run the small foil pieces down the barrels, tuck them behind the turret openings, and glue them into place with super glue.

Once the glue is dry, position the turret so the barrels are pointing upward and then start applying small amounts of white glue with a toothpick around the barrel at the opening. The white glue will conform to the opening and the foil backing will hold the glue in place. If you apply small amounts at a time you will be able to judge when there is enough glue. You want the white glue to completely cover the opening and also encase the barrel at the opening. Once it is dry check for pin holes and apply some more glue if you aren't satisfied with the appearance. You can also use white glue to simulate blast bag coverings for one-piece guns by simply applying the glue with a toothpick to the base of the barrel where it meets the turret or gun shield. Blast bags are usually black, but I have also seen gray, white, and even dark red ones, so check your documentation. If you can not determine the color, paint them flat black.

White glue is also a handy filler for medium-caliber gun turrets if the barrels don't fit very well into their openings and there are no blast bags. I had this problem on the twin 5-inch mounts on Hasegawa's 1/700 scale *Essex* class aircraft carrier. White glue filled the voids between the barrels and the turret so well I could not detect any difference.

Fuse boxes, storage racks, and recoil tubes. Medium- and small-caliber guns can be mounted on an open base, and the base may also have things like fuse boxes and projectile storage racks attached. You can simulate these with small plastic boxes cut from Evergreen strip stock with a



Aluminum foil makes a great backing material for gun turrets that will have blast bags made from white glue.

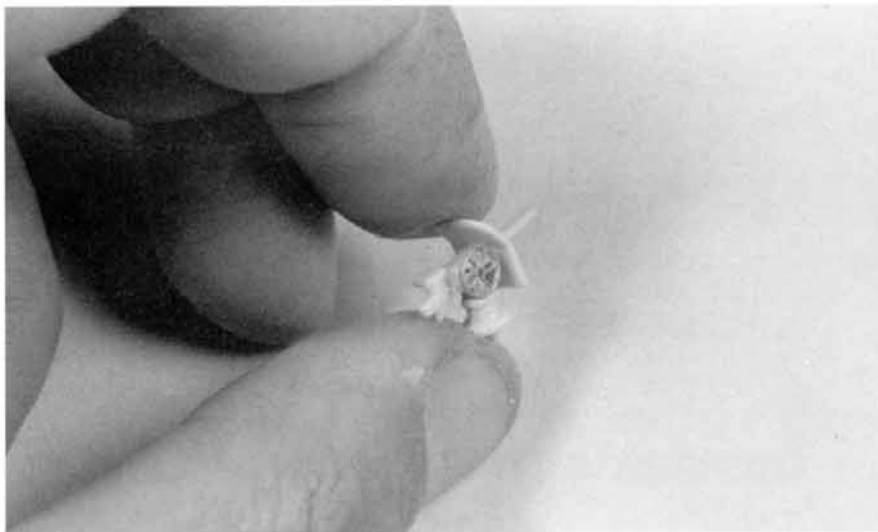
chopper. Adding these shapes to the area around the guns will enhance their realism. Another enhancement is to add small lengths of plastic or brass rod to simulate recoil tubes. Check your documentation and pictures and compare them to the kit's guns. Most times they will be generally accurate in appearance, but there are always some details you can add. The Floating Drydock Company has the best selection of gun drawings, and they also sell pictures; if you are going to add a lot of detailing, invest in some good documentation. One point to note here is that cutting, shaping, and adding all these small parts is tedious, and you must be sure to duplicate the added parts on all the guns. I recommend grouping all the guns that are the same and adding the same part to all before moving on to the next one. This will help ensure that all the parts go in the same location on each gun and that each gun gets the same number of parts.

Drybrushing. Drybrushing open gun mounts to bring out detail is another way to enhance their appearance. Use the base color of the gun and add a little black or white to darken or lighten the color slightly. Drybrush this onto the small details using a small flat brush. Don't press very hard against the part. The raised detail will pick up small paint particles. If the small-caliber guns come in

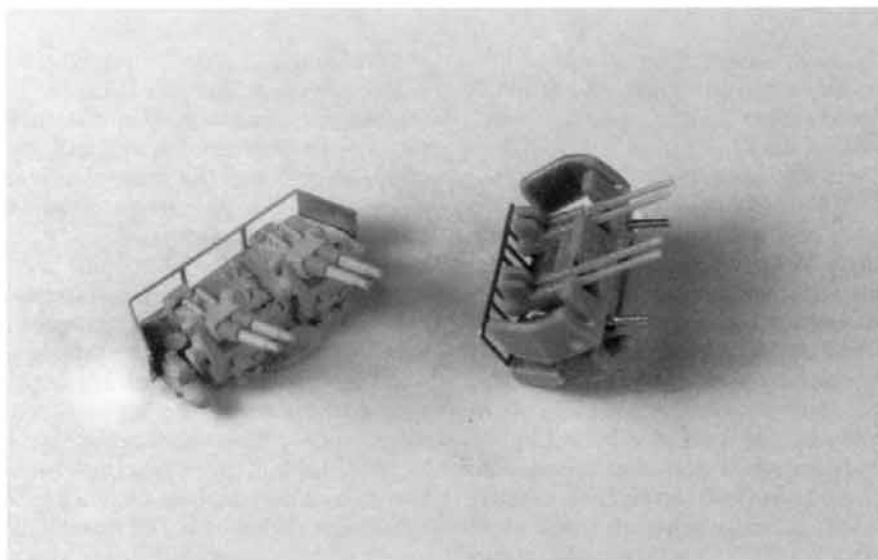
several parts, as do Heller's 1/400 scale series and Tamiya's 1/350 series 20 mm guns or their 40 mm Bofors mounts, I recommend mixing slightly different colors of the same shade of paint and then painting the parts these different shades.

Gun shields. Several kit and photoetch manufacturers provide separate parts for small-caliber guns. Usually the guns and the stand are one piece and the shields are separate. Several resin ship kit manufacturers supply their small-caliber guns in photoetch. They can range from two to as many as four or five separate pieces. While many of these look great when assembled, their small size makes for some tedious work, especially in the 1/700 scale. Another problem is getting all the guns to look the same, especially the positioning of the gunshields. There is no easy way to achieve consistency except to glue them on one at a time and carefully check the position.

For Tamiya's 1/350 *Iowa* kits, replace the kit's plastic gun shields with Gold Medal Models photoetched 20 mm gun shields. The openings on these photoetched shields must be slightly enlarged so they will sit correctly. Gold Medal Models also makes 1/700 scale 20 mm guns, which look good but are difficult to work with because of their size. Whatever scale you are working in, use small drops of



The small-caliber guns on Glenco's 1/225 scale *Oregon* were enhanced using brass detail parts from HO scale train accessories kits.



White-metal quad 40 mm mounts are the finest replicas of these guns available. The gun on the left is from an MB Model's *USS Gearing*. It was used to add detail to the Tamiya 1/350 scale gun, which was enhanced with photoetched railing from Gold Medal Models, lengths of brass wire, and small bits of Evergreen plastic strip stock.

white glue to attach the parts initially so you can properly position them. Once this is dry you can hit each attachment point with a small drop of super glue.

For Heller's 1/400 scale ship kits, cut the tab that is supposed to act as the attachment point for the 20 mm gun shields. It is too big and will make the gun shield sit skewed. The gun shields supplied with the kit can be thinned out by running them across

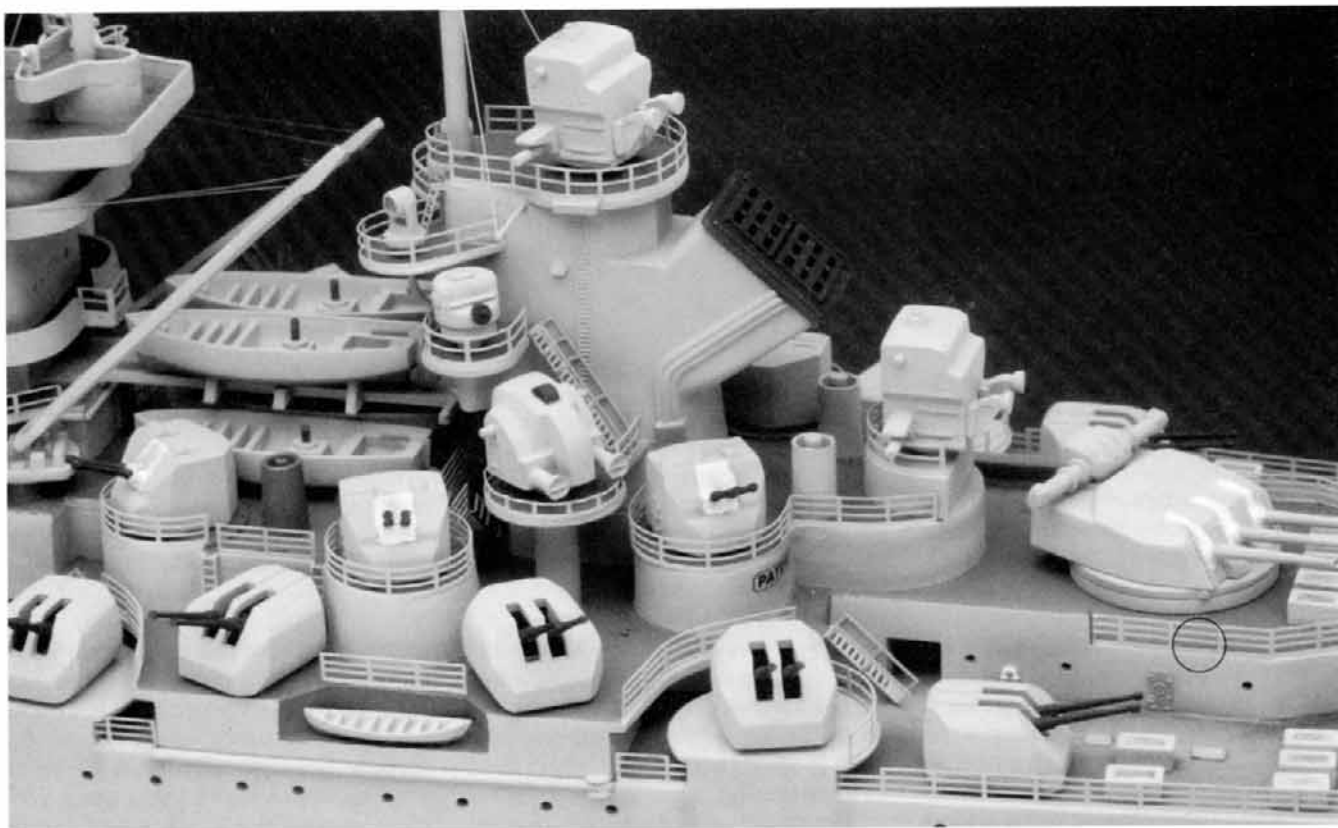
stationary fine grit sandpaper. You can also use the Gold Medal Models shields if you are willing to take the time to cut them down so they have a more scale appearance. Attach plastic shields with Testor's glue and photoetched ones with white glue applied with a thin wire applicator or a toothpick so you can position them on the guns. Once the glue is dry you can apply a small drop of super glue for a good bond.

Railings. Open gun mounts like 40 mm guns can also be improved by adding small pieces of wire and plastic to them. Gold Medal Models also makes 1/350 scale photoetched rear railings for 40 mm gun mounts. They can also be used on Heller's kits if you cut the railing legs down a bit. Resin ship kits supply some of the finest detailed Bofors mounts I have ever seen.

Periscopes and range finders. Turret mounts can also be improved by adding the periscope and range finder appendages as well as by adding Gold Medal Models photoetched hatches. The periscopes are the small box or rectangular appendages that gun captains use for targeting, and the range finders are the larger rectangular shapes that contain the mechanical range-finder equipment for each gun. These small additions can really dress up an otherwise bland turret mount.

Small-caliber guns. British warships also had multiple pom pom gun emplacements and even these can be enhanced to some degree by adding minute shapes like boxes and rectangles. This type of gun looked like a long rectangular box with a group of small barrels protruding from the center of the rectangle. There is not much kit manufacturers can do with a gun that looks like that. In the Revell kit of *HMS King George V* as well in the entire line of Airfix 1/600 scale British warship kits these guns are nothing more than a small box with tiny stubs for guns. Even the 1/400 scale Heller kit of the *HMS Illustrious* has pretty bland pom poms. The pom poms on all these kits can be enhanced using Evergreen strip stock and your handy chopper.

Some resin kits use photoetched brass for small-caliber guns like 20 mm guns, and while these parts look okay in 1/700 scale, in 1/350 scale the guns look flat and out of scale. Gunshields add some depth to their appearance in the larger scales, but to give them a three-dimensional appearance you can add white glue along both sides of the gun after the shield has been installed and the assembly has been mounted on its base. If you dilute the glue a little so it is not so thick, and apply it with a thin wire in very small amounts, it will conform to



White glue was used to completely fill the inside of the medium-caliber guns on this 1/400 scale Heller kit of the *Jean Bart* in order to make the blast shields for the guns.
Photo by Glenn Johnson.

the outline of the gun. Once the glue is dry, give the entire assembly a coat of primer to check the glue surface for pin holes and areas where it may not have settled. Add more glue to these locations and then give the gun its final paint color.

Another approach to solve the thin, out-of-scale appearance photoetched guns have in the larger scales is to use parts from injection-molded kits.

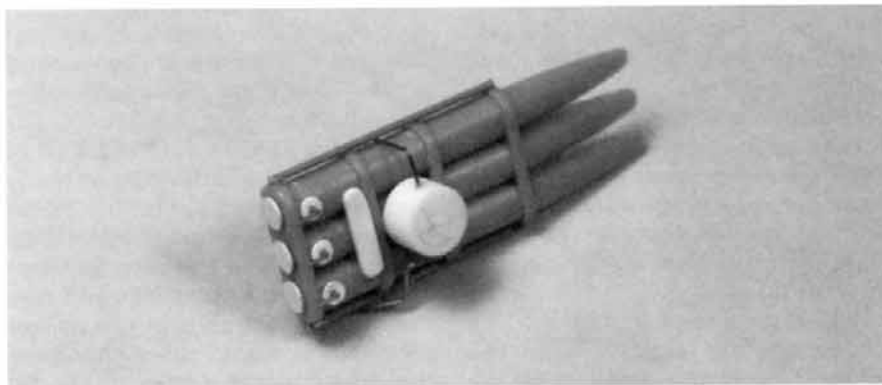
If you build a lot of ship models you should keep a good supply of ship kits on hand so you can use parts to replace or enhance other guns. The scales do not have to be exact, and as you build more kits you will find that kit-supplied guns in some scales are too big.

