

# **RACEHORSE**

*English Bomb Ketch 1754*

**Art. 793**

## **ASSEMBLY INSTRUCTIONS**

*English Version*

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*For the*

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## HISTORICAL BACKGROUND

The ketch, a vessel with a two-masted rig characterised by a main and mizzenmast, was often said to be “ship without a foremast”. In the 18<sup>th</sup> century, bombs comprising hollow metal spheres packed with explosive and with a fuse were fired from large, short powerful cannon called mortars or bombardars. Ships firing such large artillery pieces needed special strengthening to prevent their timbers moving apart or even breaking under the massive recoil. *Racehorse* is equipped with two bombardars. The *Racehorse* and her sister ship *Carcass* were both fitted out and strengthened at Chatham dockyard in preparation for an arctic exploration – the expedition of 1773 in which Horatio Nelson served on the *Carcass* as midshipman / coxswain. It was this strengthening to withstand the arctic pack ice that made these ships eminently suitable for use as bomb vessels. During the war with Russia, the British Navy used twelve of these vessels, among which was the *Racehorse*.

## ASSEMBLY INSTRUCTIONS

General notes:

- All dimensions given are in millimetres. The symbol  $\varnothing$  means diameter
- English translations of the Italian notes on the plans are given in these instructions.
- Component numbers (n.11, etc) refer to the numbered plywood parts on Plan 1.
- Figure numbers given below (Figure.1, etc) refer to the numbered figures on Plan 1.
- Part numbers (Part 12, etc.) refer to the detailed or exploded drawings on Plan 2.
- The sequence given here is the recommended order for completing the model.

### PLAN NUMBER 1

This plan shows how to construct the frame of the ship, and how to plank the hull and stern. The two drawings of the laser-cut plywood parts can be used as reference to identify the parts. On the thick plywood sheet containing the keel and frames, mark the identity numbers on the parts with a soft pencil. Remove all of the plywood parts from both plywood sheets with a craft knife, smoothing all edges with fine sandpaper and taking care not to destroy the laser-cut outline of each piece.

**Figure 1.** Test the correct assembly of all of the frames without glue, inserting all the frames into the keel n.16, filing or sanding to get a good fit where necessary.

**Figure 2.** Bevel frames n.1, n2 and n14 as shown in Fig. 2, to permit the correct fit of the eventual planking strips around the frames to the bow, and to provide a broader area for adhesion.

**Figure 3.** Glue the structure together, leaving off the transom n.12 and n.13. Before the glue sets, insert the two half-decks (n.19), which will bring the frames into alignment (Fig. 3). Check the frames are square to the keel and aligned down the centre-line of the keel, clamp and allow to dry.

**Figure 4.** Add the transom n.12 and the two transom supports n.13. Note that these will need to be supported with tape or pins until set.

Fit decks in the sequence n21; n.20 and n.22, ensuring that the decks sit down tight against the frames to get the correct ‘sheer’ or curve to the decks. Note that you will have to ‘curl’ the decks slightly to fit them between the side ribs, but once inserted, they should fit against the frames under slight pressure. The decks can be identified from Figure 6 and from the cross-section views through the frames n.5, n4, and n9.

**Figure 5.** *Racehorse* is double-planked. 1x3 Lime planks are used for the inner planking and 0.5x3 Walnut planks are applied for the outer planking. Start the application of the strips at the point indicated in Fig. 5 by the thick horizontal line, setting the first plank parallel to the line of the keel. Note that the bow end of the plank needs to be formed into a curve using a plank-bending tool. Proceed with the planking according to the special instructions on planking provided at the end of this booklet. The side planking strips will extend beyond the stern. Leave these planks untrimmed for the moment, or cut them off leaving at least 15mm from the back edge of the transom n.12.

**Figures 8 and 9.** Cover the back of the transom n.12 and the underneath of the stern with horizontal planks. Measure and trim each stern plank to shape to ensure a perfect fit between the planks already applied to the sides. After having completed the second application of planks in Walnut, trim away the excess planking with a sharp craft knife and sand the joints and planks smooth. After having completely covered the hull, trim the top edge of the planking above-deck to bring the parapet height level with the top of the ribs, and sand the top edges of the parapet walls to take the handrails. Use Figure 7 as a guide to the parapet heights.

**Figure 6.** Use a small saw or craft knife to trim away the tips of the frames (ribs) which are still visible and which extend along the inner parapet walls. Sand the stumps flush with the surface of the deck. Only after this step has been completed can the decks be covered with deck planking.

**Figure 7.** For the deck planks, cut 0.5x3 Lime strips into accurate 50mm lengths, ensuring a neat, square cut at both ends. Note that it may be useful to make up a cutting template, as over 100 of these planks will be needed to cover the entire deck area. Position the planks alternately using the scale plan-view on **Plan 2** as a guide. Trim the planking around the holes in the deck, and fit shaped pieces of planking in corners so as to cover the entire deck surface.

