

# Modeling the USCG *Harriet Lane*

An authentic scale model of a real ship

*The fourth in a series of progressive model tutorials*

Kit number MS2270

Scale 1:96 (1/8" = 1' 0")

Model overall length 28", width 8", height on base 16"



Model design and instruction book by David Antscherl

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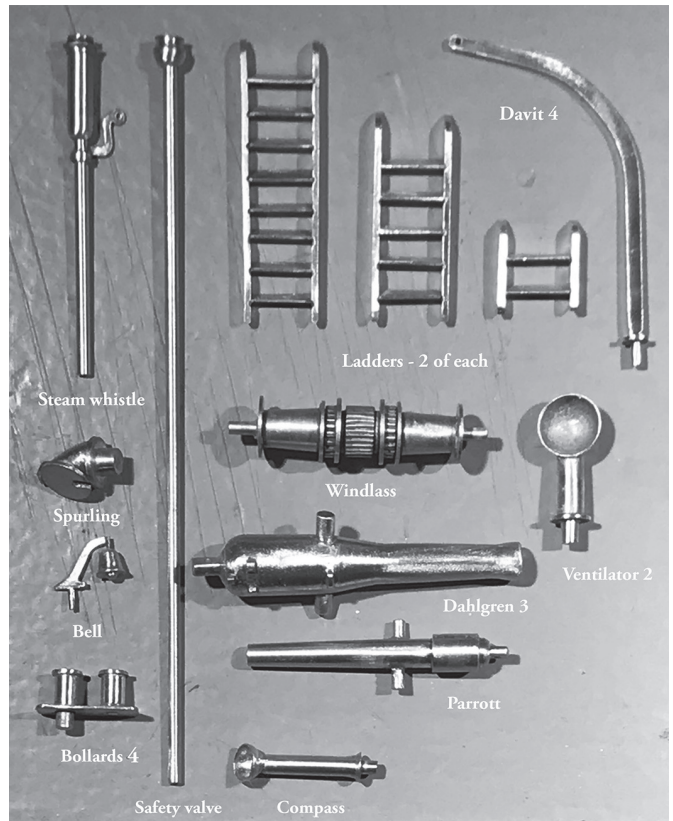


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***Tools and materials:***

If you have built any of the previous models such as the Norwegian pram or lobster smack you will already have most of the tools to build *Harriet Lane*. A list of tools needed are shown on pages 60 to 64.



**CASTINGS IDENTIFICATION PHOTOGRAPH**

## *Please read this first. (When all else fails? Read the instructions!)*

**This is an *advanced skills* kit. I want you to be successful so, if you've little or no previous experience, I strongly recommend that you build the Model Shipways pram or Muscongus Bay lobster smack kit first. That way you will learn techniques and acquire the tools needed to successfully complete this model.**

**There is less description of techniques than in previous kits because I assume that you know these already. If you do not or have forgotten, check the Muscongus lobster smack instruction booklet on-line.**

### **Plans:**

Some drawings included are for reference and may not be exactly to size. Review and study both drawings, photographs and assembly instructions before starting so that you understand how the parts will come together. Please follow the recommended building sequence!

### **Make allowances:**

You may need to adjust and compensate for small differences as your model shapes up and how the parts relate to each other. As long as it looks right, it is right. Again, study the photographs.

### **Kit lumber:**

This kit contains laser cut basswood parts. A word about laser cut pieces: a common misconception is that the parts should simply be punched out of the carrier sheet. Not so! Laser cut parts are held in the carrier sheet by small bridges of uncut wood called *tabs*. These may be oriented at any direction relative to the grain, although an effort has been made to place them along the grain of the wood.

It is always better to *cut* through all tabs rather than try to push out parts and risk breakage. You may need to cut through not only the tabs but any part of the outline not cut completely through the sheet. Turn the carrier sheet over and cut from the back to release parts without damaging them.

Preparation is needed before gluing laser cut parts. The cutter burns through the wood leaving a brown, shiny surface. This does not allow good glue adhesion. I recommend lightly sanding or scraping away the char before gluing. It is not necessary to remove all the char unless a finished wood surface is to show. Sometimes simply scraping using the back edge of a #11 blade is sufficient.

***Hint:* A bench brush for cleaning parts and work surface of char and other dust is helpful!**

### **Take your time:**

Building a model is not a race! Take the time to read the instructions over first to give yourself an overall view of the process and to familiarize yourself with the parts' names.

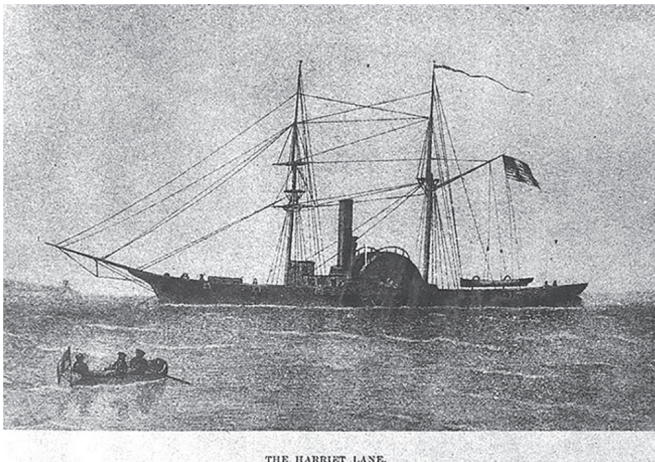
The *sequence* of building a model is important. You don't want to paint yourself into a corner and find out that you should have fitted something first that is now difficult or impossible to add. I've worked out the best order of things for you.

In summary, enjoy the process of building a 'real' ship model. The skills you developed on previous models will give you confidence as you tackle this more challenging one.

First, let's look at some of *Harriet Lane's* history. She was one of several coast guard cutters for the United States Navy built during the 1850's named after various First Ladies. Launched in November 1859, she was named for the niece of President James Buchanan, who was unmarried. Harriet acted as his First Lady.



*Harriet Lane* was 177' 6" long and 30' 6" wide, with a 12' 0" depth in her hold. Her motive power was provided by double marine steam engines driving two side paddles, as well as two masts for sailing. When launched, her armament was described as 'light guns'. However, when she joined the West Gulf Squadron her firepower was increased. She was given a 4" rifled Parrott gun and a 9" Dahlgren forward, with two 8" Dahlgren Columbiads aft. Her full crew complement was 95.



THE HARRIET LANE.

*Harriet Lane* was soon caught up in the Civil War. She was captured by the Confederates in 1863 and put into mercantile service. Union forces recaptured her at the end of war. The Navy declared her unfit for service and sold her to new owners out of Philadelphia who renamed her *Elliot Ritchie*. She carried mixed cargo and coal for some years. After 23 years of

service, *Elliot Ritchie*, ex *Harriet Lane*, was abandoned at sea in 1881 when her cargo caught fire. A fuller account of her history can be found online at:

[https://en.wikipedia.org/wiki/USRC\\_Harriet\\_Lane\\_\(1857\)](https://en.wikipedia.org/wiki/USRC_Harriet_Lane_(1857))

### The model of *Harriet Lane*

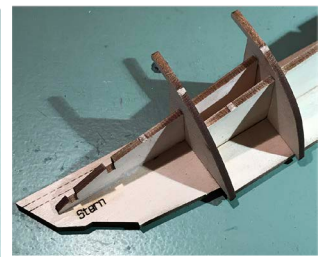
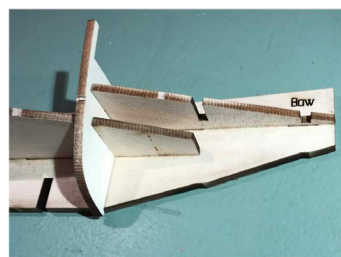
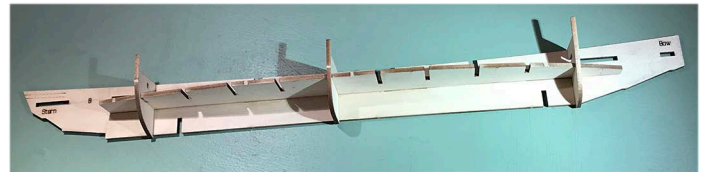
This model, when complete, will be an imposing size at 1:96 scale or 8' 0" = 1". She will be a challenging build but, if you follow the instructions carefully, you will have a quality model to be proud of. Take your time on it; it's not a race! There are several optional refinements suggested along the way, if you wish. Sails are not supplied, but a sail plan is provided.

Numbers in **red** refer to the laser cut wood sheets. There may be minor differences between the photographs and the production kit. ***Unless otherwise specified, use white glue on all parts.***

#### 1. The central spine

**Sheets 1, 2, 3, 4**

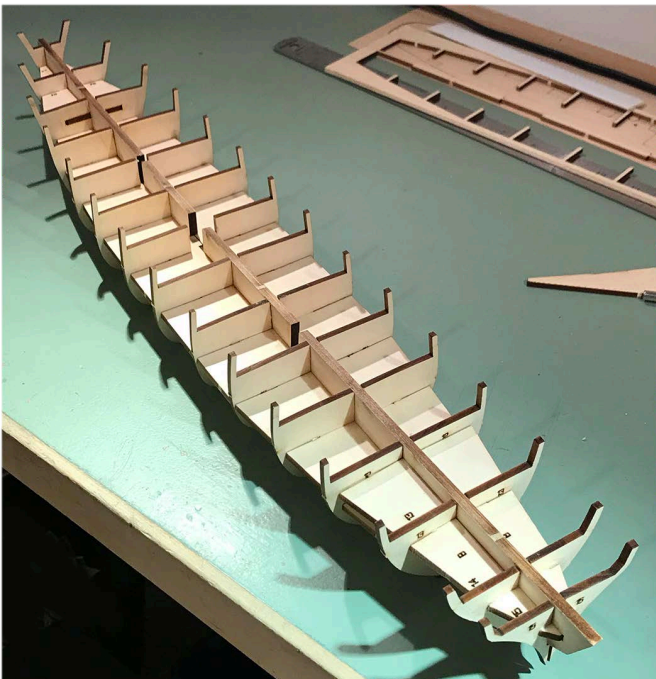
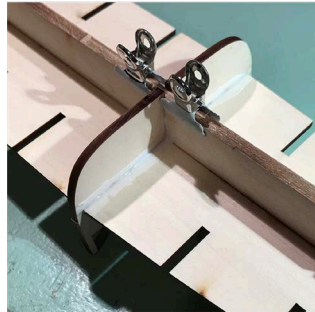
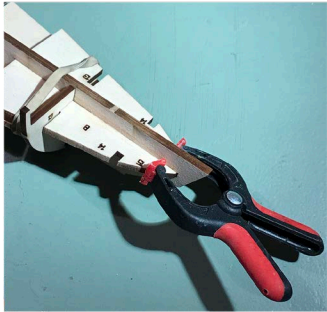
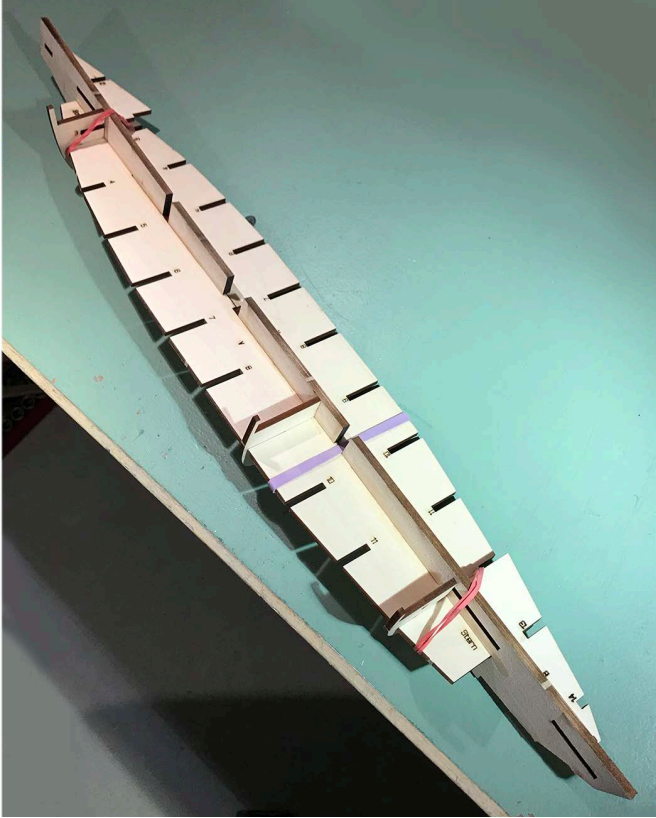
Glue parts A, B & C in sequence to one side of the spine, Do this on a flat surface to avoid warping. Use half bulkheads 2, 3, 7, 11 & 13 to square up the parts as you glue them in. Repeat on the second side.



#### 2. Bulkheads

**Sheets 2, 3**

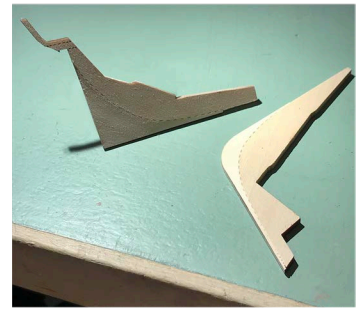
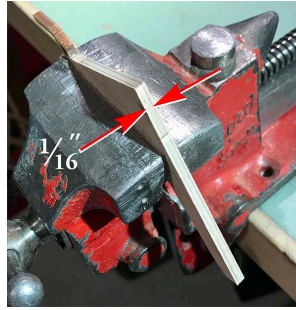
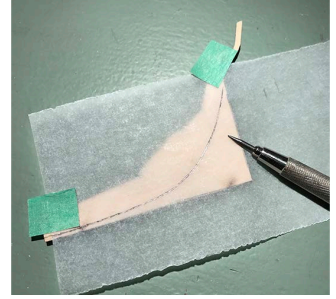
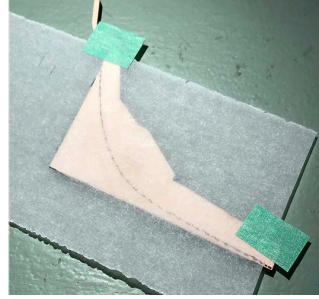
Glue and slot the half-bulkheads in on each side. Begin with number 6. Don't confuse parts 6 with 9! Make sure they slide in all the way home, line up across with each other and match the guide lines on the spine. File the slots a little deeper if needed. Fillets of glue will ensure rigidity.



### 3. Inner stem and stern post

Sheet 4

These require some shaping before assembly. Trace and transfer the curved lines down on the second sides of the pieces using tracing paper. Carve and sand the changing bevels on each side until the edges are no more than  $\frac{1}{16}$ " thick. Glue into place fore and aft, making sure that the pieces are centered.



### 4. Inner keel pieces

The innermost pieces are  $\frac{3}{32}$ " x  $\frac{1}{8}$ " wood strips placed horizontally. Leave gaps for the two mounting pedestals. Sand the inner stem, stern posts and bulkheads flush to the inner keel if necessary.



### 5. Stern knuckle pieces

Sheet 4

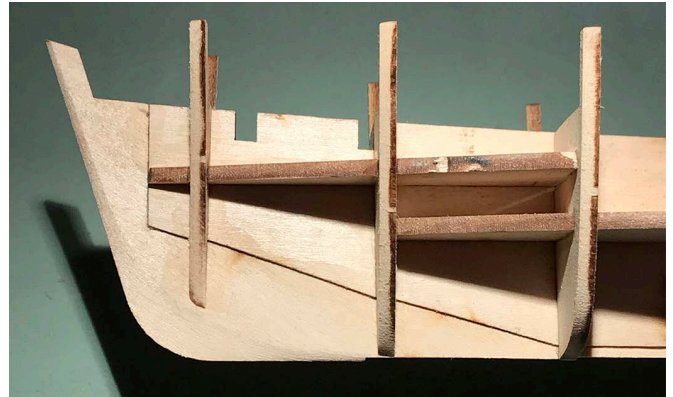
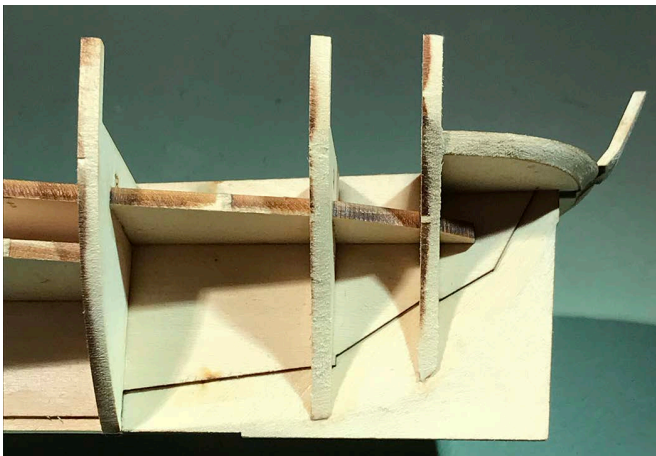
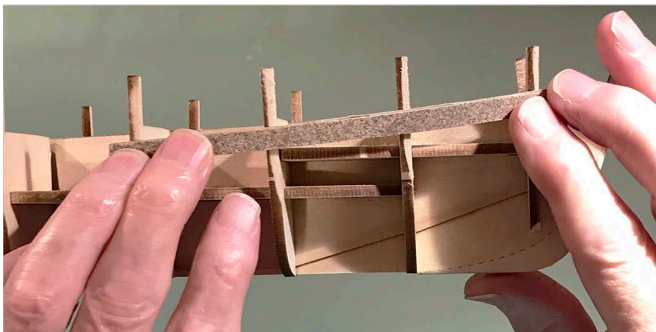
These pieces help define the lower *knuckle* or angle at the stern and act as a landing to glue planks on. Glue them on with the guideline *down*. This helps define the bevel on these pieces. Note that the pieces slope slightly to match the round up of the deck on bul-

wark 15 (photograph below). Cut or sand the angle underneath once the glue has set. As the stern bulwark extension is fragile, glue a reinforcement piece from **Sheet 4** to each side of the inner stern post.



## 6. Fairing up the bulkheads

Use flexible sanding sticks in the usual way. I use 100 grit sandpaper on both sides of the stick. The stick should be long enough to span at least three bulkheads at a time. Be careful to go gently along the tops of the bulkheads!



The preceding two photos show the bulkheads after fairing. Almost all the char has been removed.

Use wider sanding sticks to fair the round up of the deck. The tops should be flush with the central spine.

## 7. Bulwarks & upper counter

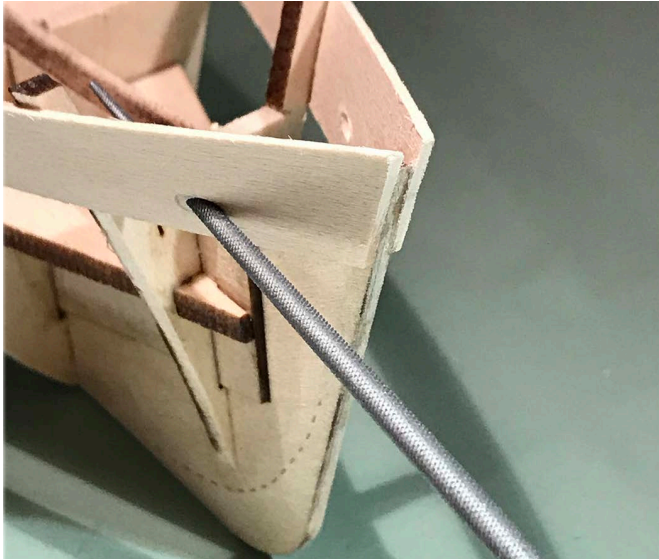
**Sheet 6**

**Do not cut out the ports at this stage!** The fore strips need wetting and clipping into place to achieve the twist in them. Line up the lower edges with the edge of the deck at the side, except amidships where a slot is left for the paddle sponsons. **Note the indications for the aft ends of the aft pieces.** When dry, check for any waviness along the sides. Shim out any low spot with paper or thin card strips now.

When satisfied, glue the strips in place. The joint between the fore and aft pieces should sit halfway across bulkhead 7. It will overhang a little at the bow. The aft end of the aft piece sits halfway across bulkhead 15. Trim this end before gluing it. The aft pieces may be glued on without moisture.



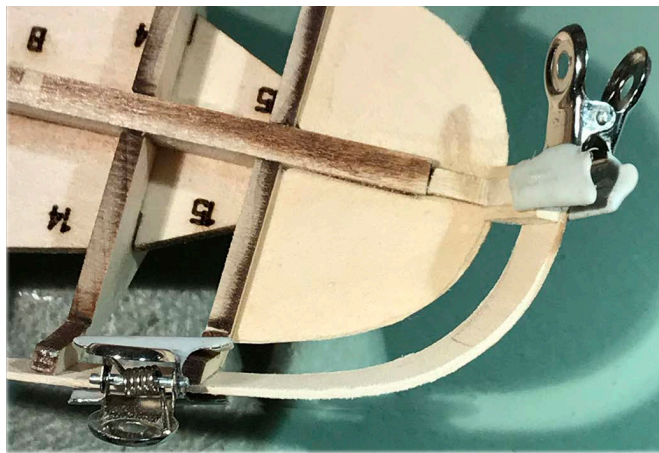
**Hint:** to clamp the bow ends, rubber cement small pieces of sandpaper to the inside of the clip's jaws. Then the clip will not spring off the bow.



When the glue has set, trim and sand excess bulwark off flush across the inner stem (photograph above).

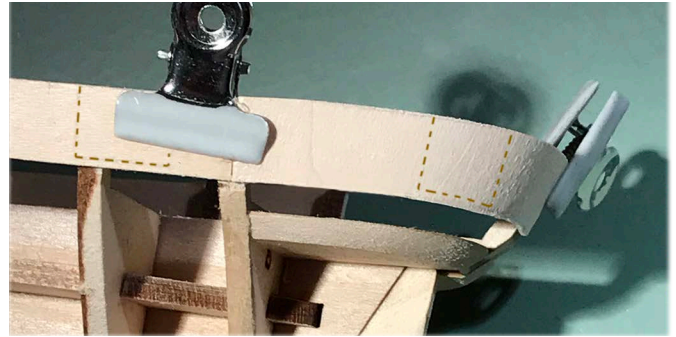
File out the hawse holes using a small round file (above). Keep the file parallel to the keel and angled slightly upward. The hole will become oval.

The extreme bend at the stern requires careful handling of the upper counter pieces. Soak one piece in hot water, then bend and clip it in place. The curve, as seen from above, should mirror the curve of the stern knuckle piece (photo below). Coat the inner side with dilute glue and let this dry completely in place. This will reinforce the wood.



To provide sufficient attachment for the second piece, carefully mark the centerline on the end of the first strip and trim it to length. Glue it in, making sure that

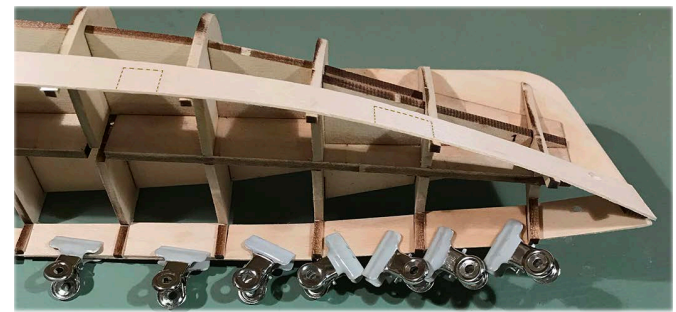
the lower edge is parallel to the knuckle piece (photo below) and the upper edge is on the laser marked line on the post. Repeat this for the second side.



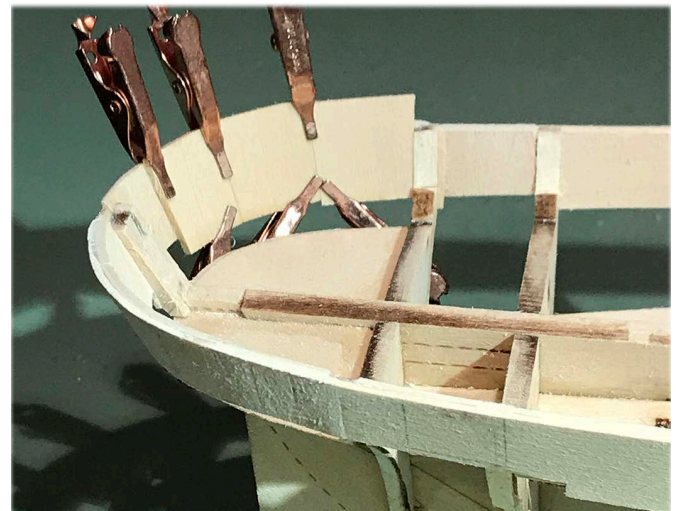
### 9. Bulwark inner filling strips

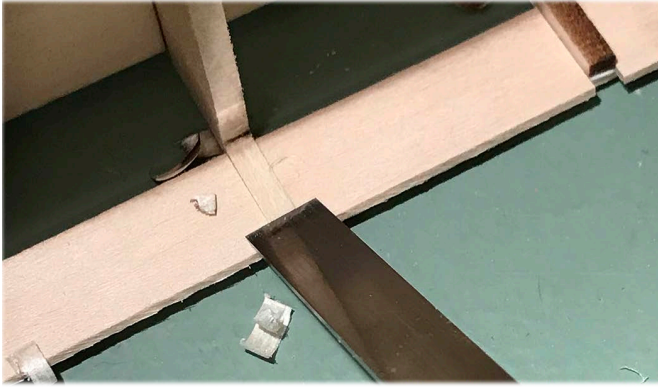
**Sheet 7**

Cut these from the strips on Sheet 7. Glue them between the bulkhead extensions to reinforce the outer bulwark strips. Keep the pieces clear of the slots amidships. Wet and mold pieces to shape where needed.



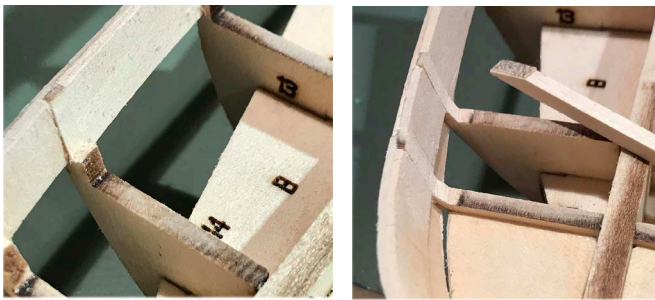
Around the stern use the keystone shaped pieces of stock with vertical grain. Each piece will need to be fitted carefully. Don't distort the curve by packing in these pieces tightly. Drill out and file the hawse holes at the bow again.





Trim and sand down the inner faces of the bulkhead extensions flush to these strips. Use a new sharp #11 blade or chisel to remove the bulk of the waste, then use a flexible sanding stick to complete the job.

**Hint:** Use your chisel or #11 blade bevel side down for better control (photograph above).



**Important!** Don't cut the bulkheads down too far at 14 and 15 (above left) as there is a second angle there. Use a small sanding stick (above right) to file these angles. Make sure that there are no lumps or bumps to mar the inner bulwark planking. Trim and sand the tops of the bulwarks and fillers flush with the bulwark tops in a nice, smooth curve.

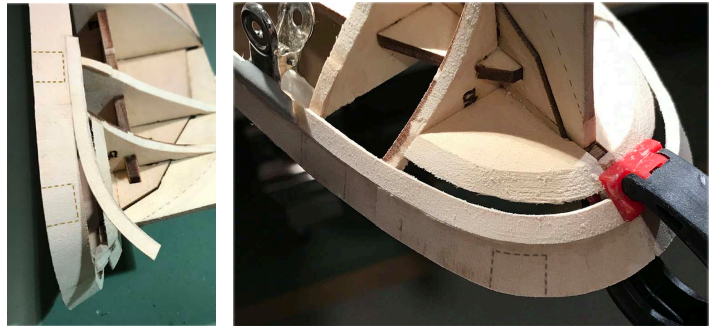


## 10. Lower counter pieces

Sheet 6

These form the second angle or knuckle under the stern. **Important:** First bevel the upper convex edge of each lower counter piece back at  $45^\circ$  to the inside. Use a sanding stick to do this carefully.

Glue the forward end in place and let this dry (below left). Moisten the outer face using a damp brush and mold the piece into shape to meet the lower edge of the upper counter. Let this dry before gluing into place. Repeat on the opposite side.