A good example is Revell's 1/570 USS *North Carolina*, which has 20 mm guns that are just too big—but if you want to rework and detail Lindberg's 1/525 *Essex* class carrier or Revell's 1/480 scale *Yorktown/Hornet*, they are just about right. Another point to

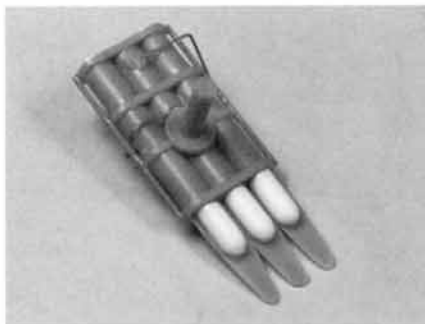
keep in mind is that some photoetched smaller-caliber guns in resin ship kits can be replaced with parts from injection-molded kits. If you work in 1/700 scale, purchase several sets of Skywave's ship detail sets. These are crisp and well detailed and are great for replacing average kit parts such as small boats, medium-caliber guns, and torpedo tubes.

TORPEDOES

Torpedo tubes on American and Japanese ship models always cry out for more detail. They are busy-looking pieces of equipment with a lot of appendages such as tubing and gas vents. If you are working in 1/700 scale and the torpedo tubes lack detail, you can either add some or use the Skywave's detail sets. Theirs are

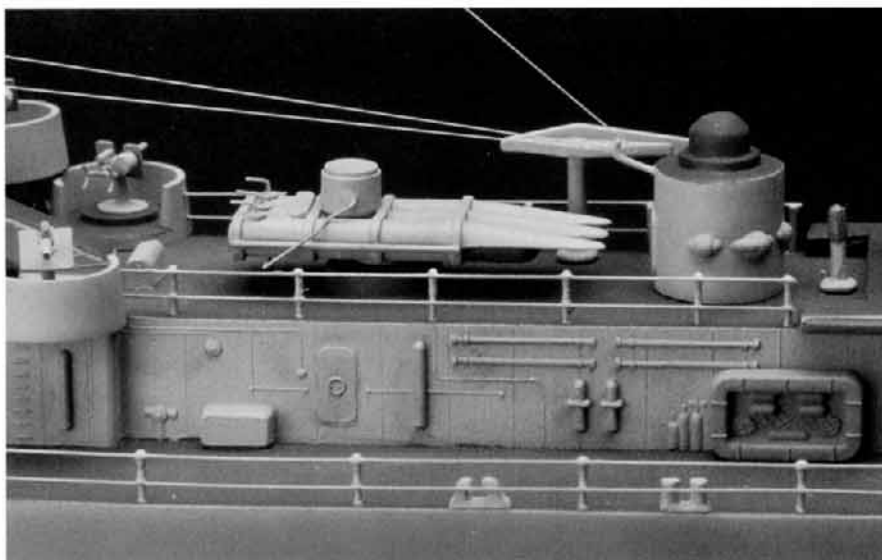


Torpedo tubes in 1/500 scale and larger can be enhanced with disks, lengths of thin brass wire, and other scratchbuilt shapes.



To enhance the appearance of torpedo tubes add the torpedoes to the underside of the tubes.

The torpedo tubes on Revell's 1/240 scale *Buckley* look a lot better with some added detail. Photo by Glenn Johnson.



the best I have seen in this scale and I have even used them as reference to help me detail tubes in larger scales. If you need good reference material the Floating Drydock Company has an excellent ordnance pamphlet on torpedo tubes that contains photographs and drawings.

To dress up torpedo tubes you can add piping with small-diameter plastic and brass rod. Other appendages can be made with Evergreen strip stock, and any disks you need can be made with your Waldron Punch Tool. You can also scratchbuild the blast shield, which is the round housing that sits on top of the tubes. To build a blast shield, select the Evergreen tube size that closely approximates the diameter you want, cut it to length, and glue on a small piece of sheet stock to cover the top. When the glue is dry, cut and sand the sheet stock to the shape of the tube. You can then add small appendages using the punch tool and strip stock and rod.

Another nice detail to add is the actual torpedoes. The Japanese, British, and American navies used a lot of torpedo tube designs during the war, and in some of them the ends of the torpedoes protruded from the tubes.

To make a torpedo, take a rod in a size slightly smaller than the desired tube diameter and round the end by sanding the tip with a Flex-File sanding stick. For a nice round shape, rotate the rod as you sand it.

Once you have made the number of torpedoes you need you can form-fit them into place. Be sure to cut them all to the same length. You may also have to slice them in half to get them to fit correctly.

Resin kit manufacturers provide finely detailed torpedo tubes in either white metal or resin. Usually the white-metal ones come in several pieces. You have to assemble the individual tubes onto the base and then attach the blast shields. White metal is very soft and it is not unusual for parts to be slightly bent. Simply bend them back into shape.

Torpedo tubes on 1/72 scale patrol boats like the ones manufactured by Airfix and Revell provide a lot of scale detail. Although they can be built straight out of the box, you can still add some detail to them to enhance their appearance by checking your documentation. Another good source for reference material on American PT boats is the age-old movie, *They Were Expendable*, starring John Wayne.

On the Revell's 1/72 scale kit of PT-109 you can add the firing levers to the small gas containers that sit on the rear tops of the tubes. Make them of plastic rod that has been flattened to represent a handle. You can also cut off the front ends of one or two tubes to represent tubes that have fired their fish at a juicy target. On Airfix's 1/72 scale German E Boat you can position the rear and front torpedo tube doors in the open position

and also insert the torpedoes supplied with the kit inside the tubes. On their 1/72 scale Vosper MTB boat you can leave the tubes empty or use the torpedo heads supplied with the kit. If you decide to leave them open you must remove the location pins inside the tubes.

MISSILES

The majority of ship kits with missile systems are fairly well detailed, even in smaller scales. There are many variations of launch systems, from the single/dual pedestal-type system to enclosed box, circular, and canister launch systems. Most of these kit parts are nicely detailed, especially the DML 1/350 scale sea power series of the *Spruance* and *Aegis* class ships. In the 1/700 series the modern U.S. Navy detail set by Skywaves provides some excellent replacement parts.

The best step you can take when building up missile launchers is to clean the seam lines off the parts without distorting the shapes or losing detail. Light scraping using a number 11 X-Acto blade held at a 45-degree angle will remove most of the seams on missiles, the tubes of canister launch systems, and the arms of pedestal systems.

Box launch systems usually come in either left and right parts, or left, right, front, and back parts. In either case, remember that the seams must be removed and the box has to be straight when you assemble it.

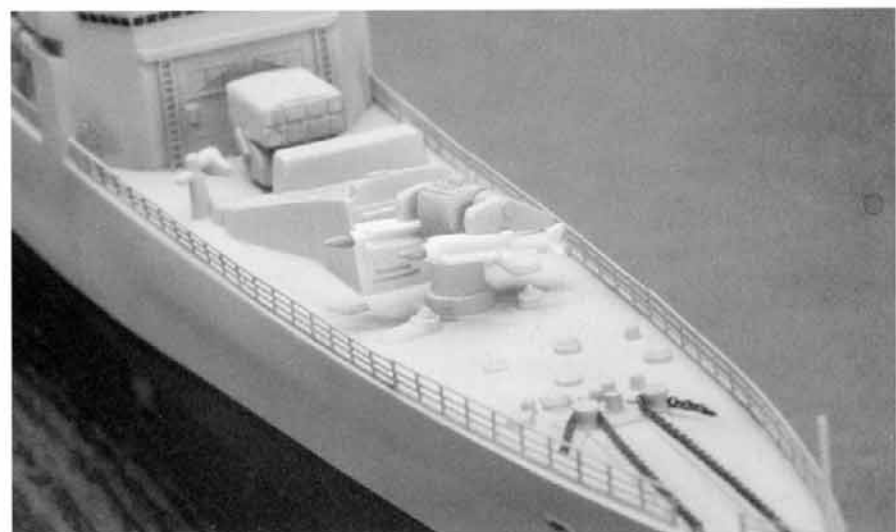
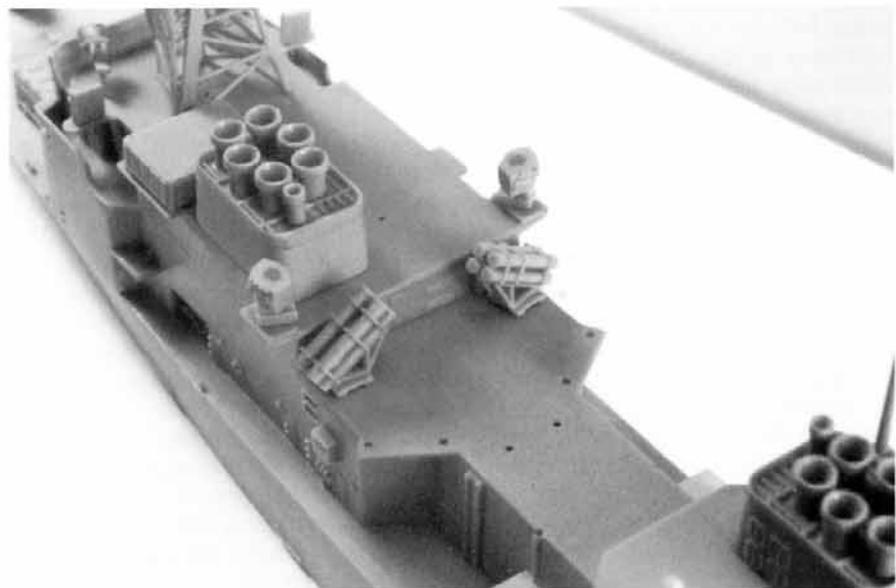
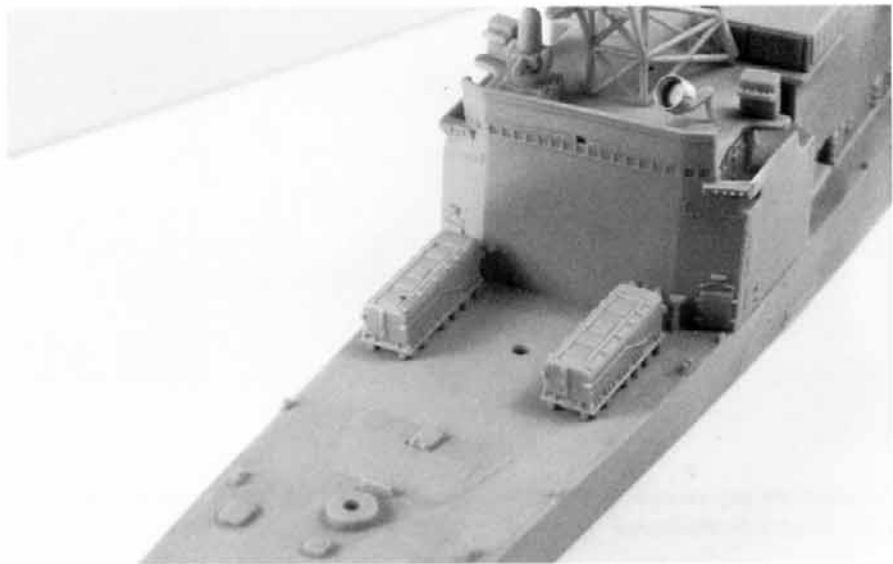
The box launch (top) and cross deck tube (center) launch systems on DML's 1/350 scale *Spruance* class destroyers are beautifully detailed, and they fit together perfectly. The main superstructure parts on this model are getting their final fit check. Note the holes drilled into the flag bags in preparation for rigging. Model by John Ficklen.

Sometimes the aligning pins are off slightly, so tape the parts together before you glue them and check the fit. If the fit is off, check the gluing surfaces for flatness or remove the pins by sanding the gluing surface on stationary sandpaper.

After you have glued the parts in place, sand the seams or do some filling, although either may result in some loss of surface detail. If you are careful when you sand you can replace lost detail with small pieces of evergreen strip stock cut to size with your chopper. Small disk details can be added using a Waldron punch tool. Even the old *Aurora* ship kits reissued by Revell or Monogram from time to time can have their missile launch parts enhanced with strip stock and your Waldron punch tool. To give pedestal-type launchers a more realistic appearance you can reposition the arms so they appear to be in a firing position. This can easily be done by bending them upwards slightly, but be sure the arms match.

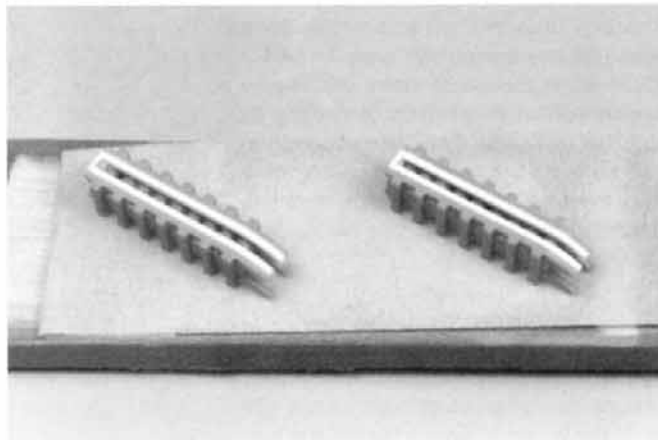
Missiles are usually off-white, while the arm and pedestals are some shade of gray. Most other launch systems are the same color as the superstructure, but to make them stand out, paint them a slightly lighter or darker shade. When missiles are launched from pedestal systems the paint on the deck area around the pedestal usually gets scorched. To simulate this, ball up a small amount of fine steel wool grade 0000, double-tape it to a piece of balsa wood, and lightly rub the wool into the paint.

The completed missile launch systems on Monogram's *Halsey* have been enhanced with small disks and some drybrushing. The scorch marks on the deck to simulate missile firings were done with pastel pencil dust. Photo by Glenn Johnson.





Enhance the appearance of the depth charge rack by adding small lengths of plastic rod.



To hide minor flaws that just cannot be fixed you can add small lengths of Evergreen strip stock to represent framing.

Glue the missiles onto the pedestal arms before you glue the entire assembly to the ship because these small parts will be hard to position if you install the pedestal first.

DEPTH CHARGES

Adding detail to depth charges and their associated delivery devices like racks and "K" loaders is not hard, but the techniques are determined by the scale of the kit. On many 1/700 scale models the depth charge racks can be nothing more than a series of hemispheres molded just above the deck. As these look odd and unrealistic, you can improve their appearance by using photoetched depth charge rack framing designed to fit right over these molded details. The photoetched framing will give a three-dimensional appearance to the parts.

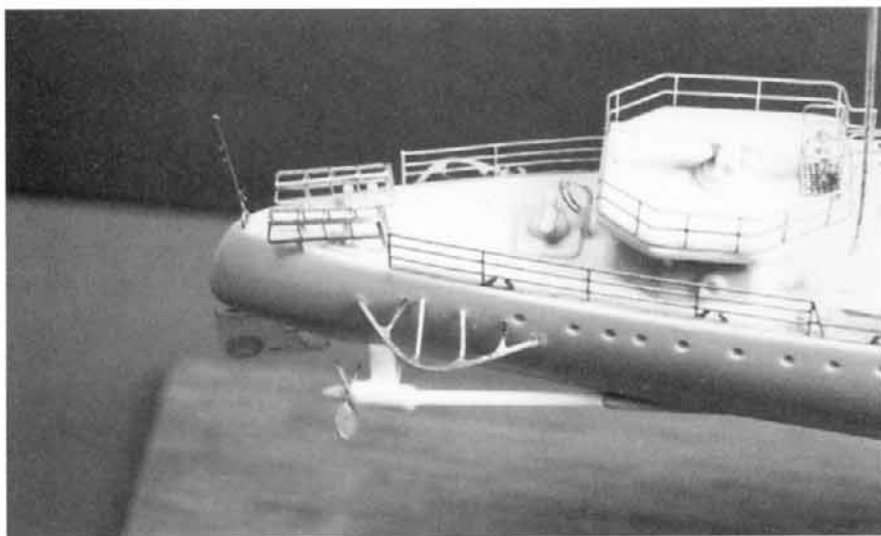
Another method is to use the photoetched racks in combination with the Skywaves detail sets, which have several sets of depth charges.

