TRANSLATION LINKS

1. type into your browser ... **english+italian+glossary+nautical terms**
2. utilise the translation dictionary 'Nautical Terms & Expressions' from Euromodel website

A research paper including an *interpretive* build

Aiax

1765 version of 18th. Century European Frigate

Scale 1:72

Checked the Resource Information File ?

07.ANCHORS to PUMPS

May, 2022 **(editing continues)**

This *interpretive* build is based on the supplied drawings, the kit material – *and a considerable amount of extra material.*

This work only illustrates how this ship might be built.The level of complexity chosen is up to the individual

This resource information was based on the original text supplied by Euromodel and then expanded in detail as the actual ship was constructed by the author, 'piratepete'. Neither the author or Euromodel have any commercial interest in this information and it is published on the Euromodel web site in good faith for other persons who may wish to build this ship. Euromodel does not accept any responsibility for the contents that follow.

This file (like all others in this set) is ***not*** typical of instructions found in most kit builds.

The text and associated images show how the build was researched & interpreted.

Many steps could have been simplified (or omitted) by only using the 'kit' contents but the Euromodel philosophy has always been that additional material would be required, dependent on the skill of the individual builder.

This is especially the case when considering the many features on the gun deck not visible externally. It is planned to partially expose part of this deck through a cut-out in the hull on one side.

Plan Sheet 2 offers the opportunity to explore more fully the important features to be found within the ship. This set of drawings is the very foundation for this build but is not a prescription for how the individual will build the ship.

The contents in the supplied box is a collection of Euromodel-resourced material but should never be viewed as simply a kit that is to be assembled to produce a replicate copy of what may be seen as the Aiax.

Many have interpreted this ship as having the name 'Ajax' but that is not so.

This ship was French-built, captured by the English and re-built with the many features expected to be found on an English ship. That is why the cover page on each of the Aiax files describes the ship as a 'European frigate' rather than an 'English frigate'. Some builders with a historical interest have questioned the authenticity of this ship, believing it to be one of a number of named 'Ajax'- that is not the case for this model.

To build the Aiax using the Euromodel drawings is a fantastic opportunity to engage in a quasi-scratch ship without getting into all the demands of a scratch build.

Plan Sheets 2 and 4 were used for the *base references*.
Plan Sheet 1 is useful in looking at the rigging BUT many other details in that drawing are *conceptual*; dimensional accuracy and positioning should be gleaned from other drawings or at the very least by using common sense.

Reference Texts

The Masting and Rigging of English Ships of War 1625 – 1860 by James Lee (1984). Another indispensable book ! Without this, the masting and especially the rigging would have been difficult.

The Construction and Fitting of the English Man of War 1650-1850 by Peter Goodwin (1984)

Historic Ship Models by Wolfram zu Mondfeld (1989).

[To navigate through the contents – use 'control + click']

Contents

Illustrations

[The figures below are not hyperlinked]

Chapter 1: ACCESSORIES (anchors – pumps)

ancora

Anchors

The larger **sheet anchor** (ancora di speranza) and the smaller **bow anchor** (ancora di posta) are to be found on each side at the bow end. The attached ropes are connected to a nearby capstan. Buoys floating on the water surface indicate the vertical position of each anchor.

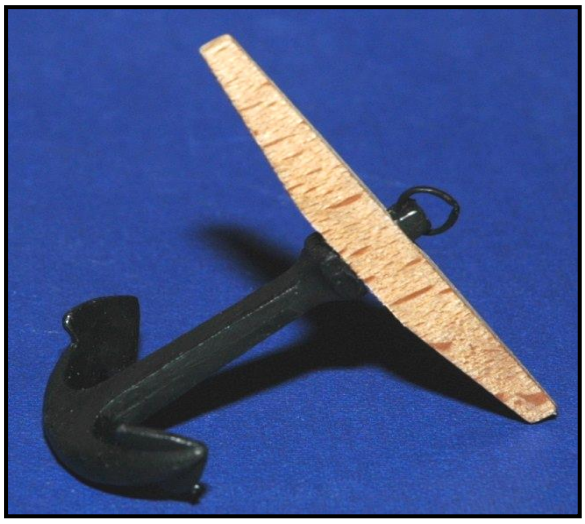


Figure 1: Stock, Anchor & Ring

The top of the shank (above the wooden stock) will need to be very carefully drilled through to accomodate the anchor ring. There may well be an impression of a hole, but this will need to be re-located further up the metal shank due to the thickness of the stock. This fits in well given the diameter of the anchor ring. The metal is fragile and and drilling must be done by hand ***very slowly*** to avoid breakages. [I had to reduce the thickness of the stock slightly before doing all of this!].