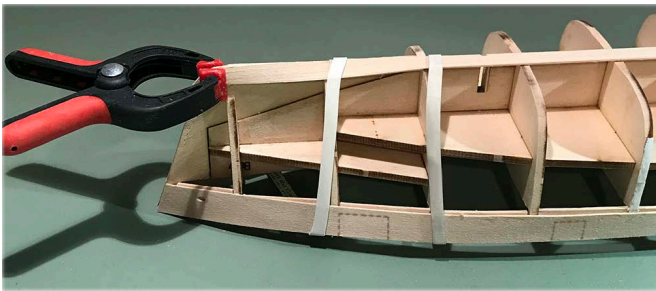




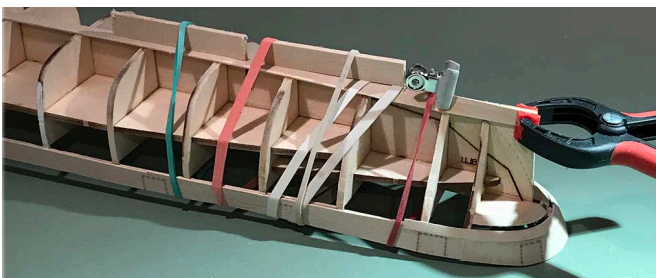
Before proceeding further, take a rigid sanding stick and ensure that the lower edge of the counter is in a straight line as seen from the side (photograph, middle of previous column). The completed assembly at this stage should look like the photographs.

### 11. Planking: The garboard strake **Sheets 14 & 15**

Begin with the fore plank. It twists through 90° at its forward end, so soak the piece in hot water for five minutes, then use clamps and elastic bands to hold it in position while it dries. Bands should always be placed over the bulkheads, not between. Repeat for the aft garboard plank. Trim the center plank to fit.



Make sure that all plank butts land on the centers of the bulkheads. Trim any excess at the ends off after. When gluing, make sure that the garboard is centered on, and in firm contact, with the inner keel. Also, check that the bow and stern ends are level with the keel. Re-moistening the plank if needed to conform and creative fixation are the rules here (photo below). Repeat on the opposite side of the model.



**Hint:** always work each strake on alternating sides of the model rather than planking all the way up one side first. Planks can be made wet again and adjusted if not glued down correctly.

Next, the fore and aft ends of the garboard need to be pared flat carefully, as shown (top of next column).

Use a sharp blade or chisel. Do not cut or sand the ends of the planks lower than the inner keel! Also, make sure there are no 'springy' spots and that everything is firmly glued down.



Take a strip of 1/32" scrap and glue it to the surfaces at bow and stern where you smoothed it flat. Carefully sand the edges to match the bevel of the garboard as it comes in to the bow and stern (photo below).



Smooth the end of the bow piece so that the outer stem (**Sheet 4**) is a reasonable fit. Any slight gap can be filled later. Do not glue the stem to the hull yet, though! This will be done after planking and sanding.



## 12. Planking the hull

**Sheets 14 to 17**

Although the hull form is an 'easy' one to plank, the strakes still need to be shaped to run properly, so fit them in correct sequence. Most of the kit's planks are about double the width and length of true scale planks. However, as the hull is to be fully painted, this short-cut will not show. Even so, take your time to plank the model properly to show off its elegant form.

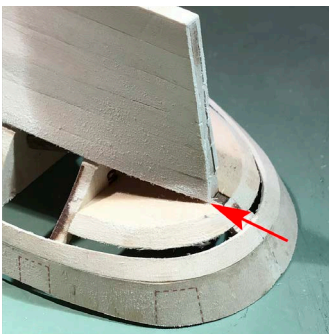
Carefully bend and fit each plank. The pay-off will be the end result! This part of construction will take time to complete, so stay the course. *If you have not planked a model before, I strongly recommend you practice first on a simpler kit such as the Norwegian pram or lobster smack to get the hang of it.*

**Hint 1:** Basswood is easily dented. Before using filler, try wetting the dented area with a few drops of warm water. This will usually re-expand the fibers and restore the shape. Lightly sand when dry.

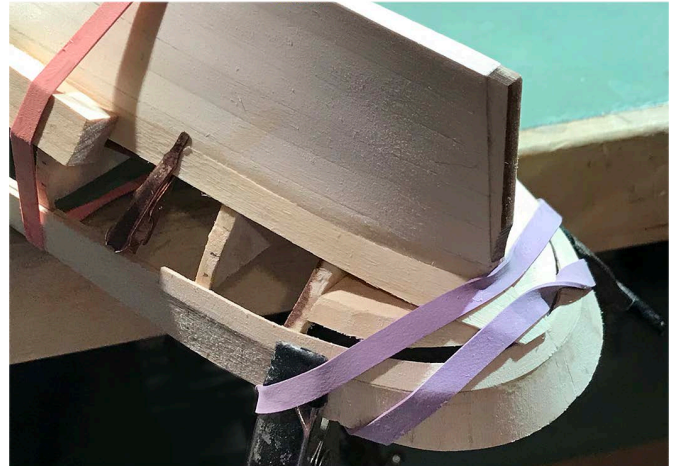
**Hint 2:** Sometimes a hairline gap between planks may be closed by wetting the wood and, while wet, running dilute white glue into the joint. Allow to dry thoroughly. This dodge will not work with wider gaps!

**Hint 3:** 'Paint' the inner sides of each plank as well as the adjoining edge with white glue before you attach it. It helps to stiffen the structure.

Particularly at the turn of the bilge amidships, (the smallest radius curve) bevel the plank edges with a sanding stick so that they fit closely.



At the aft end of strake 6, make sure it fits as shown against the knuckle piece (photo bottom left of previous column). You can now also add the stern post, **Sheet 4**, as shown to right in previous column. Make sure this is centered properly and the end is flush to the inner keel. The planks will be slightly proud of both sides of the post at this stage.



The first plank aft under the lower counter needs creative clamping, as shown above. Make sure that its edge is in close contact with the adjacent plank and the edge of the counter. Trim off any extra wood at the mid-line of the counter when dry so that the opposite plank will abut it neatly at the centerline. If you end up with a small gap, a piece of scrap glued in will fix this.

**Option:** The junction between the last strake against the stern post and the first under the counter forms a crease. To stabilize this joint, run a little 5-minute epoxy along it. When set, use filler to gradually transition from a radius forward to a crease aft just at the stern post.

The final strake may not fit perfectly due to variation planking your particular model. Carefully sand the edges of each plank to fit. If there is a very slight gap, use filler, if a larger one, use slivers of scrap wood.

Now is the time to sand the hull. The aim is to obtain a perfectly smooth and flowing surface all over.

If the planking job is not perfect, use wood filler in any small gaps: paint will hide any fixes later. Start with 120 grit, then move to 150 grit.

**Hint:** Sand diagonally and at right angles to the planks. If you sand along them, you will develop a series of flat ridges with hollows between them. Use a point source light at a grazing angle to show up uneven spots.



You will undoubtedly find areas that need filler. Slightly over-fill these and sand down when dry using 150 grit. A vacuum will be very useful to control the dust. Repeat until certain that all the surfaces are smooth.

There are two areas that need special attention. The first is at the stern post. The planking aft has to be carefully sanded flush to the sides of the post and keel (photo right). Carefully sand until there is one smooth continuous surface.

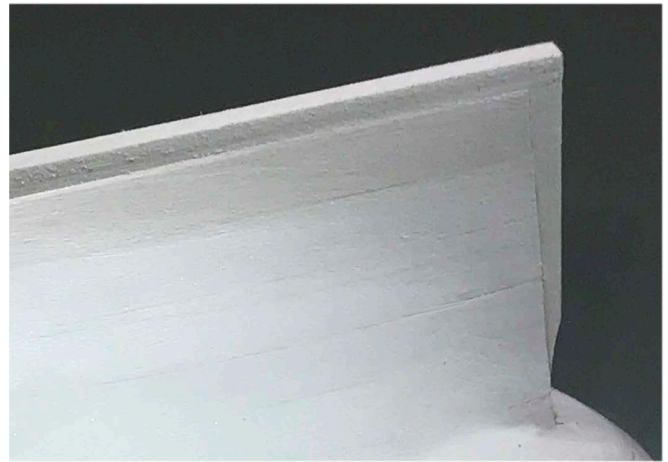


At the bow, the planking also needs to be sanded to meet the stem. First the stem and keel need to be fitted.

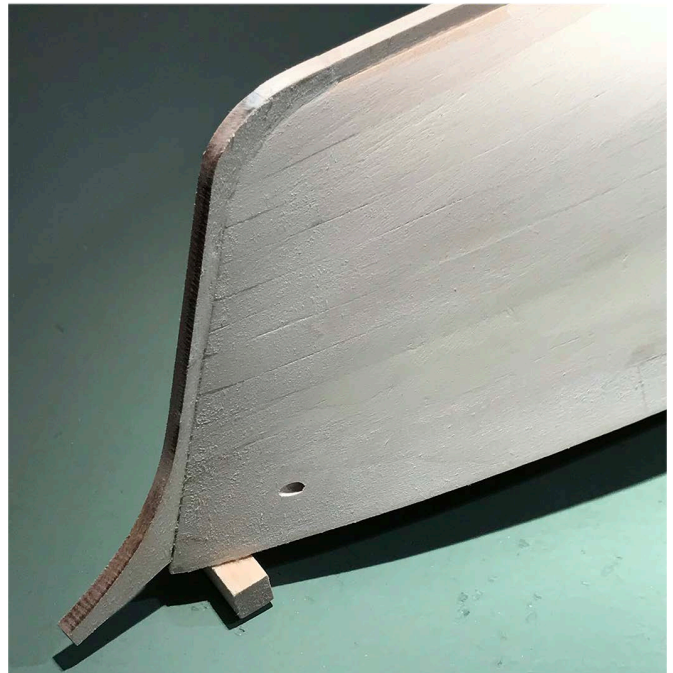
## 12. Outer stem and keel

**Sheet 4**

Cut the outer keel pieces from 1/8" square strip. Glue these on, making sure that they are centered and have half-round hollows around the mounting post points.



Make sure that the outer stem and stern post are also centered. I recommend gluing a scrap spacer temporarily to the bow bulwarks to keep the beak of the stem off the workbench (photo below). For security, I used epoxy to glue the stem to the hull. Make sure that the 'beak' is parallel to the keel and does not tilt to one side as seen from ahead



Sand the bow planking until it meets the stem without a step or ridge.

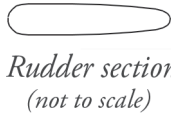
Congratulations; you have successfully completed your planking marathon! From here on the work is more varied and interesting.



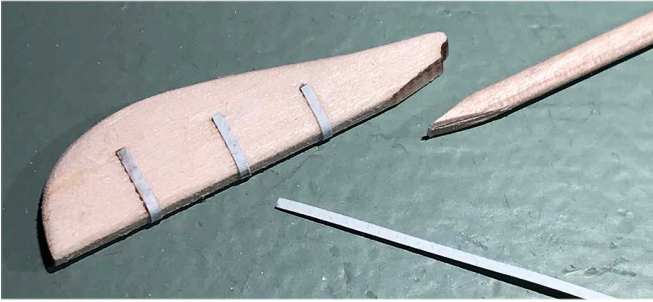
### 13. The rudder

Sheet 4

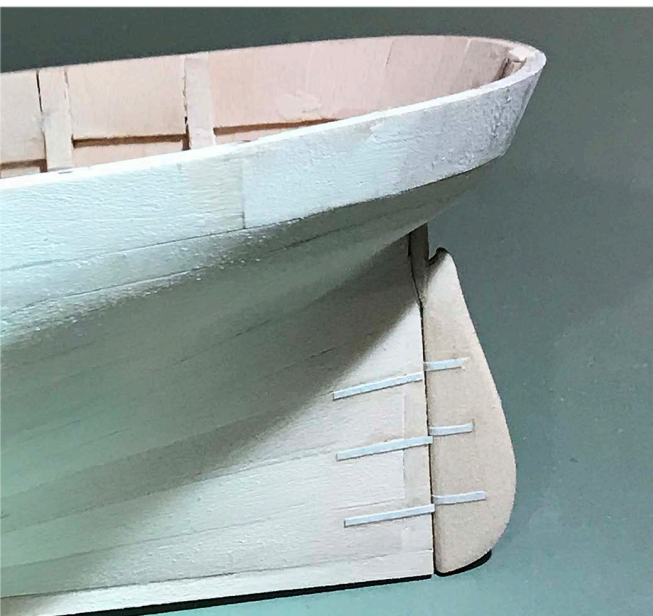
Drill a small hole in the counter next to the stern post. Carefully enlarge it to  $\frac{1}{8}$ " diameter as shown. Sand the forward edge of the rudder to a half-round and taper the rudder as shown to its aft edge. Glue strips of card or paper  $\frac{1}{32}$ " wide on each side as shown below.



Rudder section  
(not to scale)



Take a piece of  $\frac{1}{8}$ " dowel and sand a double taper on one end (photo above). The taper should be such that the dowel is in line with the edge of the rudder, Glue it to the top of the rudder. I used epoxy here for security. If there is any gap, fill and sand smooth. Cut the dowel to length,  $\frac{1}{2}$ " actual.

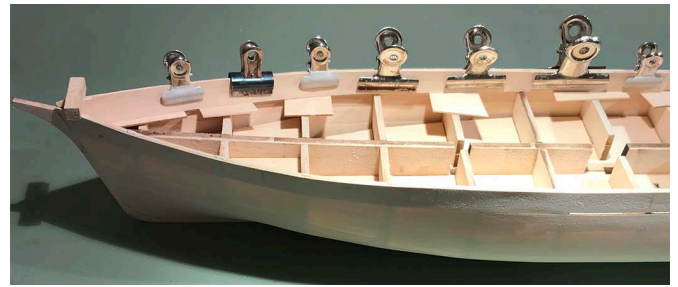


Install and epoxy the rudder to the stern post and hull. Glue more paper strips on each side of the hull as shown (foot of previous column) for the rudder straps. This completes work on the basic hull.

### 14. Inner bulwark planking

Sheet 8

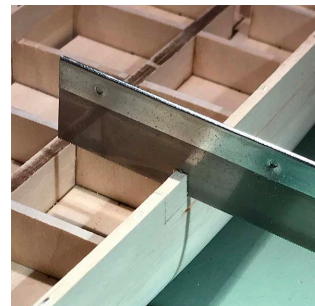
The inside of the bulwarks are next to be completed. **Important!** The pieces should be carefully bent and glued in  $\frac{1}{32}$ " above the top of the bulkheads at deck level to allow insertion of the deck later. Use scrap wood pieces as spacers (photo below).



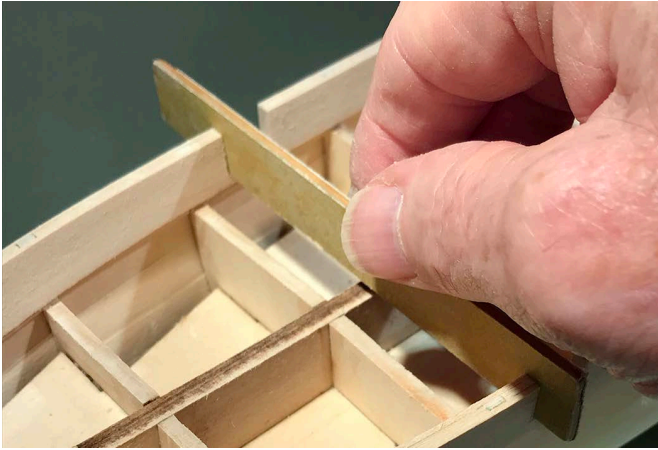
The aft pieces (Sheet 6) will require soaking in hot water before bending them in and letting them dry. Trim the fore ends to fit. Make sure that these parts are all well glued down. Trim the tops and sand flush to the bulwarks.

### 15. Gun port openings

Finally it is time to cut these out. All the ports (except the two stern pairs on each side) have sides at right angles to the keel, not the bulwarks. Make vertical cuts with a razor saw a little *inside* the marks. Score the bottom inside and out with a knife, then wiggle the piece until it comes out. Clean up the sides and bottom to the marks using sanding sticks (photo next page), then clean the corners using a sharp #11 blade.



The two aftermost ports on each side need more care. The sides are at right angles to the bulwark. Also, the wood grain is not horizontal so, after the vertical cuts are made, the waste must be carefully cut, filed and sanded away. If you try to split the waste out, the lower edges will break away at an angle. It can be repaired, but it is better to avoid this.



**Superdetail: Port stops**

The port openings had linings that acted as stops for the lids. You may wish to add these as shown below. Cut them from  $\frac{1}{32}$ " x  $\frac{3}{32}$ " strip, flush to the inner sides of the bulwarks. Cut and glue in the bottom strips first, then the sides. I cut the sides long, then trimmed them down after the glue had dried.



**16. Opening up the hawse holes**



To do this neatly, drill through from outside using a small #60 bit, then open out to size using a series of broaches of increasing size from *inside* the model.

**17. Spirketting**

**Sheet 6**

This is a thicker band of plank just above deck level. Make this from  $\frac{1}{32}$ " x  $\frac{1}{8}$ " strip. I recommend making each side in three pieces; one from bow to midships, the second from there aft. The third, shaped piece bends around inside the stern. **Important!** As for the inner bulwark plank, use  $\frac{1}{32}$ " scrap as spacers to allow the deck to slot under later.



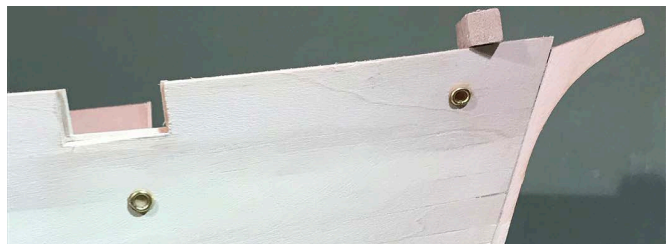
The aft pieces need to be soaked in hot water and clamped to dry (above) before gluing in. If the joint at the stern is not perfect, don't worry; it will be hidden later on by the steering box.

**18. Portholes**

Use the supplied brass rings for these. Mark the positions of the ports using the patterns on **Card CC, 1**.

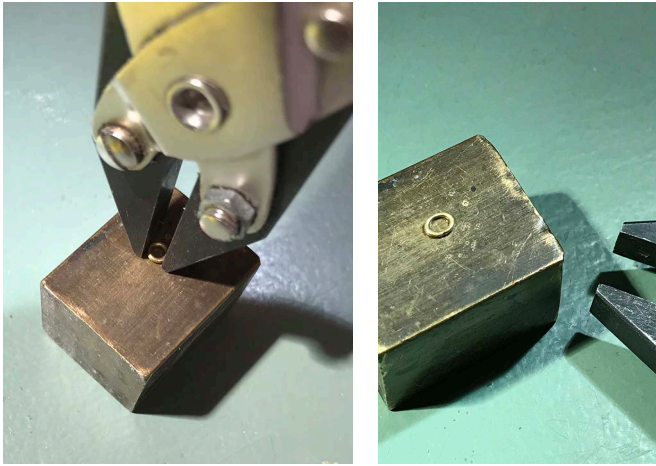
**Option:** place the rings on a hard metal surface and *gently* hammer them slightly flat for a more convincing effect.

Set the model on its side and use a drop of cyano or epoxy to glue the port rings in place.



### 19. Hawse holes

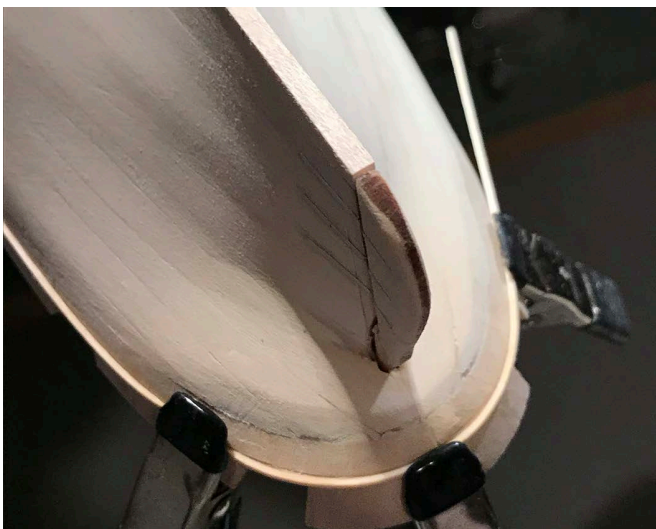
These are oval. Place a brass ring on a metal block and squeeze it oval *gently* using your parallel pliers. Make sure the joint in the ring is in the middle of a flattened side. Attach these as you did the ports.



### 20. Rub rail

The rub rail is attached in using white glue. Use  $\frac{1}{32}$ " square stock. This rail attaches  $\frac{5}{16}$ " below the top of the hull, along the lower edge of the ports. The fore end should pass just below the hawse hole. Cut the end that goes against the stem at an angle to fit. The rail is interrupted along the slot for the paddle housing.

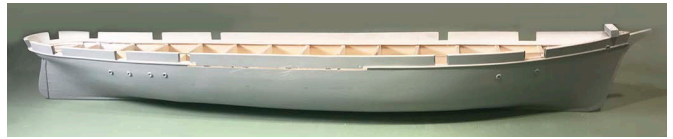
The aft end around the stern needs to be wet bent and allowed to dry first. The rail sits with its lower edge along the line of the knuckle. Aim for a nice smooth curve when viewed from almost astern.



### 21. Painting the hull

The first step is to prime the hull and inside bulwarks. I used Tamiya grey primer (87042) from the can, as this does not raise the wood grain. Mask off the inside of the hull where the deck will glue to later.

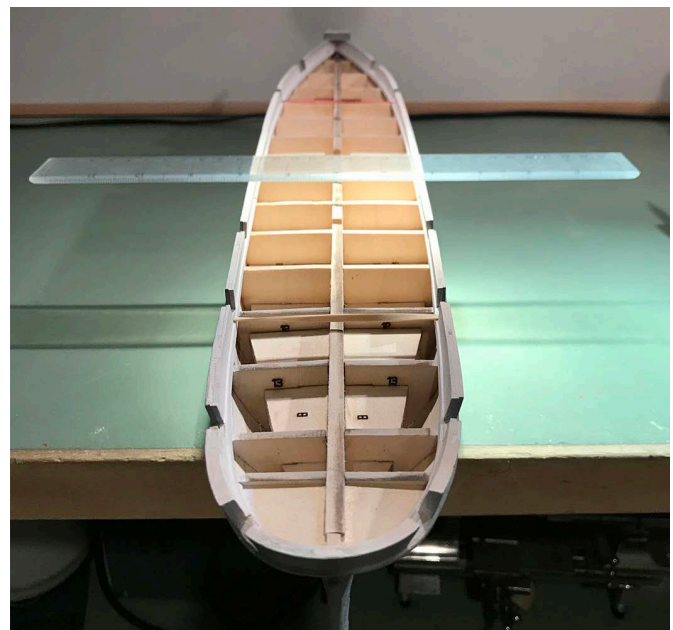
After the first coat you will see clearly where more filler is required. Fill, sand using 240 grit and re-prime as necessary to get a smooth, even surface. It took me three rounds to achieve a nice, even surface as seen in raking light.



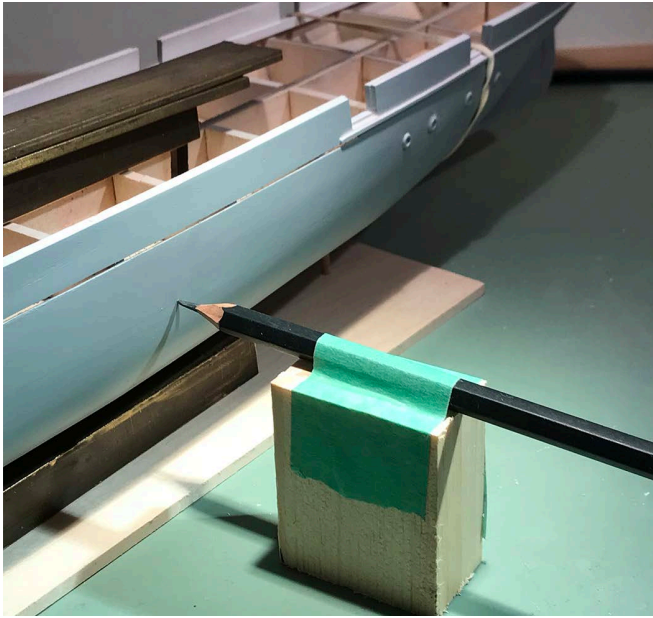
### 22. Drawing the waterline

**Sheet 22**

Mount the model temporarily on the partial base. Cut two lengths of  $\frac{1}{8}$ " dowel 2" long. Push these all the way home in the holes on the underside of the keel. Making sure that they are vertical as seen from end on, mount the model on the baseboard. **See Step 36.** Use a straightedge to sight along the model (below).



The waterline is  $\frac{1}{4}$ " below the top of the bulwark amidships. Use a pencil on a block of suitable height to mark the waterline all the way around the model. If the model is not rigid, stabilize it using elastic bands,



**Option:** the waterline may be raised by 1/8" towards the bow and stern. This is to counteract the impression that the line droops because of the shape of the hull.

### 23. Underwater hull paint

The actual ship was probably copper plated, but this would look out of scale at 1:96. I recommend painting the lower hull copper (MS 4814) after removing the hull from its mounts, turning it upside down and masking off along the waterline. I used Tamiya flexible 5 mm tape for this.

### 24. Topsides painting

Once the copper paint is thoroughly dry, re-mask and paint the outboard topsides black. A greyish black may look better than intense black at scale size. I used Tamiya TS 82 spray. A satin finish is better than glossy for a model. The inboard bulwarks are painted MS 4831 white.

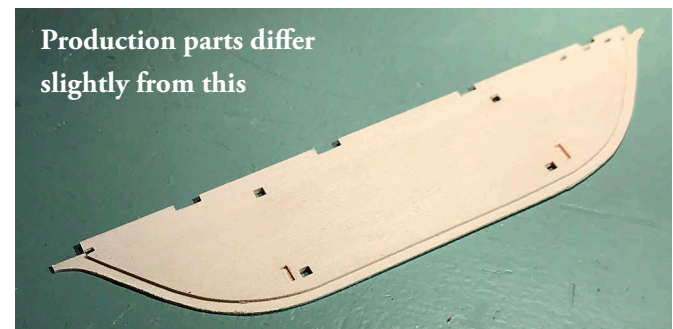


*The following structures are the most complicated parts to make. Please read carefully and understand each step first to be successful!*

### 25. Sponson deck sections

**Sheets 7 & 8**

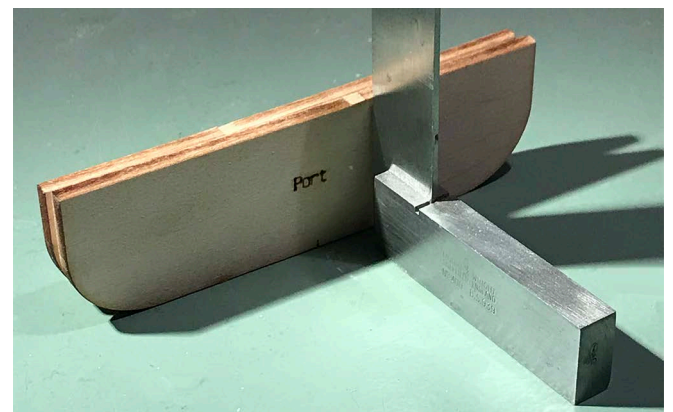
*Sponsons* are the extensions around the paddle wheels. These are complex and care should be taken in constructing them. The first section is the sponson deck. Each side is in two pieces. Glue upper and lower pieces as follows: First damp the non-gluing faces with a wet cloth or paper towel to minimize warping. Spread white glue on the upper surface of the sub-deck. Register the pieces with two short lengths of square stock. When the glue tacks, remove the locator pieces and wipe up any squeeze-out. Weigh down the assembly on a flat surface between paper towels until dry. The photo below shows the *underside* when assembled.