Gold Medal Models, Tom's Model Works, and other manufacturers supply these parts. Simply remove the existing molded detail from the kit's deck, fold the photoetch, glue the Skywaves depth charges into the inside of the photoetch rack, and glue the completed part to the deck. You may also have to trim the sides of the Skywaves parts to get them to fit, but all you need to do is run them across stationary sandpaper to remove excess plastic and then form-fit them into place. The time-consuming part of this is removing the molded depth charges carefully without damaging surrounding detail or gouging the deck. Use a number 11 X-Acto blade

to peel off the plastic. As you get closer to the deck with the knife, start scraping the plastic instead of cutting it. Smooth out the surface using a Flex-I-Pad standing stick with its end cut flat.

In larger scales most manufacturers strive to mold separate parts for the framing, and generally the racks are in two parts with the depth charges in the middle. While these look more accurate, adding extra plastic rod and strip can make a big difference. Usually the depth charges aren't wide enough, which results in a skinny-looking depth charge rack. This is the case on some of the old Revell ship kits. To fix this, use your chopper to cut inserts for the depth charges from rod stock and glue the rod lengths to the depth charges. The rod sections will be very small, but the addition of just $\frac{1}{16}$ " in depth can make a world of difference in the appearance. I also add small lengths of strip stock to the framing to enhance its appearance and hide flaws. Since the rod you cut will most likely not match the diameter of the depth charges, you must also hide the difference, and adding small strip stock is the way to do it.

Resin kit manufacturers usually supply photoetched framing for their



Photoetch manufacturers and resin kit manufactures make great-looking depth charge racks. All you have to do is add lengths of rod to simulate the actual depth charges. Model by John Ficklen

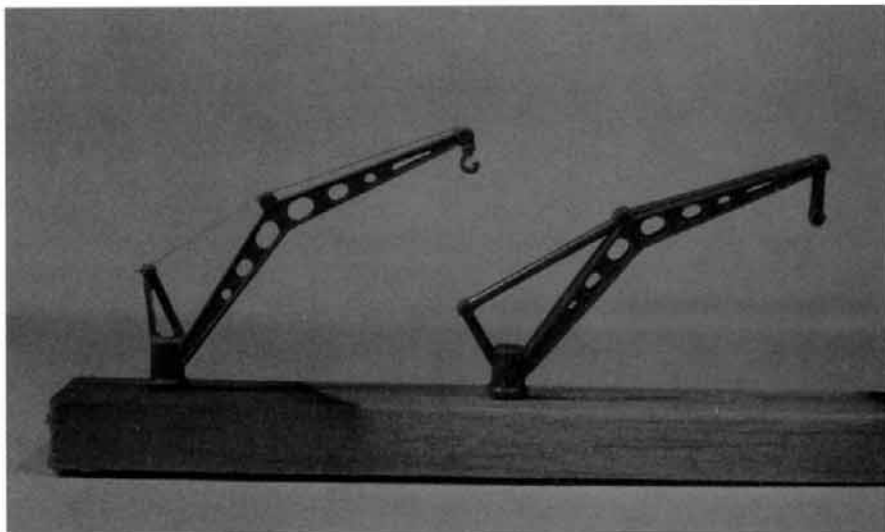
depth charge racks and white-metal depth charges that go inside the framing. Be sure to clean up the seams on the depth charges before you insert them into the framing and test them for proper fit. Sometimes you must shave off some layers of white metal to get them to fit. If you take your time and bend the photoetch correctly you can achieve realistic depth charge racks with these kits. Another approach is to use the framing, but not add the depth charges.

Both Japanese and American ships also had some type of alternate launching system for small depth charges that launched them away from the ship. These launchers consisted of a small frame that stored the depth charges and also aligned them with a pedestal device that launched them. The racks were angled so when a depth charge was launched, another would roll into place onto the pedestal. The pedestals looked a little like a sideways K, so they became known in the U.S. Navy as "K" loaders. Resin ship kits have nicely detailed photoetched parts for these systems, but they can be tedious to bend into shape. To be sure all the racks look the same, be careful how you bend them.

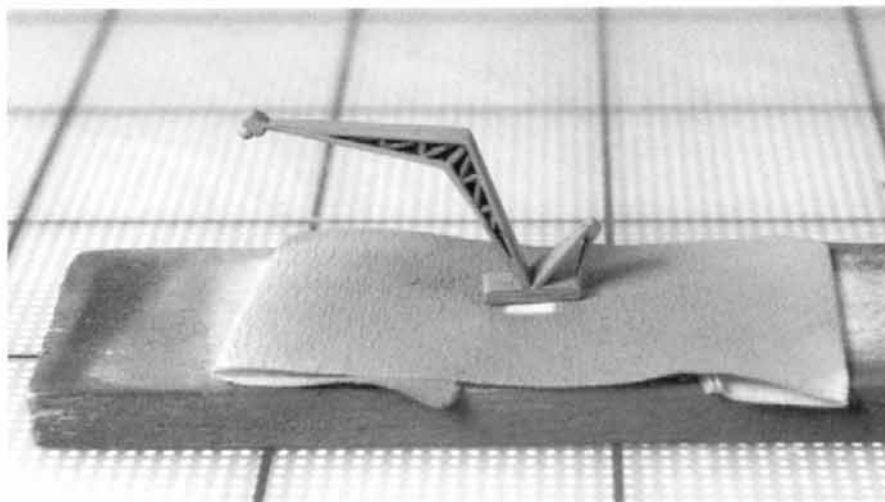
CRANES

The designs of cranes vary with each navy, but they all have two common elements—pulleys and cables. If you are not working in a scale for which photoetched parts are available to replace the kit's cranes you can add detail that will enhance their appearance.

For cranes that have open framing, clean the seams from between the framing using the tip of a number 11 X-Acto blade and the tips of micro files. You can also thin the framing at the same time for a more scale appearance. The pulley assemblies usually supplied by the manufacturer are always out of scale and must be cut off, along with the molded cable. Sometimes kit manufacturers try to mold too much detail into a single part, making it difficult to determine what detail belongs to what. In these instances before you start cutting check your documentation to see where pulleys and associated framing were located and how they were con-



The airplane crane on Revell's 1/426 scale *USS Arizona* looks much more realistic with the framing thinned out, a new rear cable frame, and stretched sprue for cabling.



Small scale cranes can be enhanced by painting the area between the molded-on framing.

structed. Also check how cabling ran along the crane and through the pulleys. You can make the pulleys by punching out small disks with your Waldron punch tool. Fashion framing from strip and rod stock, and the cabling from clear nylon thread.

For models without open framing, remove the pulley and cable details and build new ones. Next paint the crane the finished colors, using at least two coats of enamel paint. When it is dry give it a coat of Testor's or Polly-S clear gloss and let it dry for at least 24 hours. Next, hand-paint the areas around the framing with a

slightly dilute coat of water-base flat black. Finally, take a small ball of number 0000 steel wool and rub the flat black off areas where the paint has flowed onto the framing. The result will be a clean-looking frame on a black background.

Resin ship model manufacturers supply well-detailed crane assemblies made from resin or white metal and photoetch, and with the addition of some clear nylon thread for cabling, these parts look great. Photoetch manufacturers make specific photoetch sets for classes of ships or individual ships, and using these in



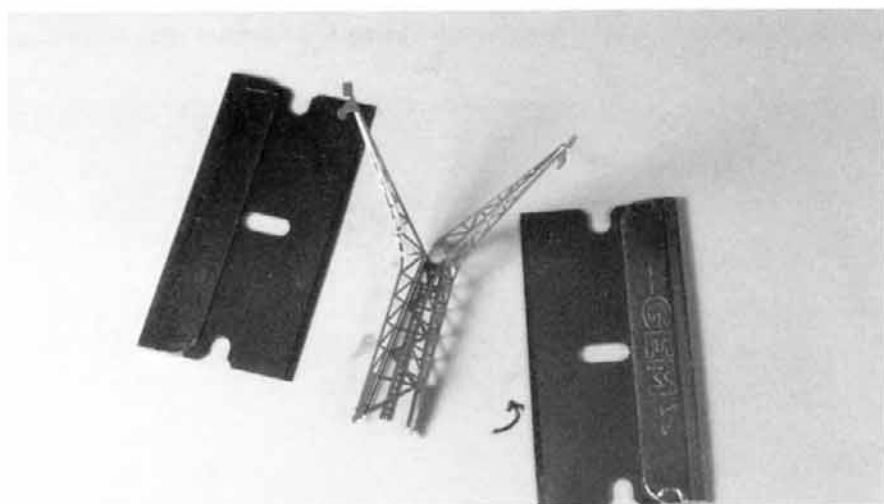
Note how the cabling on the boat cranes of Commander Model's 1/350 scale USS *California* have been dropped to simulate the fact that there is no tension on them. These little extra effects can make a great-looking model even better. Model by Lonnie Ottzen, photo by Glenn Johnson.

combination with modified kit-supplied parts you can make well-detailed cranes. A good example is the 1/350 and the 1/600 scale Gold Medal Models photoetch sets for the *King George V* battleship, which uses kit-supplied parts in combination with photoetched parts.

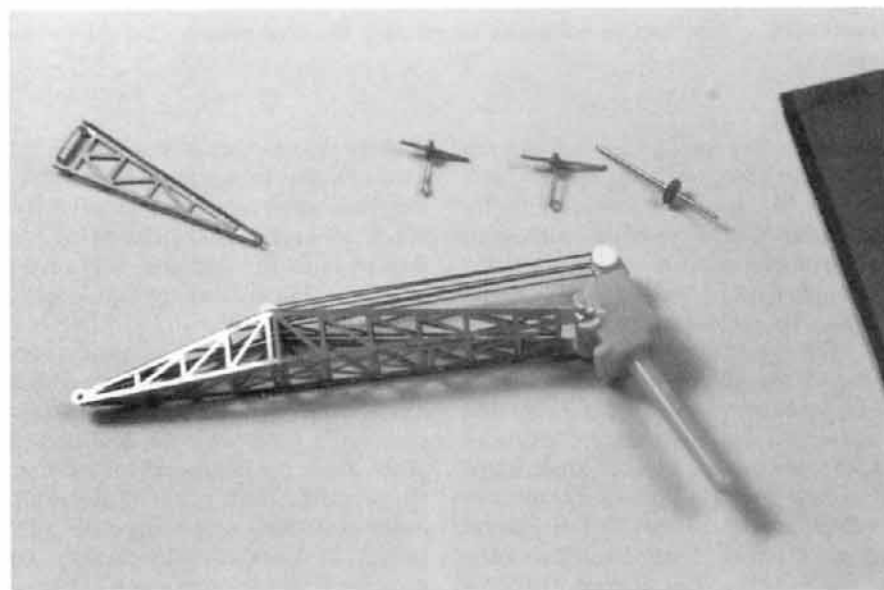
In smaller scales you can use two single-edged razor blades to bend the photoetched framing, just as you did with ladders in Chapter 3. In larger scales lay a metal straightedge across one side of the fold line and use a single-edged blade to fold the other side up. I have experimented many times to learn the best sequence to fold these complex parts, and I've had the best luck with slightly folding the smaller side sections first so the fold lines will have good creases in them. Then I fold the larger side sections to their correct shapes and work the smaller side sections into position with a combination of tweezers, flat-ended pliers, and gentle pushing and prodding with my fingers.

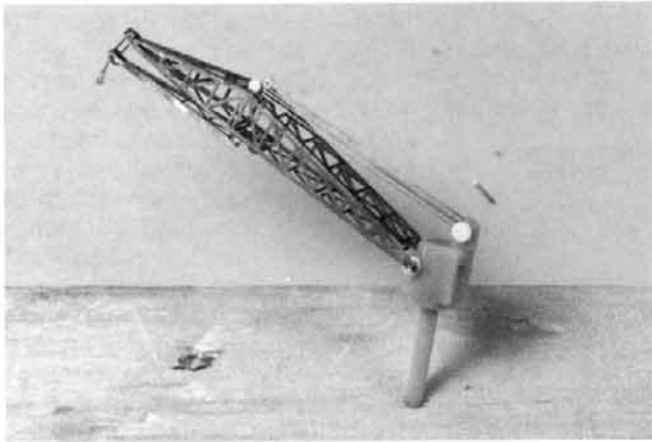
Once you get the crane folded the way you want it, apply small amounts of super glue along the fold lines and completely glue a fold line before proceeding to another one. Once the entire crane is glued, let it dry and then sand the surfaces of the photoetch to clean the brass or stainless steel and remove excess super glue. Running the flat-surfaced parts across a stationary piece of fine-grit sandpaper in combination with using small sections of Flex-I-File sanding sticks for those hard-to-reach places will ensure that all surfaces are clean and free of excess super glue.

Sometimes kit parts are used in combination with photoetched parts. The subassemblies for Airfix's 1/600 scale boat cranes for the HMS *King George V* battleship are ready to be painted and installed.

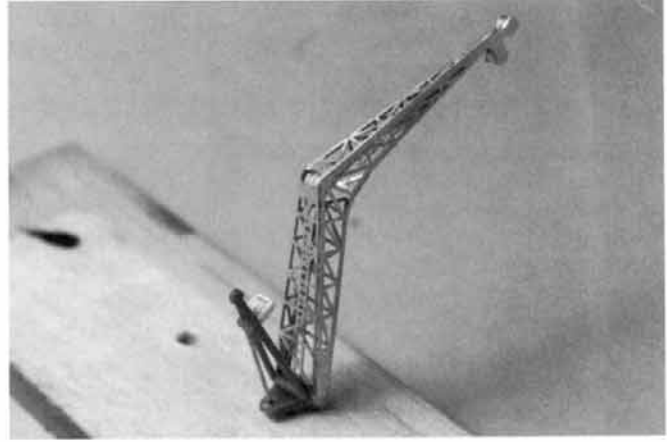


To get sharp, straight bend lines on photoetched cranes use single-edged razor blades.





Use small disks punched out with Waldron's punch tool as spacers as well as covers for minor flaws.



Make the pulleys on this 1/350 scale *Iowa* class battleship boat crane from two different disk sizes punched out with Waldron's punch tool and then sandwiched together.

You can also build the framing for the cables from plastic strip and brass rod, and you can make pulley blocks for the frame as well as for the crane using a Waldron punch tool. To make pulley blocks, punch out two disks, then punch out one disk smaller than the other two and sandwich it in between. To help set the disks correctly, lay the first on a small strip of masking tape, then glue the small one, then the other large one.