When the deck planking is completed, plank the insides of the parapet walls (bulwarks) with horizontal 0.5x3 Walnut strips as shown in Figure 2 and in the three cross sections on Plan 1. *Note that the excess frames have already been removed.* Cover the inside face of the transom with vertical 0.5x3 Walnut strips.

**Figure 10 – Ship's Cradle.** It is useful to hold the keel in a vise or cradle while the superstructure is being assembled. If you do not have a suitable vise, make up a cradle from 4x4 Walnut plank as shown, so that the keel n.16 will slot in and be held between the two wooden runners. The material for the cradle is not supplied in the kit.

**Figure 11.** This shows the painting of the stern and hull sides. Leave this until later in the construction process.

## PLAN NUMBER 2

The large plan-view FIG.A and the side-view FIG.B of the vessel are to the scale of the model, and can be used for checking dimensions. These views and the perspective view show the various items of superstructure to be fitted to *Racehorse*. The numbered items on the plan-view are belaying (terminating) points for the rigging. The number items on the side-view and the perspective-view refer out to the exploded views (Part 1 etc.) showing the detailed parts to be made up and fitted to the ship. **Caution: the detail drawings are not all to the same scale.**

**Handrails.** Refer to the three cross sections on Plan 1, and the scale side-view FIG. B on Plan 2. The colour photograph on the outside of the kit's box is also useful as a guide to the shape and positioning of the handrails. Make the handrails from 2x3 Lime plank. To make the curved sections at the bow, heat the individual strips in very hot water for a minute or two and carefully form the two handrails to fit the curve of the hull. Hold in position until dry and stabilised. When the required curve has been achieved, glue them in place on the parapets. If you experience difficulties with bending the handrails, cut trapezoidal pieces from the straight planks and alternate them to achieve the required curves. When glued and smoothed, the joins will disappear.

**Rubbing strakes** are timbers fitted along the length of the hull to protect the sides of the ship from damage. Refer to the three cross sections on Plan 1, the scale view FIG.B on Plan 2. The colour photograph on the outside of the kit's box is also useful as a guide to the shape and positioning of the strakes. To each side of *Racehorse*, fit the upper strakes made from 2x2 Lime plank and the two lower strakes made from 2x3 Lime plank. Before gluing the rubbing strakes to the sides of the hull, mark their positions using the cross-sections on Plan 1 and FIG.B on Plan 2 as guides. Check that they are at the same height either side, so that the rubbing strake under the transom will line up with them and be horizontal (see Figure 11 on Plan 1). Glue and pin these strakes into position. Apply 2x2 Lime plank trims around the stern, as shown in the side-view FIG.B on Plan 2, and in Figure 11 on Plan 1.

**Rudder.** Fit three of the black 'u'-shaped rudder shackles supplied to the keel as shown in FIG.B on Plan 2. Carefully cut a hole in the underside of the stern planking to take the top part of the rudder (5mm thick plywood part) and slide the rudder into position. Mark the position of the rudder shackles and fit three 'u'-shaped brackets to the rudder. Fit the rudder in position and glue the three rudder pins in place to hold the rudder onto the stern.

**Gun Ports.** Using the dimensions taken off the scale side-view FIG.B on Plan 2, mark and carefully cut out the five gun ports (size 9x6) on each side of the ship. Line the inside edges of the gun ports with 0.5x3 Walnut plank and sand flush.

**Painting.** Refer to Figure.11 on Plan 1 and to the colour photograph on the kit's box for the painting of the stern and hull sides. Paint the transom and the hull areas between the strake with light blue matt paint. Avoid painting the railings or rubbing strakes, which should be left their natural wood colour. Set aside to allow the paint to dry thoroughly. *Suggestion: we recommend the use of an air-brush and 3 coats of matt paint diluted to 3:1 with appropriate thinners. Alternatively, paint by hand using matt paint, a good quality sable brush and employing light longitudinal brush strokes.*

Fettle the brass transom and window castings supplied to remove any excess material and bring the parts to a polished finish. Use FIG.B as a guide and glue the parts in place, noting that i) the rubbing strakes need to be cut away from the stern windows, and ii) the brass parts may need to be bent slightly to fit flush against the planking..

**Preparation of the photo-etched brass parts, as shown in Figure 11 on Plan 1,** Working on a flat surface, brush acrylic dark blue paint over all of the incised portions without trying to avoid painting the raised portions as well. When the paint is dry, and on a flat surface, sand the whole plate with 600-grain sandpaper until the raised portions of the work become paint-free and shiny, the paint remaining only in the incised portions. Use this procedure to paint all the photo-etched components. After painting and sanding, varnish over to protect the finish, then cut out the pieces with tin shears or strong scissors finishing the edges carefully with a file.