### 26. Paddle box lower sections

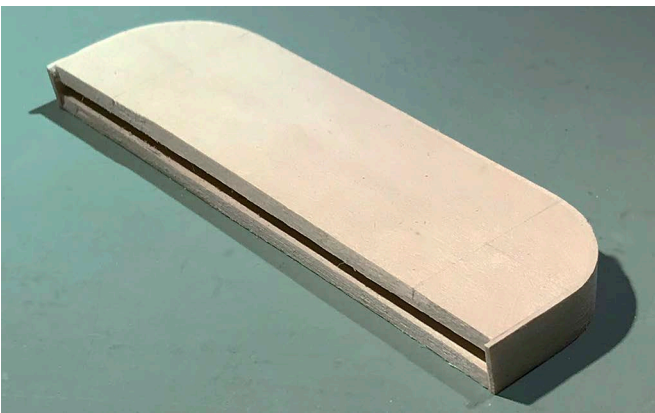
**Sheets 11 & 18**

These are located between the deck and rail levels of the model. The shape on each side is determined by two forming pieces separated by a spacer. Glue the three pieces together so that the outboard edges are vertically above each other. The inner face of the upper piece will protrude slightly over the lower one.

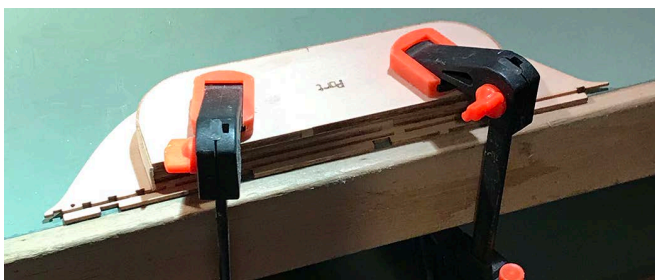




Position the wrapping piece, matching up the center witness marks. Glue it to the outboard surface first (above top), then use hot water on the bends before shaping them around the form. Wrap the ends around and hold them using an elastic band or clamp (above). When dry, make sure that the ends are aligned with the *lower* forming piece. If you need to trim them, maintain the angle so that they will fit neatly against the side of the ship later.



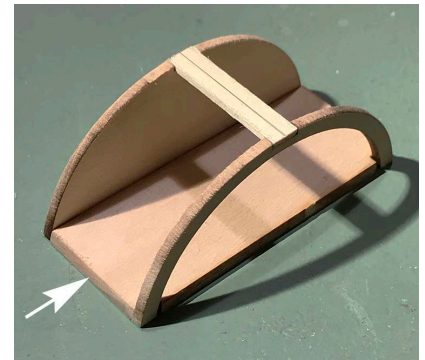
Glue the completed lower section on the top of the sponson deck and clamp until dry.



## 27. Paddle box upper sections **Sheets 9, 10, 11, 18**

The upper section is built on a frame. Carefully glue the base plate and half-hoops together at right angles. A set square will assist here. Add the cross-bar flush

with the sides. Carefully bevel the baseplate ends to conform to the curve of the half-hoops (arrow, below).



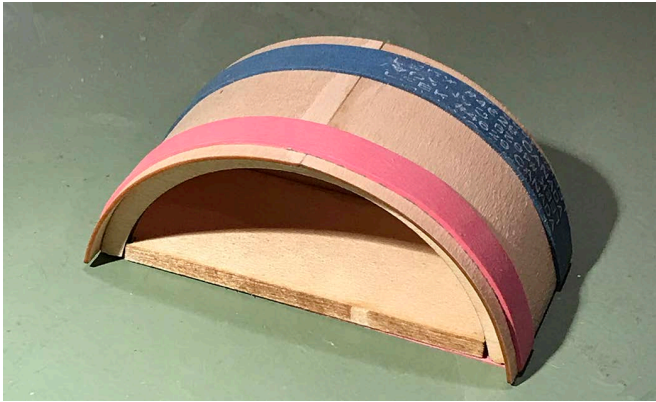
Glue the cover pieces to the crossbar first with an overlap on each side. *The mark at the center joint of the cover is the overlap on the open side. The 'L' cut-out goes on the closed side.* Clip the middle while the glue is still wet and bend around to ensure that the overlap at the sides is consistent and parallel all the way around (top of photo below).



When dry, bend and glue down the cover. This curve should not need wetting. Sand off any excess cover flush to the base. Repeat on the opposite half of the paddle box. Elastic bands are useful here (photo top of next page). If the joint at the top isn't perfect, don't worry. It will be hidden later. Sand the assembly.

Paint the inside of the paddle boxes black in preparation for assembling the front to the box.

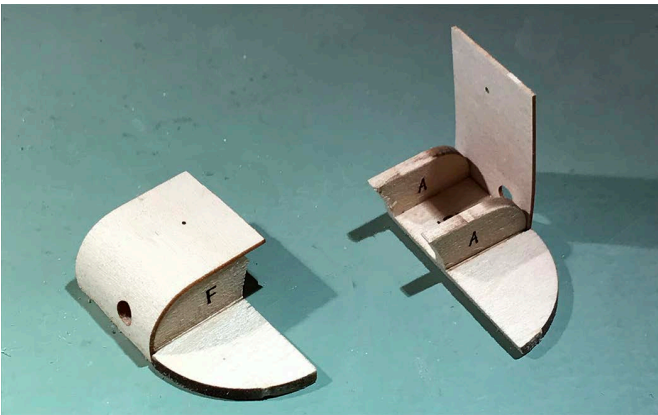
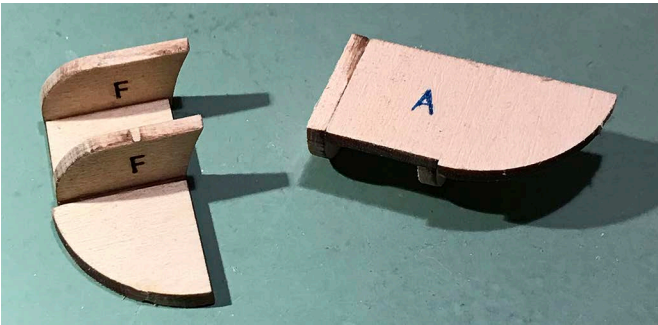




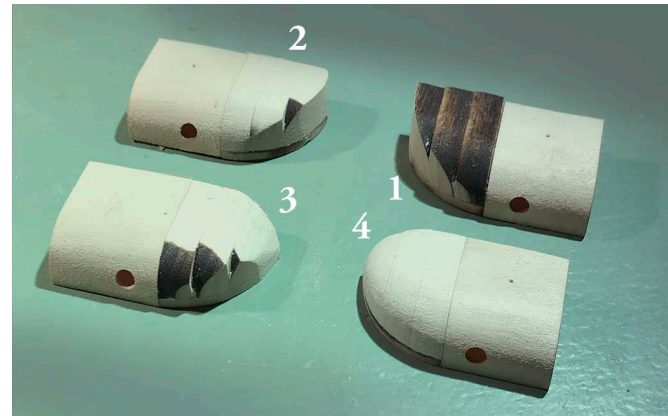
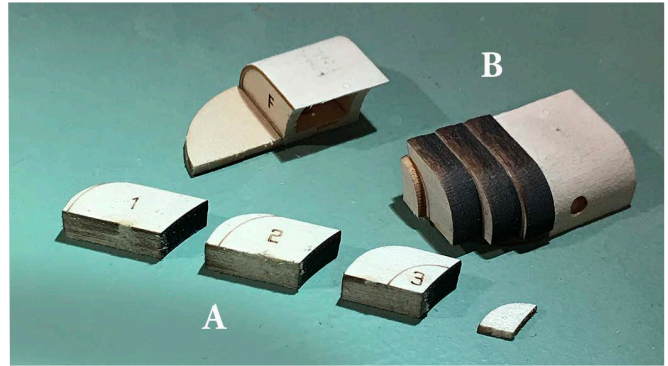
## 28. Water closets Sheets 9, 10, 13, 18

There are two water closets on each side of the ship fore and aft of the paddle boxes. These are complex in shape and are built up in sections. **Note that fore and aft pieces of these structures are not interchangeable!** They look identical, but are not.

After removing char, assemble the sets of three pieces; the base and two uprights. The larger upright is glued against the inner end of the base. Make sure that the uprights are square to the bases. *Before proceeding, mark the underside of the bases 'F' or 'A' to identify them.*



Attach the roofs to the inner sections of the closets. Do this as you did the paddle boxes. Make sure that



the correct roof pieces go on each sub-assembly! As the pieces are cross-grain, they should bend carefully without moisture.

Next are the pieces needed to form the complex dome-like part of the closet roof. Take the char off the bottom edges only (A, top of next column) and glue up as shown (B).

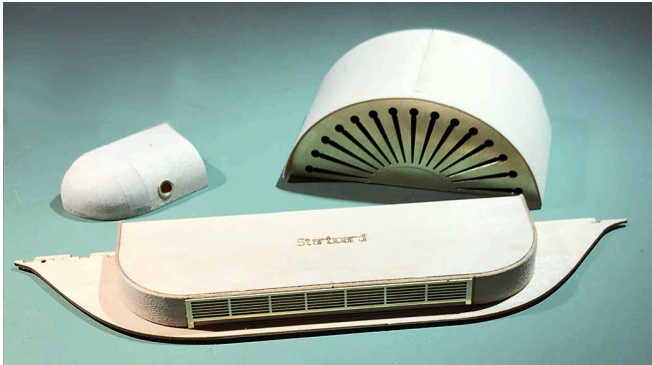
A considerable amount of shaping is required. The easiest approach is to do this in stages using coarse sandpaper as illustrated above.

Sand a curve to match the base of this unit (1, photo above). Next, sand down the top surface and round to the base flush to the curved cover (2). Sand a semicircle down from the top to the tip of the base (3). Last, sand down the solid section to a quarter of a sphere (4). To complete, a little filler and fine sanding may be required.

Take your time on this to make the four roof sections to the water closets. Finally, make sure that the pieces fit snugly against the paddle wheel covers.

### 29. Photo-etched parts for the paddle boxes

Carefully cut the two perforated paddle box fronts from the photo-etched sheet and abrade both sides lightly using 400-grit paper. This process will help glue and paint adherence. Use either cyanoacrylate or epoxy for glue metal to wood joints. (I prefer to use epoxy).



Find the four rings on the photo-etch sheet and trim them out. These surround the ventilation ports for the water closets. Gently bend these around a rod of about 1/2" diameter and glue them in place. It is easier to abrade these once fixed. Do this carefully!

Take the lower paddle box sections (from Step 26) and trim the two grilles from the photo-etch sheet. Handle carefully! Glue as shown above using the guide marks. Carefully abrade when firmly attached.

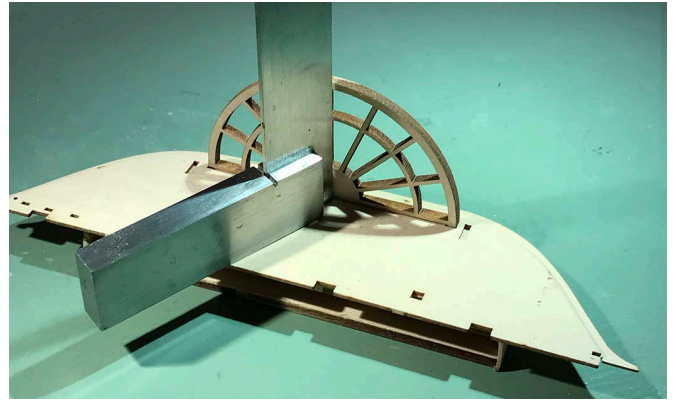
### 30. Fitting the sponsons to the model

Before proceeding, check that the sponsons fit in the slots on each side of the model. Trim back the molding if necessary until a good fit is obtained against each side. Do not attach these yet.

### 31. The paddles and hubs Sheets 9, 10

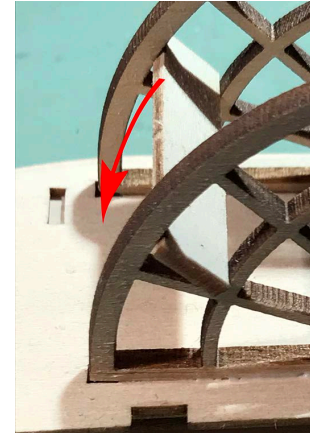
Each half-paddle consists of two rings and eight paddles. Turn the lower paddle box section upside down. Glue in the first of two half rings, keeping it vertical to the box (photo top next column). When set, attach the other half ring.

Glue in each paddle as shown by turning it at an angle to insert it, then secure it against the radial arms



using glue. The notches go to the *outside* of the rim. Make sure that all the paddles are attached on the *same* sides of the arms!

Repeat this process for the second half wheel, then glue the hubs on the outer sides (below).



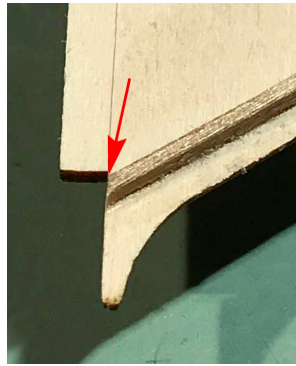
### 32. The sponson rims

**Sheet 8**

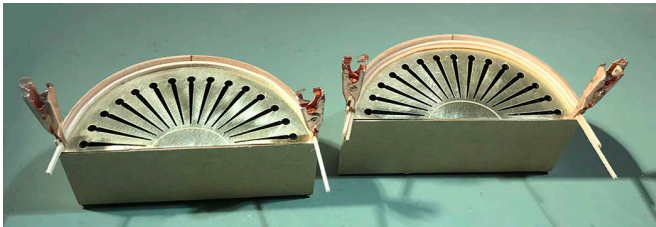
These are curved skirts around the edge of the sponson. Glue the straight central portion on and allow it to set. The curve can be dry bent and glued in place. Hold it with clips until dry as shown below. Trim back the ends of the rims flush to the outside of the slots in the sponsons as shown (top of next page).



**Optional detail:** There are decorative moldings inside the edges of the paddle boxes. Cut two 5" lengths of  $\frac{1}{16}$ " x  $\frac{1}{32}$ " strip and soak them in hot water for a few minutes. Bend them snugly in place, pushing the ends to ensure a good fit. Let them dry, then glue them in.



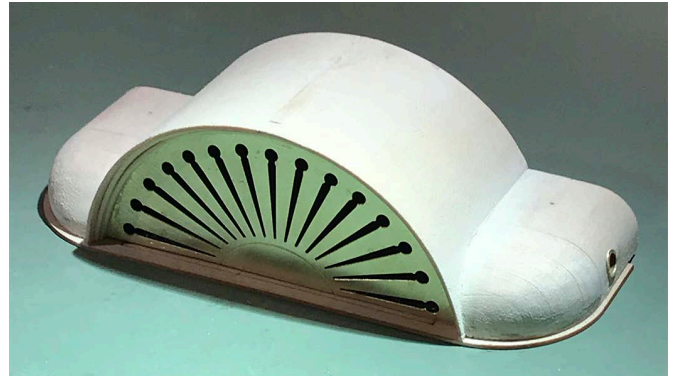
Next cut two 5" long pieces of  $\frac{1}{32}$ " square strip and repeat, bending them in inside the wider strips to give the stepped effect seen in the photo below. When dry, trim the ends flush to the units.



### 33. Assembly of the upper paddle units

Glue the paddle box in place on the sponson rail. Make sure that the front edges of both are aligned. Gently clamp until dry.

Check that the upper water closets fit with the rail protruding evenly around the curve. *Don't mix up fore and aft closets.* Glue them on, making sure that the fore and aft pieces are not switched around. If there are any gaps between the paddle boxes and water closets, fill and sand them carefully.

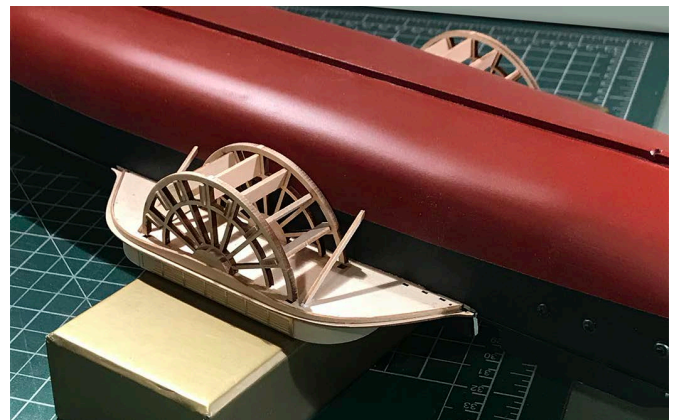


The completed upper parts of the hull outboard units should look like the photograph above. Spray with primer and touch up any defective spots before continuing.

### 34. Sponson support struts

**Sheet 10**

Sand these first. In order to install them, it is easiest to turn the model hull upside down on a box or wood block and insert the lower paddle units (photo below). This will ensure that they are horizontal when permanently installed. Glue and position the struts into their slots on the underside of the sponsons. Make sure that the struts are vertical as seen from the side and that their lower ends sit against the sides of the hull.



### 35. Completing the paddles and sponsons

Remove these carefully from the sides of the hull. Make sure all is tidy, then prime and paint them the same black as you used on the hull. Keep paint off the top of the paddle box. When the paint is dry, the paddles and sponsons may be permanently mounted to the hull.

### 36. The baseboard

**Sheets 3, 13, 21 & 22**

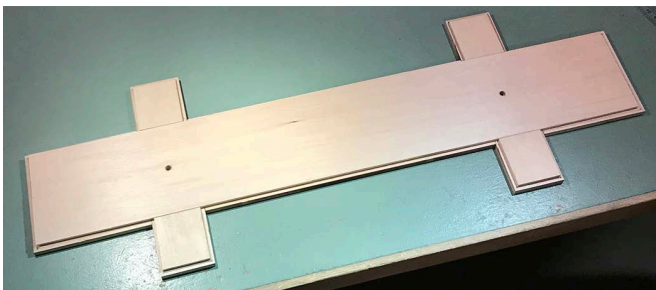
It is finally time to mount your model on its pedestals. To construct the baseboard, remove the various parts from the carrier sheets. The baseboard is made up of two layers that need to be assembled on a flat surface.

Clean off all the char before assembly. Now is the time to decide if you want a natural, stained or painted finish. If natural or stained, sand off all the char down to bare wood.

Cut two pieces of 1/8" dowel to act as locating pegs. About 1" long will do.



Lay out the lower layer pieces as shown above. Tack glue the pieces to each other, lining up the pieces with the witness marks. Then take the upper layer longitudinal piece and thread the dowel pieces through the two holes. Glue the underside (avoid around the dowels!) then position it over the lower layer using the dowels. Clamp or weigh the assembly overnight. Add the four upper side arms in the next work session.



Finish the baseboard to taste and add the dowels you cut earlier in Step 22. The base is now ready to receive the model.

Dry-fit the dowels home in the model, then glue the dowels and model into the baseboard. Check and adjust so that the model is vertical when seen end-on.

### 37. Installing the sponsons and paddles

Once the lower paddle units are painted they can be added to the model. Turn the hull and baseboard upside-down again over a raised block and glue in the paddle units. Make sure that the tabs are all the way home in the slots and check for alignment before the glue sets.

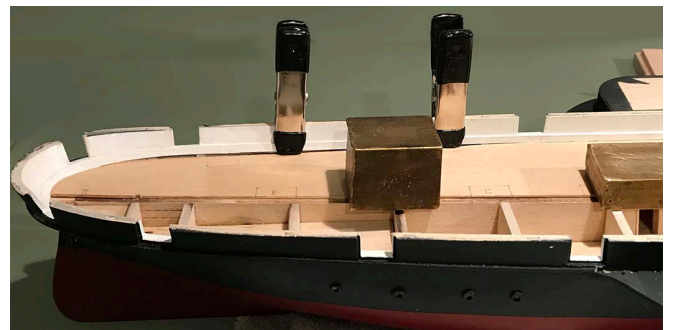
*Alternatively:* Place a weight across the sponson units when installing them (below). There will probably be some touching up needed when set.



### 38. The deck

**Sheet 5**

This is in two halves for ease of fitting. Test fit the pieces and adjust as necessary so a neat joint is formed down the centerline. A small plane can shave the outer edge if necessary. Make sure that the outboard edges fit under the spirketting. Glue in one half at a time and weigh down as needed.



If you find that at the centerline one side is not completely level, moisten the area and weigh it down until dry. This is important; or the deck houses will not sit properly. Lightly sand the deck, but take care not to remove the locator marks for the deck furniture.

### 39. Minor details before mounting the model

There are a few items easier to install while you can still invert the model. The eagle figure can be painted gold and glued under the beakhead. I used epoxy here after scraping paint off the painted surfaces to be joined. There are also two holes for eyebolts to be drilled on the front of the stem. Take their positions from the rigging plan.

The eyebolts are medium size (MS0428). Either blacken them chemically\* or paint them black. Clip off about half the length of their stems and push them into holes drilled with a #72 bit. A drop of cyano or epoxy will secure them. Tap or push them until they seat with the stems hidden.



### 40. Mounting the model

With the baseboard complete, glue the tops of the dowels. Replace the model on the dowels and check again that it is seated vertically. Let the glue set.

### 41. Inner hawse pieces

Each is in two parts. After cleaning them up, glue the two small pieces to the upper part of the backs of the larger ones as shown. Sand the edges smooth.



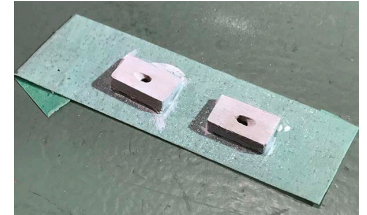
Sheet 10

Next take a length of thin rod or a drill bit and insert it in the hawse hole. Thread on a hawse piece to see how the hole in it needs to be filed out at an angle (photo top of next column). Do this using a round Swiss file until the piece sits nicely against the bulwark. Repeat for the other piece. Paint the pieces white and glue in, using the rod to guide them into place.

\* Jax brass blackener or similar agents are available online through jewelers' supply houses.



**Hint:** To secure small parts to paint them, use a length of masking tape stuck to the work top as shown.



### 42. Bowsprit step

Sheet 20

Clean up this piece and paint it white. Glue it into the center of the deck just aft of the hawse pieces. Make sure it is vertical as seen from the side.

**Hint:** In a real ship all edges and corners of deck fittings were rounded off for safety. You may wish to do the same. Don't overdo it, though!

### 43. Catheads

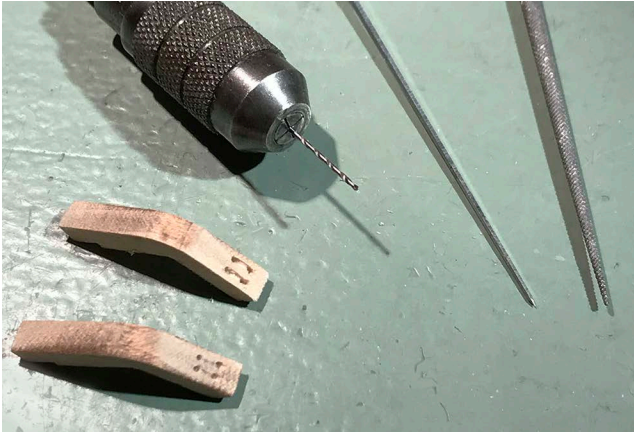
Sheet 20

Clean off the char and fit these to the bulwarks where indicated on the deck. Make sure that the notch fits around the spirketting plank and mark the catheads port and starboard.

Mark out for double sheaves (photo overleaf). Prick these marks so that the drill point will not wander.

You will need to drill through *at the same angle as the end face of the cathead*. Use a #70 bit in a pin chuck. This gives good control. If the holes come out the other side a little askew, it will not be seen. Open the holes slightly with a broach. The illusion of sheaves, if you wish, can be made using the tip of a round Swiss file (see photo overleaf).

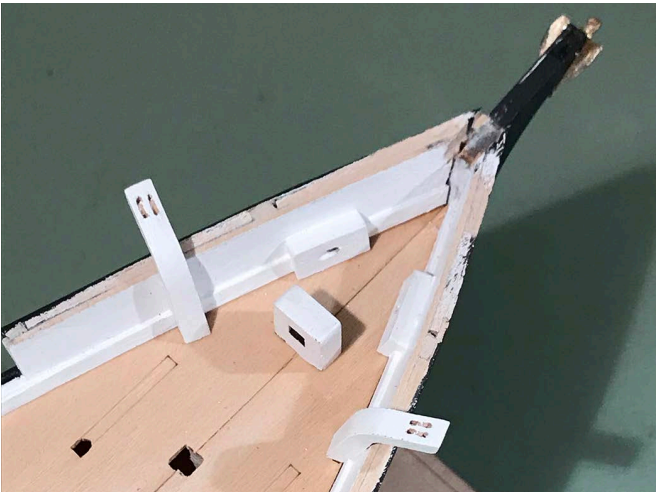
An extra set of catheads is provided in case the first effort is unsatisfactory.



The basic drilled cathead is seen in the foreground and the more detailed one above it. Also seen, left to right, are the drill bit and pin chuck, broach and round Swiss file.

Paint the catheads white, except for the gluing surfaces. Glue the catheads in place (photo below).

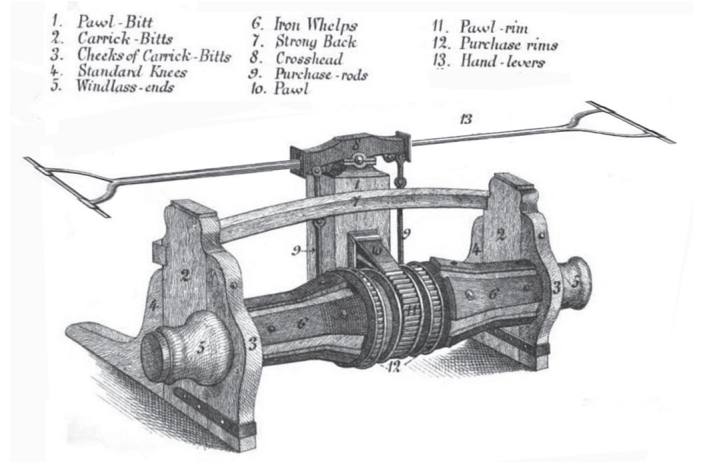
**Hint:** If possible, paint every item that needs it before attaching it to the model. It makes for neater work and saves awkward masking issues.



#### 44. Carrick bitts & Samson post **Sheets 9 & 20**

The Samson post or pawl bitt is a stout upright on the centerline. It carries a mechanism to work the windlass as well as a drop pawl to prevent run-back. The illustration (next column) shows details of this. You may add as little or as much of this as you like from scrap.

The two Carrick bitts hold the windlass. Prepare and paint both post and bitts white before fitting them to the deck. Also, prepare the cast windlass by painting it a greyish black. Assemble windlass and bitts, then install these items. Make a drop pawl from 1/32" scrap.

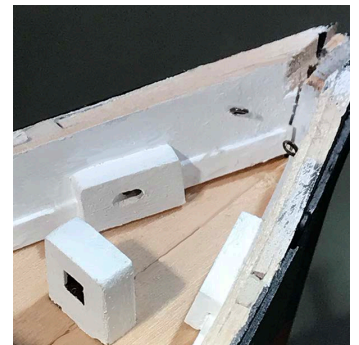


After Paaasch, *From Keel to Truck*

I made the rocker mechanism from scrap wood, stiff brass wire and card, then painted it black. When not in use, the handles seen in the illustration above (13) are stowed away.



Two medium eyebolts are needed at the bow. Carefully drill with a #72 bit, making sure that you do not go all the way through the bulwark! Securely glue in medium size eyebolts at an angle, as seen in the photograph. Other than the bowsprit, this detail completes the bow area.



#### 45. Bollards at the bow

Paint these cast pieces black and glue them in place on the deck (photo opposite).

#### 46. Spurlings

These are the angled pipes that direct the anchor chain from the deck to down below. Paint these black and install them in position on the deck (photo below and page 2). The flat cover faces forward.

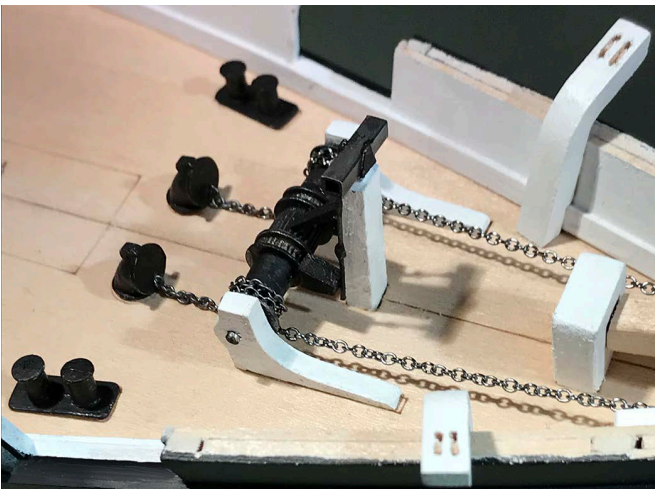
#### 47. Anchor chain

To rig the chain, prepare a length of thin wire with a small hook on the end. Push the hook through a hawse hole from outside to in and snag the end link of chain. Carefully pull the chain through the hawse. *If this does not work for you, make the chain in two pieces and glue these in at either end of the hawse hole.* Keep the wire hook: you will need it again later!