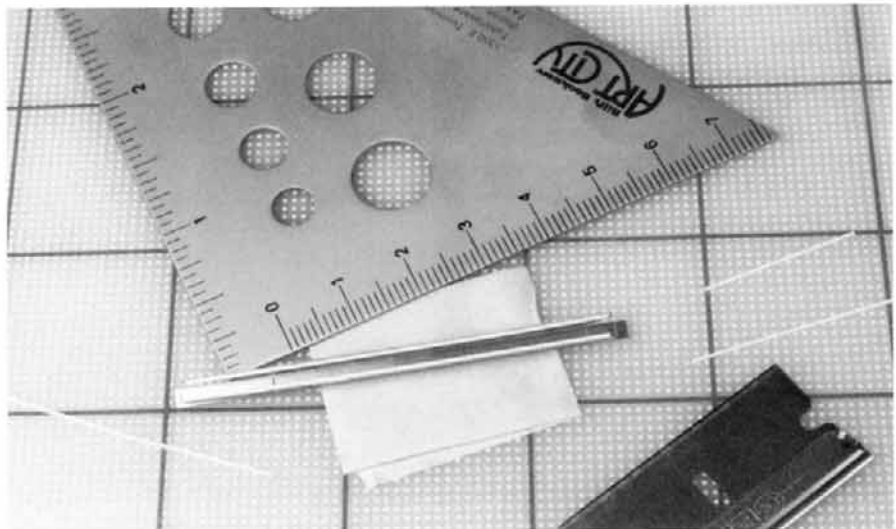
CATAPULTS

While catapult designs differ from navy to navy, their basic operation doesn't change. Most ship kits include a one- or two-piece catapult assembly and the associated planes. The catapults can be simple stationary tracks like those found on German and British warships, or rotating girder-type launch platforms like those used by the American and Japanese navies.

In the 1/350 and 1/700 scales replace molded catapults with photoetched ones, especially if the catapult is a solid piece. Photoetched catapults are easy to bend into shape, and with the addition of some extra detailing made from strip and rod they will appear quite realistic. The one problem I have found with these photoetched parts is that in the 1/350 scale the catapult's top can be difficult to position and glue to the photoetched framing. This is because the gluing lip that attaches the top to the sides of the photoetched framing is the thickness of the brass sheet.

To fix this, glue small strips of plastic stock along the upper lip of the inside of the frame so the top of the catapult will have a good lip to rest on. This is easy to do, but be sure the plastic strip is flush with the top of the framing and add the plastic strip after you bend the photoetch so you won't damage it. Once the catapult is closed up and painted you will not be able to detect the plastic strips. Use super glue applied with a thin wire applicator along the fold lines to secure the framing. To remove excess super glue and clean the photoetch, simply run the catapult surfaces across stationary fine-grit sandpaper.

You can also use the kit manufacturer's catapult parts in combination with photoetched parts to produce fine catapults. This is the approach I recommend when building Tamiya's or Revell's 1/350 scale *Iowa* class battleships. You can also add things like compressed gas containers made from small plastic rod with one end rounded off, and gas tubing made from thin brass rod. You can add brass rod to the interior of the catapult before you close it up to give the appearance of a complex piece of equipment. Catapults had small tracks that the airplanes' carriages slid along, and they also had some type of shock absorber at the end of



To provide a good gluing surface between the catapult framing and the top add some thin strips of plastic to the inside lip areas of the framing.

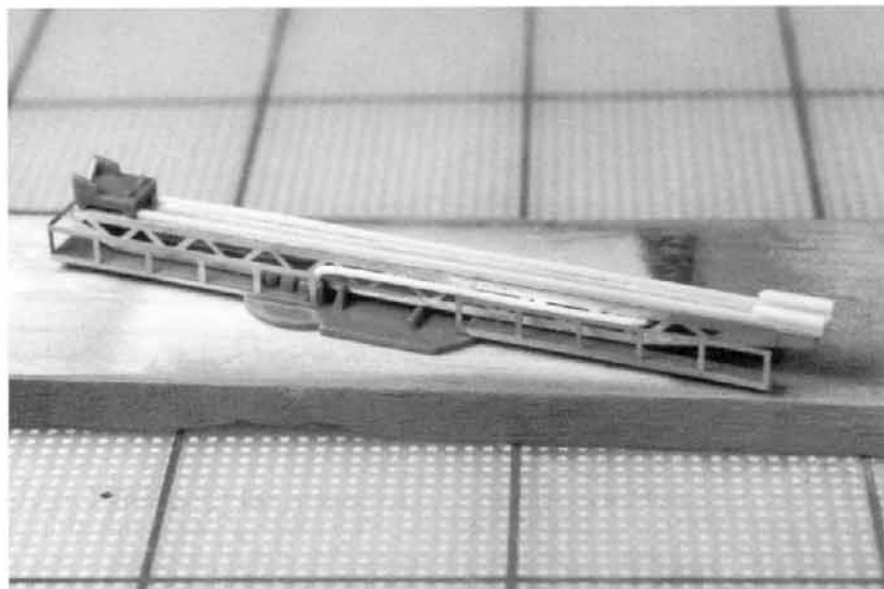
the track to cushion the catapult carriage as it hit the end of the catapult.

You can fashion all these parts from small pieces of plastic rod and

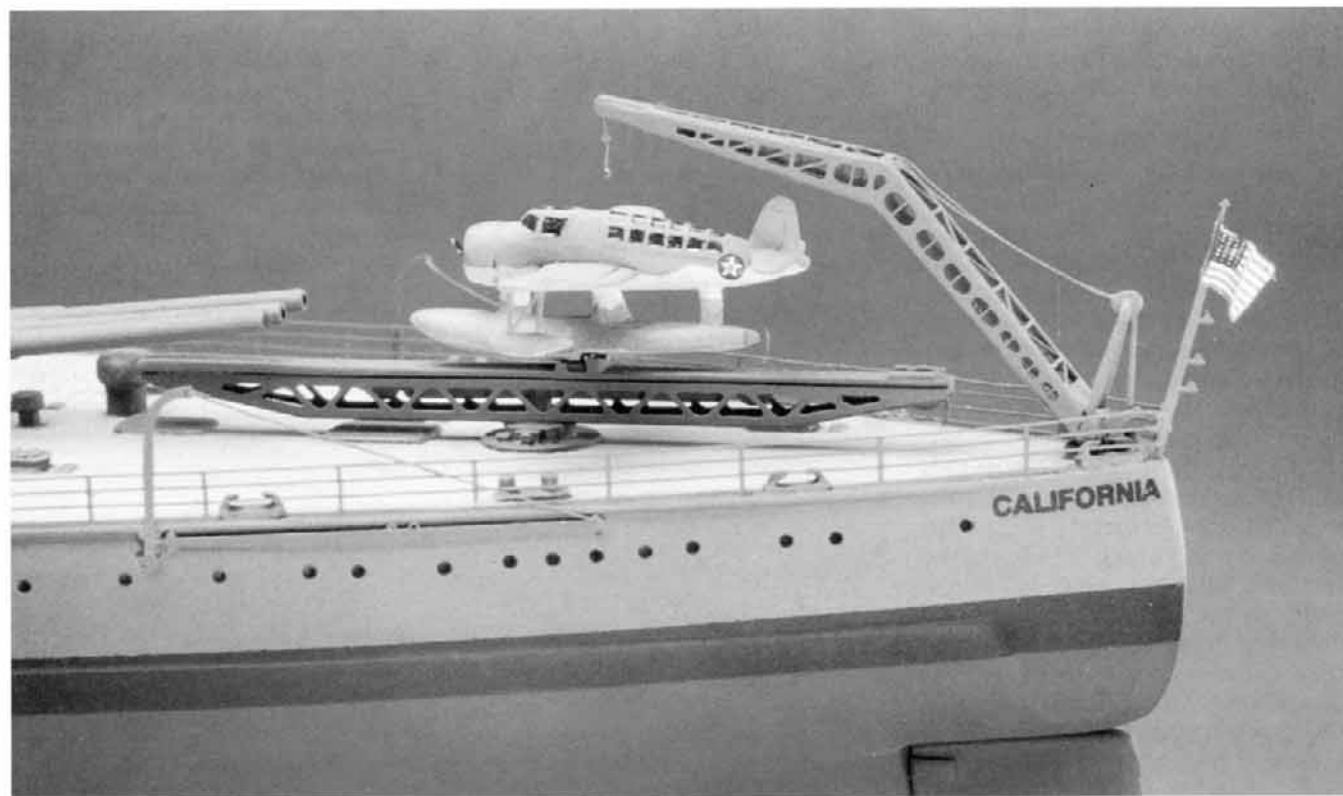
strip. If you don't have access to drawings, just add these little details in their approximate locations. Tubing goes along the sides as well as

the inside area of the catapult. The shock absorbers are most likely shaped as cylinders and are located at the front end. The tracks are small and run the full length up to the shock absorbers. Most catapults also had catwalks along their lengths and these can be made from plastic sheeting. The catwalks also had railings that can be made from photoetched railings. Resin ship model manufacturers supply the necessary photoetched parts as well as the bases, catwalks, and railings, and if you assemble them correctly you shouldn't have to add any more detail. Clean the brass or stainless steel and remove excess super glue when you have completed the assembly.

Photoetch manufacturers recommend that you paint their parts before you assemble them into a catapult so you can paint the inside areas. There are two problems with this. First, you have to skip the primer coat and spray the finish coat, and second, when you bend the photoetch you scrape paint off that will have to be



Make this 1/350 scale catapult from Gold Medal Models photoetched parts, kit-supplied parts, and Evergreen strip and rod stock.



Resin kit manufacturers supply finely detailed cranes and catapults with their kits. All you have to do is assemble them and give them a good paint job. Model by Lonnie Ottzen, photo by Glenn Johnson.

touched up. I recommend you bend the catapult framing first, add the strips of plastic, then prime and paint the framing and catapult top separately. When the two assemblies are dry you can glue them together. On 1/350 scale catapults you can scrape the paint off the plastic strip you added and use super glue, and in the 1/700 scale attach the parts using minute amounts of white glue.

If you are constructing a model for which no photoetch is available, and the catapult part has open framing, as on Revell's 1/426 scale USS *Arizona*, you can clean up the part to improve its appearance. First get rid of the seam lines along interior surfaces of the framing with a combination of micro files and sharp number 11 X-Acto blades. You will only be able to use the tips of the micro files and the blades, but you can work them into the small spaces between the framing and start removing unwanted plastic. In addition, you can thin the framing a bit for a more realistic appearance while you are removing the seams. These kit-supplied catapults can be detailed with plastic rod and stock just like the photoetched ones, and since photoetched railing is available in different scales, you can also add this detail.

If the catapult is one solid piece, removing plastic from between the

framing is impossible, and the best you can do is paint the area between the framing black, using the technique outlined in the section on cranes.

SMALL BOATS

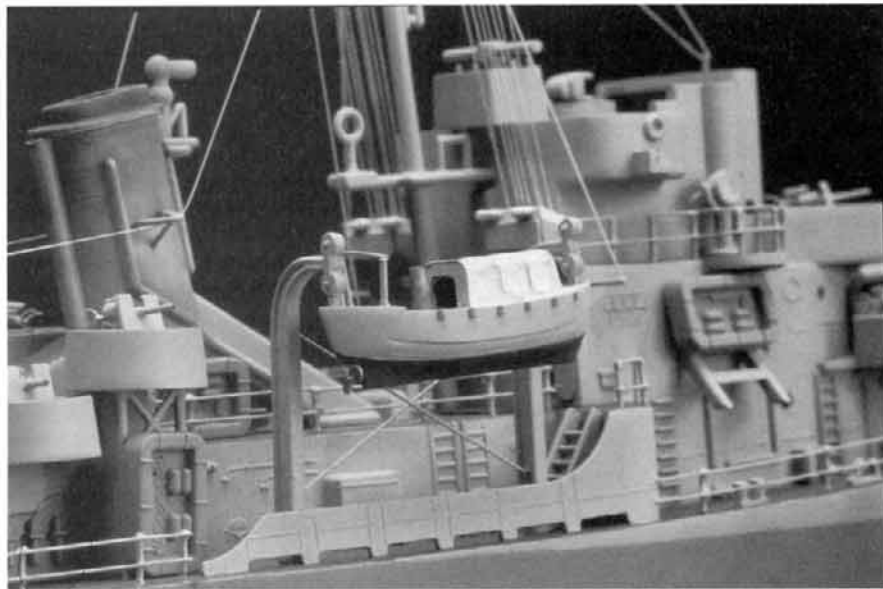
All ships have small boats to transport the crew to shore and serve as lifeboats. There are also a captain's boat, used exclusively by the commanding officer, and life rafts. The number of different types of small boats a ship may have depends on the class of ship, its design, and the period. As an example, World War I ships had small boats but few life rafts, while World War II era ships had fewer small boats and more life rafts. Modern warships have about the same number of small boats as their World War II ancestors, but the traditional rectangular life raft has given way to canisters that contain the life rafts.

Detailing small boats can largely be done by careful painting because the majority of the kits produced today have good detail on them. Check the surfaces for dimples and fill them with putty. Watch out for small seams along the keel, which can be hard to detect. You can also add extra details to small boats if the scales are about 1/400 and larger. You can make small propellers using your Waldron punch tool, add grab rails from thin

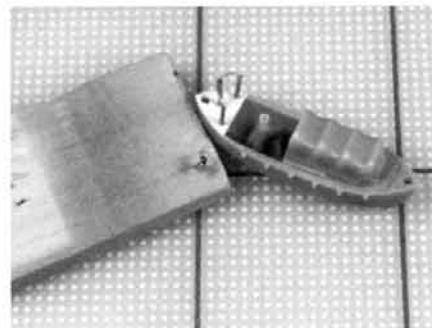
brass wire, and cut small rudders from thin sheet stock. If you are not satisfied with the kit's small boats, dip into your spare kits box and replace them. In 1/700 scale, Skywaves detail sets contain small boats that are well detailed.

To make a propeller, punch out two small disks with a punch tool and mark three points along the edges of each disk so they form a triangle. Now cut two of the legs of the triangle so you have a diamond shape. After you cut both disks, glue the triangles to the tip of a small length of thin brass wire with super glue. To simulate the twist of a propeller blade, offset each triangle when you glue it to the brass rod. You will also need to drill a small hole in the hull along the keel so you can insert the propeller. Cutting these small triangles results in tiny parts, which you can pick up using a round toothpick with a moistened tip.

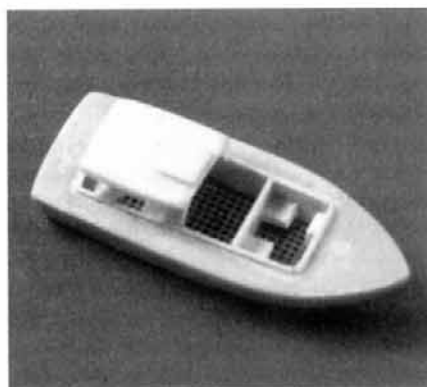
Grab rails were common on small boats that had covers or cabins. You can simulate them by drilling small holes into the sides and cutting thin lengths of brass wire, which you then bend to size and insert into the holes. To ensure that the holes are drilled along the same line, cut a small strip of masking tape, place the tab along the side of the cover or cabin making sure it is straight, and mark the drill points with a needle and pin vise. Be sure the tape location and pin holes are the same on both sides. These grab rails were usually bright brass. To simulate this, drill the holes but finish painting the boats before you install the brass. I use white glue for these parts because it also acts as a filler.