Fit the windows to the transom and to the stern sides. Now prepare and fit the other parts to the superstructure as follows.

**Part 1 - Anchors.** Make the stocks from the two plywood parts supplied, using a file to taper the ends as shown. Wind 5 or 6 turns of  $\varnothing 0.5$  thread in four places on each stock as shown (see also part 12), fixing the thread with a little glue. Drill a hole through the centre of each stock and fix the stocks on the anchors, ensuring that the stocks line up at right angles to the flukes as shown. Insert a  $\varnothing 6$  brass ring on each anchor tail. Tie a 150mm length of large thread to each anchor ring and bind it with thin thread as shown. The anchors will be placed on the hull after the sail work has been completed.

**Part 2 - Cat davit.** As shown, these are made from 4x4 walnut sections shaped to the outline shown. Drill a  $\varnothing 1$  hole 5mm back from the end, to take the anchor securing rope. Fit them to the deck, cutting a piece out of each side of the bow railing as shown in the perspective view.

**Channels.** These boards hold the deadeyes supporting the shroud lines, and are made from plywood parts F and G. Take the dimensions from FIG.A and cut 1.5mm wide notches for the chainplates with a small file. Glue the channel to the sides of the hull as shown on FIG.B. Use the plan view FIG.A to get the correct positioning in relation to the two masts.

**Part 3.** Shows how the chain plates are assembled, using a nail as well as glue to secure the chain plate foot to the hull side.

**Part 4 - Bombards.** Start by fixing the deck-plates (plywood part n.23) to the half-decks (n.19). Cover with 0.5x3 Lime planks using sizes longer than actually needed. Close the side apertures with 1x6 walnut strips. Prepare the octagonal bases (plywood part N. 24) as shown, using 0.5x3 Walnut planks, and glue in position exactly in the centre of the deck-plates. Prepare the bombard on its gun carriage using the parts supplied in the Bombard pack. Drill a  $\varnothing 1$  hole exactly in the centre of each base (n.23), and attach each bombard carriage with a  $\varnothing 1$  brass wire pin through the centre-hole, without glue that the bombards are able to be rotated freely on the bases.

**Part 5 - Outboard Companionway.** These are step-planks fixed to the outside of the hull. Use FIG.B as a guide. Make the steps from 2x2 walnut section, fixing a segment of 0.5x3 Walnut plank as a tread on the top of each step.

**Part 6 - Flagpole support.** Make the two flagpole holders from 2x6 Walnut plank and the vertical support post from 4x4 Walnut plank. The unit should be inclined at the same angle as that of the stern transom. The vertical support should be fixed with brass nails as well as glued to the horizontal holders.

**Part 8 - Rudder tiller.** Cut out the main section from 4x4 Walnut plank, then glue onto a 2x2 walnut section as shown, shaping to achieve the desired smoothed curve as shown. Connect the tiller to the head of the rudder protruding up through the stern.

**Part 7 - Cover for the rudder group.** Assemble plywood parts n25 and n26 together and cover the top and sides with 0.5x3 Walnut planks and finishing it carefully and accurately. Face with a length of 2x2 Walnut plank. Glue into position on the deck.

**Part 9. Capstan.** Assemble the parts with glue. Drill a  $\varnothing 2$  hole in the deck and glue the capstan to the deck.

**Part 9b. Treads.** Cut 16 off accurate 1mm wide planks 10mm long from short lengths of 0.5x3 walnut plank, and glue them on the deck around the capstan as shown.

**Part 10 - Hatch.** Assemble plywood pieces n.27 and n.28, to make the two hatches and cover with 0.5x3 Walnut strips. Make the doors from 0.5x3 Walnut plank. Frame the doors with an architrave made from 2x2 Walnut plank. Position on the deck, checking that they align accurately, and glue into place.

**Parts 11 and 13 - Belaying-pin racks.** The upright supports are made from 4x4 Walnut plank and the pin racks from 1x6 Walnut plank. Take the dimensions from the drawing. Drill  $\varnothing 1$  holes for the belaying pins. Drill  $\varnothing 1$  holes in the posts and in the deck, fixing the racks to the deck with  $\varnothing 1$  brass wire pins and glue. Use FIG.A for positioning.

**Part 12 - Bindings.** The diagram shows a way of making most bindings using a simple whipping method. Secure with glue, and trim the excess carefully with a scalpel when dry.

**Part 14 – Anchor Bitts.** Cut all of the elements from 4x4 walnut plank, following the dimensions of the drawing. Drill  $\varnothing 1$  holes in the posts and in the deck, fixing the bitts to the deck with  $\varnothing 1$  brass wire pins and glue.