Epoxy or cyano the inboard end of the chain to the slot in the front of the spurling. Take the inboard end of chain twice around the tapered section of the windlass and arrange along the deck from the spurling. I used dilute white glue to secure the chain to the deck (photo below).

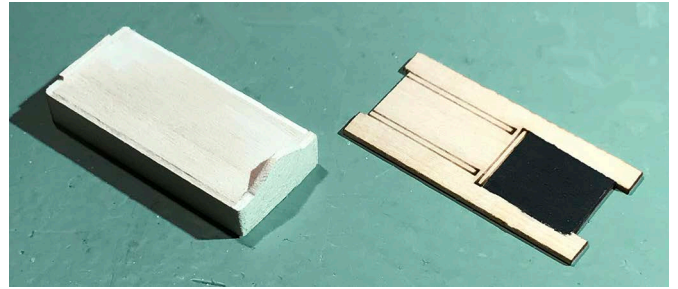
Cut the outboard end of the chain about 2" outside the hawse hole and leave it loose for now. Repeat on the opposite side of the ship.



#### 48. Companion A

Sheets 12 & 13

This is the first deck structure to construct. **Do not confuse Companion A with Deck House A!** This unit has a skylight forward and a companion (stairway) aft. After cleaning up the pieces glue the sides to the base, then the ends. Sand the top of the sides and parts of the ends flush to the base (below left).

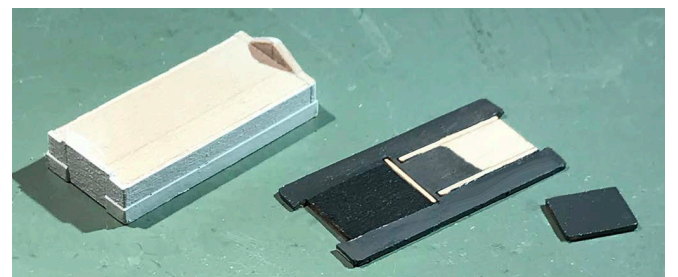


Round off the vertical corners. Next, paint the area on the roof piece black in the area shown, above right.

**Option:** The base of all the deck furniture has a trim. You may add this if you wish. **Card Sheet C, 1** contains strips for this purpose. I suggest gluing overlong strips on and trimming them back with a sharp blade when dry.

Now is the time to make some choices. The roofs of the deck structures were most likely a medium gray color, such as MS4826. However, the sides may have either been varnished wood or painted white. If you wish to represent varnished wood, paints that would be suitable are MS4829 or Tamiya 86515 AS-15.

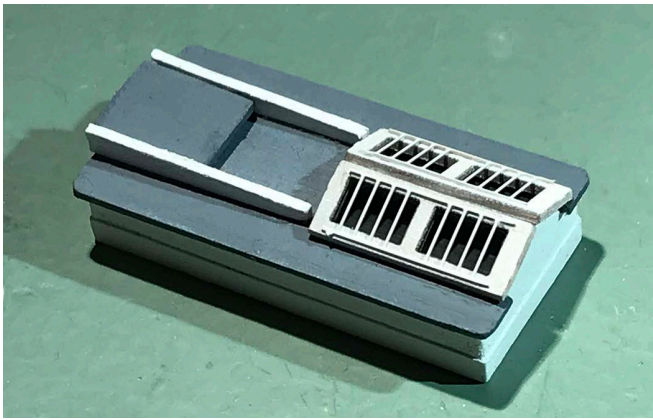
Paint the sides and ends of the companion. Paint the roof gray. MS 4826 is suitable. I masked off where parts need to be glued with Scotch™ tape. It is easy to cut masking to size as you can see through the tape.



Pre-paint the rails and one side of the small triangular piece either white or wood, as the case may be. Remember the trick of attaching small parts to masking tape to secure them while painting (Step 41). When dry, attach the rails to the roof and the roof to the unit. Also attach the triangular piece to the roof. Glue the sliding cover between the rails, adjusting it for fit if necessary. Note its angle (photo below).

Next paint the inside of the small triangular piece black, as well as the inside of the triangle on the end of the companion unit. Glue in.

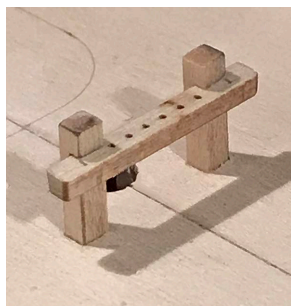
The windows frames are very delicate, so handle these carefully when sanding off char. The grilles over the lights are photo-etched. They are the pair with two groups of four bars. Carefully remove them, prime them, then epoxy or cyano them to the frames, keeping them symmetrically placed. Paint the frames white and glue them in place. The first companion unit is now ready to glue to the deck.



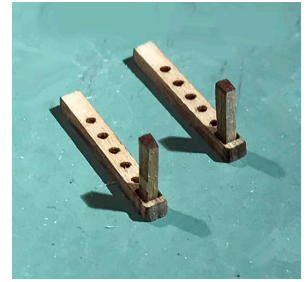
#### 49. Fore mast bitts

**Sheets 9, 10 & 11**

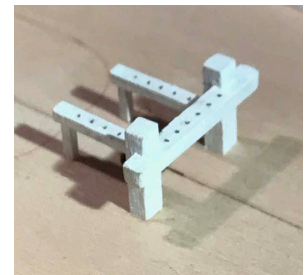
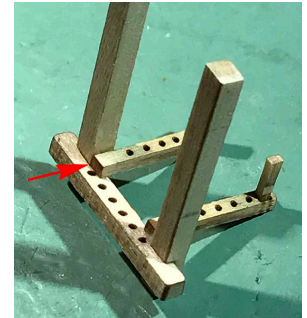
These surround the base of the fore mast. Take the two bitt pins (Sheet 11) and clean off the char. Sand until you have a good tight sliding fit in the holes through the deck. With the pins vertically in place but not glued, add the cross-piece (Sheet 9) so that it extends equally on both sides. Glue in the cross-piece only.



Fit and glue the aft pins to the side rails as illustrated (right). The next step needs care. Glue the sides to the fore bitts as shown. Try to align all the components square and at right angles. The fore ends of the side rails should be flush to the front of the fore bitt pins.



Let the glue set well before painting the bitts white. Keep the holes clear of paint. Clear any clogged hole with a needle or piece of wire. Finally, glue in the bitts to the deck and the sub-deck.



#### 50. Coaling hatches

These are the four discs with a circular groove on the photo-etched sheet. Carefully remove them and clean up the edges. Either blacken or paint them. Use epoxy or cyano to fix them in place.



#### 51. Upper paddle unit installation

**Sheet 19**

The upper parts of the side paddles are next. On their inboard sides there are paneled bulkheads. Glue the top of a lower section and position the upper unit so that the rim overlaps evenly all the way round outboard. Inside the rim should align with the outer edge of the ship's bulwark (photos next page). Check the in-

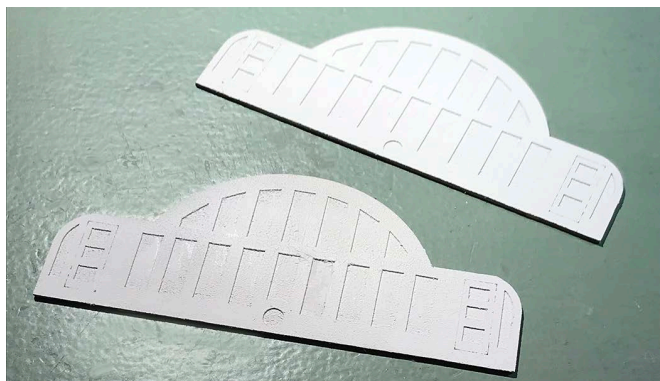




ner bulkhead piece for fit. It may need some minor adjustment. The bulkhead should seat with the base sitting close to the edge of the two square holes in the deck.

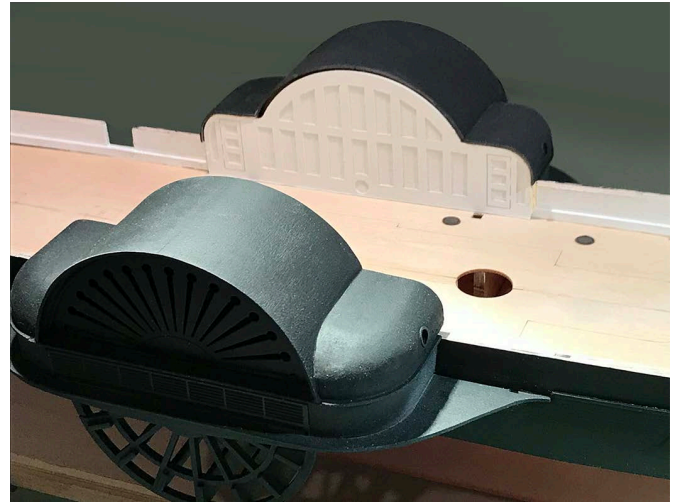
Once you are satisfied with the fit, remove the bulkheads and take the paneled pieces from **card sheet CCC, 4**.

The best way to attach the card to the wood bulkhead is to use a spray glue like 3M's Super 77™, or some other adhesive that is not water based. Carefully attach by putting the glued side of the card facing up on a flat surface and positioning the wood bulkhead over it. Press down firmly. Trim card if necessary. Prime and paint white.



**Superdetail:** You can add handles to the water closet doors and hinge detail as well, if you wish. There are also small gaps between the bulwark and bulkhead at the fore and aft ends. These may be filled and painted to match.

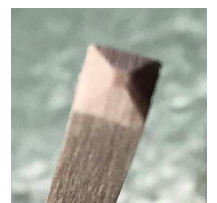
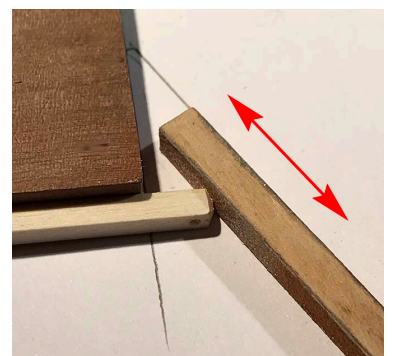
When satisfied with them, install the bulkheads permanently.



## 52. King posts

These are four stout vertical posts that carry and spread chains that support the sponsons from above. Cut four 2¼" long pieces of ⅛" square strip. Check that these will slip through the holes just inboard of the bulkheads you just installed. File the holes out a little if necessary.

The tops of the king posts are beveled. To do this use a sanding stick and simple jig (at right). Hold the sanding stick at an angle to the post, count the number of strokes, turn the post 90°, repeat and so on until all the facets come to a point.



Next, bore a hole through each post close to the top. Start with a small

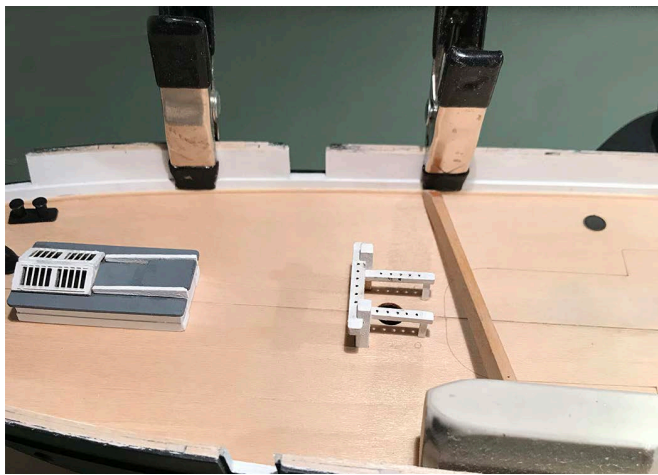
drill bit like a #60 and open the hole to about a #54 using broaches or round needle file. The hole needs to be just large enough for chain to pass through.

Paint the posts white and install them, making sure that they are vertical and that the holes face *across* the ship (photo below).



### 53. Waterways

Use 1/32" square strip wood. Glue in lengths at the angle between the bulwark and deck. They stop on either side of the water closets. Wet bend the wood at the stern to shape it before attempting to glue it in. Use dilute white glue and wash off excess with a damp brush before it sets.

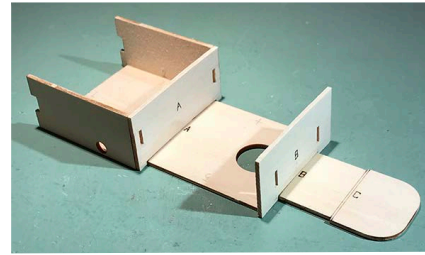
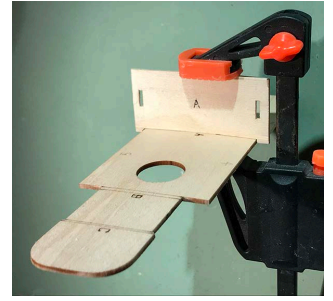


**Hint:** If there are any 'iffy' areas along the waterway, re-wet and reposition while the glue dries. Some form of light pressure such as shown above (yes, that's an eraser!) will help persuade the wood into place.

### 54. Cabin & pilothouse Sheets 10, 11 & 12

As this structure has a large number of parts, I suggest only removing pieces as you need them.

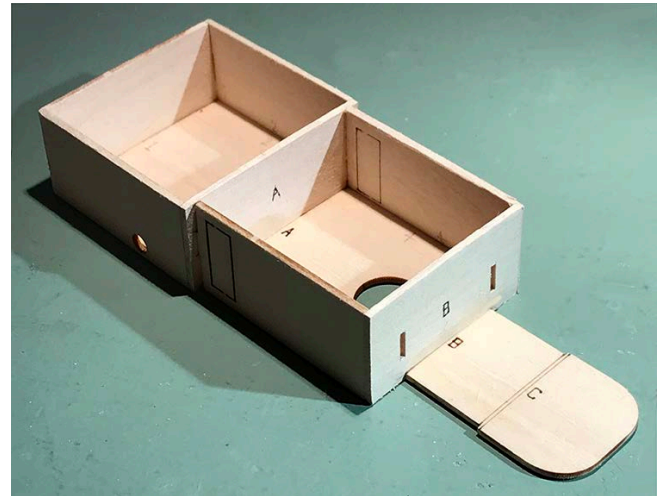
Begin with the cabin base and bulkhead A. There is a slight round up to fit the deck below, so make sure that the base is bent up slightly as you glue A to it. Check that it is set at right angles. Repeat for bulkhead B.



Take bulkheads 2 & 3, prepare them, then glue them as seen in the photo. Make sure that their sides are vertical.

Add bulkhead 1 to the aft end of the assembly. Bulkheads 4 & 5 are next (see note below!).

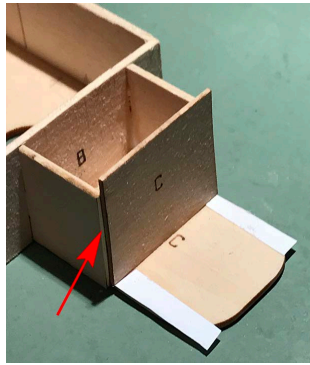
**Optional:** If you wish to show an open door, remove the door from the bulkhead before adding it to the cabin assembly.



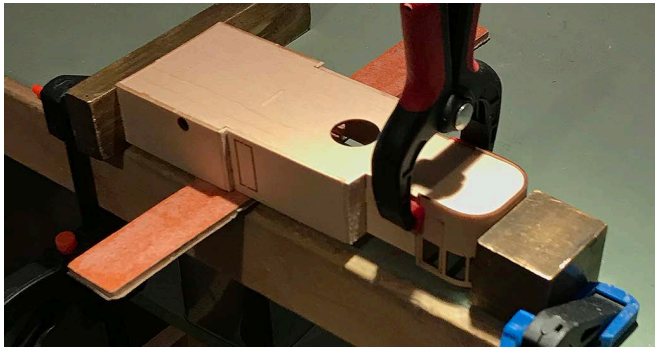
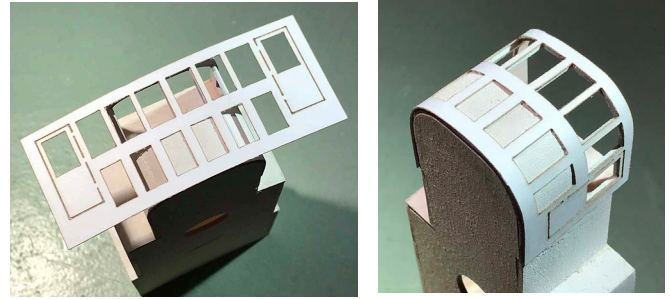
Now sand all the corners and tabs to a smooth finish. Give the top longitudinal edges a slight bevel to match the round-up of the cabin top.

Add parts 6 & 7, then pilot house bulkhead C (Sheet 12). Piece C is slightly narrower on each side than the fore ends of 6 and 7. This forms a rebate for the pilothouse front (arrow at right, next page).

Before adding the pilot-house floor (Sheet 11), glue two strips of paper as shown (right) to compensate for the round up of the base. Glue the floor over this, then trim the paper flush.

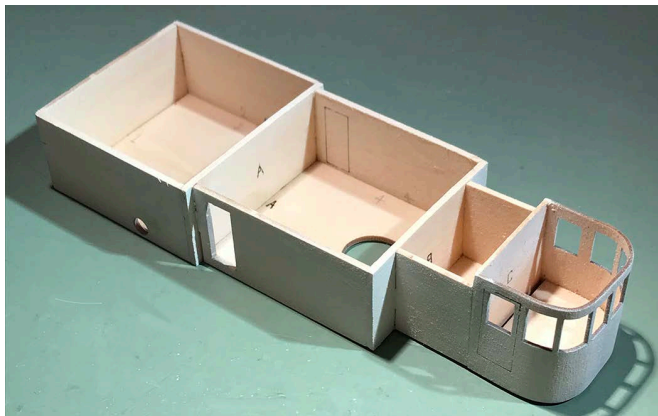
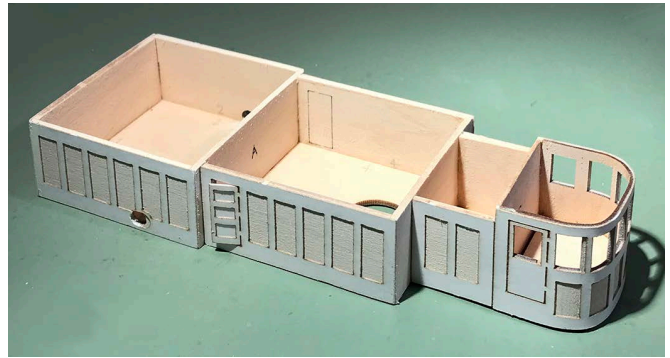


wrap the piece around both sides, as illustrated below.



Thoroughly wet the outer side of the pilothouse front before bending it to shape. *Do not attempt this dry!* Clamp the ends of the front and clamp each end of the unit as shown. A small block (a sanding stick in the photo) holds the assembly level while inverted. Let dry, then glue in place.

Apply the other panels to the cabin. If you want to show an open door, back the paneled part with a piece of scrap card (center below).



Trim runs around the base of the deck house. This trim is on **Card Sheet C, 1**. Again, spray glue is preferable for this, but white glue here will do. Another narrower band goes around the upper edge of the pilot house (photo below).

Cut the pilot house window piece from the photo-etched sheet and carefully bend and slide it inside the pilot house until the window bars register in the openings. Spray the completed assembly white.



When dry, fill any small gap between the front piece and parts 6 & 7. Sand the assembly and prime it.

### 55. Cabin & pilot house panels **Card Sheet C**

Next apply the card panels all around the deck house, using the same method as in Step 51. The pilothouse front is a tricky piece to fit. Carefully align and lightly press down the front center first, then progressively

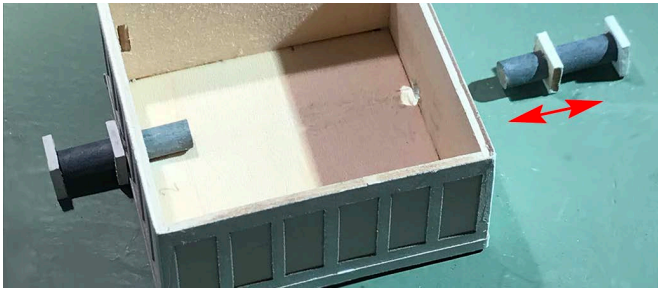
Paint the inside of the middle compartment black, as seen above.

**Optional:** Add door handles to doors if you wish.

### 56. Paddle shafts and bearings Sheet 10

These run from the deck house a little above the deck and into the paddle housings. Clean up the four bearing pieces and cut two lengths of 1/8" dowel 7/8" long. Paint these gray. Paint the bearings white. Hold these small parts using a piece of masking tape while painting them.

Glue a bearing to one end of each shaft. Make sure that the other bearing is a sliding fit along the other end. Insert the shaft into the deck house as shown.



Glue the deck house in position. Push the shafts out until the bearings meet the bulkhead wall and glue them in place.

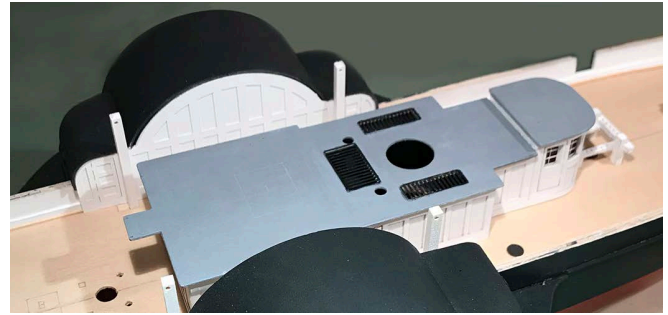
It seems as if these rotating shafts would be a work-place safety hazard, but I suppose that this was not a major consideration back then!



### 57. Cabin and pilot house roofs Sheet 12

Prime, then paint these medium gray, MS 4826. Take the three fidley gratings (those with the thicker bars) from the photo-etched sheet and paint these black. Secure them over the apertures on the cabin roof with either a smear of epoxy or cyanoacrylate glue.

Attach the roofs to the cabin and pilot house. Check that the overhang is equal on both sides. As there is a slight round up, weight the sides of the roofs while the glue sets.



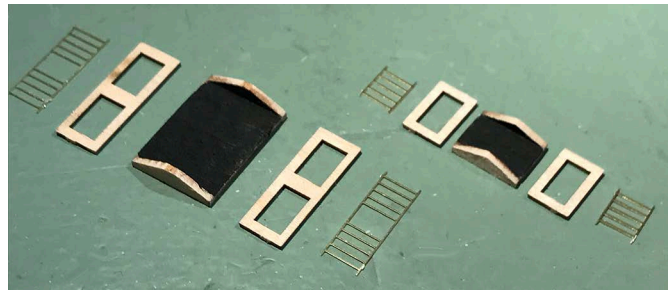
### 58. Ladders

Prime and paint the ladder castings white. The short pair lead to the pilot house doors and the long pair are aft of the deck house. Carefully glue in position.



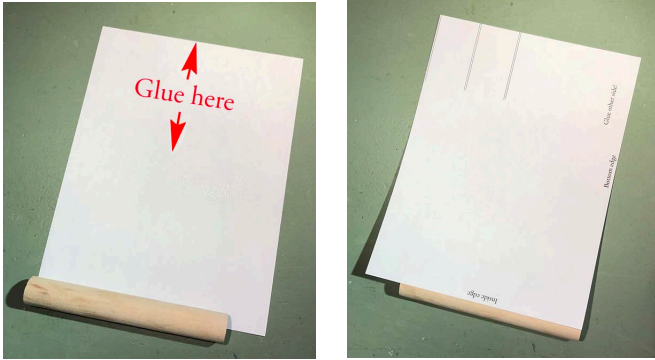
### 59. Skylights 1 and 4 Sheets 7 & 12

These are located on the fore and aft ends of the cabin roof. Assemble the bases and ends. Paint the insides black (below). Add the frames, handling them carefully. Apply two small four-bar grilles from the photo-etch sheet over skylight 4 and the twin four-bar ones over skylight 1. Paint the outer surfaces white, and add to the roof.

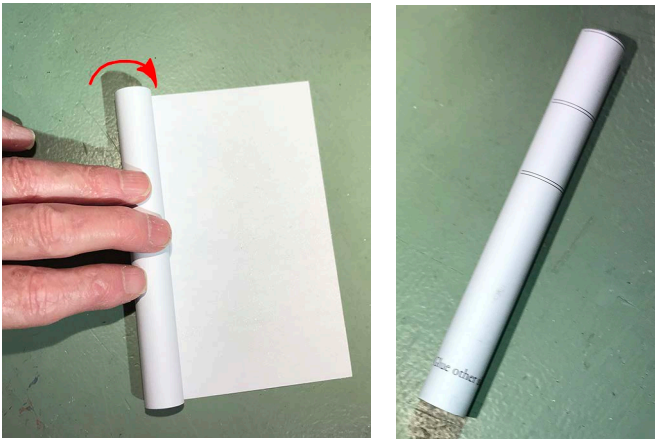


## 60. Funnel assembly **From page 65 & Sheet 20**

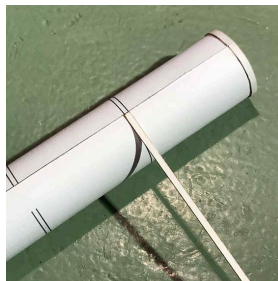
The funnel is made from paper rolled around a  $4\frac{1}{2}$ " length of  $\frac{5}{8}$ " diameter dowel. Cut out the paper piece from page 65 and spray glue across the far end on the *unprinted* side as shown (below left). Put a thin line of glue along the dowel and tack down the inside edge of the paper. Line up the bottom edge with one end of the dowel (below right).



Begin rolling the paper on the dowel. As you roll, make sure that the paper is square to the dowel. Once certain, continue rolling until you reach the sticky part of the paper. Check that all is square, then finish rolling by making sure the outer end of the paper is firmly adhered (below). *A spare pattern is also provided on Plan Sheet 3.*

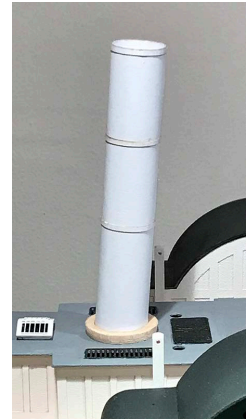


Add the three reinforcing bands, **Card Sheet CCC, 2** making the joints at the vertical seam of the paper (at right). Check the funnel for fit in the model and adjust the openings if necessary.

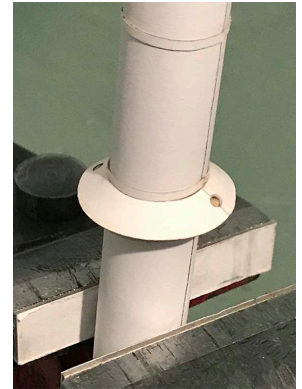


Turn the funnel so that the seam faces the centerline aft. Draw a line around the funnel where it emerges from the deck.

Remove the funnel base ring and remove char as usual. Run a line of glue around the funnel just above the pencil line and assemble the ring on the funnel with the lower surface at roof level. Let the glue set, making sure that the funnel is not stuck to the roof.



Remove the funnel and hold it in a vise. Take the base cone and joint piece from card (**Sheet CCC 3, 3A**). Glue one end of the joint piece to the cone (right). Turn it over so that the joint piece is down and bend the cone around the funnel until the ends come together. Again, the joint should be at center back. Glue. Slide the cone up and add glue to the top of the ring, then seat the cone down firmly, making sure that the seam is still at the back. Fill any small gap.