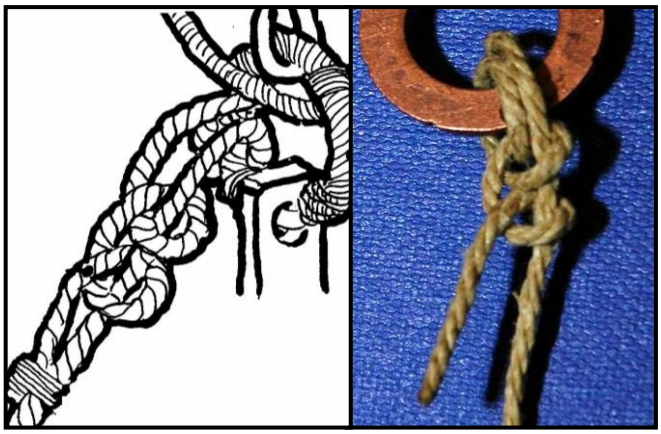


Figure 2: Fisherman's Knot Detail

Anchor Cable

At sea, the cable was often unreeved (‘unrove’ or ‘undone’) from the anchor ring and secured along the deck. During the 18th. century, the cable was secured to the ring with an ‘fisherman’s knot’ - some references confirm its use on Mediterranean vessels during this time. The ‘fisherman’s knot’ is an easy knot to create. Figure 9 illustrates this knot. Do not colour the rope to simulate tar. Historically, these ropes were not coated with tar – handling would be difficult and in any case the ropes readily dried out after immersion.

So ... sheet anchor cable = 1.5 mm./ bow anchor cable = 1.0 mm.
seizing rope = 0.25 mm.

Figure 3: Completed Fisherman's Knot

The metal castings approximated very close in *length* to the drawings but the other dimensions were markedly different. The wooden stocks were also different in their dimensions when compared to the described size and appearance but could not be modified to suit the drawings.

Sheet Anchor
(ancora di speranza)

Wooden Stock
Easiest approach was to just use the timber stocks as supplied.

However, in this build, the stock was built from scratch creating a longitudinally divided form (i.e. baulks) and made from scrap timber to the drawing size of ***48.0 x 5.0 x 5.0 mm.*** Creating the baulks requires considerable care and working with scrap timber was easier than trying to work with the supplied piece.

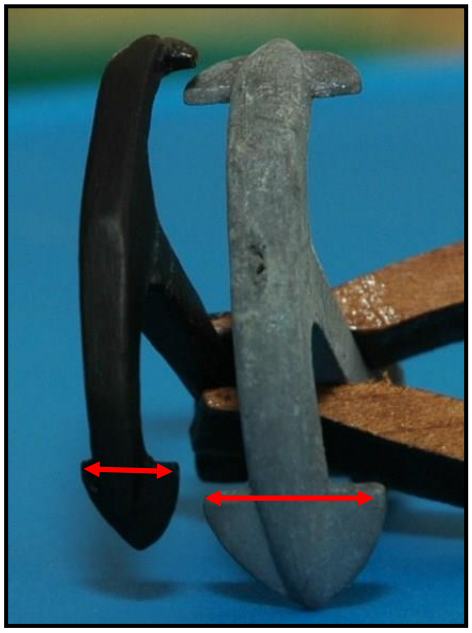


Figure 4: Reduction in Width of Fluke

Metal Anchor
Easiest approach was to just use the anchors as supplied.

Having created a wooden anchor stock of the plan dimensions, there was little choice but to then reduce the dimension of the metal anchor. ***Severe*** (but careful) filing of all aspects of the casting did create an anchor that was much more in proportion to the stock (Figs. 4 & 5). Face mask & gloves were used as this took much handling and time.