**Part 15 - Bowsprit Bitt.** Make the upright supports from 4x4 Walnut plank, and the rail from 2x3 Walnut strip, following the dimensions shown on the drawing. Drill  $\varnothing 1$  holes in the posts and in the deck, fixing the bitt to the deck with  $\varnothing 1$  brass wire pins and glue.

**Part 16 - Parapet bitts.** Make sixteen bitts from 4x4 Walnut plank. Drill  $\varnothing 1$  holes in the posts and in the parapet railings, fixing the bitts with  $\varnothing 1$  brass wire pins and glue.

**Part 17 - Securing Loop for cat davit.** Make these from 4x4 Walnut plank, making a slanted notch 4 mm wide to fit over the davit. Glue in place on the rails..

**Part 18 – Ladders.** Assemble the side-pieces of the ladder with steps made from 1x3 Walnut strip. Adjust the width of the ladder treads to make the ladder 10mm wide overall. Glue in position on either side of the deck as shown in FIG.A.

**Part 19 - Bowsprit foot.** Make this from 2x6 Lime wood plank, with the frame opening being cut exactly as needed to receive the end of the bowsprit. Check using a piece of  $\varnothing 5$  dowel as the bowsprit.

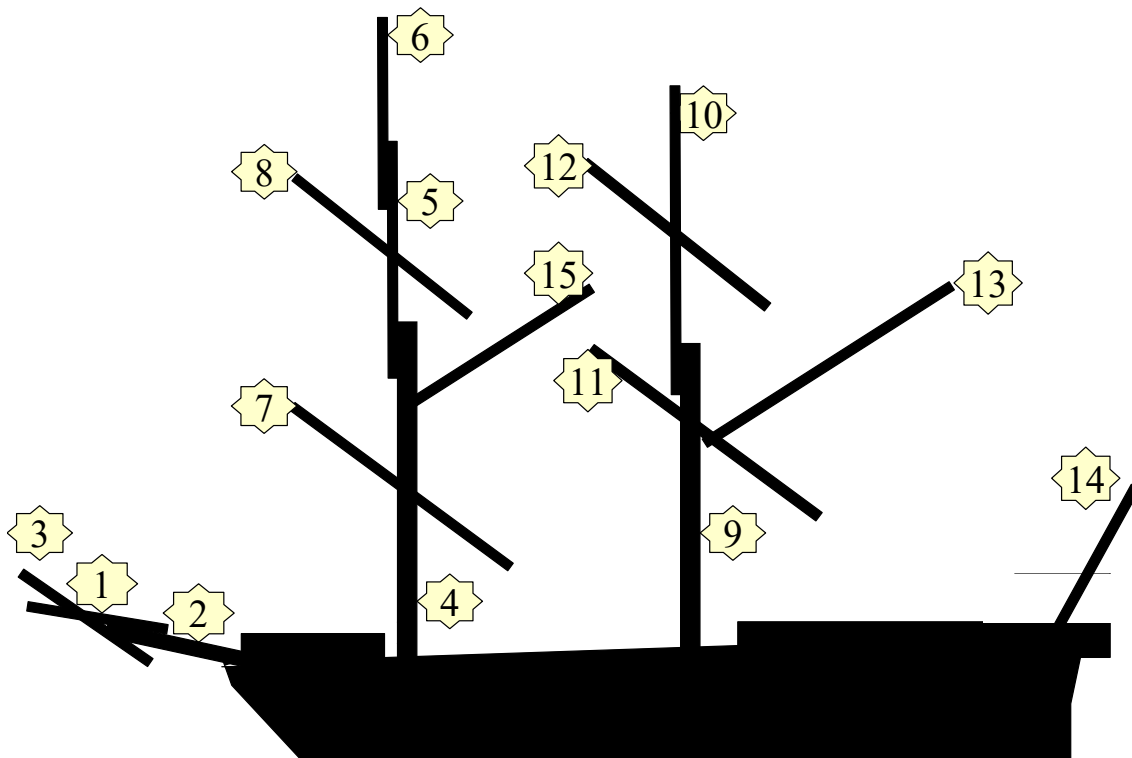
**Part 20. Transom Portholes.** Frame each of the portholes (plywood parts 29) with 0.5x3 Walnut planks as illustrated, and glue in position on the main deck stern transom between the ladders.

**Hawse holes.** Carefully drill two  $\varnothing 3$  holes in the bow to take the anchor ropes, as shown in the perspective view. Glue a  $\varnothing 4$  brass ring around each hole.

**Rigging Eyes.** Drill  $\varnothing 1$  holes and glue in eighteen brass rigging eyes on the rubbing strakes as shown in FIG.B (9 each side), plus three on the bow for the bowsprit ropes.