Make the propeller on this small boat by punching out two disks with a Waldron punch, cutting two triangle shapes from the disks, and then gluing them at an angle to a small length of brass wire. Photo by Glenn Johnson.

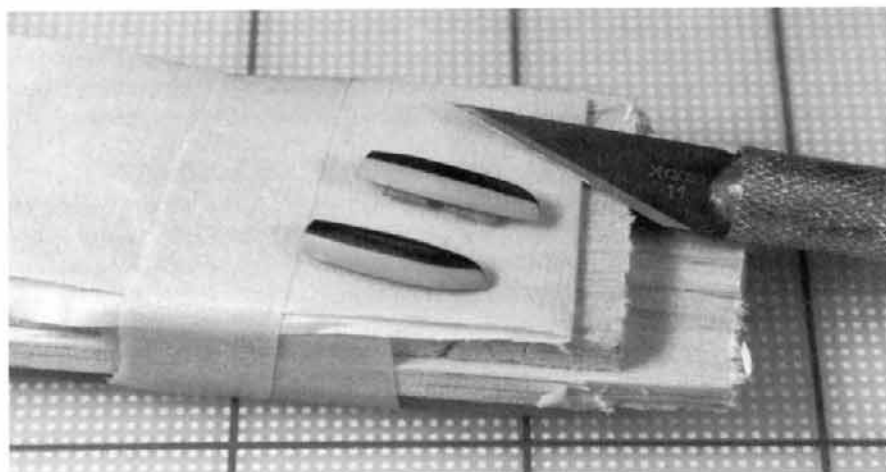


Adding plastic sheeting and grab rails as well as hollowing out the smoke stack on this small boat greatly enhances its appearance.



Some small pieces of Evergreen strip and sheet stock that were cut, shaped and form-fitted into place as well as a scrap piece of photoetched grating were all that was needed to enhance the appearance of this 1/350 scale boat.

You can cut rudders from .005" or .010" sheet stock. Just sketch a rudder, cut it out, and shape it. If the boat is an open design and you want to add a rudder with a tiller connected, punch out a disk and cut it in half. Glue two lengths of small strip stock together at 90-degree angles and form-fit the part against the stern. The tiller should extend a little way into the boat and the rudder end should not extend farther than the keel. Next glue the cut disk to the base of the strip that extends to the keel, sand it smooth, paint it, and glue it in place with white glue. Exact accuracy is not as important as the perception that the boat has a rudder and a tiller.



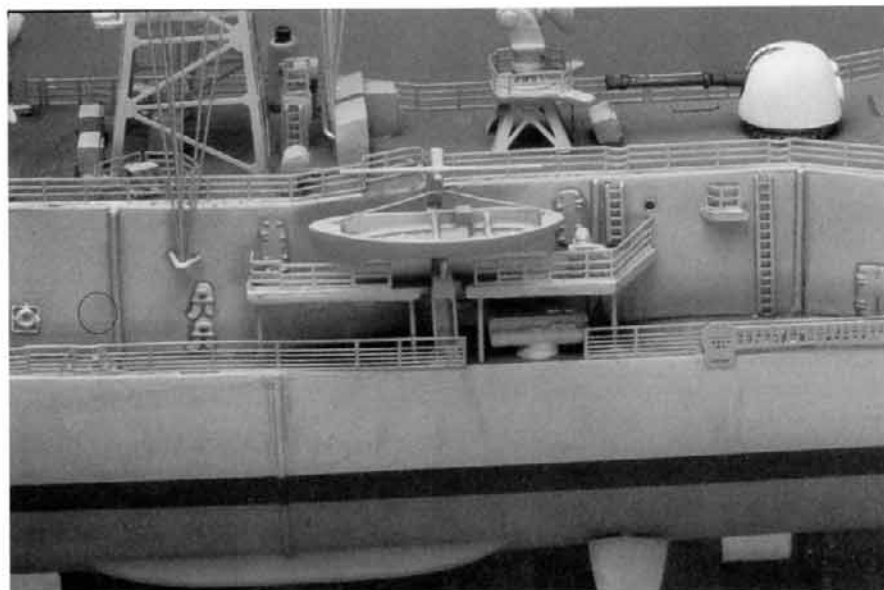
Even 1/700 scale boats should have their bottoms painted. Thin strips of masking tape wrapped around the hull to set the line was all that was needed to give these small boats a good coat of bottom paint.

In order to get these small boats to look good you must do careful masking for both the hull and for the deck, if the boat has a cover. The lower hull of most small boats was painted flat black and the rest of the hull as well as the inside painted the same color as the superstructure of the ship. Small boats that had covers or cabins were white or a dark shade of gray or even black. Painting all these colors on such a small part makes for tedious masking, but the results are well worth the effort. Life rafts were also painted the same color as the superstructure—not until some time after World War II were they painted international

orange so they could be easily seen from search aircraft.

Resin kit manufacturers supply the most accurate and detailed small boats I have ever seen. They usually come as resin or white-metal parts, and the kits also supply photoetched framing that inserts into the boat as well as oars, tillers or rudders, and a propeller. If the boat had grab rails they are also supplied. These small boats are almost models in themselves, and if you take your time with them they add yet another level of realism. Be sure to trim the photoetched parts carefully, especially the frame insert, because if there is the slightest stub present the photoetch will not sit correctly inside the boat.

Resin kit life rafts also come in two parts, the flotation portion of the raft and the mesh that forms the bottom. The flotation, which is usually rectangular, is made from either white metal or resin, and the mesh is made from photoetch. For injection-molded kits drybrush the mesh with a slightly lighter shade or use pencil pastel dust to highlight it. On modern ships like Revell's *USS Saratoga* or *Forrestal* there are a lot of these small



This hanging boat would look pretty strange without its hanging straps. Do not overlook these types of details. Model by Lonnie Otzen, photo by Glenn Johnson.

Life raft canisters on modern warships are usually a light color like white. Be careful when painting these small parts—you only want to paint the canister, not the base to which the canister is attached. Model by Lonnie Ottzen, photo by Glenn Johnson.

canisters, and I recommend you air-brush them before you install them and glue them all in place with white glue. If you are working in 1/700 scale, Skywaves detail sets for American and Japanese navies has lots of nicely detailed life rafts.

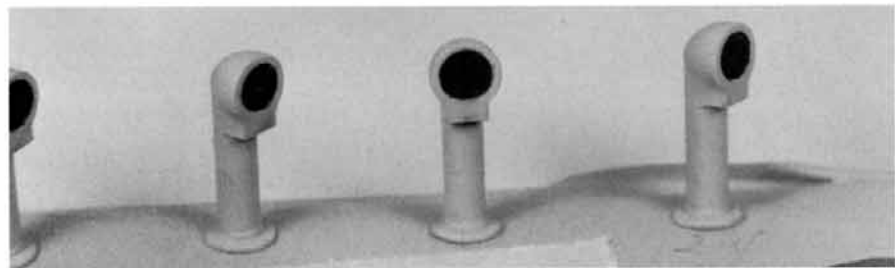
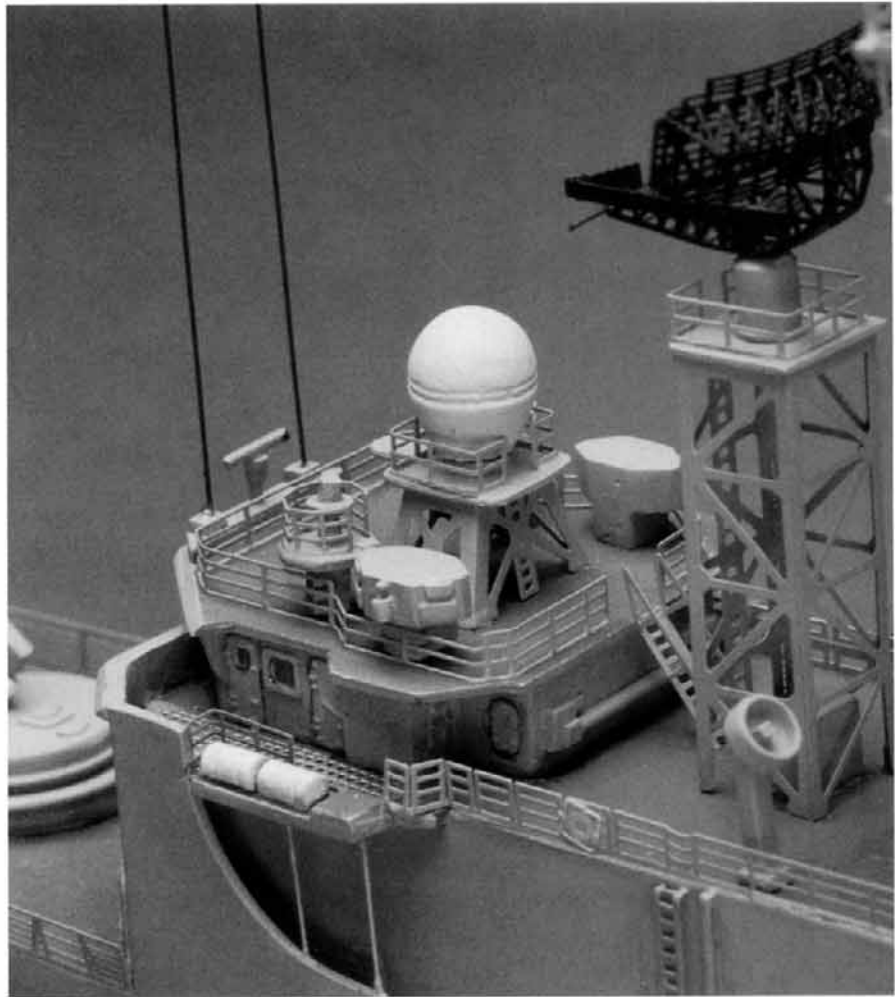
SHIP FITTINGS, AIRCRAFT, RANGE FINDERS, AND RADARS

Most small scale ship models have few parts because they are so small. The larger the ship kit the more ship fittings such as separate ladders, winches, chocks, cleats, ready ammo boxes, search lights, and boat davits you will find. All must be cleaned up and checked for flaws such as dimples. Once they are cleaned and corrected, give them a dry fit to ensure that the locating pins will fit into their holes and the part will be level.

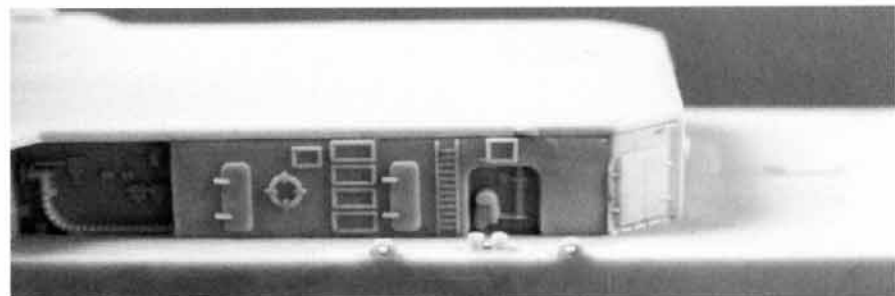
If the kit has ladders in the 1/350 scale or smaller replace them with photoetched ones. Larger scale ladders can be greatly improved by removing the plastic backing. To do this, run the part across sandpaper until the plastic backing gets paper-thin, then remove the excess with a number 11 X-Acto blade.

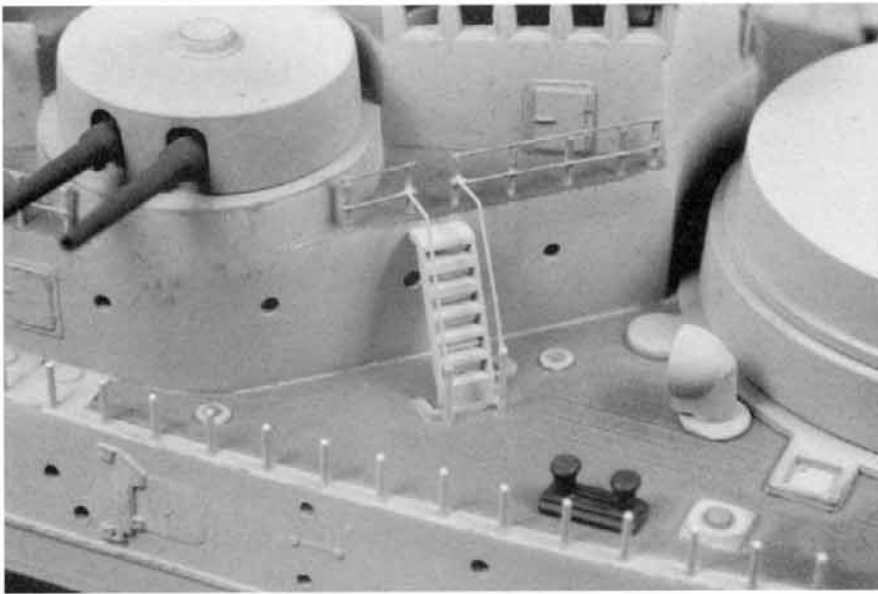
You can also improve searchlights by hollowing them out and inserting clear plastic to represent the lens. Use a pin vise to make a pilot hole in the center of the searchlight and select the Waldron punch size that comes closest to the lens diameter. Pick a drill bit of the same diameter as the punch and select several smaller ones so you can hollow out the searchlight in stages. You want to start small and work up to the drill bit size you need so you don't gouge the plastic. Once you have drilled the part, paint it and

The solid chocks on this 1/350 scale ship were drilled out to give them a more realistic appearance. Model by John Ficklen.



Enhance air vents using black paint. The base color is enamel and the flat black is a water-base paint, which makes it easy to remove any excess by scraping it off with a toothpick.





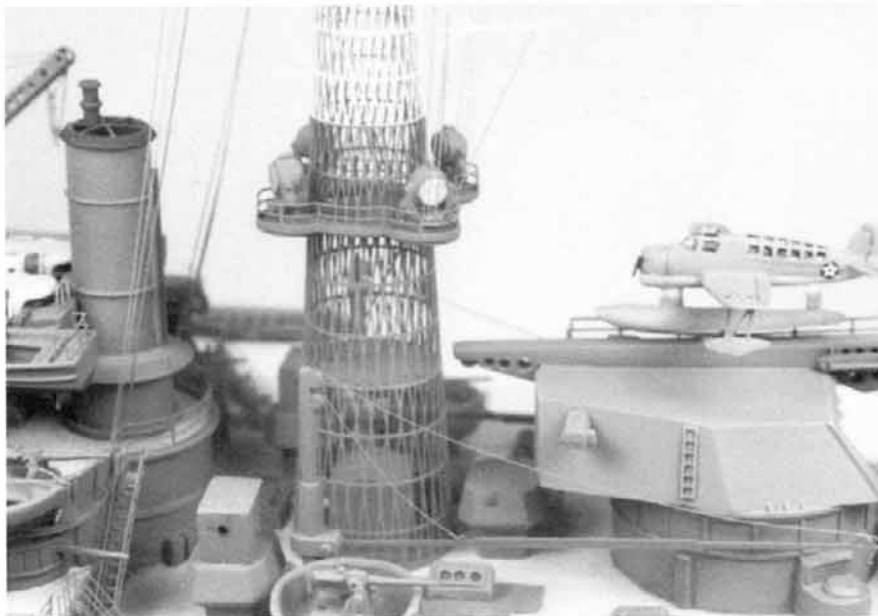
The ladders on Glenco's 1/225 scale *Oregon* look a lot better now that the plastic backing was removed and railings have been added.

then paint the inside of the searchlight flat white or off-white. After it is dry, punch out a clear disk and attach it with white glue.