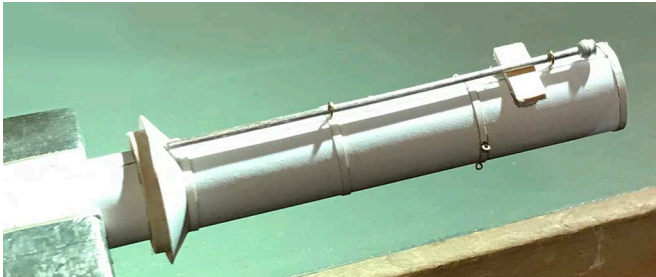
Next, run another band around the funnel just above the cone (above right).

## 61. Funnel details

As the funnel is so tall, it has four guys to support it. Drill and install four small (MS 0429) eyebolts on the second band down where marked.

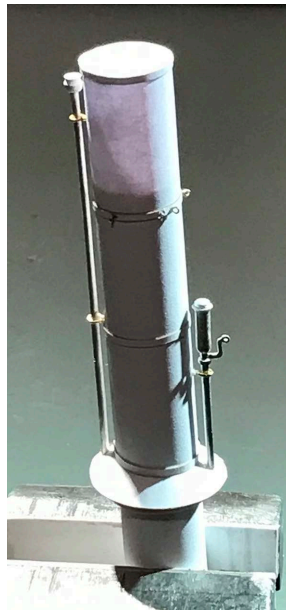
On the aft side of the funnel is the safety steam escape pipe and valve. The top should come a little below the funnel top (photo overleaf). Clip the stem at the bottom of the pipe if necessary. Use larger eyebolts

(MS 0434) that the pipe can just pass through them. Drill two holes in the aft side of the funnel. Slide the eyebolts along the steam pipe and epoxy them and the pipe. Space the pipe parallel to the funnel. A temporary spacer keeps the pipe in place while epoxy sets up (below).



**Hint:** Should these castings have become bent, they can be straightened by rolling them between two hard flat surfaces.

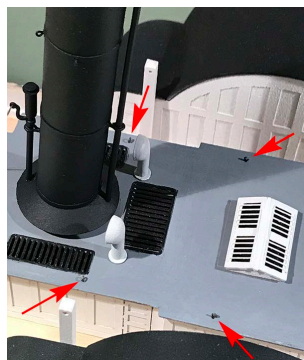
On the fore side of the funnel is the steam whistle. This also need an eyebolt to support it. Install so that the whistle barrel is just clear of the funnel (see photo at right).



Prime and paint the funnel assembly black and install it.

### 62. Final cabin top details

Install four small eyebolts (MS 0429) as shown in the photograph at right. Next add the two ventilators, painted white, making sure that they face forward and are vertical as seen from both the side and aft.



The last detail is the whistle pull. Use ordinary brown or beige thread. Stiffen the ends of a 3" length with

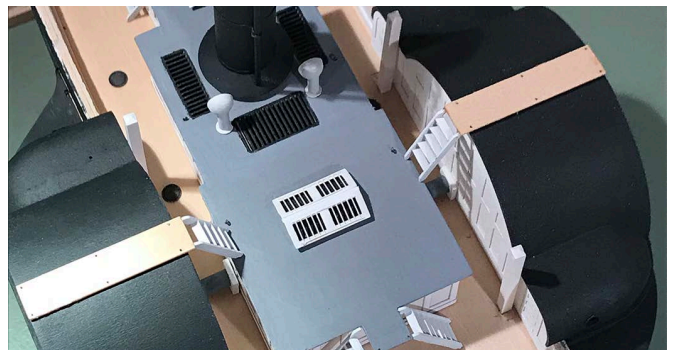
either cyano or white glue. Insert one end into the hole on the pilot house aft bulkhead and glue in place. Thread the other end through the whistle lever end, cut short, and glue in place. Leave a little slack in the line. Using dilute white glue and a brush, form the line into a natural curve and let it dry.



### 63. The bridges

**Sheet 19**

Prepare the two small decks. They may have been natural wood or painted gray. Sand the tops of the paddle covers and epoxy the decks on. They are flush to the outer edges of the covers. **Note:** *The inner ends of the decks must face inboard, or the railings will not fit later!* Try to align the decks to each other across the ship. Add the two ladders down to the cabin top.



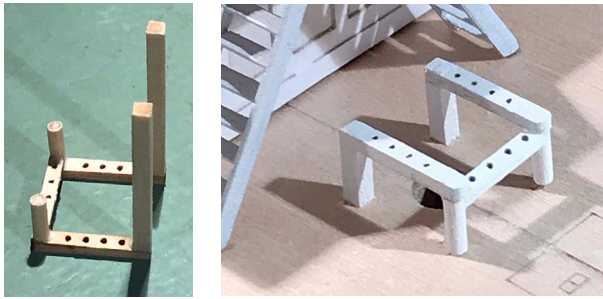
Resist the temptation to add any railings now, as they are fragile and will certainly get snagged, bent or broken.

### 64. Main mast bitts

**Sheets 9 & 10**

Assemble these as shown. You will need to slightly narrow the tenons on the fore pins on each side to fit the rails using a file. The aft pins are round; a round

toothpick will provide the correct diameter stock. Cut two pieces the length of the pattern piece on Sheet 10. Use a knife to roll the toothpick to and fro under pressure (below). This makes a clean, right-angled cut through the wood.



Prime, paint and install the bitts in the usual way.

### 65. Bulwark cleats and aft bollards

There are five cleats (WP 0045) on each bulwark aft in the positions shown below. There is one more on each side, forward just ahead of the catheads (see Step 82). Clean the castings of any flash, then prime and paint them white or brown. To paint, drill holes in scrap wood to hold the cleats. Drill the bulwarks – not too deeply! – with a #55 bit. Mark and prick the holes first, half way down the bulwark.

**Hint:** Stick a piece of tape around the drill bit to act as a cue for depth.

Cyano or epoxy cleats in place. The aft two and foremost one are angled as shown below; the other two are placed vertically. Add the bollards.



### 65. Aft bollards

Clean and paint the castings black and install as you did with the other bollards (Step 45).

### 66. Eyebolts for gun tackle

There are four eyebolts in the bulwarks at each gun port. Two medium ones are fixed in the spirketting and two small ones above them. Prick centers for the drill bit, then drill #72 holes in the positions as illustrated here. Cut the stems of the eyebolts short enough so that the eyes are tight to the bulwark when installing them. Blacken them before setting them horizontally with a spot of epoxy or cyano. **OR: delay installing eyebolts until step 80.**

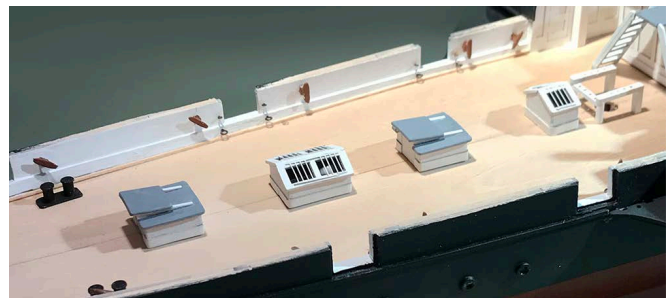


### 67. Aft companions C & E **Sheet 12**

These two companions are similar to the companion you made earlier for the fore deck (Step 48). They are not quite identical as the deck sheer becomes greater further aft, so label each companion and its orientation inside as you construct it. Sand the corners flush and round them slightly. Paint as usual, remembering to add card trim around the base of each first, except across the vertical hatch.

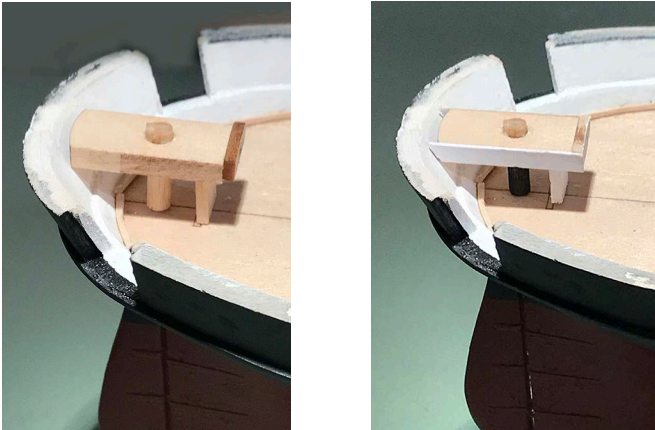
### 68. Aft skylights B & D **Sheet 12**

These are dissimilar in size, but construct and paint them as the others. Paint the insides black, and also the deck below the skylights. Mark their fore ends inside, as the skylights are not reversible. Add the photo-etched grilles (See Step 59).



### 69. Rudderhead housing **Sheets 10, 11 & 12**

This shelters the gears linking wheel and rudder. Make it up as illustrated. Cut a piece of 1/8" dowel 1/2" long for the rudderhead itself. Set up the housing and drop the dowel through to the deck (below left). Paint and glue the dowel in place. Glue on the two card side pieces from **Sheet CCC, 5** (below right).



Bend the cover by soaking the upper side with dilute white glue, then curve it around a plastic wrapped dowel covered using elastic bands and let it dry. This will set the curve.



Paint the housing white and cover gray. Add the cover and then the steering wheel, painted brown.

### 70. Compass pedestal

The compass pedestal casting can be sprayed gold to resemble brass and the compass card inside white. Install the compass facing the steering wheel. Make sure that the pedestal is vertical.

### 71. Bulwark rails **Sheet 19**

Carefully remove these pieces. The fore pieces will need to be notched on the inner edges for the catheads. Carefully mark the position of these notches. The notches will be about one-third the width of the rail, as seen below. File them out.

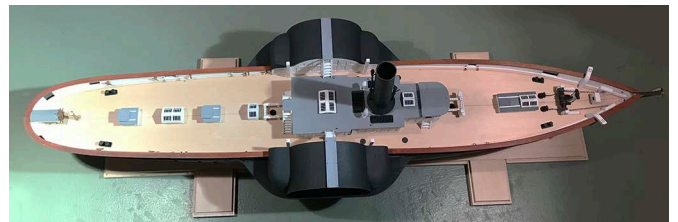


The ends of the rail are a little long to allow for adjustment; trim these to fit your model.

Once satisfied with their fit, carefully sand the long edges to a half-round section.

The rails may have been of varnished wood or painted white; stain or paint the tops and edges before installing them. I use white glue to attach the rails, which allows a little time for adjusting their fit.

The aft part of the rail on each side is in two sections. The joint between them is called a scarph joint. Clean the mating surfaces of char and glue them on a flat surface over a piece of plastic wrap. Check for fit and process as before. The aft rails may need slight bending and trimming at both ends to fit your own model. Try to get a neat joint at the stern. Your model will now have a much more finished look. However, there's still a way to go!



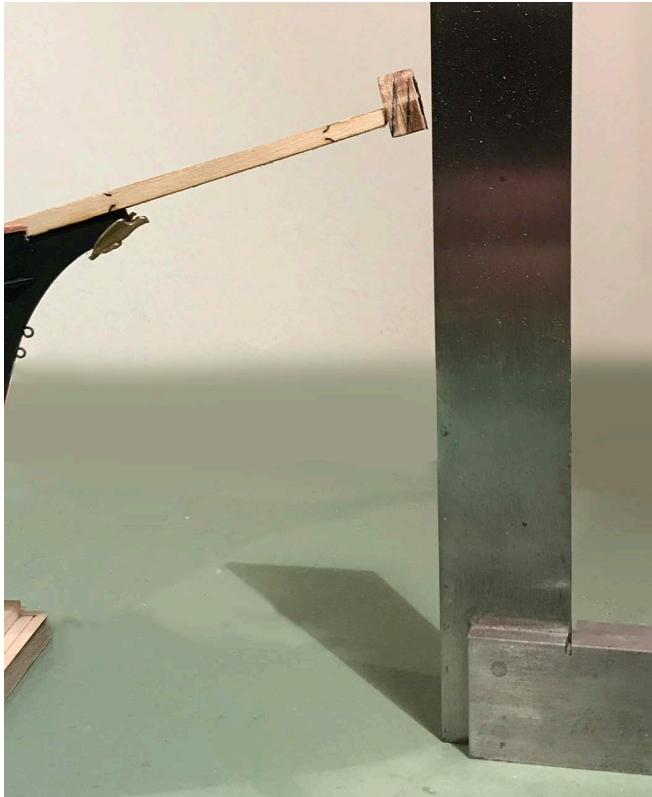
### 72. Bowsprit & bowsprit cap **Sheets 1 & 13**

It is time to make and fit the bowsprit and its cap. First clean char off the pieces. Narrow the tenon on the inner end of the bowsprit a little until it slides into the mortise on the step. Sand the gap in the bulwark rails at the bow until the bowsprit just slides through and is parallel to the keel.

Narrow the outboard tenon to fit the square mortise in the cap.

The cap is thicker than its final size. The front and rear faces will need to be pared so that, when seen from the side, the cap stands vertically and the hole for the jibboom will be parallel to the bowsprit. Study the photo (top of the next page) to understand this.

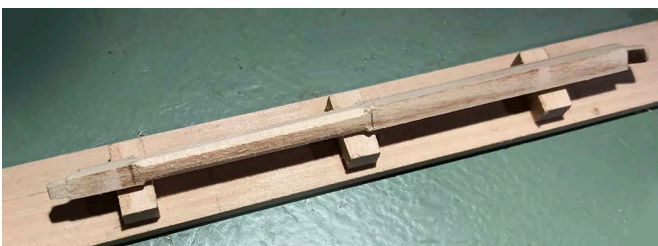




Initial shaping may be done with a chisel, then sand the surfaces smooth. An extra cap is provided in case the first attempt goes awry. Drill a shallow  $\frac{1}{16}$ " hole into the underside of the cap in the recess.



The inboard section of the bowsprit is square. Outboard it is round, then square again at its outer end. First mark the limits of the square sections on the top and bottom surfaces. Taper sides of the spar to match the side view. Next carefully sand the central section octagonal. If you built either the lobster smack or Norwegian pram, you will already have a  $45^\circ$  jig similar to the one shown below. Next, carefully sand the section to round. Don't overdo it and end up with a skinny spar! If you have not done this before, a spare bowsprit is provided for practice.



When shaped and smoothed, glue on the bowsprit cap. Add two card bands as shown on the rigging plan. Make the joints on the underside of the spar. Drill #72 holes, then add two medium eyebolts (MS 0428). Add another eyebolt to each side of the bowsprit cap. Prime and paint the assembly white, then install it.



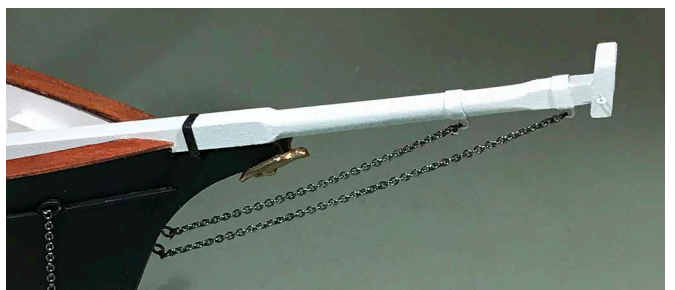
### 73. Gammoning strap

An iron strap replaced the earlier rope that held the bowsprit down at the bow. Use a card strip, painted black, to represent this (see Plan Sheet 1 and below).



### 74. Bobstays

There are two chain bobstays below the bowsprit. The easiest way to attach the chain to the eyebolts is using black thread. Tie a length of chain under the bowsprit first. Measure the length to the bow and cut the chain when taut. Attach the chain end to the bow eyebolt, again using thread. Fix the knots with dilute white glue and trim when dry. Repeat for the second bobstay. Any slight sag will be taken up by other rigging later.

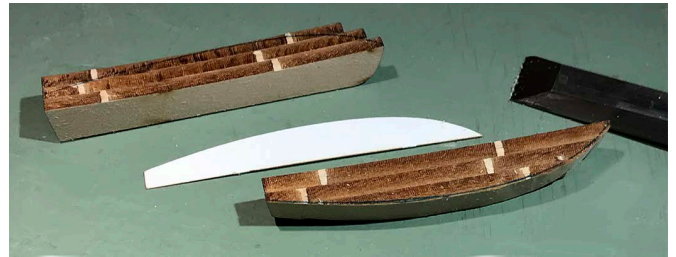
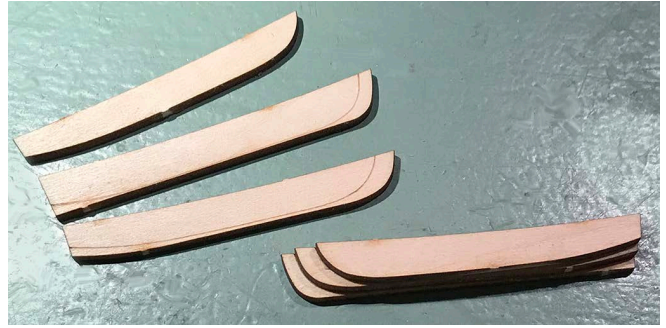


## 75. The bow fairlead

Sheet 7

*Handle this piece very carefully; it is fragile.*

A spare is provided in case of breakage. It takes a sharp bend at its center on the bulwark rail. Soak the area of the bend *thoroughly*. When really flexible, curve the piece as shown around a piece of 1/8" dowel, then allow to dry in a set-up similar to that pictured below. I used brass weights here.



Prime and then paint. The fairlead was probably black. Gently sand the lower edges flat on fine sandpaper. Carefully fit the fairlead around the top of the bowsprit. Do this upside-down using a fine file. Don't be tempted to use a blade. If you do, the wood will be sure to split. Trim the ends at the catheads if needed so that the fairlead sits flat on the rail. Glue it in place.



## 76. Ship's boats

Sheets 11 & 19

There are two boats to be built. Remove one boat at a time from Sheet 11. Without removing char, glue up the three pieces for each half of the boat (top, next column). Make sure the aft ends of the pieces are in alignment. Sand off char from the upper and stern surfaces.

Take a pattern from **Card Sheet CC, 2** and transfer this to the top of each half (above). Do the same with the transom pattern. Using a wood bench stop, chisel off the bulk of the waste. Sand the half hulls until char is almost all gone (below). The aft end of the boat has to be hollowed. Use a round sanding stick and file.



Prepare the keel piece by sanding the top edge at an angle on each side to form a central ridge. Add two small eyebolts (MS 0429) in the slots at the top of the spine (right).

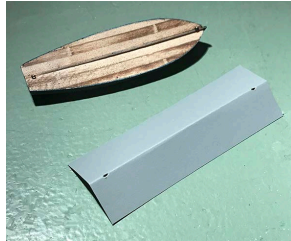


Glue each side to the central keel piece, port side first. Note that the stem end is higher than the top of the half-hulls. Check that the hull surfaces are smooth

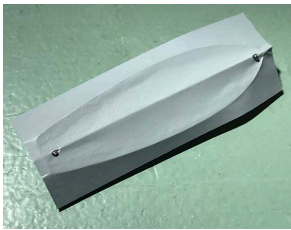
and that there are no flat areas, particularly near the transom. Any unevenness will show up after priming. Fill and smooth as necessary. Don't paint the top of the boat; it will be covered. Paint the hulls black.



Boat covers can be of regular bond paper. Spray one side with gray primer. Cut a piece about 1" x 3" and fold it in the middle along the longer dimension. Mark and cut two small holes on the fold for the eyebolts to project through. Place the cover over the boat.



Run a line of white glue along the top of one side of the boat and glue the paper down to the top edge of the boat. Repeat on the other side. Trim the paper about 1/16" outside the edge of the boat. Cut straight across at the bow and diagonally at the aft corners. Bend and glue the edges down.



Boats and their davits will be rigged later, as the davits are rather fragile.

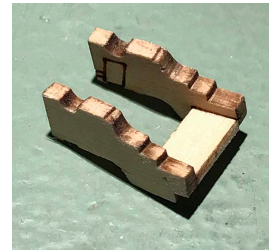
### 77. Gun carriages

**Sheets 9, 10, 11 & 12**

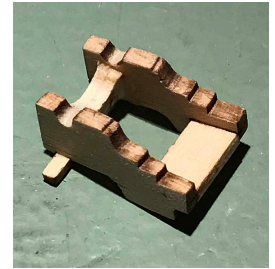
Treat each of these as a separate mini-models. Note that one carriage, for the Parrott rifle, is narrower than the other three. Free and clean up the parts for one carriage at a time. See Plan Sheet 1.

Glue the bed to one cheek (side), wide edge facing the rear, making sure it is attached at right angles. When

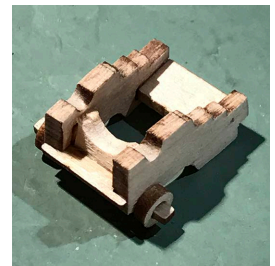
set, glue on the other cheek (set, glue on the other cheek at right). Turn upside down to add the axletree, then the transom at the angle indicated (next down, right). Next, add the apron piece at the front of the carriage, then the wheels (third photo down, right).



The Marsilly carriage design has the two steps on the carriage quarter-rounded off as shown below right. Use a fine sanding stick or safe edged file (fourth photo down).



The carriages were probably dark brown or black. There are three medium eyebolts on each carriage; one either side in the pre-drilled holes and the third in the middle of the bed at the rear that you will need to drill with a #75 bit. (Some carriages had an additional bolt on each side large enough to feed the breeching rope through).



### 78. Guns and detailing

Clean and remove any casting flash from the three Dahlgren guns and the Parrott rifle. Drill the holes for the breeching rope through the pommelions at the rear of the guns with a #55 bit. Prime and then paint the guns dull black.

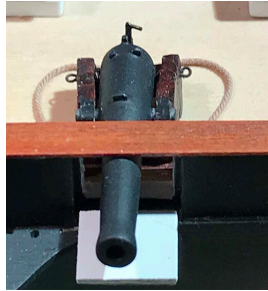
Epoxy the guns, level, on their carriages. Rest the front ends of the barrels on a piece of scrap wood until the epoxy has set (right). Next add the capsquares.



These are the brackets that hold the gun to the carriage. Use strips of card left over from the funnel bands, ¼" long and painted black. Form them over the trunnions and glue them down.



**Optional detail:** There was an elevating screw at the rear of each gun. At this small scale use wire to simulate the screw as shown. I used ⅓" diameter brass wire and a piece of bristle, epoxied on top. These were then painted black.



## 79. Port lids

Sheet 7

Sand all edges smooth, prime and paint one side black. The edges and other side are white. As there is no bulwark above the ports, just the rail, the lids hinge down. There would be a ring bolt and line attached to haul the lid up again, but one can omit this detail for a cleaner look. As the lids are shown open, the hinges may also be omitted.

Scrape a little paint off the molding under the ports and the edges of the lids for better glue adhesion.



## 80. Installing the guns

These may either be shown inboard or run out. In either case the breeching ropes should be added. Cut about 6" lengths of 0.6 mm beige line (MSI242). Either white glue or cyano the ends to stiffen them and thread one end of each piece through the hole in the pommelion. Wet the center of the line and let this dry. Wet each leg of the line about ¼" beyond the gun muzzle and bend it as shown. This is the stretched



out length of the breeching when the gun is inboard.

**Hint 1:** When working with rope, always glue ends before cutting or threading line through blocks or ring bolts.

**Hint 2:** Wet the line and 'fix' it in place using either dilute white glue or acrylic matte medium. Glue can be softened using water to reposition a line. Matte medium is waterproof and can only be dissolved using rubbing alcohol. Each has its use. Sometimes you don't want something coming adrift when wetting it.

Glue the gun in position. Thread the ends of the line through the lower, larger ring bolts in the bulwarks. Secure the lines to the rings with a spot of glue. When dry, cut the loose end short to within ¼" of the ring and glue the line end to itself. Repeat on the opposite side. *This is easier to do before gluing the eyebolts into the bulwarks (see Step 66).*

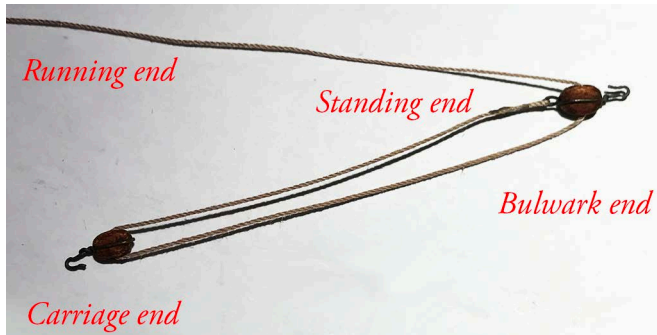
Once the glue has set, wet the line on either side of the gun and drape it in a natural curve. Allow it to dry in position.



**Superdetail:** There is also a tackle on each side of the gun for hauling it out. At this scale it is very small. I chose to omit this. However, if you wish to add it, use two 2 mm single blocks and very fine line. I recommend MSBB1020 from Model Expo. You will need 16 blocks and there are 20 per pack.

The blocks are *stropped* (wrapped around) with wire hooks, as shown. One block of the pair has a small loop at the opposite end to the hook for attaching the standing end of the line to (at right). I used thin blackened copper wire for these examples.





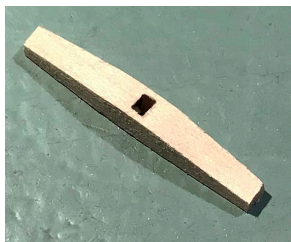
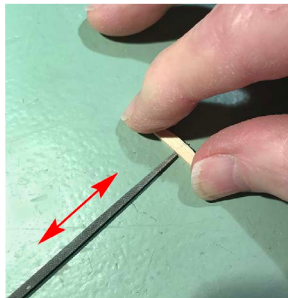
Attach the standing end of the line through the loop, then take it through the other block, and back through the first block again (above).

The standing end block hooks into the small eyebolt in the bulwark and the other to the eyebolt on the carriage. Coil the running end of the line neatly on the deck on each side of the gun (see Step 138).

### 81. Anchors and stocks

### Sheet 11

Prime and paint the two anchors (WP8001) black. These need to have stocks added. Remove these from Sheet 11 and clean them up. First a hole is bored through the center of the stock with a #55 bit. This hole needs to be widened into a rectangle, the slot going *across* the stock. (The stock mounts at right angles to the arms.) Use a square Swiss file as shown, turning the stock over every few strokes until a sliding fit is obtained.



Next taper both sides of the stocks until the ends are square in section. Paint the stocks dark brown or black.

Open the holes for the anchor rings slightly with a broach. Don't overdo it, as there is very little extra metal here! Take two large rings (WP 0953) and open them using round-nosed pliers. Thread them onto the anchors and squeeze them gently shut using parallel pliers. Paint them black.

### 82. Rigging the anchors

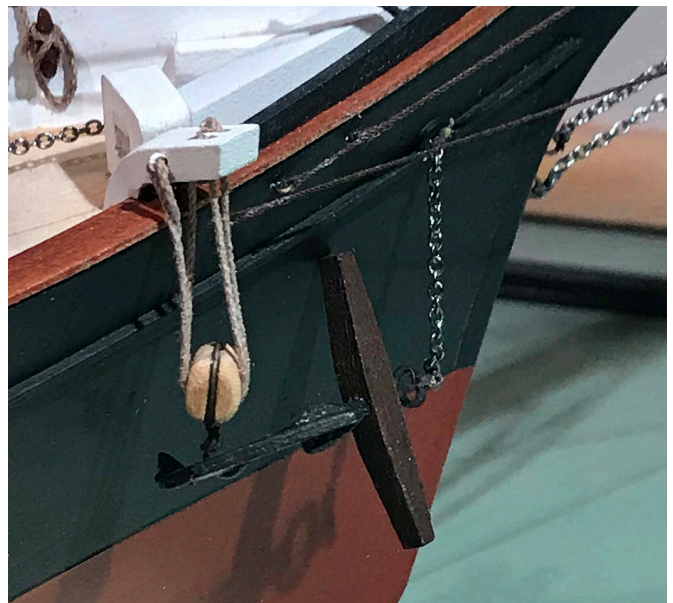
There are two parts to this. First is securing the anchors to their chains. In the real ship a shackle was used, but at this scale use black thread between the last link in the chain and the anchor ring.

The other part is to suspend the anchor from the cathead. There is a specialized block and tackle for this. The double block is stropped with a hook large enough to 'catch' the shank of the anchor. Use 7 mm double blocks (MS 0311X) and brass wire to add strops and hooks (above). Make sure that the holes in the block are at the hook end.



Drill for a small eyebolt (MS 0428) in the aft side of each cathead and attach these (photo below). Paint them white.