## Masts, Spars and Yards.

Using the dowels provided in the kit, cut and taper all the masts and yards to the cutting and shaping dimensions in the table below. The **Identifier** is the circled number on the drawing below: **Length** = finished length; **ØMin** = the smallest diameter, **ØMax** = the largest diameter. Parts are tapered towards one end only, unless stated otherwise.



### Mast and Spar Scheme on the Race Horse

Identifier	Length	ØMin	ØMax	Name
<b>Bowsprit</b>				
1	125	2	4	Upper bowsprit
2	175	3.5	5	Lower bowsprit
3	125	2	4	Bowsprit yard – tapered both ends
<b>Main Mast</b>				
4	290	5	6	Main mast
5	165	4	5	Main upper mast
6	125	2	3	Main topgallant mast
7	205	2	4	Mainsail yard – tapered both ends
8	165	2	4	Main topsail yard – tapered both ends
15	115	2	3	Main Gaff
<b>Mizzen mast</b>				
9	260	5	6	Mizzen mast
10	175	2.5	4	Mizzen top mast
11	190	2	4	Mizzen sail yard – tapered both ends
12	135	2	3	Mizzen topsail yard – tapered both ends
13	190	2	4	Mizzen Gaff
<b>Flagpole</b>				
14	105	1.5	3	Flagpole



**Part 21 – Assembling the Tops.** Part 21 and the side-view FIG.B show how to assemble the two mast tops – the joints and platforms between the sections of mast.

The construction process is the same for both top assemblies. The platforms (tops) are made from plywood parts A and B and are covered with 0.5x3 Walnut planks. A kick-board made from 1x6 Walnut plank is fixed to the rear side of the platform, and a piece of 0.5x3 Walnut plank is used to trim around the edge of the platform. Here we explain how to assemble the top for the mainmast.

- Square off the last 65 mm at the top of the mainmast and file the last 5mm into a  $\varnothing 5$  dowel.
- Fit two support cheeks (plywood parts C either side of the mast against the squared sides of the mast.
- Make the two tressle-trees (the supports that run fore and aft) from 2x3 Walnut plank fit them above the support cheeks. Make the cross trees (the cross-supports that sit upon the tressle trees) from 2x2 Walnut plank and glue them in place ensuring that they line up square and central with the mast.
- Glue the platform onto the cross-trees ensuring that the platform lines up correctly with the mast centre-line and leaves equal gaps each side of the mast.
- Insert the main upper mast through the mast cap (plywood part E) and insert the mast down through the platform between the cross-trees. Push the mast cap down onto the mainmast.
- Adjust the positions and alignment of the masts before the glue dries.
- Using the dimensions on FIG.A, make the two tressle-trees from 2x3 Walnut plank and fit them to the end of the main upper mast. Make the cross trees from 2x2 Walnut plank and glue them in place on the cross-trees, ensuring that they line up square and central with the mast.
- Insert the main topgallant mast through the mast cap (plywood part E) and insert the mast down between the cross-trees. Push the mast cap down onto the main upper mast.
- Adjust the positions and alignment of the masts before the glue dries.

Assemble the mizzen mast assembly in the same way – taking the dimensions from FIG.A, and noting that there is no topgallant mast on the mizzen mast.

- Tie reinforcing rope around each mast in the positions shown in FIG.B, and secure with glue.
- Trial-fit the masts into the deck without glue and make adjustments to the deck holes as necessary to get a perfect vertical alignment of both masts as viewed from the stern. Use FIG.B to align the masts with the positions on the drawing.
- Make up a mast foot ring for each mast from  $\varnothing 1$  brass wire. Remove the masts from the deck holes and slide the base of each mast into the appropriate mast foot ring. Glue the masts in place, using small wedges if necessary to ensure that the masts and tops align with the centre-line of the ship. Trim any excess glue or wedges away and glue the mast foot rings in place on the deck.

**Part 24 – Yard Fenders.** Glue 0.5x3 Walnut planks to the lower yards as shown, taking the dimensions from FIG.A. Allow to dry and sand smooth.

**Varnishing.** Now varnish the mast assemblies and the spars with clear matt varnish.

**Part 22 – Gaff fixing.** Fit the jaws plywood parts D into slots cut in the ends of the gaffs. Drill  $\varnothing 1$  holes in the jaw prongs and fix the gaffs to the mast with  $\varnothing 0.5$  rope

**Bowsprit.** Assemble the two bowsprit sections into the bowsprit cap made from 2x6 Walnut plank. Drilled with two  $\varnothing 3.5$  holes to take the masts. Lash the upper bowsprit to the lower section using medium thread. Glue the bowsprit in place on deck and fit a small chamfered piece of Walnut plank on the top of the lower bowsprit. Lash (gammon) the bowsprit assembly to the ram with rope as shown in the side-view.