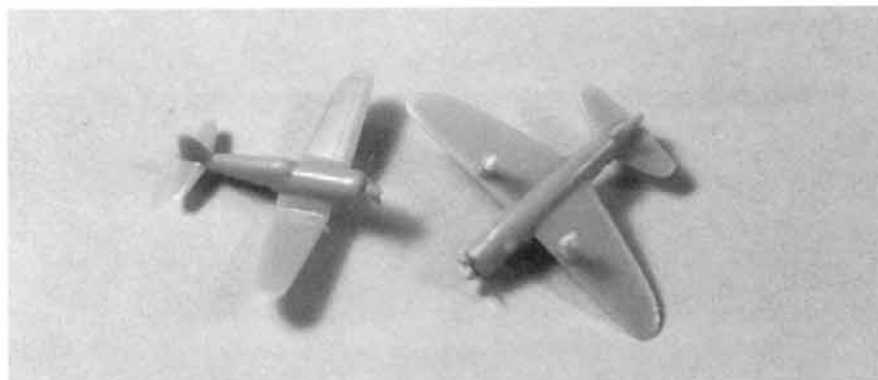
Aircraft can be improved by adding small disks punched out with your Waldron punch to simulate wheels, and you can add photoetched propellers and tail hooks to really dress them up. Air intakes on jet aircraft and open cockpits on biplanes can be improved by removing the plastic with drill bits. Simulating canopies on aircraft can be achieved by painting them off-white. On larger scale planes like those on 1/350 scale kits you can also paint the framing on the canopies if you take the time to mask them off.

Most ship kits have range finders and radar assemblies that are easy to install. In most cases there are large range finders located on the upper areas of the superstructure for the main guns and smaller range finders located all over the superstructure and the main deck for small-caliber guns.

Remove the mold lines on these parts, especially the small ones. These lines may not be visible before you paint, but they will definitely stand out after the part is painted and installed. You can dress up the large range finders with photoetched hatches and small lengths of rod and strip stock if the parts are devoid of detail. These additional parts can also hide dimples that may be hard to fill. To help make the small range finders stand out, paint them a slightly different shade than the surrounding superstructure. When you glue them in place use white glue so you can position them correctly. White glue provides a good bond between painted parts, and I recommend you attach all your small parts with it. If you get any excess on painted surfaces you can wipe it off with a damp Q-Tip.

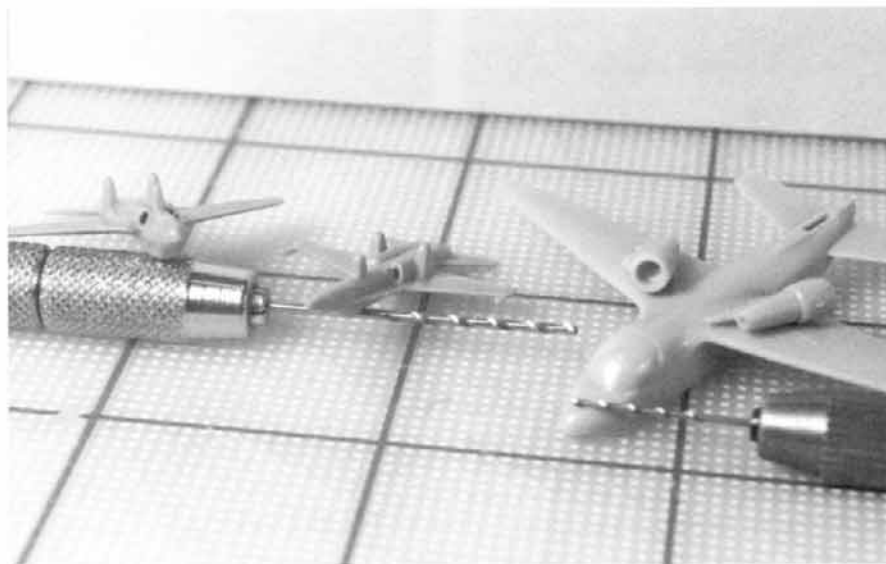


Carefully painted searchlights can look just as good as ones that have been hollowed out. Model by Lonnie Ottzen.

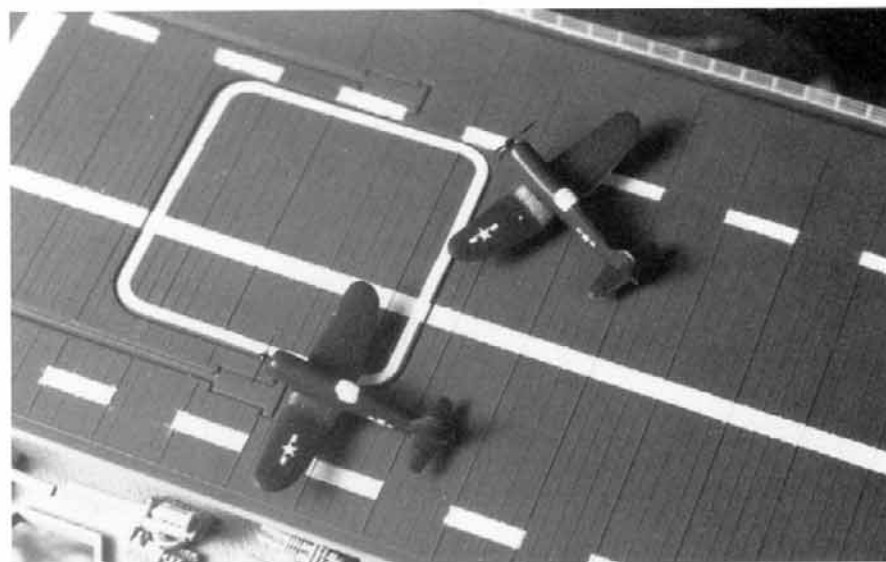


Photoetched propellers and wheels made with Waldron's punch tool can spice up even 1/700 scale aircraft.

The jet intakes on these aircraft have been drilled out so that they will appear more realistic. The two aircraft on the left are from Revell's 1/540 scale *Saratoga* and the larger aircraft on the right came from Tamiya's 1/350 scale *Enterprise*.



Radars come in various configurations, sizes, and shapes, and if you are using the kit-supplied radars the best you can do is drybrush the radar grids if they are a solid piece. Most radar grids were a dark color, which makes it easy to drybrush lighter colors to help detail stand out. If the kit has open-framed radars like those found on Heller's 1/400 scale ship kits, simply give them a coat of paint. To enhance these open framed parts you can add generic photoetched radar grids to the back of the framing. Simply form-fit the grid and super glue it into place. Not all radar frames had mesh backing, so check your documentation.

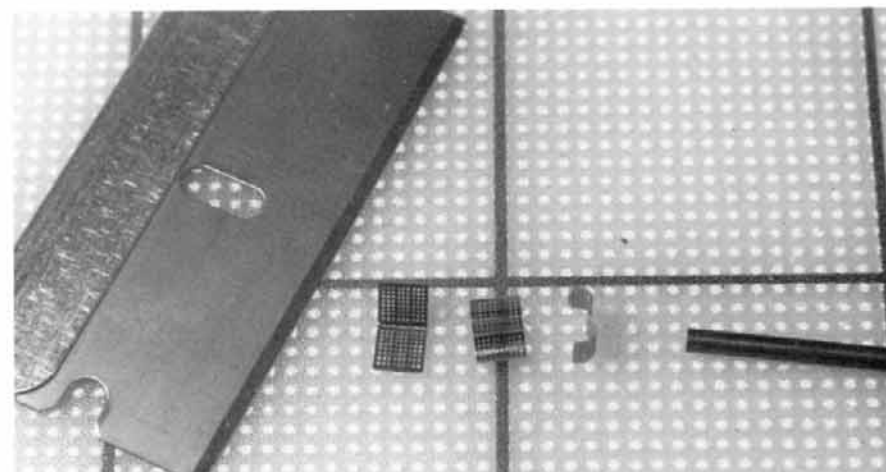


In cases where you can use photoetched radars and range finder grids, replace the kit's plastic parts with these replicas. Several of the photoetch manufacturers make specific radars and generic radar grids you can modify and use on various scale ships.

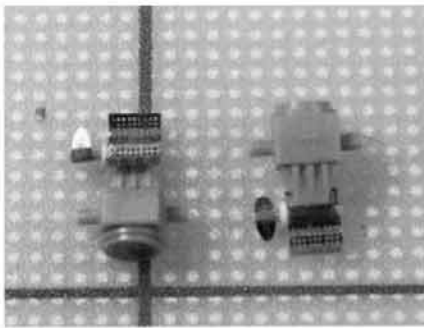
Some radar grids, like the US Navy World War II SK-2 type radar, are made up of layers of rings with bent spider webbing set behind them. It is best to tack these assemblies together using white glue at a few contact points. This will give you time to adjust the parts. Once you are satisfied with the positioning, let the white glue set and then use super glue to hold the rest of the assembly together.

Giving aircraft a coat of clear gloss will make decal application much easier. These decals are from Gold Medal Model's 1/700 scale decal sheet.

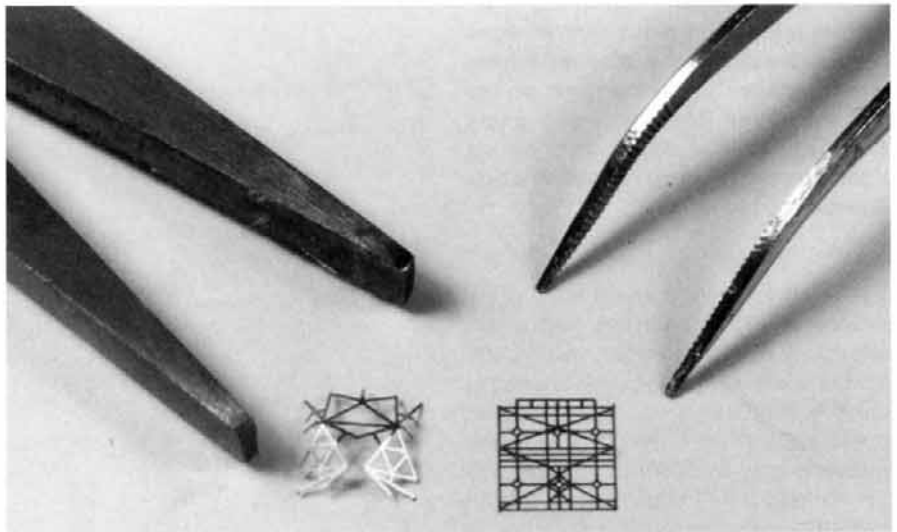
If you are building a radar grid from scratch using generic photoetched grids, add some framing to it. Evergreen has very small strip stock



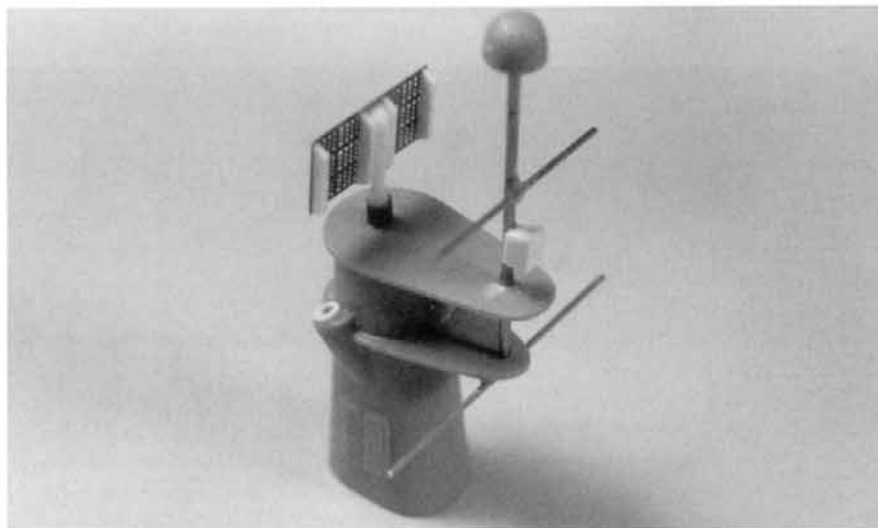
Mark 37 radars can be a bit tricky to bend. First, give the two panels a slight bend, then use a dowel or a Waldron punch stem to give the individual panels a curve. Next, bend the panels along the crease line and then give the panels more curve. This last step is a repetitive process of bending and shaping.



After bending the panels to shape, glue a small length of rod at the back side of the bend. You can use it as a mounting point and to attach the side antenna as well. The bases of these MK-37 radars are 1/700 scale Skywave detail parts.



The MK-37 radars and the SK radar have been installed on the superstructure of this 1/700 scale *Essex* carrier, which has also been rigged.



To get the rear frame on this 1/700 scale SK radar to sit correctly, set the bends and then form-fit the webbing onto the radar panel. You can tack the webbing into place with white glue at two or three contact points, adjust it, and then use super glue to attach the remaining gluing points.

sizes down to .005" x .005", which make excellent framing for radars. Photoetched grids respond the same way as photoetched railings to bending and shaping, so use wood dowels and flat-ended needle-nosed pliers to get the bends and curves you need. Cut and shape the grid first and then add the framing.

All resin kits use photoetched radar and range finder grids as well as photoetched framing for both the grids and the bases of the radars. While these take time, they are well worth the effort, as they are the most realistic representations of radars that can be found in any ship kit.