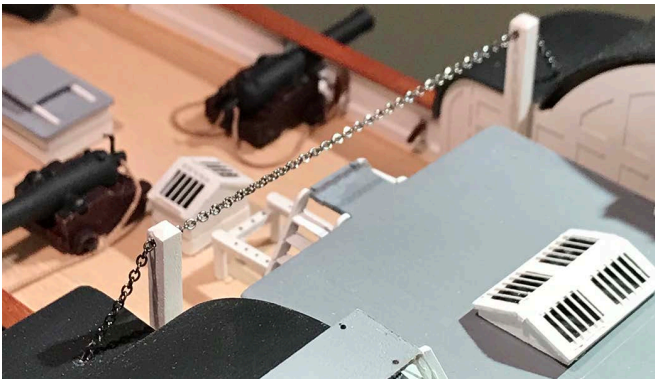
Take a length of 0.2 mm beige line (MS 1241) and attach one end to the cathead eyebolt. Stiffen the ends of the line first! Take the line down through the block, up through the aft sheave in the cathead (use a broach to enlarge the holes if necessary) down again, through the second sheave in the block, then up once more through the fore sheave in the cathead. Weigh the hook down with clips or other means, then wet and stiffen the line using dilute matte medium (below).



When dry, secure the running end of the line to the cleat by the cathead. Hook on the anchor as shown (previous page), securing it with glue at the hook and where it rests against the ship's side. This shows the anchors in the process of being "catted"; being raised in order to stow.

### 83. Chain trusses

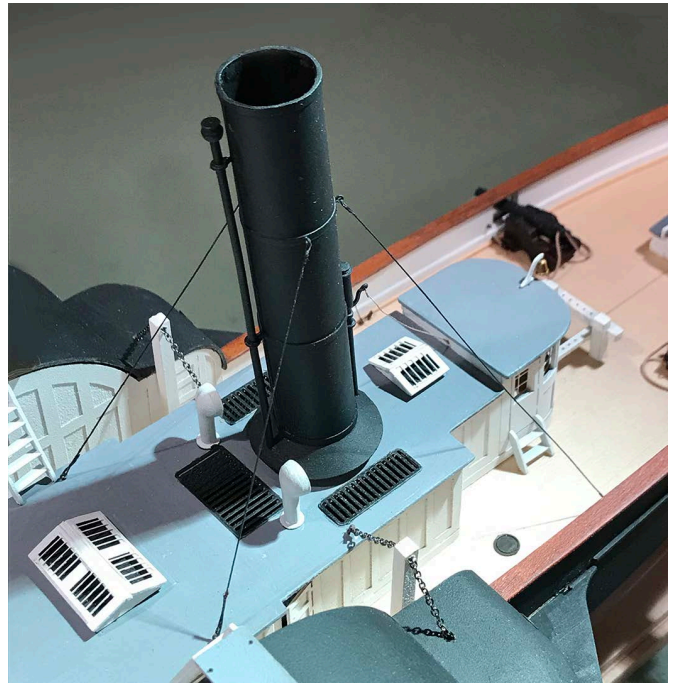
These support the sponsons from above. Drill holes in the tops of the water closets in line with the king posts to a #53 size bit (see Plan Sheet 1). For the aft truss feed a length of chain through one king post using the wire hook that you made earlier (Step 47). Push the end of the chain down through the hole and epoxy or cyano in place. Feed the other end of the chain through the opposite king post and down into the other hole. Glue in place without allowing any sag in the chain.



The fore chains are in two parts, to avoid the funnel. Their inboard ends attach to the ring bolts in the top of the deck house. The outboard ends are fastened similarly to the aft chain (photo top of next column).

### 84. Funnel support guys

As the funnel is so tall, it is supported by four guy chains or wire ropes. I used quilting thread painted dark gray to represent wire. Glue a small eyebolt in the deck on each side opposite the pilot house in the smaller holes. Secure these as usual. Attach the two forward guys as shown, then the two aft ones from the funnel to the eyebolts on the top of the deck house close to the foot of the steps. Make sure that these lines are taut and straight (photo top of next column).



### 85. Ship's bell

Handle this item carefully as it is very delicate. Prime, then paint the bracket white and the bell gold. Install on the pilot house roof as shown.



### 86. Fore and main chains and deadeyes

The chain plates are on the photo-etched sheet. Carefully remove these. Either paint them or chemically blacken them. There are a total of 22 needed for the model, but extras are provided.

Place a deadeye (MS 0339) flat on the work surface and gently ease the loop of the chain over it until it lies in the groove. Gently squeeze the sides of the loop together using parallel pliers. To



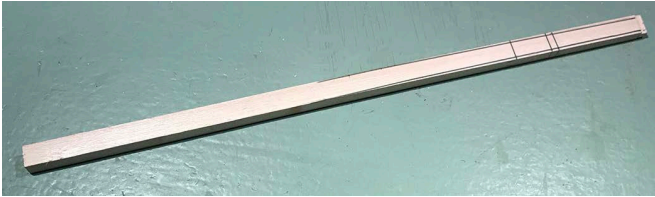
further secure things, epoxy or cyano across the gap and over the ends of the loop. Make sure the deadeye is well secured and oriented as shown in the photo. You do not want any coming loose while rigging!

Put the chains and deadeyes to one side until the two lower masts have been made. These are needed to determine the angles of the chains.

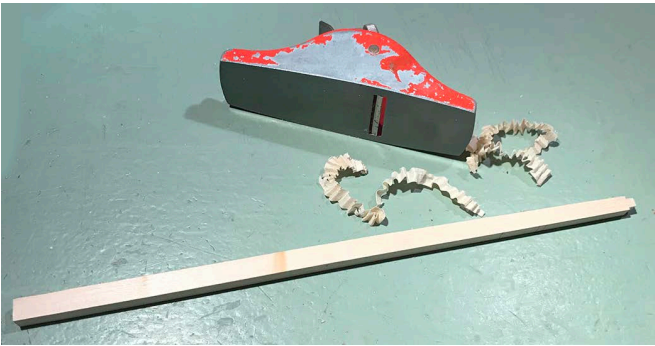
### 87. Lower masts

Sheet 13

Once freed from the sheet, clean off the char on the sides of the masts. Transfer the marks from the top to the other three sides of the spar. Also mark the profile of the mast onto one cleaned side (photo below). The curves can be drawn by using the shape of the gap on the carrier sheet as a guide.



Use a mini plane or chisel, then sandpaper, reduce the two sides until the spar is four square along its length (photograph below).



Mark out for eight square from the lower end to the first marks and shape the mast on your 45° jig. (If this operation is unfamiliar to you, read the Muscongus Bay lobster smack instructions, pages 31-32, Step 45, Mast making.) Finish rounding off with sandpaper in the usual way.

The upper section of the mast is square in section. Cut the tenon on the top to a square cross-section for the mast cap. Repeat for the second mast.

### 88. Trestle and cross trees

Sheets 9 & 10

Carefully remove and clean these pieces. Be careful, as the parts are fragile across the grain of the wood. Spares are provided. Glue the trestle trees to the sides of their masts, taking care that the notches are in line with the mast head and that they are both parallel

to each other and angled according to the rigging plan (Plan Sheet 2).

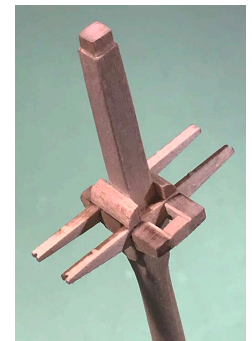


The lower part of the cross trees are cut away in a concave curve. Use files and sandpaper to do this, to achieve the shape shown (right). Round off any sharp edges. Test fit the mast cap, Sheet 9, then put it away in a safe place.



Fit the cross trees, making sure that they are parallel to each other and at right angles to the mast. Adjust the notches if needed. Glue in and clean up.

Notch the outboard end of each cross tree. Use a round file to make a vertical notch for the futtock shrouds, Step 113 (right).



There are several additional pieces required to complete the mastheads. First are *bolsters* that allow the shrouds to bend less sharply around the mast head. Take a length of 1/8" square stock and shape it to a quarter round section. Cut 5/16" lengths and glue as shown on top of the trestle trees (above right).

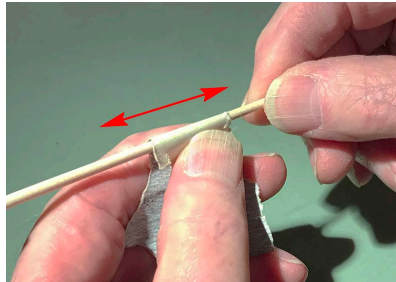
Next reduce the gap at the front of the mast head so that the topmast fits snugly. The hole remaining should be 1/8" square. First glue two 1/32" thick pieces of scrap to the inner sides of the trestle trees. Reduce these if needed until the gap is 1/8" wide. Glue a piece of 1/8" square stock across the front of the gap to close it in. Sand the front face flush (above right).

### 89. Topmasts

Sheet 3

As these will be needed shortly for marking out backstays on the hull, they should be made now.

Clean them of char and taper the flat sides as you did for the lower masts. As they are much thinner, it is hard to eight-square them in the jig. Note that their lower ends remain four square. Gently sand the diagonal faces with the spar flat on your bench. Round off with sanding sticks and finally with a loop of sandpaper as shown.



Place the topmasts over the rigging plan (Plan Sheet 2) and mark where the stays attach. To make the stops for these, use card strip left over from the deck houses. Glue the end of a length at right angles to the spar and let it set (photograph below, top). Dampen the outer side of strip, then glue and roll it on to the mast and trim at the overlap (below bottom).



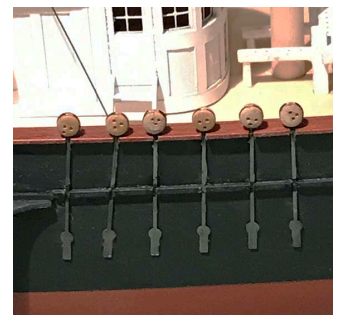
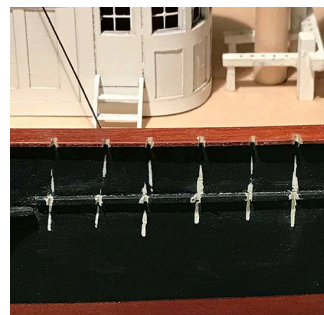
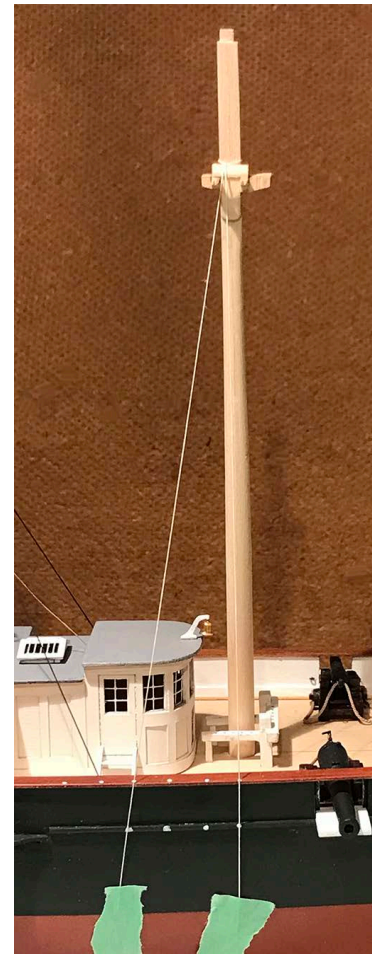
### 90. Setting up the lower deadeyes and chains

Take a length of thread and tie it around the fore lower mast head above the trestle trees. The first shroud is opposite the mast (photo top of next column). Mark this on the rail with a dot of white paint or in pencil on a narrow strip of masking tape. Space the other shrouds at  $\frac{5}{16}$ " intervals. There are four shrouds and two backstays on the fore mast, three shrouds and two backstays for the main mast.

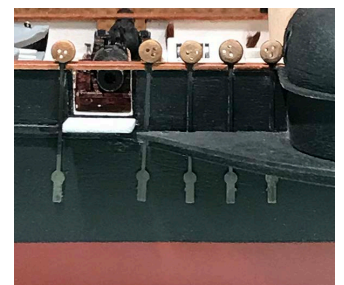
Slide the mast cap over the topmast from the top and push a small piece of  $\frac{1}{32}$ " square wood through the slot at the foot of the topmast. Place the foot of the topmast in the trestletrees and push the cap into place.

Using the thread, mark the rail where the thread crosses it as well. With other lengths of thread, repeat this for the two backstays.

Once you are sure of the layout, cut slots in the rail and rubbing strip just wide enough for the chain straps to sit in. Carefully use a narrow Swiss file for this. At this point the work may look a little untidy; scrapes in the paint show that the slots are deep enough for the chain to sit against the ship's side. Epoxy or cyano the chains in position with the deadeyes at rail level. Touch up paintwork where needed.



For the main mast, there are four slots in the sponson for the three shrouds and one backstay. Locate the second backstay just aft and clear of the gun port (photograph at right).





## 91. Completing the masts

Sheet 7

Remove the masts from the ship and disassemble them. Add the trucks - the buttons at the tops of the topmasts. As these are delicate, extras are provided.

**Hint:** One way of making small basswood parts more sturdy is to first soak with them with diluted white glue and let them dry thoroughly before trying to free and fit them. Alternatively, use small beads instead.

**Important!** The trucks must be small enough to pass through the mast caps. As the lower end of a topmast is square, the topmast has to pass through the hole in the cap from below. Otherwise, fit the truck *after* the topmast is threaded through. **Do not glue the mast caps on yet!**

Masts can be painted similarly to the rails, or left in natural wood if you prefer. If painting, prime these first. The mast tops and 'doublings' are white, so mask them off to paint them. The finished masts should look like the photograph.



## 92. Boom saddle

Sheet 9

The main mast has a boom saddle fitted. Clean this up and paint it together with the masts; but do not attach it until the mast hoops (see below) are fitted. This underlines the importance of thinking ahead when building a model!

## 92. Mast hoops

Card Sheet CC

The main mast and main topmast have a series of wooden hoops loosely threaded on them for the fore and aft sails. There are nine hoops needed for the lower mast **CC, 3** and six for the topmast **CC, 4**.

Prepare a piece of  $\frac{5}{16}$ " dowel that has either been

covered with plastic wrap or well waxed. Nine lower mast hoop card strips are needed. Wet a strip first, then apply matte medium, wrap it around the dowel and let dry thoroughly. (If unsure of the technique, practice with leftover funnel bands first.)

*Prime using spray primer.*

This step is important because, with acrylic paint, water will either soften or undo the hoops. Thread the hoops on a toothpick held horizontally with clips to prime, then paint. I used Deck House Buff (MS 4816), securing the hoops to a piece of masking tape. Let them dry, then turn them over to paint the other edges.



Repeat this process for six topmast hoops around a piece of  $\frac{3}{16}$ " dowel.

Thread the lower mast hoops on the main mast, then glue the saddle to the aft side of the mast with its upper surface  $\frac{3}{4}$ " above the deck (right). The topmast hoops can be slipped over the masthead later.



## 93. The yards

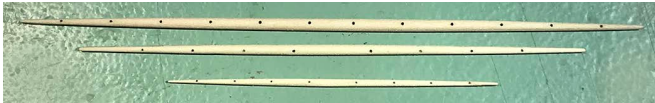
Sheets 3 & 20

This is a good time to complete the preparation of the spars. There are three yards, jibboom and striker. Shape these as you did the masts. As these spars are quite delicate, particularly towards the yard arms (the ends), handle them gently! Spares are provided, just in case.

While the yards are still square, drill a #75 hole in the center at right angles to the holes for the jackstay eye-bolts (photo on next page). A piece of wire here will assist later when hanging the yards.



Note that the topgallant yard is a little thicker than scale at the yardarms for strength. If you can thin the ends a little more, it will improve its appearance. Take your time in shaping them nicely.



#### 94. Jibboom, gaff and boom Sheets 3 & 20

The jibboom is straightforward, without a square section. The inner two thirds are not tapered. Make sure it will slip through the bowsprit cap. There are two stops near the outer end (Plan Sheet 2).

Leave a small square section on the inner ends of the gaff and boom where the jaws will fit. Round off the rest of these two spars as usual, then glue the jaws on. Fill and sand any gap. Soften the corners and edges of the jaws. The inner surface of the gaff jaws are beveled, as it is at an angle to the mast. Use a half-round file (above).



#### 95. The striker Sheet 10

This is the small vertical spar below the bowsprit cap. It is quite fragile, so shape it carefully. There is a spare provided. The upper end fits into the slot and hole under the bowsprit cap. So that the striker sits vertically, angle the upper end to suit. The hole at the lower end is in the athwartships direction. A short piece of stiff wire is glued in (photo at right).



#### 96. Preparations for rigging

There are several #75 holes to be drilled in the masts and caps. The fore mast is first. To hang the yards, it is helpful to have wire pins securing them to the mast.

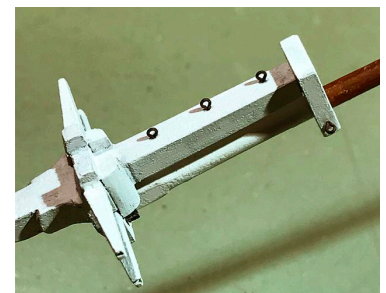
The lower yard is hung just below the hounds, which you painted white. Drill a hole in the front of the mast. *Refer to Plan Sheet 2 for this and the following.*

The topsail yard (when lowered) is just above the level of the cap, so drill a hole there. **Note:** If you plan to add sails, the yard will be raised to a level just below the first stop. Drill there instead.

The topgallant yard is just above the first stop, unless you add sails. In that case it is at a level just below the second stop. Drill where appropriate.

Both mast caps have a small eyebolt on each side near the fore end of the cap. Drill for these as well. **Do not glue the mast caps on yet!**

On the main mast, there are three small eyebolts on the aft side of the masthead for peak halliard blocks. These will be added in Step 99. Add another eyebolt, not shown, below the aft crosstrees (see Step 99).



Add small eyebolts painted black in all the drilled holes except the three on the fore side of the fore mast.

Add card stops on the yard arms, jibboom, gaff and boom according to the plan as for the masts (see Step 89). The yards should match your masts; natural wood or painted. Prime and paint now.

Drill and add another eyebolt on the top of the gaff jaws (right).



#### 97. Jackstays

These were a nineteenth century innovation. They are rails along the tops of the square yards for bending (attaching) the sails to.

First insert and glue small eyebolts (MSO429) in the holes along the main yard. Make sure that the eyes are at right angle to the yard. Next, take lengths of 24-gauge copper wire. Lightly sand using 240-grit. Straighten the pieces by rolling them between two flat hard surfaces with a little pressure. Repeat if necessary. Prime and paint black.

Thread pieces of wire along the yard through the eyebolts. There is a central gap (photograph below and see rigging plan). Secure in position using either cyano or black acrylic paint, filling any gaps in the loops of the eyes. Carefully touch up the paintwork where needed on the yard and jackstay. Repeat for the top-sail and topgallant yards.



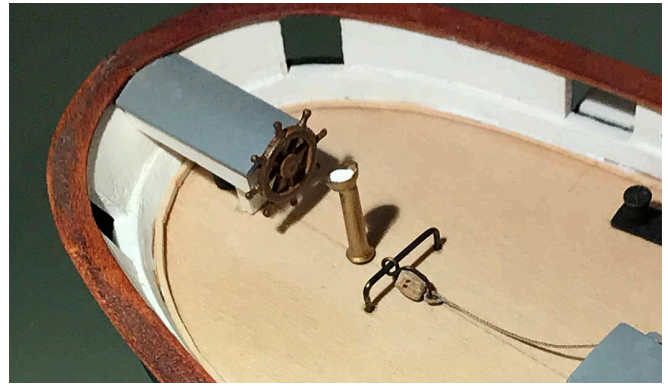
### 98. Traveler

This is the rod along which the main sheet block moves. (If you built either the lobster smack or pram dinghy model you will remember this feature). Bend a piece of 0.025" brass rod using parallel pliers with 1/2" between its legs.



Next prepare two double blocks by filing their grooves deeper at the corners (lower left). All blocks can also be improved by filing the corners off to a more oval shape as well, if you wish.

A copper wire strop is needed for the lower block. Form a loop at the bottom that is large enough to slide along the traveler (right). *Make sure that the holes in the block are at the loop end!* Take the strop around the block and twist the ends together, leaving a gap above the block big enough to thread a line through. Tie about a 9" length of thin beige line to the block and then glue the traveler in place.



Leave the line loose until later in the rigging process. The aft end of your model should now look similar to the above photograph.

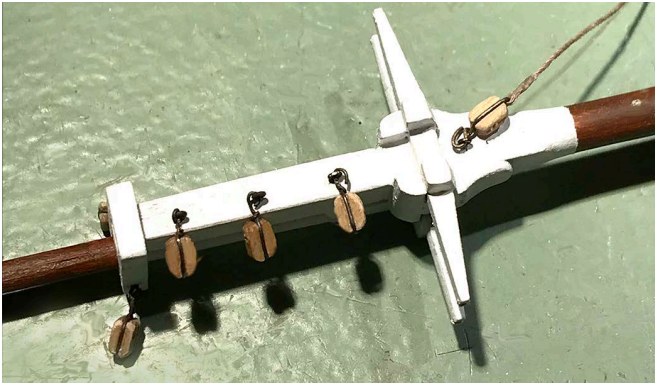
### 99. Blocks on the masts

It is simpler to do as much as possible off-model. First there are a number of single blocks to be stropped and attached to various eyebolts and yards.

Starting with the mainmast, there are three single 1/8" blocks (MSO302) hooked to the eyebolts in the aft side of the masthead. Strop these with wire, forming a hook. Make sure that the hole in the block is clear (use a broach for this) and that it is located at the hook end of the block (see photo below) Hook the block on and close up the hook so that the block does not fall off.



Next, a double 1/8" block (MSO308) is hooked to the eyebolt on each side of the mast cap. Prepare these in a similar way. Finally, a single 1/8" block is attached to an eyebolt on the aft side of the mast. Trap an 8" length of small beige line in the strop and glue the end back along itself (photograph overleaf and see Step 107).



On the fore mast all that are needed are two 1/8" double blocks hooked to the eyebolts on each side of the cap and an eyebolt on the aft side of the cap.

**Note:** Some of the rigging on this model is simplified. However, additional detail is described should you wish to add it.

**Superdetail:** If you wish to imitate full-size rigging, blocks are also needed on the fore topmast. A pair of 1/8" single blocks, one each side, should be attached just above the lower stop, *after the topmast is in place. Otherwise the topmast cannot be raised through the trees or lowered through the cap.* Another pair of single blocks, 3/32" size (MS0301), are added in the same way above the upper stops. **Full description in Step 127.**

### 100. Blocks on the yardarms

Adding these now will save trouble later on! A block is needed at each main yard arm just outside the stops. A single 1/8" block with a thin beige line attached is added here. Trap the end of the line under the strop and glue the end back on itself (right and see Step 107). The line should be about 20" long.

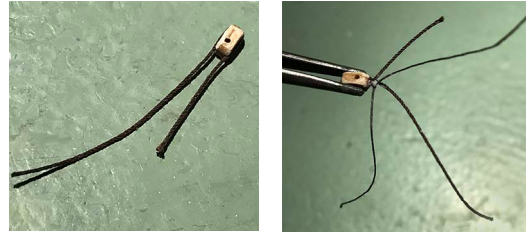


There are no blocks on the topsail or topgallant yards.

### 101. Blocks on the gaff

There are two 1/8" single blocks secured to the top of the gaff as indicated on the plan. A different stropping

technique is used here, using line instead of wire. A 'third hand' (see 'Tools' at the end of this booklet) is very helpful for this. Take a length of thin dark line about 3" long and glue it around the block so that the long ends are at the end with the hole (below left). Tie dark thread around the two legs of the line, knot, and secure with a dab of glue. Pull the legs apart (below right).



When set, trim the thread close (below left). Glue the legs of the line around the gaff securely, allow to set, then trim excess line off on the underside. A sharp chisel blade makes a neat joint (below right). If you find this too difficult, simply knot the two ends, glue and cut neatly when dry.



**Hints:** when trimming line, make sure that the glue has completely set first. This will prevent unraveling. White glue does not adhere well to a painted spar. Use acrylic matte medium instead here.

There is also another small 3/32" single block (MS0301) under the outer end of the gaff. Attach this in the same way.

### 102. Block on the boom

There is a double 1/8" block on the boom for the main sheet (see plan). This is suspended under the boom. Strop and attach as for the gaff blocks.

### 103. Parrals

At this scale beaded parrals are perhaps too difficult to

do well. I suggest plain rope ones instead. Enlarge the holes on each side of the boom and gaff jaws so that the heavier dark rope will pass through. Knot one end of about 3" of line and thread it through one jaw from the outside. Trim and secure with a dab of glue or matte medium (photo at right). Leave the other end loose for now. Repeat for the other spar.

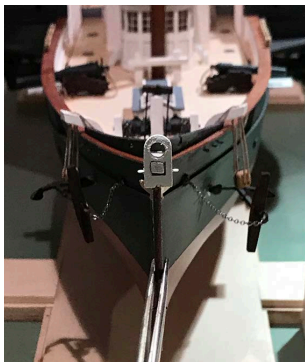


#### 104. Preparing to rig the bowsprit

There are three more small eyebolts needed each side of the bow as indicated on the plan. Drill these and fit the eyebolts, *but do not glue them in yet!* It will be easier to attach the lines to the eyebolts off the model and then glue them in. See Step 107 for example.

#### 105. The striker

This short vertical spar sits below the bowsprit cap (Step 95). Check the fit of the upper end into the shallow hole. Epoxy the striker in under the cap. Make sure that it is vertical as seen head on as well as from the side and the wire oriented athwartships. (photos below).



#### 106. Jibboom

Next slide the jibboom in and glue in place making sure it is in line with the bowsprit.

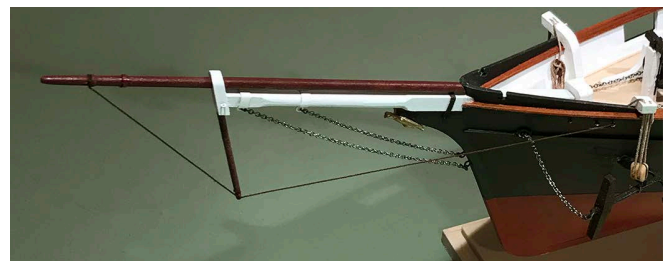
#### 107. Martingale stays

There are two supporting stays to the striker. One runs from the outer end of the jibboom to the port side aftermost bow eyebolt, the inner one from the jibboom to the starboard side. *All standing rigging is dark brown.*

Begin by threading one end of a length of thin dark line through the aft eyebolt off the model. Bend the line back on itself and glue it into an eye (photo). If you cannot manage this with a little practice, a small neat knot will do instead.



Next, glue the eyebolt into place. Run the line forward under the pin in the striker and up to the outer stop on the jibboom. Carefully tighten the line and secure it to the jibboom and trim when dry (photo below). Repeat on the opposite side of the model for the inner stay.



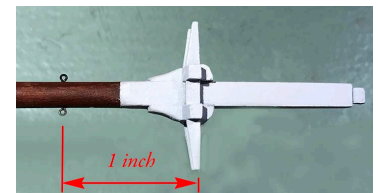
**Superdetail:** In reality the outer end of the stays and shrouds (see below) were eye-spliced around the spar, and led back to small deadeyes and laniards, like regular shrouds, to allow for adjustment. This is too small for most to do neatly at this scale.

#### 106. Bowsprit shrouds

There are two each side. The inner pair are attached to the eyebolts in the sides of the bowsprit cap. They run back to the foremost eyebolts at the bow. Attach the rope to the eyebolt at the bow first, then out to the cap. The outer pair run from the end of the jibboom to the middle eyebolts at the bow.

#### 107. Foremast shrouds

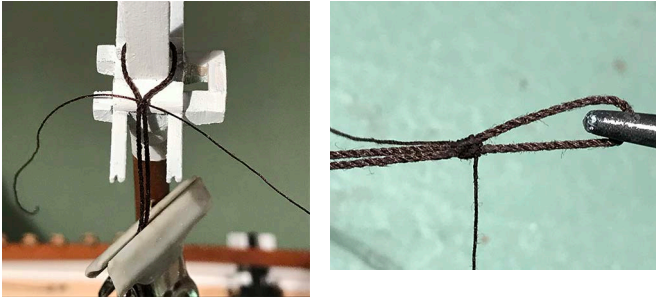
To prepare for the shrouds, first drill and drive a medium eyebolt (MS0434) on each side of the mast



1" below the trestletrees. These will be for the futtock shrouds (see Step 113). You could also put a narrow black card band around the mast first.