**Belaying pins.** Glue a belaying pin (supplied in the kit) into each of the belaying pin holes drilled previously, using a small drop of instant glue.

## Rigging

Before securing the yards to the mast, it is advisable to tie all the necessary blocks to the masts and the yards. FIG.B shows where the blocks need to be fitted. The key at the bottom of Plan 2 indicates the sizes of the blocks and ropes to be used. The largest blocks have 2 holes, all others have single holes.

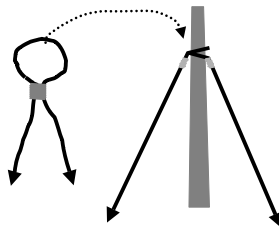
**Part 23** shows how to make and rig the halyards to support the yards.

**Lower Shroud lines.** Make these from medium thread and secure them to the masts by using a seized loop as shown in **Part 25**. The shroud lines are secured around the mast, above the tressle trees and are passed down through the gaps in the tops to be tied off to the deadeyes.

**Part 26 - Terminating the Lower Shrouds.** The lower ends of the shrouds are terminated around deadeyes and the deadeyes are tensioned against the deadeyes on the channels using thin thread as shown in P.2.

**Top Shroud Deadeyes.** On the platforms, drill  $\varnothing 1$  holes for the deadeye ropes and fit deadeyes for the top shrouds with medium thread. Pass the threads down through the drilled holes in the platforms and tie the threads off to the tops of the lower shroud lines just below the tressle-tree support cheeks.

**Top Shrouds.** Rig the top-shrouds as shown in the scale side-view, using medium thread. The recommended method for fixing the top-shrouds to the mast is to make a 'seized' loop using thin thread as shown below. The loops should sit snugly on the taper of the mast. Secure the top-shrouds to the top deadeyes as shown in Part 26.



**Part 27– Ratlines.** When the shrouds are fitted and tensioned correctly, make and bind the ratlines to the shrouds using thin thread and using the knotting techniques shown in Part 23. Secure the end knots with a drop of instant glue.

**Part 28 – Shroud Boards** (bottom left-centre of the plan). Make these from 2x3 lime plank. The slot positions should be measured directly from the shrouds, and should not be larger than 1 mm wide. Attach them to the shroud with a drop of instant glue.

**Rigging the yards.** The recommended sequence for rigging is to follow the small numbers 1 to 48 shown on the FIG.B starting with the mainmast lower shroud lines numbers 1, 2 and 3. The terminal points are shown on the plan-view and side-view. Dual ropes indicate that the rigging is doubled and therefore needs two terminal points – one on each side of the ship. Apply glue to stiffen the tips of the lines to help insertion through block holes. Ensure that rigging is tight, but does not deform masts or spars.

**Detail drawing C** shows how to secure a rigging line to a belaying pin.

## Finishing off

- When the rigging is completed, fit mast end caps to the main and mizzen masts. Drill a  $\varnothing 0.8$  hole in the end of the two masts (to take a brass nail) and make up two end caps from  $\varnothing 3$  dowel drilled through with a  $\varnothing 0.8$  hole. Fix with glue and a brass nail.
- Secure the anchors in place on the bows. The anchor rigging is shown on Plan 2.
- Secure the flag on the flagpole and on the main topgallant mast. To give the flags an appearance of weight and droop in the absence of wind, fold and secure each flag in a draped position using some thin pins, and then spray the flags with fixer or transparent hair lacquer.
- Fix the figurehead in position under the bowsprit. Cut and bend the brass rail provided to make the three bowsprit supports on each side. Fix these to the bow with brass nails and glue.
- Varnishing: Leave all parts their natural colour and varnish them with matt varnish.

## Sails

Sails have not been included with this model as many model-makers prefer small models without sails. However, please note that a ready-made set of sails for the *Racehorse* may be purchased separately from Mantua Models: **Art 34012** refers.