CHAINS AND ANCHORS

Some manufacturers, such as Heller, supply chains with all their ship models, as do all the resin ship model manufacturers. Model manufacturers mold ship chains onto the deck, and no matter how good a

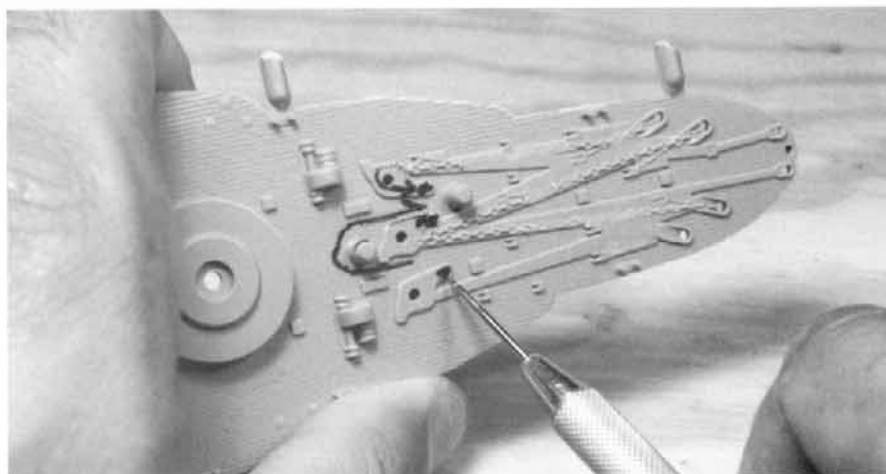
Make the rear framing on this scratch-built radar from lengths of Evergreen strip cut to shape. The radar panel is made up of seven individual pieces including the base.

painter you are, painting them just doesn't cut the mustard. Adding chains and the details necessary to accommodate them is quick and easy. First, pick a chain size that appears to be in scale and paint it black. I usually test several sizes before I find one that looks good. I airbrush the chain using the same black color I used to paint the boot strip on the hull. One point to note here is that you need to get all the work done for laying the chains, but adding them is one of the last steps.

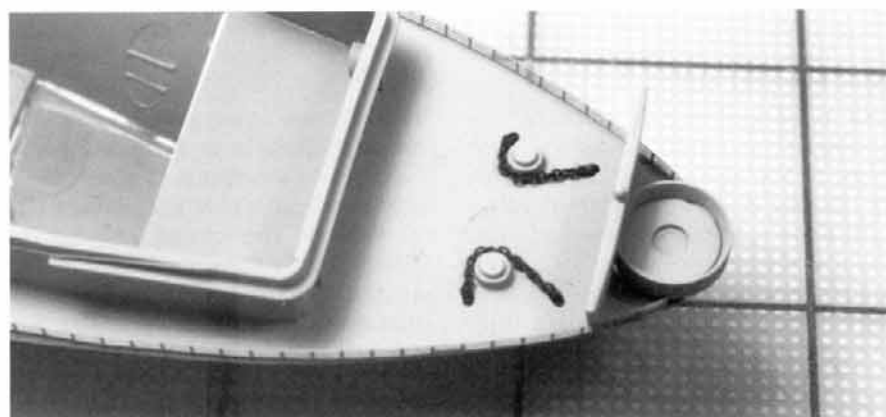
If the deck has molded chains, scrape them off and sand the surface flat. The best scraper for these small details is a stencil X-Acto blade or a number 11 X-Acto blade. Hold the knife blade at about a 45-degree angle and scrape the raised detail flush with the deck. If you try to cut the plastic you will gouge the deck's surface, so be patient. After you have removed the raised detail wrap a piece of fine sandpaper around a thin section of balsa wood and sand the surface smooth using the edge of the wood. If you are careful and don't gouge the surrounding plastic you can usually hide minute flaws when you lay down the chain.

Next, determine general layout of the chains on the deck, where the holes are that they emerge from, how they wrap around the capstans, and where they attach to the anchor. Once you determine where they emerge, drill angled holes in the deck large enough to accommodate the chain. Be sure to drill all the way through the deck—this will make it easy to tuck excess chain into this hole. Be sure the location is such that the chain will emerge from it and then wrap around the corresponding capstan. In addition, to measure the length of chain you need, lay it on the deck in its location, tuck it into the hole you drilled, and add a few links for safety. Glue all chain to the deck with white glue.

If the ship had the chain and anchor lying on the main deck as most destroyers did, attach the chain directly to the anchor. If the model is a small scale you can just super glue the end of the chain to the center stem of the anchor. This center stem either lies on the deck or is pulled up into the anchor opening in the hull



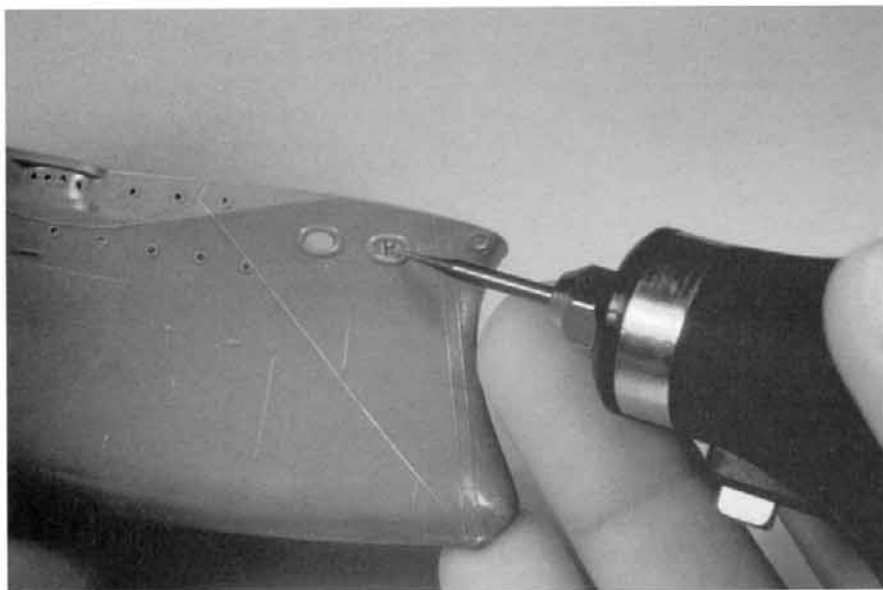
To help you plan the general layout of the chains on the deck, draw lines and make some notes. This is especially helpful when the kit has no holes in the deck indicating where the chains emerge from.



Even if you add nothing but chains to a deck area it will improve the overall appearance of the model. Most of the deck area on this *Essex* carrier will be covered, but you will be able to see the ship's chains when you look from the side.



The forward deck area of Revell's 1/240 scale *Buckley* looks a lot better with real chains and enhanced anchors. The deck on this model was replaced and the deck parts were cut from the kit. The bits were also scratchbuilt.



To allow anchors to sit correctly, hollow out the hawse pipes on the hull. Do this at the same time as you are drilling out portholes.

and is hinged to the base of the anchor. To simulate this, add a slight angle to the stem of the kit's anchor by bending it and then glue the chain to it. If the model is a larger scale you can drill a small hole in the stem, split a chain section, weave the split into the drilled hole, and then add a drop of super glue.

If the center stem is missing, pick a piece of plastic rod that appears to be in scale, drill an angled hole into the anchor's base where the rod will sit, and glue the rod into place. When it is dry, cut the rod to the correct length and flatten the last third of its length using flat needle-nosed pliers and drill a hole in the flattened surface for the chain attachment point.

If the ship's anchor rests against the hull both ends of the chain terminate under the forward area of the deck. This is the easiest situation to deal with. This configuration is generally the case on cruisers, battleships, and aircraft carriers. Drill a hole through the deck at the termination points so both ends of the chain can be tucked into the deck. Also drill out the hawse pipes in the hull so the stem of the anchor will sit correctly. The hawse pipe is the ringed opening on the bow.

Sometimes the capstans supplied with the kit are not the right size, or the sides don't have an inward curve.

To make new ones, select a rod size that appears to be in scale and insert the rod into the chuck of your motor tool. The length that sticks out from the end of the chuck should be slightly longer than the height of the capstan. You don't want an excessive amount protruding because the rod will wobble.

Turn the motor tool to its lowest speed and press a small round file against the side of the rod. Don't let the file stay in contact with the rod for more than a few seconds at a time because the friction will melt the plastic. The file will start to form inward curves on the rod. You can vary the size of the curve by selecting a section along the tapered length of the file. When you finish, remove the rod, cut it to length, and install it. You may have to practice on a few lengths before you get the feel for filing down the plastic, so don't worry if you have a few rejects.

Sometimes the entire area where chains go must be scratchbuilt. This is easy as long as you take the time to draw the correct shapes. I usually draw the new decking components onto good typing paper, cut out the drawing, and glue it to a section of sheet stock that has the scale thickness I want. I glue the paper with white glue so I can remove it easily. Once the glue is dry I cut out the part

using a straightedge and sharp number 11 X-Acto blade. After I cut it out, I soak it in water to remove the paper and glue residue, run it across fine sandpaper to remove scratches, and glue it to the deck. I usually add tiny amounts of Testor's glue to the underside of the part with a toothpick, and I keep the glue away from the edges. After it is positioned I run a bead of super glue around the perimeter of the part using a thin wire applicator.

MASTS

Some kits have good representations of a ship's mast system while others must be either modified or scratchbuilt because they are damaged, warped, or inaccurate. Compare the appearance of the mast parts to the pictures in your documentation. Look for two basic things: the relative thickness and size of the mast, and its configuration.

Once you determine that the kit's mast system is accurate, clean up the mast parts prior to assembly. Remove seam lines using a number 11 X-Acto blade. A gentle touch is all that is needed. If you need to reshape parts, use a Flex-I-File and fine-grit sandpaper to restore the round shape. Check the fit of the mast with the superstructure and also see that it sits straight from the front and the side. If you have to adjust the position of the base, remove the locating stub and flatten the base. Once you have added parts to the mast and painted it you can glue it in place. Fill in any portion of the locating hole that may be showing in the deck with white glue and cover it with touch-up paint.

Once you get the main mast positioned correctly glue any parts to it with small amounts of Testor's glue applied with a toothpick and adjust their position so they sit correctly. Glue one part at a time and reposition the mast in its location so you can adjust the part. This is slow, but it will ensure that each part is sitting straight and level. Small platforms and yardarms are usually the parts you add and you must be extra careful to glue them on straight.

If the mast is angled slightly towards the stern, and many of them are, be sure platforms are parallel with the deck. This takes a sharp eye

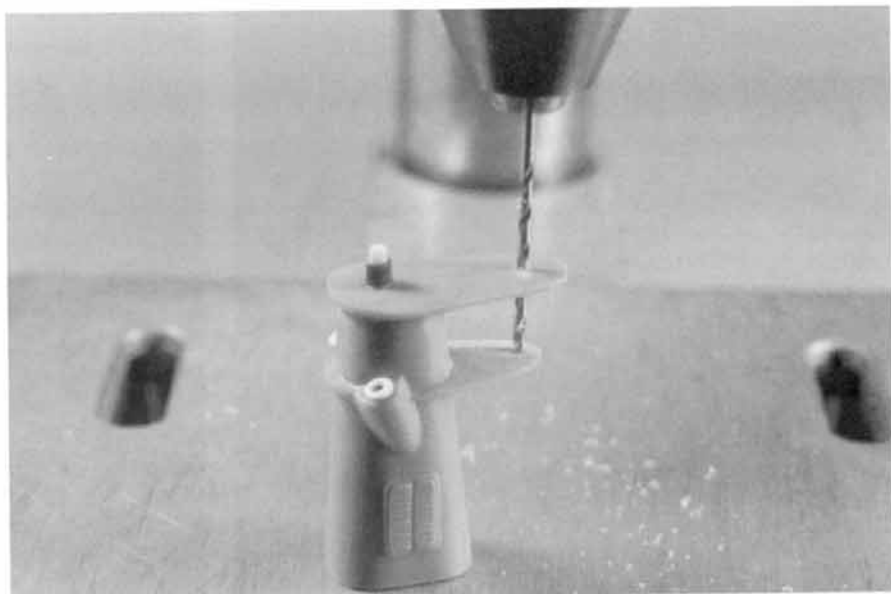
and some adjustment, and that is why I recommend Testor's glue for this purpose. Once you get the position of a part set correctly apply a small amount of super glue.

If the model has more than one mast, work with one at a time and completely finish one before moving on to the next assembly. To be sure multiple masts are all sitting correctly I complete one mast, paint it, and glue it in place. I then use this mast as a visual reference to see that the others are sitting straight and level and parallel to one another.

Small scale ship kit masts are usually not a problem, but large scale ones may need extra support, especially if you plan to add a lot of rigging. Cut the mast locating stub, flatten the base, drill a small hole, and insert and glue a small length of thin brass wire into the hole. Next, set the mast in place on the superstructure to check the fit and then drill a corresponding hole into the deck where the locating stub would go, making the hole slightly larger than the brass wire's diameter so you can adjust the mast's position. Most likely the hole you drill will be the mast's normal locating hole in the deck.

You can also add small details to the kit's mast if it has a platform. There are usually angled braces under the platform that attach to the mast. If the kit does not have them you can make them with thin sheet stock and your chopper. These supports are triangles, which are easy to cut with the chopper. You may have to form-fit the size of the support, which means you must cut several test sizes until you get the correct lengths—but once you get a good shape it's easy to duplicate. Also, the front side and back sides of mast platforms mast platforms are not usually uniform, so you may be cutting sets of different sizes.

If you decide to build a new mast I recommend brass wire because it is strong, yet easy to cut and shape. I use combinations of brass tubing and brass rod to get the mast configuration I want and I glue the parts with super glue. You will most likely need to modify the masts' location on the superstructure to accommodate the new diameters, so select your brass sizes carefully.



To ensure that scratchbuilt masts will sit straight, use a Dremel drill press to drill any holes in superstructure parts.

When gluing brass with super glue, sand the surface of the brass with fine-grit sandpaper to clean them. When you are cutting brass tubes you can use a small tube cutter, which can be purchased from Micro Mart, or a razor saw. Be sure to clean the cut tube's end to remove any burrs. When cutting brass rod use a pair of sharp wire cutters and flatten the cut point and remove burrs or stubs with a micro file.

When building up a new mast, do the vertical assembly first, including the addition of platforms, support bracing, and other details. I usually cut the necessary detail parts from the kit's mast, clean them up, and glue them to the brass. When you have completed the vertical assembly, insert it into the superstructure and mark the locations of the yardarms. Cut the sizes you need, mark their center points, and then glue them into place. The super glue will set more slowly on brass so you have time to adjust the yardarms so they are level. Be sure the vertical mast is straight, glue the yardarm in place, and position it using the horizontal sections of the superstructure as a guide. This will require that you position the model at the edge of your workbench so you are looking up at the yardarms and superstructure. This is tedious, but you can make good-looking masts

with a few small lengths of brass, some scrap plastic sheeting, and modified kit parts.

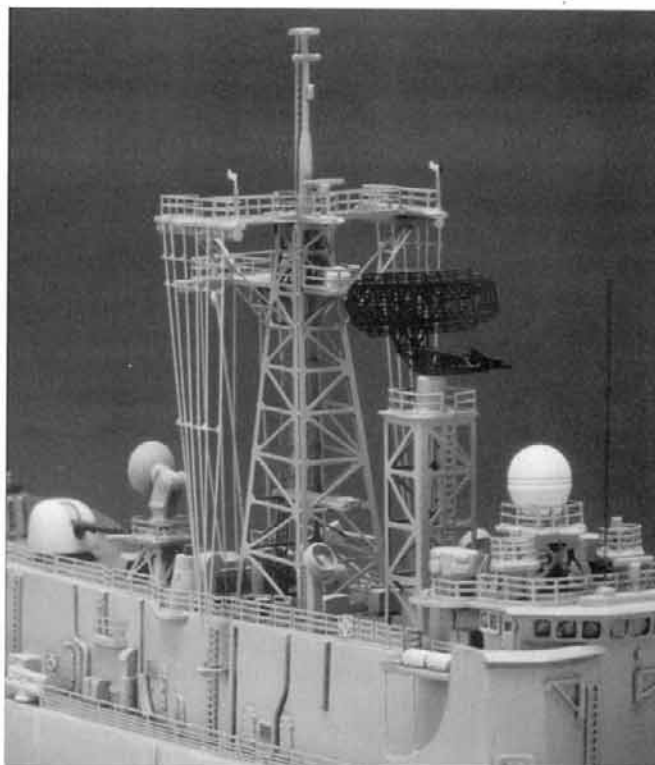
You can also use combinations of kit parts and brass parts. Sometimes the kit's main vertical mast is good, while the yardarms that are either molded onto the vertical section or are separate parts are too thick. In these instances use the kit's main mast and cut new yardarm masts using different diameters of brass wire. Be sure to clean up the ends of the brass so they are properly shaped. If the main mast is thick enough and you are working in a scale larger than 1/300, consider drilling holes through it so you can slide the brass through the mast instead of having to glue it to the outside. This looks more realistic, but you also weaken the plastic, so be careful how you drill.