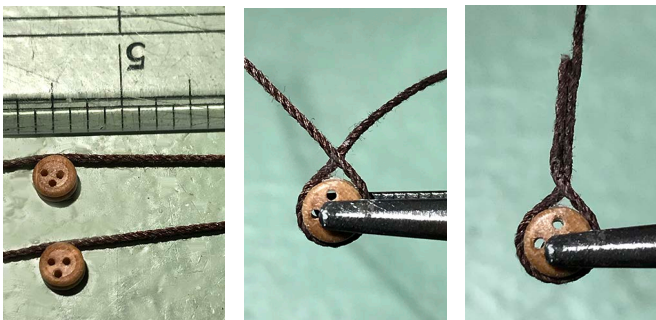
Use the heavier dark rope for the shrouds. The trick for neat shrouds is to get their length right. For the foremast each shroud pair should be 14" long before turning in the deadeyes.

Bend the shroud in half and loop it over the lower mast head. Tie a thread around on the two legs over the bolster. Make a secure knot and brush on dilute glue or matt medium (below left). Trim when set.



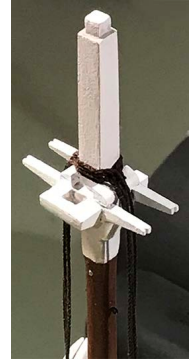
**Superdetail:** Alternatively, seize as was actually done. Wind thread around the shroud five or seven times, then take the long end up between the shrouds and make two turns around between them and tie off. Again, secure using matte medium or dilute white glue and trim (above right). 'Third hands' (see 'tools' on page 60) are very helpful for rigging.

Repeat for the other three shroud pairs, then lay them out on the workbench. Measure 5¼" from the loop of the shroud and spot-glue a deadeye to it on each leg (below left). Glue the shroud around the groove of the deadeye and cross the shroud over itself (below center). Spot glue the crossing, leaving a small triangular gap above the deadeye. When set, turn the free end up and glue it alongside itself and let dry. Trim about ¼" up from the deadeye and glue the end alongside as shown (below right). The trick is to allow adequate drying time for the glue at each step.



This gives the impression of the real thing. In reality there was a throat seizing at the cross-over and two round seizings above that kept the legs together. Unless you are a miniaturist or tie fishing flies, this is too difficult to do neatly at this scale.

Complete the four pairs of shrouds, then loop them over the masthead alternating starboard, port, starboard, port. Snug the loops down with the lashings on top of each other neatly with a little glue. Mold loops to shape if needed using a little water and brush (photo at right). The mast cap may now be glued on.



Next are the laniards. Knot one end of a 9" to 12" length of dark thread. Stiffen the free end with glue to act as a needle. Thread it through the upper deadeye from inboard on the side of the short shroud leg. Note that the short leg will face forward on one side of the ship and aft on the other.

Take the laniard down through the lower deadeye and up through the upper deadeye alternately. Do not let the line cross over itself. The last leg goes inboard for the moment. Carry this out for all the shrouds, making sure none are crossed over each other. Do not tighten any laniard yet! Photo below.



Progressively tighten laniards and shrouds on alternate sides so as not to pull the mast to one side. **Sight along the model from the bow to check this. Adjust as needed.** Take the end of the laniard from inboard

through the triangular gap above the upper deadeye. Secure it by wrapping it around the shroud several times, (use water on a brush to tame it) then half-hitch it to itself (photo at right).



Trim off excess lengths of laniard as shown after gluing it to prevent fraying. Try to align the upper row of deadeyes horizontally. They may twist around a little but this will be corrected shortly.

### 108. Mainmast shrouds

Drill and install an eyebolt on each side of the mast below the hounds (see Step 107). There are an odd number of shrouds on each side, so the arrangement is a little different. In the ship the first shroud was a single with a split splice over the masthead. Instead, make a shroud for each side with its own loop.

Loop a length of line around the mast head and tie thread around at the level of the bolster to starboard. Glue this and trim it. Leave the lower end of the shroud long for now. Repeat on the port side (right).



Make up two shroud pairs as for the foremast, but make the loop temporary and large enough to slip over the mast head and the blocks. The length to the deadeyes should be 5 3/8". Complete two pairs as usual, then slip on the starboard pair first. Slide the thread holding the loop up until it is at bolster level, then secure and trim it. You now have a reference for turning in the deadeye on the foremost shroud. This is a little trickier as it already on the model, but a 'third hand' will be a great help here (right).



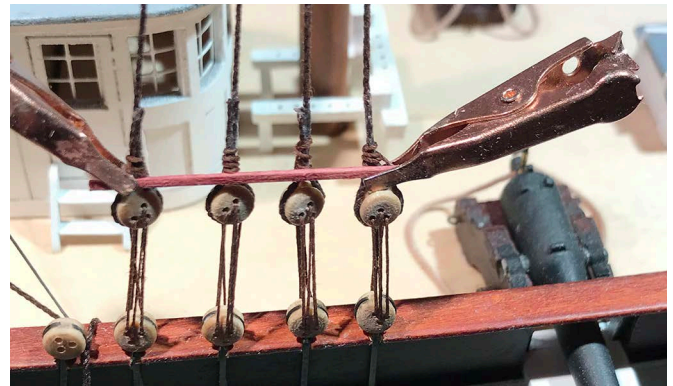
Repeat this procedure on the port side, then install the laniards as before.

### 109. Sheerpoles

These are iron rods or wood battens that cross the shrouds just above the deadeyes. They help prevent twisting of the shrouds and laniards. In a ship these are lashed on, but for the model simply glue them outside the shrouds.

Cut pieces of 1/32" square stock just a little longer than the shrouds are wide. Color or paint before adding them.

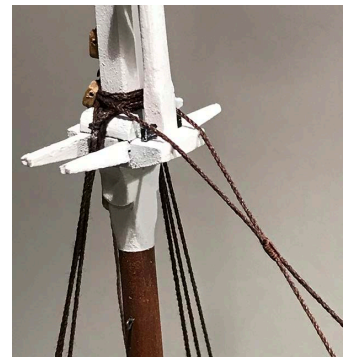
Make sure that you do not bow the shrouds in or out as you install the sheerpoles. Glue the two end shrouds first, then the inner ones (photo below).



### 110. Main stay

This is a double line from the main mast head to the larger eyebolts in the deck opposite the pilot house doors. Take about 22" of heavier line and double it. Take the line around the mast head over the shrouds and seize the two parts together about an inch forward of the trees (photo at right). If you cannot manage a seizing, a thread knotted around the stay will do.

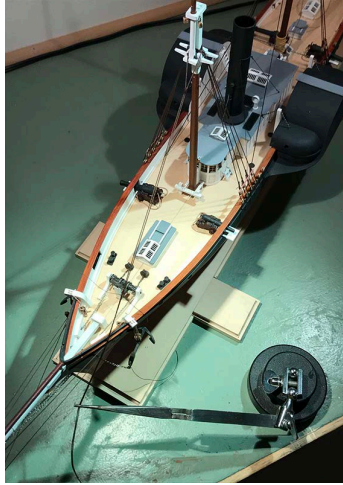
**Hint:** Hold the legs of the stay taut using a 'third hand' beside the model while seizing it.



Separate the legs forward and down and thread through the eyebolts on deck. Tension and add a seizing or knot to secure the ends. Trim off any excess line.

### 111. Fore stay

This is similar, except that the doubled line runs almost to the bow before splitting. The second seizing or knot should be applied above the bowsprit step. When seizing, keep the stay under tension using a third hand (photo at right).



Thread the two legs through the eyebolts inside the bow (don't cross them over) and adjust the tension on each leg using third hands until the stay is on the mid-line of the ship (photo below). Secure to the eyebolt using glue and create a false splice or knot the line. Trim to complete.



**Superdetail:** On the actual ship tension of the stays was adjusted by deadeyes and laniards at the deck, or possibly by turnbuckles.

### 112. Ratlines

Many model-makers avoid these. If you wish, you may too! However, I will show you a method that you may want to try. The biggest problem is 'hour-glassing', where the shrouds are pulled inward. This can be avoided by sequencing the order of rigging them.

Ratlines in this model are spaced a little more than 1/8" apart. Use a 4 mm spacing. Prepare a card with lines drawn horizontally this distance apart. The card should be about 5 1/2" tall to fit inside the mainmast shrouds. Make every fifth line bolder (below left).

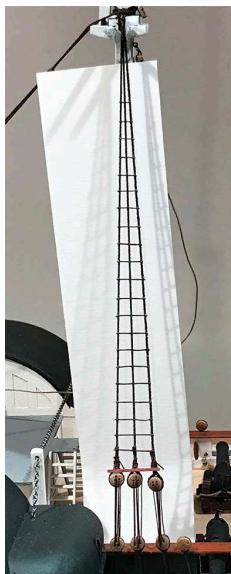


In reality ratlines were clove-hitched, but at this scale it would look very heavy-handed as well as take time to do well. Place the card behind the shrouds. Take a length of dark thread and wet it to straighten it. Using a small brush, place a spot of slightly diluted white glue across the shrouds, then place a length of thread across. Do this only at every fifth line (above center). This step prevents progressive narrowing of the shrouds that will happen if you do them in ascending sequence.

Next add every third ratline and finally all the remaining alternating ones (above right). Once you are used



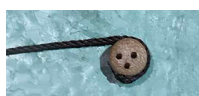
to the process, it takes very little time. Add ratlines to just above the eyebolts in the sides of the mast. Allow to dry completely before trimming off the excess thread (right). A pair of flush cutting nippers is ideal for this. (See 'Tools' at the end of this booklet on page 64.)



### 113. Futtock shrouds

These are the shrouds that angle outward below the trees. There are two each side at both mast-heads. These shrouds were usually of iron, but we will use brown line that has been stiffened with glue. Their lower ends attach to the eyes on each side below the hounds and their upper ends hold deadeyes for the topmast shrouds.

Begin with about a 3" length of line; cut-off pieces from the stays will do. Spot-glue a deadeye at its top (two holes up) near one end of the line (upper right). Glue the line around the deadeye and trim the short end so that it appears like the photo (middle right). Glue the long end of the line around and give it a sharp bend where the line meets (right).



The notches at the ends of the crosstrees may need filing out so that the shroud sits in them nicely. Glue in well and take the line down through the eye at the side of the mast. Add a clip and run dilute white glue along the line. Allow to dry.



Repeat for the second shroud. Glue both to the eyebolt and trim them short neatly. Add a couple of ratlines as shown (photo at right) to complete the futtock shrouds.



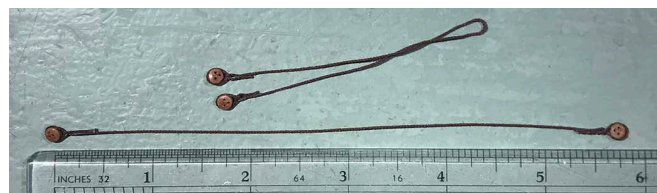
The lower standing rigging is now complete, so mount the topmasts and add the *fid*; the small metal retaining bar through the ends of the topmasts. Make these from  $\frac{1}{32}$ " by  $\frac{1}{16}$ " strip about  $\frac{1}{4}$ " long and painted black.

### 114. Topmast shrouds and ratlines

These are dealt with in the same way as for the lower shrouds. Two shroud pairs are needed for each mast. In this case small loops are needed to go around the topmast just above the lower stops. Temporarily tie this loop to get the length of the shrouds, allowing for turning in the upper deadeyes. The permanent seizing will be applied as you install the shrouds.

The main topmast shrouds are  $5\frac{7}{8}$ " long from dead-eye center to deadeye, not including extra for turning in (photo below). Again, the starboard pair go on first. Remember to use a long enough laniard. There are no ratlines on the main topmast shrouds.

**Hint:** Do not over-tighten the laniards! Topmasts are flexible and easily pulled out of line. If you are too enthusiastic, something is sure to give way.



The fore topmast shrouds measure  $6\frac{1}{4}$ " between deadeyes. There are ratlines up the fore topmast shrouds, as shown (photo overleaf). The highest ratline is about  $\frac{1}{2}$ " below the stop on the topmast. The deadeyes should be closer than in the photo overleaf.

### 115. Fore topmast backstays

There are two stays each side. Use the thinner line for these. They run from the lower and upper stops to the two remaining deadeyes aft of the fore shrouds.

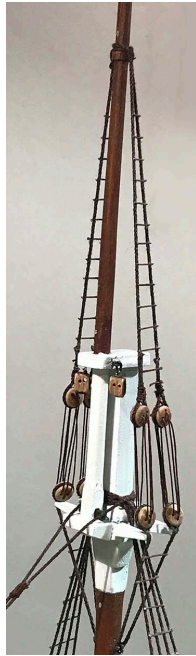
Take a piece of line longer than twice the length for the stay and turn a deadeye into one end. Loop the center of line over the stops in a half-hitch so that the line comes off the aft side of the mast. Reeve the laniard on the side with the deadeye and approximately tighten it to length.

Adjust the half hitch at the stop so that the stay is neither too tight or too loose. Measure the position of the deadeye on the other end of the line. Add and turn in the deadeye. Reeve the laniard and snug the stay only just taut. Backstays will tighten further when the fore stays are added.

### 116. Inner fore topmast stay

This, of thinner line, is doubled like the forestay. Begin with a double length of line and glue it around the underside of the bowsprit as shown. Either seize or knot a thread around above the jibboom, making sure it is far enough above so that the lines are clear of this spar.

Take the two lines up to the lower stop on the fore topmast. Make sure that they are not twisted and tie a half hitch behind the topmast. Add enough tension so that the backstays tighten without bowing the mast. Spot glue the half-hitch. Add another seizing or knot as shown. Bring the ends of the stay around the topmast, glue and trim.



*Superdetail:* In a ship, the lower end of this line attached to a heart (a heart-shaped wooden ring, not supplied) and another heart was attached to a rope collar around the bowsprit. The hearts were lashed together, providing adjustable tension to the stay.

### 117. Jib stay

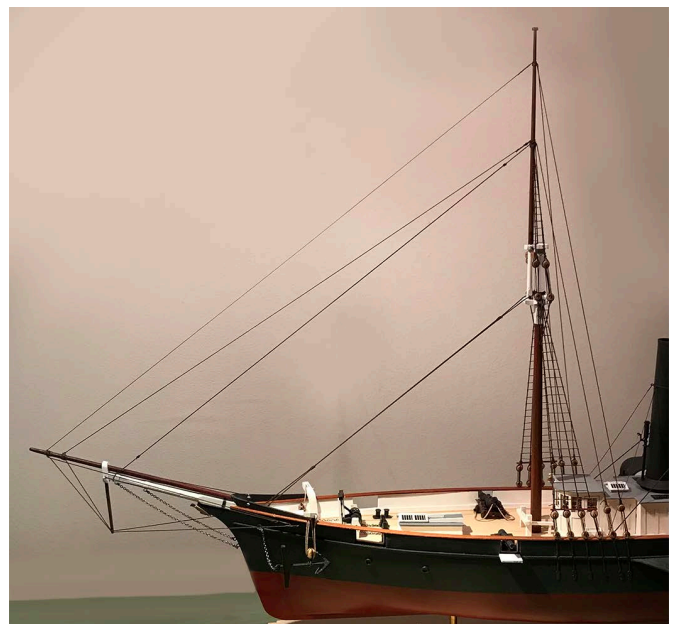
This line is single. Start with a length of thinner line and loop it above the inner stay. Either seize (preferred) or knot the line into an eye around the topmast at the lower stop. Take the line down to the inner stop on the jibboom. Hitch this around and adjust the tension - don't overdo it! Glue and trim (photo below).

*Superdetail:* In a ship, this line ran through a single block seized to the jibboom and then aft, though a hole in the fairlead at the bow and belayed inboard to a cleat on the bulwark (not supplied).

### 118. Outer fore topmast stay

This is a very thin line. I would use stout brown thread for this. It runs from the upper stop on the fore topmast to the outer stop on the jibboom. Deal with this as you did the jib stay (photograph below).

This completes standing rigging to the foremast.



### 119. Main topmast backstays

These are made in exactly the same way as those for the foremast (Step 115).

### 120. Main topmast stays

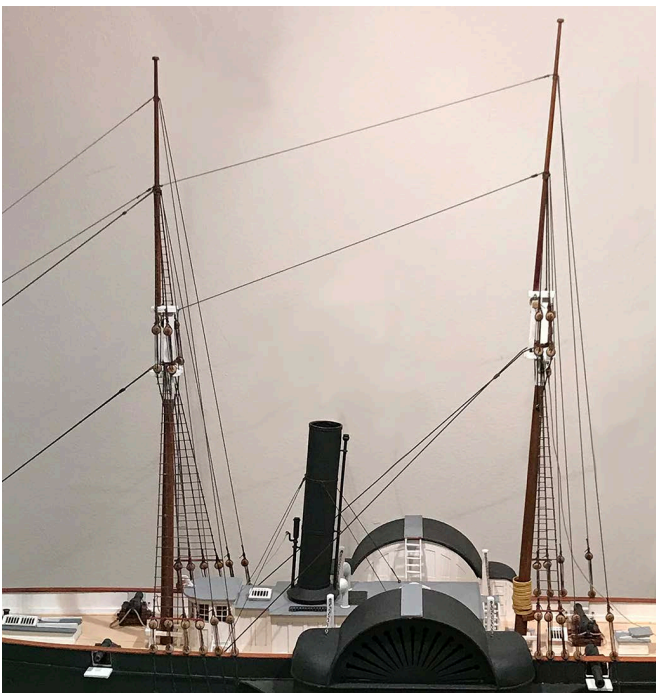
There are two stays. The lower one runs from the lower topmast stop to an eyebolt in the aft side of the foremast cap (photograph below).

**Superdetail:** In the ship a single block is hooked to the eyebolt in the aft side of the cap. The stay is reeved through it and taken down to the deck to belay at a pin in the bitts at the foot of the mast.

The upper stay runs from the upper topmast stop to the lower fore topmast stop (photograph below).

**Superdetail:** A single block is seized to the fore topmast and the line runs through this, then down to belay at the foremast bitts.

This completes all the standing rigging. Congratulations for getting to this point! It is surprising, even at model size, how stable the standing rigging makes the topmasts.



### 121. Main yard - footropes

All three yards have footropes attached. The dependent parts of these, the *stirrups*, may be of thin brown line. Stiffen some thin line using dilute white glue. Hold one end in the third hand and clip the other end so it hangs vertically while it sets.

Cut short lengths and attach them to the *back* of the yard using acrylic matte medium. When set, trim them to length. They should be cut about 1/4" below the bottom of the yard (photograph below).

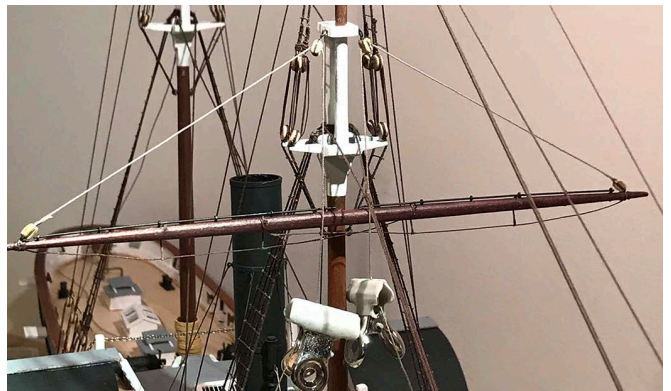


The footropes or *horses* are of thread. Carefully attach with acrylic medium and shape a natural drape in the ends, as shown below. Footropes are rather fussy items to add, so could be omitted if you are having too much trouble.

### 122. Fore lower yard lifts

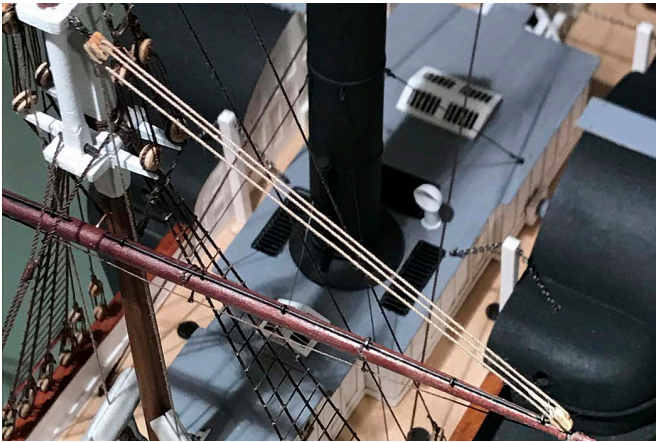
These lines and blocks are already attached to the yard arms. It is time to cross the yard. Glue a stout piece of wire into the back of the yard at its center. This will be glued into the corresponding hole in the mast. Note that the yard should be spaced about 1/8" in front of the mast, not up against it!

Reeve the lift lines through the upper side of the fore holes in the double blocks at the sides of the cap. Temporarily add clips to the line as shown below and trim the yard to horizontal. Either epoxy or cyano the mast, wire and yard.



**Note:** Lifts don't actually lift a yard; *jeers* (to be mentioned) do the heavy lifting. The lifts only trim the yard level as you have just done.

Reeve the rest of the line down through the single block from below up, then up to the double block, then down *behind* the yard (photo below). This sequence is important or the line will cross itself. A crossed or *fouled line* is always to be avoided. In the photo below, the lines do not cross. Do not tension or tie off the lines yet, though.

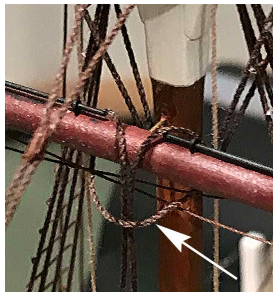


**Hint:** To make a line appear to run nicely through a block, soften it with a drop of water on a brush where it enters and exits the block.

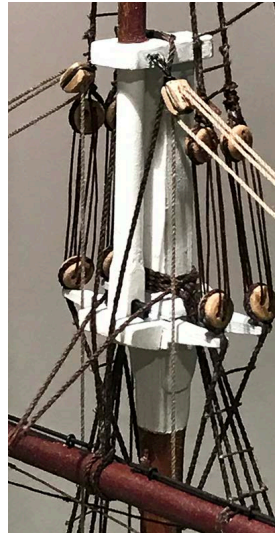
### 123. Fore lower yard slings

Two sets of lines raise and hold the yard in place. The *jeers* are the lines that raise the yard (which we will omit) and the *slings* hold it in place.

Take a 6" length of thicker dark line and, after bending it in half, bring it under the center of the yard from behind. Thread the ends over the yard and down through itself (right). Don't snag or trap footropes or any other line!



Next take the ends back up between the legs of the stay and in front of the trees, behind the double blocks, then across the top of the mast cap. Adjust



so that the turns around the yard are close to center and any slack in the line is taken up (photograph bottom of previous column). Glue the end of the lines across the top of the cap and, when set, trim any excess (left).

**Superdetail:** This is not exactly how the slings were rigged during this period. If you are interested in how it

was actually done as well as other rigging and also how the jeers were set up, see *The Young Officer's Sheet Anchor* by Darcy Lever, pages 33 to 36. You can find this in facsimile reprints at modest cost or on-line (url at the Library of Congress below):

<https://www.loc.gov/item/13013309/>

### 124. Fore lower yard braces

These are the lines that turn the yard. Each brace has two parts. There is a *pendant* attached to the yard arm that carries a single block. The standing (fixed) end of the line is attached to the main stay. It runs through the block, then back aft to belay at the aftermost cleat inside the bulwarks.

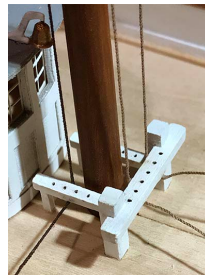
The two pendants are made from 2" to 2½" of thicker dark line. Form a small eye in one end just large enough to slip over the yard arm. Secure a ⅛" single block in a loop at the other end with a false splice or knot. Make sure the hole is at the eye end of the pendant. Slip the eye over the yard arm (photo at right). Repeat for the second pendant.





Tie one end of a 24" length of thicker beige running line to the main stay at about the same height as the fore yard. Knot and glue in place (photo above, A). Take the line forward, though the block on the pendant from above (B), back to the last cleat on the bulwark aft (C). Trim the line close to the knot on the stay. Do not tie off any running line permanently yet!

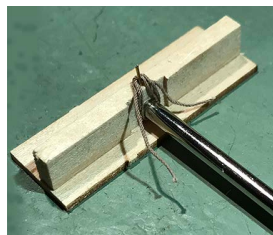
Adjust the tensions of lifts and braces so that the yard is level and square to the model. Take the ends of the lift lines down to the fore bitts. Run the line from inside the bitts to outside between pin positions, and fix it underneath using matte medium (right). When dry, trim off excess line.



If space for the finished model is an issue, you could turn the yards to an angle to reduce overall width of the model and its case.

### 125. Belaying running lines

To do this as on the real ship is very awkward at scale size. Once the lines are adjusted, glue them to the bitts and cut them short, as above. Create separate coils of line to place over the belaying pins. A simple jig from scrap such as shown here will do.

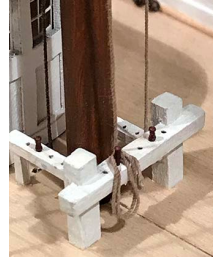


Take a length of line of the same type as the fall, wet it, then wind several turns around a piece of  $\frac{3}{16}$ " dowel. When dry, lay the coil on a plastic surface and use acrylic matte medium at one spot on the coil.

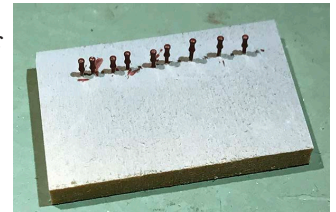
Lay the coil over the jig, the glued spot around the wire pin. Wet the coil where you want it to bend, put the end of a file in the loops and mold to shape (photo previous column). Allow it to dry (right).



Trim one end and hide it under the coil and the other so it hangs down naturally. Remove carefully and use matte medium around a belaying pin on the rail (photo at right).



**A note on belaying pins:** The bright pins supplied look lovely, but in a working ship they were never of polished brass! Drill some holes in scrap wood, spray prime the pins and paint them brown.



### 126. Topsail yard footropes

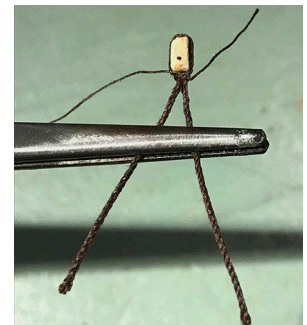
These are made as in Step 121, but have only one stirrup a side (see Plan Sheet 2).

### 127. Topsail yard lift blocks

These may be omitted if you wish.

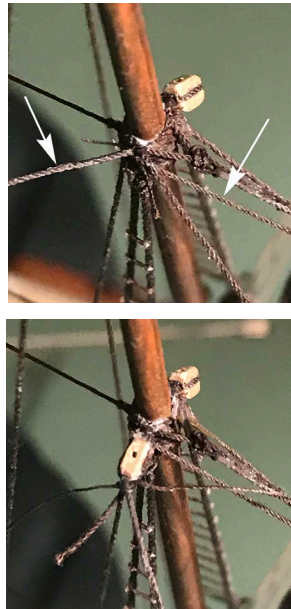
**Superdetail:** These lifts are simpler than those on the main yard as they attach directly to the yard arms by small eye splices. The lines go up to small single blocks on each side of the lower stops. Fit these small  $\frac{3}{32}$ " single blocks first. Remember to modify the grooves at the blocks' ends first (see Step 98).