## LIST OF THE MATERIALS CONTAINED IN THE KIT

**Plywood laser-cut board 1 mm** N. 12- 20- 22- 23- 24- 25- 26- 27- 28- A- B- C -D -F- G

**Plywood laser-cut board 5 mm** N. 1 -2- 3 -4- 5- 6- 7 -8 -9- 10- 11 -13- 14- 16- 19- E –rudder

### Limewood Planks

65 off 1x3x500

7 off 2x2x500

6 off 2x3x500

1 off 2x6x70

### White Maple Planks

28 off 0.5x3x500

### Walnut Planks

85 off 0.5x3x500

2 off 2x2x500

1 off 2x3x500

1 off 1x6x500

1 off 3x3x500

1 off 4x4x500

### Dowel

1 off Ø3x150

1 off Ø3x500

2 off Ø4x500

1 off Ø5x350

2 off Ø6x300

1 off hank of brass wire Ø1x250

1 off brass moulding 2x3x500

## FITTINGS

### Rope Pack

21m thin, light rope

30m medium, light rope

2m thick light rope

### Deadeyes Pack

28 off deadeyes Ø3

42 off deadeyes Ø5

### Blocks Pack

24 off 3mm single-hole blocks

24 off 5mm single-hole blocks

8 off 5mm double-hole blocks

### Ladders Pack

1 off right ladder side

1 off left ladder side

1 off strip 1x3x70 walnut

### Chainplates Pack

20 off Ø5 chainplates

20 off chainplate stirrups

### Flag Pack

1 off silk flag

### Plate Pack

1 off brass photoengraved plate

### Nails Pack

100 off nails 8mm

### Belaying-pin pack.

10 off Walnut belaying-pins 8 rnrn

6 off Rudder hinges

3 off Hinge pins

25 off brass pintles (eyelets)

### Anchor pack.

2 off Anchors

2 off Brass rings Ø6 rnrn

### Bombard Pack

2 off bombard barrels

4 off trigger guards

2 off supports

### Capstan pack.

1 off capstan Ø12x20

1 off cap Ø10x3

1 off brass disk Ø9x2

1 off Construction plans (2 sides)

1 off Instruction booklet

*Note: Depending on the availability of supplies the Mantua Model Group may from time-to-time, substitute alternative materials to those specified above.*

## PLANKING INSTRUCTIONS

Newcomers to this fascinating hobby, or those new to the construction of a Mantua Group period ship model, sometimes have questions when they start to work such as: "How big an obstacle is the planking? Is it possible to have something additional in the way of equipment or instructions to help in this most important part? Are there any photographs or diagrams that may help?" To assist you, we have produced this short instruction sheet in an attempt to lessen any problems you may encounter.

### PLANKING OR THE APPLICATION OF STRIPS

First, a short note on the background. Each vessel was originally clad with large wooden boards positioned longitudinally or diagonally to the line of the hull, either with one plank overlapping the next (clinker-built), or plank one adjacent to the next (carvel-built), and nailed onto the ship's frames. This covering, in addition to being necessary for buoyancy (after caulking and sealing the joints) also gave considerable strength to the whole vessel.

In the case of our own models, because of the nature of the materials used, the planking will be accomplished using not short planks, but with full strips wherever possible, and doubled up in most cases, as they were in the original vessels. This technique is made possible through the flexibility and quality of the materials provided.

To achieve a high quality finish to the planking, we suggest the following system that we consider is most effective, and which is demonstrated in the diagrams on the last page.

The planking operation begins on plan number 1 of each of our model's instructions. The position of the first plank is shown on a profile of the skeleton structure after assembly. This reference point normally corresponds to the highest point of the two or three central frames and coincides with the lowest point of the curve formed by the extreme tops of the frames themselves. Where required, use a strip bender to curve the plank so that it fits the shape of the hull.

The first strip applied must be perfectly parallel to the line of the keel and should be fitted at the bow, the other end projecting beyond the length of the hull as in Fig.1 below. If the ship is to be double-planked, the initial planks may be glued and lightly pinned to the frames. The pins are to be removed once the assembly has properly set. Please note that where the upper sections of the frames are to be removed later, the planks should be pinned only at these places, i.e. no glue applied.

Proceed in the same manner from the top to bottom, fitting each plank snugly against the other, checking that they can be positioned easily without having to unduly force or twist the plank longitudinally. **Be sure to cover each side of the hull alternately, working three to four planks at a time. This avoids twisting the hull.**

After a number of these 'easy' planks have been fitted, a certain amount of difficulty will be encountered in placing subsequent strips, as the planks will now want to overlap in some places. You will now have arrived at the curve or sheer, of the vessel. Planking now requires a different procedure. All the planks must adhere to, and lie flat against, the frames for their entire width without curling, twisting or forming strange and unwanted 'ears'. We need to overlap the new plank on the previously positioned plank, allowing the strips to guide us in determining at what point the overlapping is to begin at each end. Position this overlapping plank without gluing onto the central two or three frames of the hull (see Fig.2), holding the ends down with your fingertips, mark both ends where they overlap, with a pencil. Cut along the lines drawn, using a sharp craft knife (see Fig.3).

Reposition the cut strip on the hull, fitting it snugly against the preceding plank, making slight adjustments to the angled cut as necessary, to ensure an exact fit.

Now glue and pin the trimmed plank into position. Proceed with this method working towards the bottom of the hull i.e. towards the keel. Note that if this operation is carried out with due care, the planking will create the beauty of a wood inlay as the pieces fit together smoothly.