RIGGING

No ship model is complete without rigging. While it may not be possible to install every line and cable, the appearance of some level of rigging adds another level of realism. Many modelers use stretched sprue and attach it with white glue. If you are going to use sprue, use clear plastic, which is slightly more flexible than colored plastic when stretched. The problem with stretched sprue is getting a consistent thickness, and one



The completed scratchbuilt mast with kit parts attached has been primed and is getting its final fit check. Photo by Glenn Johnson.



The complex-looking mast framing on this 1/350 scale *Perry* class frigate was enhanced by using painted clear nylon thread for the cabling and sailing ship model thread for the signal flag ropes. Model by Lonnie Ottzen, photo by Glenn Johnson.

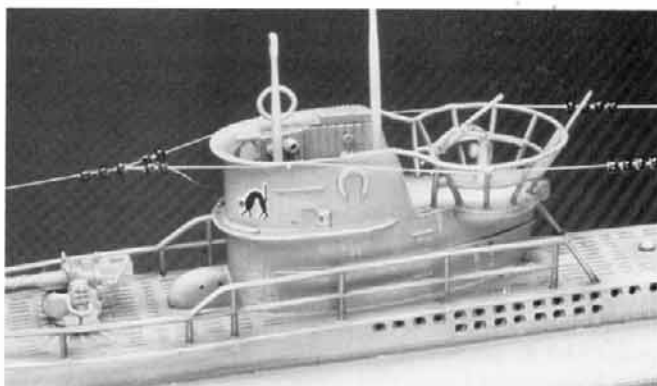
way around this is to use nylon sewing thread. It is strong, responds well to super glue, comes in different colors and, best of all, it has a consistent diameter. I keep a roll of clear and a roll of black on hand at all times, and I think once you use it you will never mess with stretched sprue

again. I use unpainted nylon thread for the 1/500 and smaller scales and painted thread for the larger scales. Never use cloth thread for rigging because it's hard to glue in place and collects dust, which is just about impossible to remove without breaking the model.

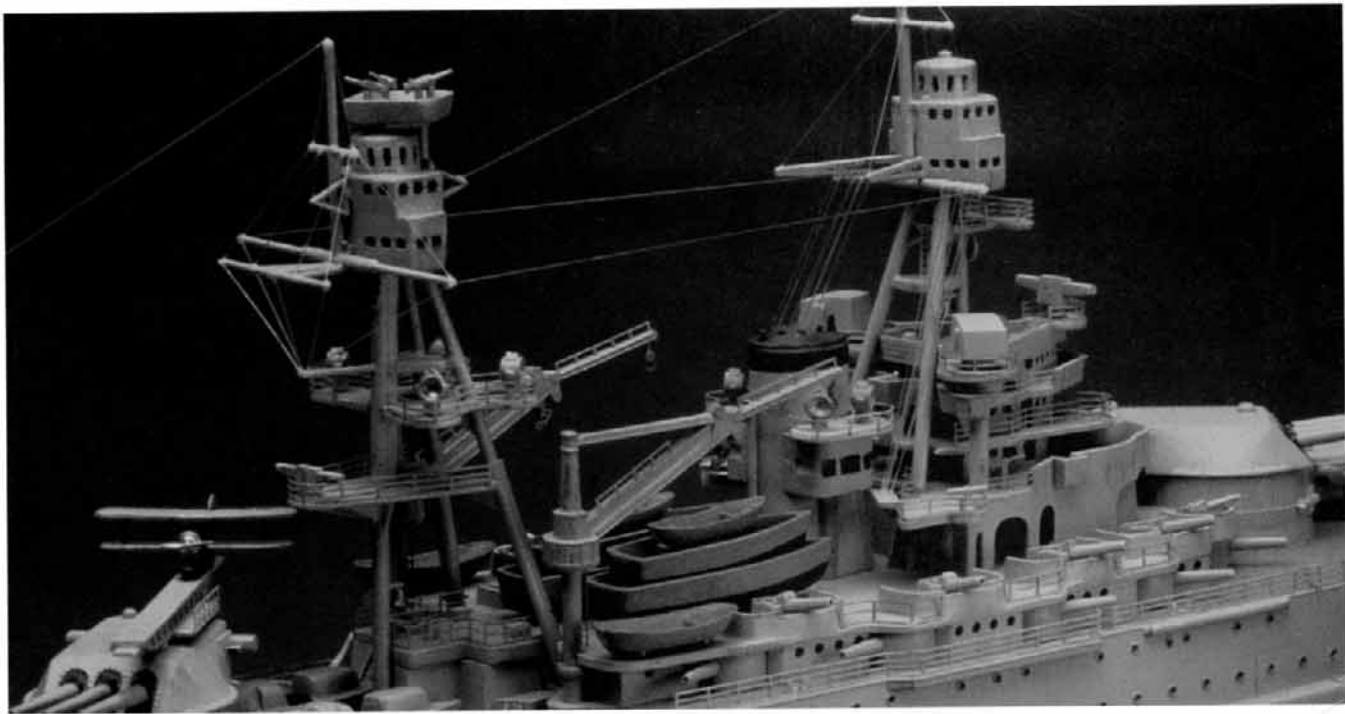
Before you start rigging, identify where you will attach it. Check the documentation to see where the attachment points are and the general rigging arrangement. While installing rigging on the masts is pretty straightforward, installing between the masts and parts of the superstructure takes



Sometimes a model needs additional details. A small length of brass wire added to the side of the superstructure provides a strong attachment point for the additional rigging that was necessary on this model.



On large scale kits you can use small necklace beads to simulate the insulators on antenna cables. Model by Richard Boutin Sr., photo by Glenn Johnson.



The complex rigging arrangement on Revell's *USS Arizona* was achieved by assembling and rigging the forward superstructure prior to gluing it to the deck. This made it much easier to work with, especially when gluing the signal flag rigging. Photo by Glenn Johnson.

a little planning. If you plan to run several sets of lines from the mast's arms to the flag bags, drill small holes in the flag bags to accept the rigging. For rigging that terminates in the superstructure on small scale models, drill small holes into the termination areas and glue the rigging into the holes. For 1/450 and larger scale models, drill the holes for termination points in horizontal surfaces and glue the rigging into them. For vertical attachment points like the sides of smokestacks and superstructures, drill small holes and insert small lengths of brass wire. Attach the rigging to the brass wire. Some of your rigging may not be totally accurate, but here again you are trying to achieve a perception of accuracy.

The sequence in which you attach rigging will differ depending on the ship type and mast configuration, but generally, work from the inside out. Concentrate on attaching rigging to the masts and yardarms first. Start from the top and work towards the bottom of each mast. If you plan to install the flag bag rigging you will need to run rigging support from the

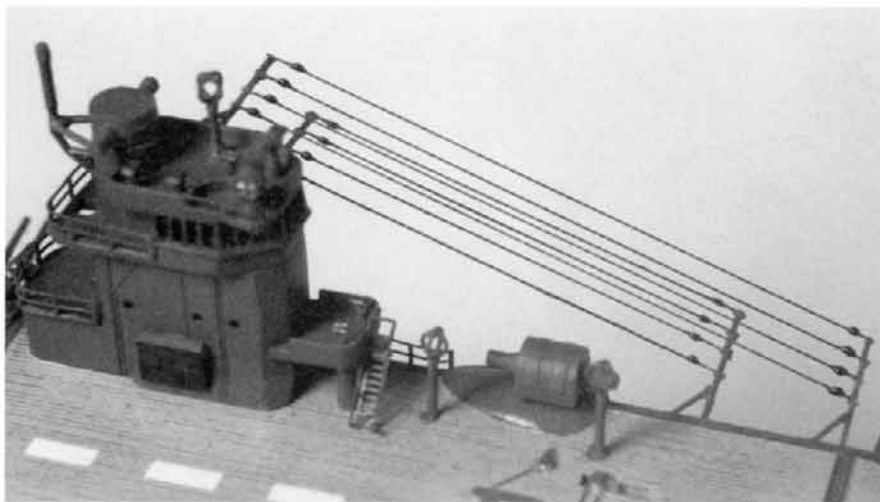
flag yardarm to the next highest level on the mast so the arm you are going to attach all the flag rigging to won't bend or sag. This holds true for other rigging that runs from yardarms to other masts or to the superstructure.

If you are using nylon thread, use super glue to attach the rigging. If you are inserting rigging into holes, dip the tip of the thread into a small puddle of super glue and insert it into the hole. The glue will bond the thread instantly. If you are attaching it to mast points, apply a minute amount of super glue to the attachment point with a small wire applicator and touch the rigging to the glue. Attach rigging to stronger points first so you can pull them taut when you touch the other end to the super glue on the weaker points.

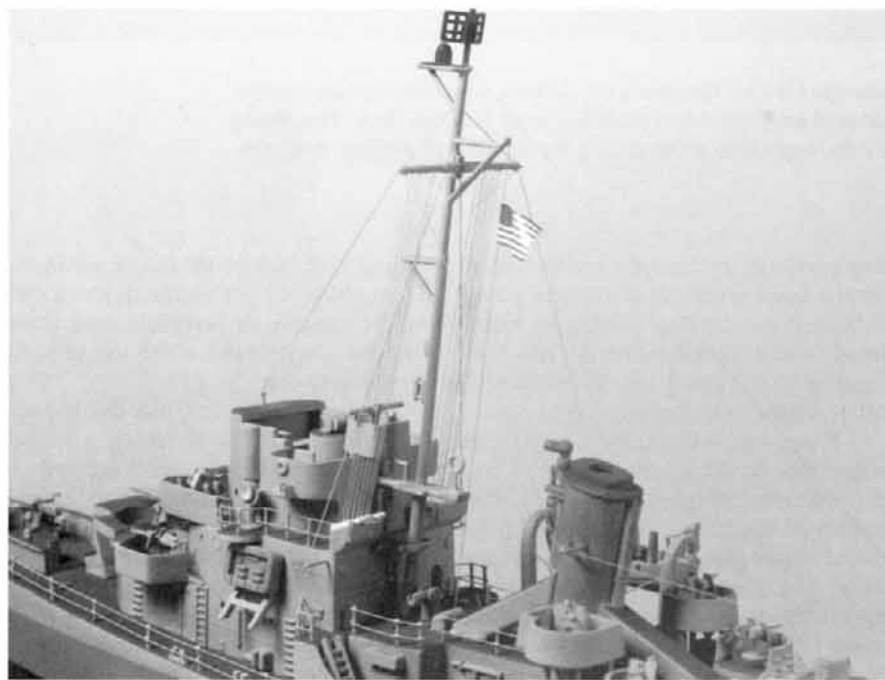
If you are using stretched sprue, use white glue to attach it. Follow the same installation sequence as with nylon line, but let the white glue set before you glue the other end. White glue is strong and a minute amount is all you need, but you need to give the glue a few minutes to dry before you stretch it. Stretched sprue is not very

strong and you could break a length. To avoid this I get as much slack out of the length as possible and then tighten it with heat after the glue is completely dry.

A lot of modelers use the blown-out match trick—lighting a wood match, letting it burn for a second or two, blowing it out, and then letting the smoke run past the stretched sprue that needs to be tightened. The heat from the smoke tightens the sprue. I have used this method with some success and it is amazing to watch the sprue tighten up, but this is inconsistent. I have gone through piles of matches with no success at all. A better technique is to use the side of a hot knife blade, which will provide a consistent heat source and allow you to direct the heat to the length of sprue that needs it. The one problem with using any heat source is the risk of damaging rigging or plastic parts. Even when you are extra careful you can do damage, some of which may not be repairable, so go slowly and be patient. Remember, the smaller the model the more tedious the rigging will become, so be sure



The insulators on this Nichimo 1/500 scale *Akagi* were made with white glue. In order to get the required mast strength to rig the complex-looking antenna array, the plastic parts were replaced by brass rod. Model by Scott Weller.



The flag on Revell's 1/240 scale *Buckley* was set in place on a long length of painted nylon thread that was then cut to length and glued into place.

you are in the right mindset when rigging small scale ship models.

If you need to paint the rigging, use a small flat brush and simply run the flat face of it along the rigging. Be sure to lay the brush under the line and make another pass so the entire circumference of the thread is painted. Be careful not to splash the paint onto the model. To avoid this,

lay small strips of tissue paper beneath the rigging you want to paint.

FLAGS

Just about every kit manufacturer supplies flags made of paper or decals, and both are easy to use. The most popular are the paper flags, which must be carefully cut so all traces of the white backing are gone.

Cut the paper on your glass decal cutting surface, using a metal straight-edge and a sharp single-edged razor blade. After you cut the flag, fold it so both sides match and give the fold a sharp crease. Moisten both inside areas of the flag, lay a length of thread at the fold line, and press the two sides together. Be sure the sides match and that the thread is located along the fold. You can also apply a small drop of dilute white glue to the contact surfaces to ensure that the flag will have a good bond. When you are done, check to see that the color borders are okay. If you see some white paper where there should be color, take a small detail brush and paint over the paper with the appropriate color. It doesn't have to be an exact match—just be sure it's the same color. Once the flag is done, curl it so it appears to be fluttering and give it a light coat of Testor's water-base clear flat.

Decal flags are cut and assembled the same way, except that you can't give the flag a nice crease while it is dry. The best way to work with a decal is to soak it, wet the palm of your hand, and lay it into your palm. Next, slide off the backing onto your palm, taking care not to let the decal fold over itself. Remove the backing from your palm and carefully pick up the decal by one end, turn it over, and touch the ends of the flag together. Insert the thread into the space where the fold will be and carefully press the decal together, working up to the fold. As long as the decal and the palm of your hand stay moist you can work with the flag, but you have to work quickly. You can adjust it slightly so the sides match, but be careful not to tear it. Once it is dry you can touch it up with paint, curl it, and give it a coat of clear water-base flat paint.

For those rigging lines that are to have flags, attach the flag first and then glue the rigging in place. This takes some careful measuring, but if you attach the flag in the center of a long length you will have a lot of thread to work with. Approximate the height at which you want the flag, cut the lower thread to that length, glue it in place, stretch the thread to the upper attachment point, and glue it.