Take a length of about 4" of thinner dark line and secure the first block at least 1½" from one end using glue and thread. The hole in the block should face the longer part of the line (photo at right). To snug



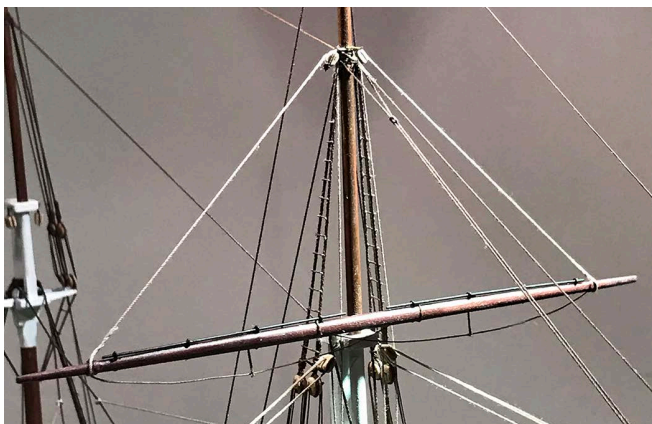
the thread tightly to the block, first half-hitch, then pull the thread ends. Pull the legs of the strop apart. This moves the thread tighter to the end of the block. Re-tighten the thread half-hitch and repeat the half-hitch on the other side of the strop legs, bringing them together again.

Take the legs around the mast and, with another thread, tie the legs together close to the mast. Open the legs (arrowed). Glue the end of the second block between the legs, hole towards the mast, and take them around the block. With another thread, tie the two legs tightly to the other end of the block and glue them (right). Let everything dry well before trimming off the excess.



### 128. Topsail yard lifts

Use thin beige line for these. First attach the yard to the mast with a wire pin about 1/8" in front. Make a small eye splice at one end of the line. Take this over the end of the yard arm. Take the line up though the top of the block or, if blocks are not installed, tie off at the mast. Pass the line from the block down behind the yards to the bitts at the deck. Repeat on the other side and trim the yard level. Temporarily tie off the lines.



### 129. Topsail yard parral

The *parral* constrains the yard to the mast with a degree of freedom to turn and move. It is quite a complex arrangement that we will show in simplified form.

Take a length of dark line and attach one end of it to the front of the yard just to one side of the mast. Use acrylic matte medium. When set, take the line around the back of the mast, over the top of the yard, round under it (don't trap the footropes!), then secure it again. When set, complete the parral by trimming and gluing the end under the yard at the point that you started.



### 130. Topsail yard tye

This is the line by which the yard is hoisted. In the ship, this line goes up to a sheave through the topmast and then down again. At this scale the mast is thin and fragile, so I recommend faking things by simply gluing the end of the line to the front of the topmast.

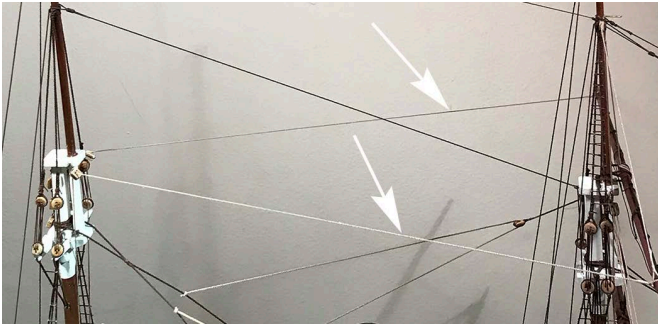
To attach the line to the yard, do the following *inside* the parral lines. Clip the long end of the line higher up the mast for now. Take the other end down behind the starboard side of the yard, around the front, back across behind itself, then forward and around the port side of the yard. Bring the line up behind inside the loop you formed and glue the short end against the long one (lower part of photo at right). In practice, the end of the line was lashed to the running part.

Shorten the long end to just below the lower stop and glue it to the front of the topmast (top of photo at right). Omit the fall aft of the mast; it will not be obvious at this scale.



### 131. Topmast yard braces

These are much simpler than those for the lower yard. Take a length of thinner beige line and form a small eye splice in one end. Fit this over the yard arm. Take the line aft, through the *inner* sheave of the double block on the main mast cap and down to belay at the bitts below. Repeat for the other side. Adjust the lines to brace the yard square.



This step completes the topsail yard rigging. The last yard to add is the topgallant yard. The rigging is almost identical to that of the topsail yard.

### 132. Topgallant yard footropes

Shown on Plan Sheet 2, these have one stirrup a side.

### 133. Topgallant yard parral

As for the topsail yard, but use thin dark line.

### 134. Topgallant yard tye

Similar to the topsail yard, but the 'sheave' through the mast is just below the upper stop.

### 135. Topgallant yard lift blocks and lifts

As for the topsail yard, there is the option of two small single blocks attached above the upper topmast stop (right). The lifts are rigged similarly as well using thin beige line. The falls, if shown, belay at the shrouds above the trees. Take the line around the 'neck' of the fore futtock shroud under the deadeye.



### 136. Topgallant yard braces

Use thin beige line. The braces lead aft to the outer sheaves in the double block at the main mast cap, then down to belay at the bitts. This completes rigging to the fore mast.

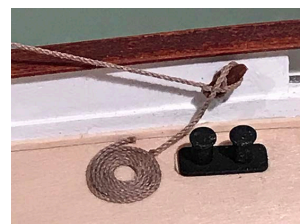
### 137. Adjusting running lines

Now is the time to trim all the yards so that they are parallel to each other and at right angles to the length of the ship. Gently pull or relax lines as needed. If you pull too hard or move too fast, you will either break something loose or snag a line. Use caution and patience! It is interesting to see how the various lines work, just like on a real ship.

Once satisfied, the belaying ends can be secured using acrylic medium and excess line trimmed off. The belaying pins and coils can then be secured to the pin rails.

### 138. Making rope coils

These are needed for the 'tails' of the main brace lines. Use about a 5" length of the same line as used for the braces. The best method is to put a piece of masking tape, sticky side up, on the bench and 'build' the coil on this.



First dampen the line, then start coiling it from the center outward (upper right). When coiled, soak it in dilute acrylic matte medium and allow it to dry.

Gently free the coil from the tape using a flat blade such as a palette knife (middle right). Glue in place, trimming and hiding one end (lower right). Done neatly, it should look like part of one continuous line.

### 139. Boom parral

Start by looping the parral line around the mast and threading it through the opposite jaw from inside to out. Remember that the block on this spar is on the underside! Lift the mast hoops and slide the boom into place. Tighten the parral line, knot it and cut off the excess line.

### 140. Topping lifts

These keep the end of the boom up. Various methods of rigging these were in use at this time period. We will use the simplest, further simplified.

First two  $\frac{1}{8}$ " single blocks are stropped  $\frac{3}{16}$ " apart as shown (right). These go around the main masthead just above the shrouds. Glue the strop into place, one side of the mast head at a time (right). Overlap and glue the ends around the front of the mast head.

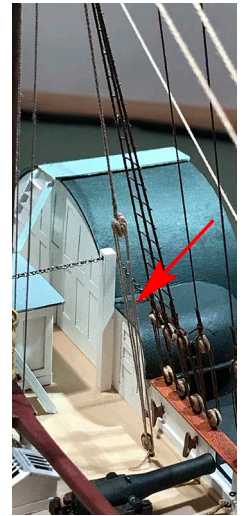


Take a 30" length of beige line and bend it in half. The center is taken around the outer end of the boom outside the stop and seized above it (right). Each end of the line is taken up to the blocks at the mast head and then down to the deck. Belay at the main bitts.



Do not permanently attach the lines yet!

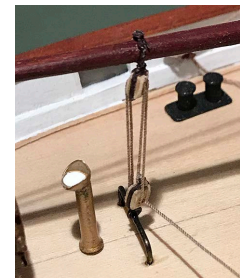
**Superdetail:** In practice, the two lift lines ended about 16' 0" (2" actual) above the deck and a block and tackle was attached to each to give additional purchase, as shown. The boom was a very heavy spar. On each side a double block was eye spliced into the end of the lift (right). A single block was given a hook on one end and a length of beige light line attached to the other. The hook engaged an eyebolt in the deck, the line reeved through both blocks and the end belayed around the bottom of the lower block.



### 141. Main sheet

This is the line that controls the swing of the boom. You installed the traveler and double block on the deck back in Step 98 and the block on the boom, Step 102. Reeve this line between the blocks and let the end down to the deck.

Adjust main sheet and topping lifts so that the boom is centered with its aft end about  $\frac{3}{4}$ " above the rail. Belay the topping lift and make up a coil of line on the deck for the main sheet.



### 142. Gaff parral

Time to rig the last spar! Take the parral around the main mast just below the futtock shrouds. Be careful not to trap any other line inside the parral. Tighten, knot, fix and trim as for the boom.

### 143. Gaff throat halliard

One block and the line attached had already been installed in Step 99. Another  $\frac{1}{8}$ " single block with a hook is needed. Attach this to the eyebolt on the jaws of the gaff. Reeve the line down through the lower



block, through the upper block and down to starboard of the gaff to belay at the main bitts. Do not tie off permanently yet.

#### 144. Gaff peak halliard

The standing end of this thin beige line is eye spliced near the outer end of the gaff. It runs zig-zag fashion between the blocks on the mast head and the spar, then down the port side of the gaff to belay at the main bitts. Adjust this line and the throat halliard so that the tip of the gaff is a little above the level of the main mast cap.

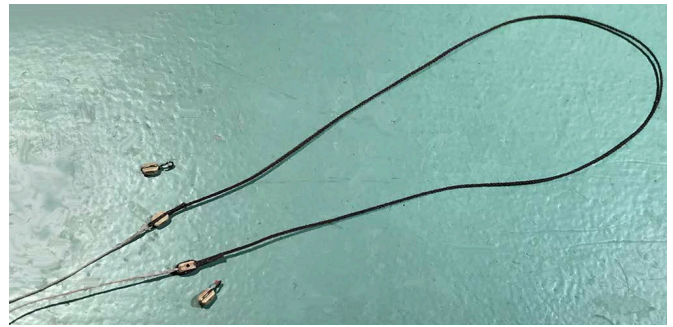


Adjust the gaff so that it is parallel to the centerline of the model and put matte medium between the jaws and the mast to secure the spar in place. The gaff is constrained between the topping lift lines.

Tie off the lines as usual and add pins and coils on the pin rail.

#### 145. Vangs

These control the aft end of the gaff. A length of 12" of thick dark line has a 1/8" single block stopped in at each end, with lengths of thinner beige line trapped at the far end of each block (photograph next column). Sometimes these blocks were doubles instead.



The vang pendants (dark brown) are clove hitched around the gaff so that each end is the same length. (If you can't manage a clove hitch, simply wrap the line around the gaff. Use dark thread to tie the pendants together just under the gaff, then fix it with matte medium.)

Another single (or double) block is stropped with a wire hook on each side and hooked to eyebolts in the deck near the cleats just aft of the boats. You will need to drill a #75 hole and epoxy or cyano the eyebolts in.

Reeve the fall line on each side through the block on the deck, up through the block on the pendant, and down again to belay at the cleat. Make sure that the tension on both falls is even and does not pull the gaff to one side. Add a coil of line each side on deck.



#### 146. Ensign halliard

The final line is a continuous loop of thin line. This could be of off-white thread. The ensign is attached to this. Take a long length of thread through the small block at the end of the gaff and make sure that it is long enough to reach the deck and a bit more.

### 147. Ensign

The ensign with 37 stars for this time period, is printed on both sides, pages 65/66. (A spare is given as well.) It may be cut out and glued to the halliard. Fold the hoist band in half and glue it around the halliard. Try not to have the ensign sticking out rigidly, but crease and fold it to hang naturally (right).

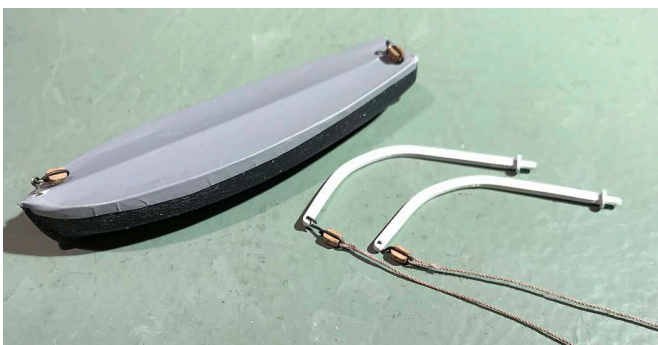
**Note:** If the ship is under sail, the ensign should blow forward; if under steam, most likely it would flutter aft. If at anchor....



### 148. Davits and falls

The simple way to rig these is simply to tie the boat using light line from the eye in the davit and through the eyebolt in the boat. If doing so, skip the next two paragraphs. A more realistic method is given below.

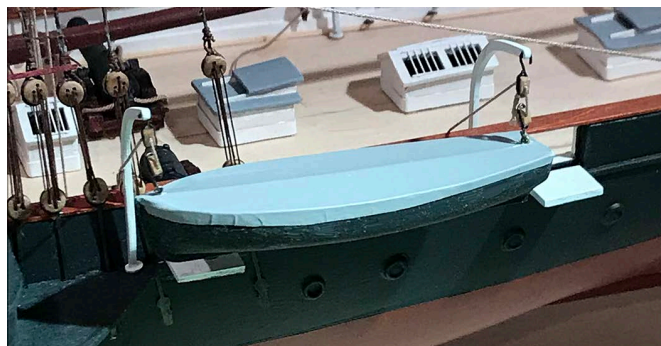
**Superdetail:** Each fall consist of two small  $\frac{3}{32}$ " single blocks. The lower one is wire stropped with a hook to the eyebolt of the boat. The upper on is wire stropped on one end with a hook and a thin beige line trapped on the other (photograph below).



Hook the lower block to the boat and the upper one to the davit.

Add the davits to the ship using 5-minute epoxy, as this gives time to adjust the davits vertically and for distance apart (photograph next column). Make sure that the distance between their tips matches that of the two boats' eyebolts. This is  $2\frac{1}{2}$ ". Check that the main sheet is clear of the aft davit.

Rig the boats using either method. If opting for the more detailed method, follow the next paragraph.



**Superdetail:** Reeve the line down through the lower block, up through the upper one, then belay it at the nearest vertical cleat inside the bulwark. Adjust so that the boat is level and clear of the port below (photo above). Repeat on the opposite side. When I rigged the boats, for variety I showed one lowered down to water level. I suppose that the cover should have been taken off the boat, but in this case it was just an exercise for the crew. At least, that's my excuse!

Any excess line is neatly coiled on the deck.

### 149. Railings

These have been left until the end as they are very delicate, so handle them carefully! Trim them from the photo-etched sheet. Bend the rails for the bridges carefully. If you have no experience in bending photo-etched parts, please read up on this first. Use parallel pliers when forming parts or a special bending brake designed for the purpose. *Gentle* is the key word; the pieces are easily bent out of shape.

Prime and paint the rails white. Carefully maneuver them into place and secure them using matte medium (photo at right).



## 150. Tidying up

Inevitably there will be dust and fragments of rigging on the decks and horizontal surfaces of the model. The easiest way to remove them is by using a damp but not wet brush to pick up stray particles.

Check that rigging lines are taut where they should be and slack where not. Make sure nothing has been pushed out of place accidentally.

Check for any paint touch-ups and carefully carry these out.

Once all is ship-shape it is time to sit back and enjoy your completed model. Congratulations on finishing an advanced level and very intricate ship! Please consider getting a case to protect it from dust and accident and to preserve your craftsmanship for years to come.

### *A note about sails:*

Material for sails and extra blocks required are not supplied with this kit. The layout for a suit of sails are given on Plan Sheet 3.

If you wish to show sails on your model, the following books will give you all the rigging information you may need. Some of these are available in inexpensive reprint or on-line. The most useful is listed first:

*The Young Sea Officer's Sheet Anchor* by Darcy Lever

*Seamanship in the Age of Sail* by John Harland and Mark Myers

*Masting and Rigging the Clipper Ship and Ocean Carrier* by Harold Underhill

## TOOLS AND MATERIALS

The following tools and materials are all you will need for building the *Harriet Lane*. You should have most of these from the dory, pram or lobster smack build. Extra items can be added as you progress. **Many of these items are available from Model Expo.**



### Glues

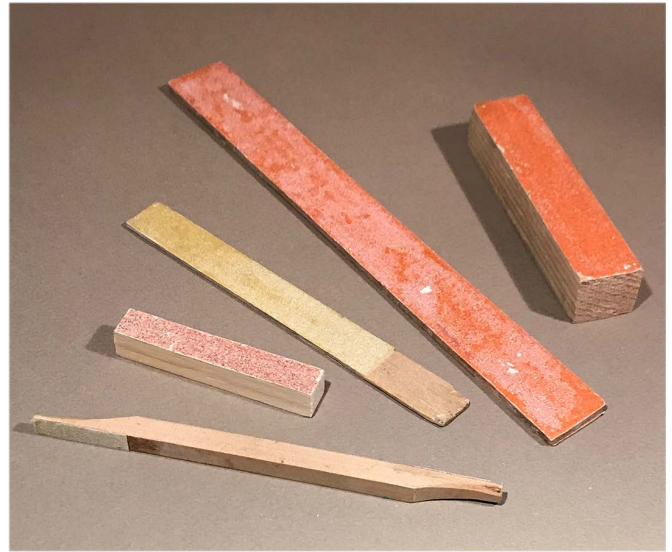
The most often used glues are polyvinyl alcohol (PVA) white glue and aliphatic yellow carpenters' glue. Both are easy to use and clean up with water before setting. Available from your local hardware store. These glues can be dissolved using rubbing alcohol (see below).

Another useful glue is rubber cement. This is used like contact cement. Coat both surfaces to be joined and allow the cement to dry. They will then stick to each other. Excess dry glue can be rubbed off with a piece of crêpe rubber, or use a regular elastic band like an

eraser. This is very useful for sanding sticks. Rubber cement is available at your local craft store.

### Rubbing alcohol

You will need this to separate a glue joint if something goes wrong. Try to get 95% grade or higher, available from your local drug store. The 70% has greater water content and wood will need time to dry out before re-gluing. Do not use near a source of ignition!



### Sandpaper and sanding sticks

Sandpaper comes in a wide variety of grades from coarse to very fine. Two useful grades for our purpose are 150 grit and 220 grit. Coarser grades cut too aggressively and finer ones produce very fine dust without finishing the surface appreciably better. Find these at your local hardware store.

Sanding sticks are very helpful. They can be easily made by sticking sandpaper to a piece of flat or curved scrap wood, or even heavy card, as needed (photo above). You can control the sanding process much better by moving the item to be sanded than holding a piece of sandpaper or the sanding stick in your hand. Move the piece back and forth along the stick.

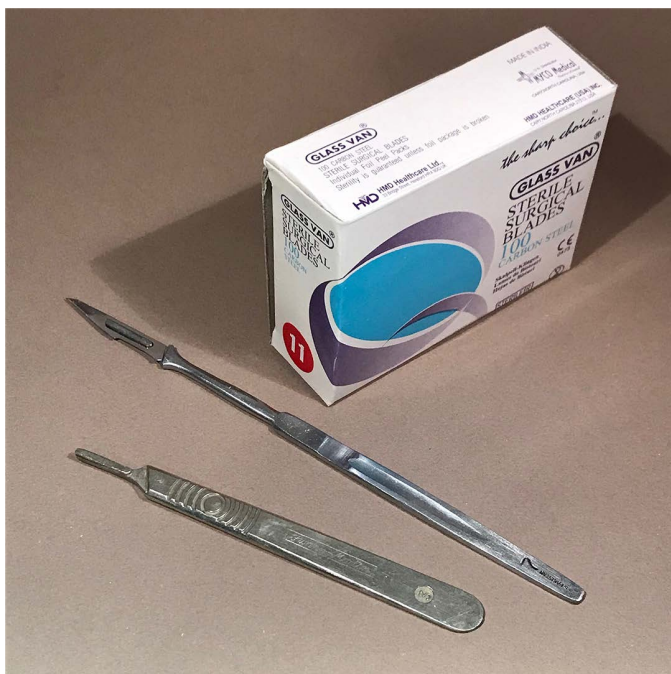
I use rubber cement (see *glues*) to stick sandpaper to the stick. When dulled, the paper can be peeled off and replaced with a new piece. You could use white or yellow glue instead, but then you can't peel off used sandpaper to replace it.

I coat the back of the sandpaper and the stick with rubber cement and let it dry. When both surfaces are ready, press the stick onto the sandpaper. Trim the paper using a disposable box-cutter style blade.

### Cutting surface

A plastic self-healing cutting mat is a must, particularly if building on the dining room or kitchen table! It will save a lot of grief or explaining. Get the largest size that will work best for your situation.

### Knife and blades



For these kits, a basic knife such as an X-Acto or Excel with #11 blades is a start. However, these blades get blunt and need to be replaced quite often, so the cost can add up. You might wish to consider a surgical scalpel handle, such as Swann Morton. A box of 100 #11 blades will last you a long time. These are available

from medical supply houses or from Model Expo on-line. I recommend changing blades using small flat-nose pliers; even dull blades can cause damage! Don't ask how I know this! Dispose of used blades in a sharps disposal container, please. A small supply of  $\frac{3}{8}$ " wide chisel-end blades such as #17 size will also be useful.

### Set square



A small steel or plastic engineer-style set square will be very useful, but not essential.

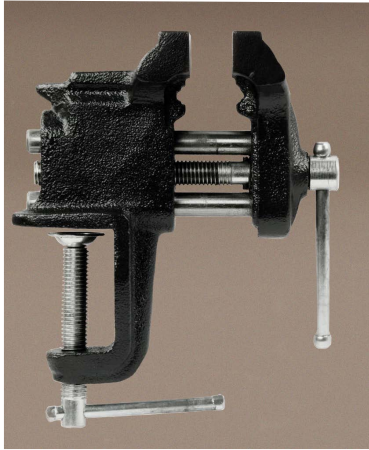
### Saw

A small razor saw with replaceable blades such as X-Acto or Excel (above) is a very helpful tool to have.

### Clamp-on vise

I prefer the kind that clamp onto the table edge. There are suction-mount ones available, but I find that they always come loose when you don't want them to! A small vise is all that is needed, such as a 3" Irwin, DeWalt or Bessey. A more expensive option is a universal or rotating vise, but this is not really necessary. Find one at your local hardware store or on-line.

So that you do not mar the workpiece, line the jaws with a softer material. I custom cut pieces of cardboard to size and rubber cement them on. They are easily replaced when they get chewed up, as will happen.



### Paint brushes



For model work I find 'flat' brushes best. Please buy quality brushes and look after them – cheap brushes that you replace cost more in the long run and will probably shed hairs in your paint! I find 3/8" or 1/2" wide ones for acrylic paint the most useful. Also from your local art or craft store.

For glue, I use a number 1 or 2 size artists' round brush. Wash it out well after every session. Should glue dry on it, rubbing alcohol will rescue the brush.

**Care:** wash your brush out well with soap and water after use. Should paint dry on the brush (please try not to let this happen!) you can dissolve acrylic paint in rubbing alcohol. When washed and clean, rub a little

soap into the hairs to re-shape them before storing. Never, *ever* leave your brushes bristles down in a water jar! They will splay out permanently. I have brushes over 20 years old that are still in good shape because of the care suggested here.

### Paint

Any good acrylic paint for models such as the Model Expo range will perform well.

### Tweezers

A good pair or two of fine pointed stainless steel tweezers are a useful item to have, particularly when it comes to rigging.

### Clips



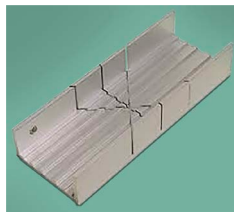
2" mini-spring clamps with rubber tips are very helpful. 'Bulldog' style binder clips are also occasionally useful. An assortment of smaller sizes can be found online or at your local stationery store. Buy more in the sizes you need, when you need them. One can never have enough clamping gizmos!

### Elastic bands

These are handy and inexpensive items to have. Keep a number of different sizes on hand.

### Miter box

This is a very useful item for making saw-cuts at right angles or at 45°.



### Epoxy glue

Two-part epoxy glue is available from your local hardware store. The five minute variety in tubes or squeeze bottles is recommended. Mix equal quantities of both parts well on a disposable surface.

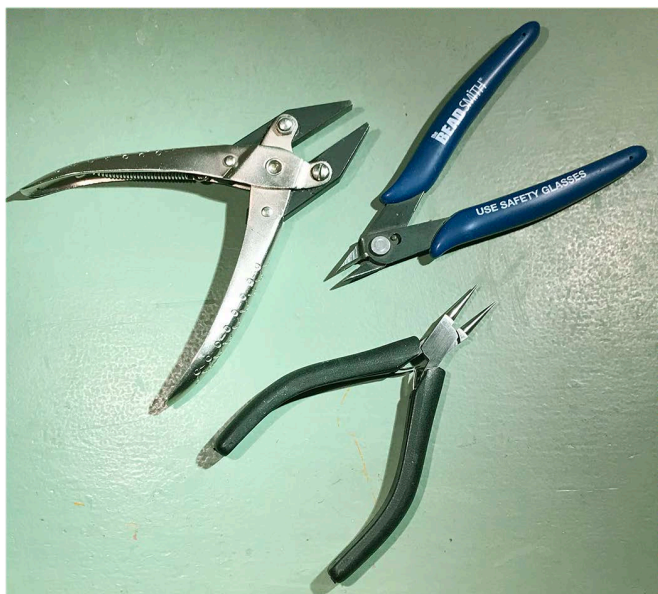


### *Tools for metalworking:*

Here are a few basic metalworking tools that you will need sooner or later.

### Hammer

A small jeweler's hammer is very useful. Either style by Model Expo will do.



### Hard metal flush cutting shears

Shears for soft metal will not work on hard brass. You will simply damage the cutting edges. I use the Bead-Smith ones. The Xuron 9200 might be an alternative.

### Pliers

A set of parallel pliers are most useful when working with sheet or strips of metal (previous column, left). A quality pair of small round-nose pliers, also shown, will be needed for bending wire. Find these through on-line suppliers.

### Files

Add these as you need them. A small flat fine-cut file and 3/8" round file are all you need to start with.

### Bench block

A small steel bench block is useful for a number of purposes, including riveting. An anvil is overkill!

### Soldering mat

A ceramic heat-resistant mat is essential for soldering operations and heat-softening metal. You will need this and butane torch (see below) for the *Harriet Lane*.

### Soldering iron

Either model offered by Model Expo will work for soft soldering. However, the 30W set includes solder.

### Small butane torch

Use this to heat metal to anneal (soften) it. It is much too hot for soft soldering, but will also be useful when you learn to silver solder later on. In the meantime, use it in the kitchen to make *crème brûlée*! Available from your local hardware store or on line.



## ADDITIONAL VERY USEFUL TOOLS

You should already have a basic assortment of tools (previous pages) that you acquired while building the pram or lobster smack kits. For this model, there are a few more items for you to consider. None are expensive, but buy quality if you can.

### Third hands



These cross-tweezers on a heavy base are called 'third hands'. Get two of these, as they are useful for many purposes, particularly while soldering or rigging.

### Flush cutters

Useful, particularly for cutting photo-etched parts from the sheet, or metal wire. Another use is trimming wire strips on blocks.

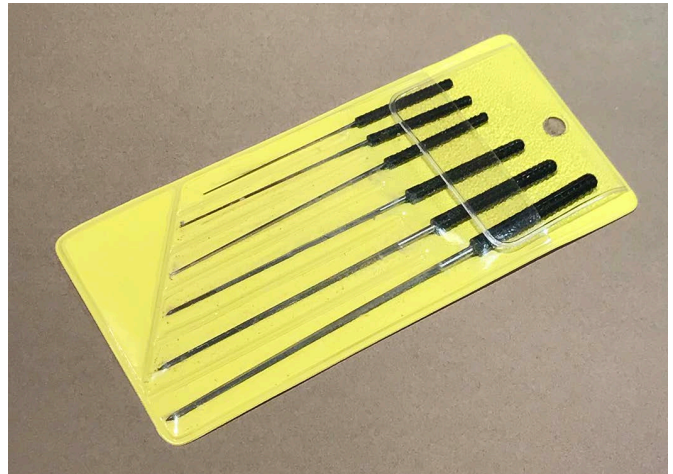


### Flush nippers

Use these for trimming rigging knots closely to lines without cutting them accidentally. Do not use on hard metal!



### Broach set



Broaches are useful for slightly enlarging drilled holes or clearing holes of waste. These are very helpful for cleaning up blocks and deadeyes. Pick the appropriate size, insert and twirl while applying a little end pressure. I use these quite often to clear holes in blocks.

### Micro-scissors



Not essential, but very handy for trimming lines with precision. Known as corneal or Castroviejo scissors, a pair can be obtained on-line at a reasonable cost. They can be picked up easily (unlike regular scissors) and can maneuver into tight spaces.