Figure 5: Reduction in Width of Sheet Anchor Shank

- Reduction in length of fluke (11 mm. to 8 mm.) and width of fluke (11.9 mm. to 7.3 mm.)
- Reduction of shank base (4.55 mm. to 3.4 mm.) and tapering to shank top (4.5 mm. to 2.8 mm.)
- Upper shank reduction (4.2 mm. to 2.6 mm.)

There was a need to identify & create a new position for the anchor ring.

Bow Anchor

(ancora di posta)

Wooden Stock

Easiest approach was to just use the timber stocks as supplied.

However, in this build, the stock was again built from scratch creating a longitudinally divided form (i.e. baulks) and made from scrap timber to the drawing size of ***40.0 x 3.5 x 3.5 mm.*** Creating the baulks requires considerable care and working with scrap timber was easier than trying to work with the supplied piece.

Figure 6: Reducing Bow Anchor Dimensions

Metal Anchor

Easiest approach was to just use the anchors as supplied.

Having created a wooden anchor stock of the plan dimensions, there was again little choice but to then reduce the dimension of the metal anchor. ***Severe*** (but careful) filing of all aspects of the casting did create an anchor that was much more in proportion to the stock (Figs. 4 & 5).

The fluke size was significantly reduced from a width of ***8 mm.*** to ***5 mm.*** and the shank was squared and given a taper (***2.5 mm.*** finished to ***2.2 mm***.). Face mask & gloves were again used as this took much handling and time.

Figure 7: Bow Anchor Hoops

Metal Hoops

For both anchors, these bands hold the baulks together using ***0.5 x 1mm*** timber strips. I found it easier to glue these on rather than use metal such as brass. To make the task a little easier, the strips wdere painted black before cutting them into suitable short lengths & applying to the baulks. The method of application was to simply apply each ‘hoop’ in four pieces working around the four faces in that order. The stock will remain ‘natural timber’ so any glue residue needs to be carefully removed as you work.

Anchor Ring

The four brass rings supplied were all approx. 6.5 mm. in diameter and will be utilised by most modellers. However, it was here again that I decided to work from the diagrams and created two ***9 mm.*** rings for the sheet anchors and two ***8 mm.*** rings for the bow anchors from some 0.81 mm. brass rod. Of interest, the ring would have a series of puddening – strips of tarred cloth followed by rope and finally some fine yard applied at each end of the rope and also in the middle. At this scale, it is reasonable to only apply the rope (***0.6 mm***.) – see Fig. 8. At this stage, the top of the shank (above the stock) will need to be very carefully drilled through to accomodate the anchor ring.

Figure 8: Anchor Ring

Anchor Lining

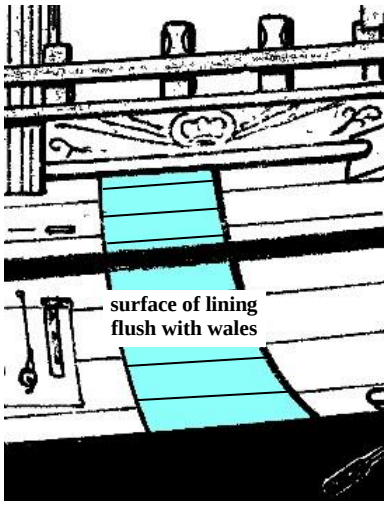


Figure 9: Anchor Lining

Although the cathead was designed to keep the anchor clear of the side of the ship whilst it was being lifted, there was always the tendency for it to swing inwards, damaging the hull. An external 'anchor lining' consisting of short sections of extra planking were fixed onto the hull as shown in Fig. 9 and were easily replaced when damaged. Of a thickness that produced a ***surface flush with the wales***, the aft edge is seen to be 'circular' (late in the 18 Century, this was simply vertical).

It is typically made from second planking.

Fig. 10 shows that not all builders include this feature !

Figure 10: Anchor Lining Omitted

Beakhead Ornamentation

The beakhead or '*knee of the head*', a continuation of the stem post, is a large flat piece of timber supporting the ornamental figure placed underneath the bowsprit.