After proceeding in this manner for a while, we arrive at a point where the strips begin to leave a space (rather than overlapping). Irregular shaped spaces appear at the bow and stern ends of the strips as we position them alongside the preceding strips. Even in this case, let the strip itself guide you. Fix the strip into position, letting it follow its own natural curve. The spaces that are left, normally acute triangles, will be filled later with segments of strip carefully cut to shape (see Fig.4).

After the lower portion of the hull has been completely covered, proceed to cover the upper areas along the upper deck parapets (if this is relevant to your model), leaving the ends of the strips extending beyond the parapet line. This will be trimmed away later to achieve the correct outline when measured against your drawings (see Fig. 5). After the application of the first layer of planking over the entire hull, it will be necessary to smooth down the surface, removing the inevitable remains of excess glue, and leveling off any small imperfections in the planked surface.

Having finished the surface to your satisfaction, if you are working on a kit that is double planked, proceed to apply the second and final layer of planking. This will be the layer that is visible. Having gained the skills carrying out the first level, you should now be well able to ensure that the quality of the second layer is of a high standard.

The second planking will follow the same process, and, assuming a good level of preparation, should be somewhat easier.

In some instances, strakes or rubbing boards that stand proud of the planking should be fitted to the first level of planking, where indicated on the drawings. However the instructions may well direct you to fit them after the second-level planking has been completed.

## **FINISHING**

When the final planking has been completed and the glue is fully set, the next task is to smooth the entire hull. We suggest the use of a scraper, a small wood plane (set fine) and various grades of sandpaper.

At this point, after having trimmed off the excess planking, according to the general profile at the parapet line, proceed to install the handrails and the gunwales, which are those planks that extend beyond the planking.

For the handrails, since they will be placed flat it will be necessary, especially at the bow and stern sections, to cut the strips into small angled (trapezoidal) sections in order to follow the curve of the hull (see Fig 6). The joints between these sections should be carefully sanded to make them as invisible as possible and to achieve a smooth, continuous curve.

For the gunwales, the strips will be fixed "edge on". The thickness of the strips (usually 2mm.) means that it will be necessary to pre-form them to fit the curves. We suggest the following methods to achieve the desired curve. i) If only a slight curve is required, use a standard plier-type plank bender. If a deeper curve is needed, ii) soak the strip in very hot water for a minute or two, then carefully bend and hold the strip in position against the hull or over an object of the right shape until set. Alternatively, iii) wet the strip and use a wheel-type bender.

When the strip dries out it will be stabilized and can be placed into position. If there are a number of these pieces to make, build a jig to save time and increase accuracy.

At this stage, after ensuring the main decks are properly positioned, cut out the sections of the frames that are visible above the decks (extending up to the parapet tops), and smooth them off level with the deck surface. Proceed to plank the inside faces of the bulwarks, covering the inside of the first layer of white planks. Carefully sand this last section of planking smooth using progressively finer grades of sandpaper.

*The foregoing briefly describes the subject of planking in an effort to assist the beginner with what appears to be a rather daunting task but which can become a very satisfying achievement. The rest "as they say" is up to you. Take your time; use your own skill and ingenuity to develop your own methods having considered our suggestions.*

## **TOOLS FOR THE JOB**

Each individual may have their own idea about how many, or what type of tool to use and what to use them for. We set out below some general advice of modeling tools and their uses for your consideration. These are just some of the tools available. Please ask your supplier for details.

- **Craft Knives.** There are a number of sizes available, the larger handle being the most useful. There are many blades available from straight edge to curved and chisel ends, together with saw blades, etc.
- **Plank Benders.** There are two main types: i) plier-type strip bender for forming dry planks (used in most applications); ii) wheel-type bender suitable for bending wet planks.
- **Strip Clamp.** This is a quick release clamp for holding strips whilst you trim them. This also doubles as a hull clamp allowing you to work with both hands on intricate work.
- **Pin Pusher.** This tool is spring loaded. A pin is inserted headfirst into the barrel then the tool is used to punch the pin into the wood, removing the need to hammer pins in delicate places.
- **Balsa Plane.** A small plane with a razor-type blade, and can be set for a fine cut.
- **Scraper.** A razor-type blade used for finishing flat surfaces.
- **Pin Vise.** A tool that looks like a jeweller's screwdriver but with collets of varying size, and which can take the smallest drill bit and act as a twist drill.
- **Sanding Stick.** A small plastic spring-loaded stick with a tapered end that takes a thin sanding belt, for sanding in tight places.
- **Razor Saw.** There are various grades of miniature saw blade available that all give a very fine cut. They are usually tenon-backed and can be obtained in sets to include the handle, mitre box, or just the blade.