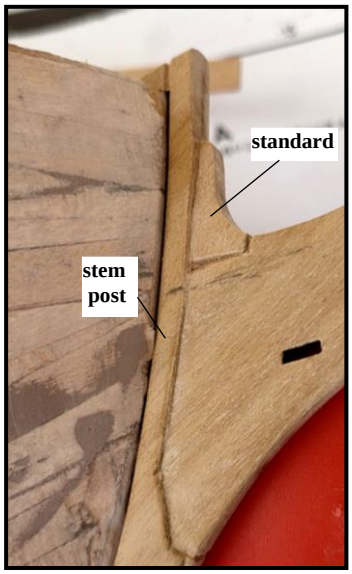


Figure 11: Standard Knee

It is secured to the bow of the ship via …

- two horizontally mounted knees - '*cheeks of the head*' - at the lower end,
- another knee, the *standard* (Fig. 11) at the upper end.

In the Aiax, there are ***three head rails*** with segments of head timbers between them (refer to Fig. 12 below). In the majority of models, builders tend to place the timbers behind the rails.

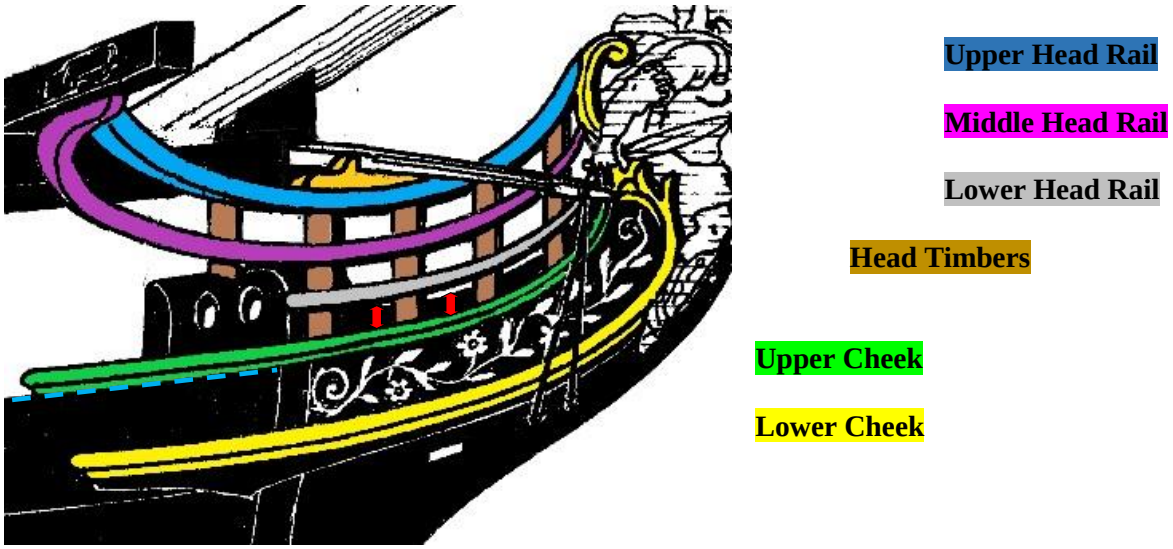


Figure 12: Plan Sheet 2 Aiax Cheeks & Rails

The ***upper cheek positioning*** has a critical relationship with the wale upper edge (broken blue line) and the upper edge of the beakhead (solid fred arrow). Whether and/ or how this is achieved will be up to the skills of the builder.

The 'kit' does not provide material for creating the cheeks and rails.

The cheeks were made from ***2 x 2 mm.*** walnut scrap material that had been soaking in ammonia solution for many months (temporarily forgotten about) ! It is suggested that if using ammonia solution, at least a few weeks immersion would be a minimum.

Figure 13: Build Example of Aiax Cheeks & Rails

Close examination of Fig. 13 – another build - shows the top cheek correctly abutting the wale top edge.

Difficult to discern but that cheek continues out over the beakhead just below its top edge.

The lower cheek positioning illustrates the difficulty in placing that timber over the wale.

chiesuola della bussola

Binnacle

Overview

The 17th. / 18th. binnacle [or Fr. *bittacle*] was a wooden case with glass panel(s)/ wooden lift-up vertical shutter through which a compass could be viewed. Illumination for night use was enabled through the inclusion of ship's lanterns. Additional features usually included drawers and cupboards.

The Euromodel drawings appear to suggest that this cabinet was without any upper doors or shutters and that would not be the case. Even so, they were not included in this build.

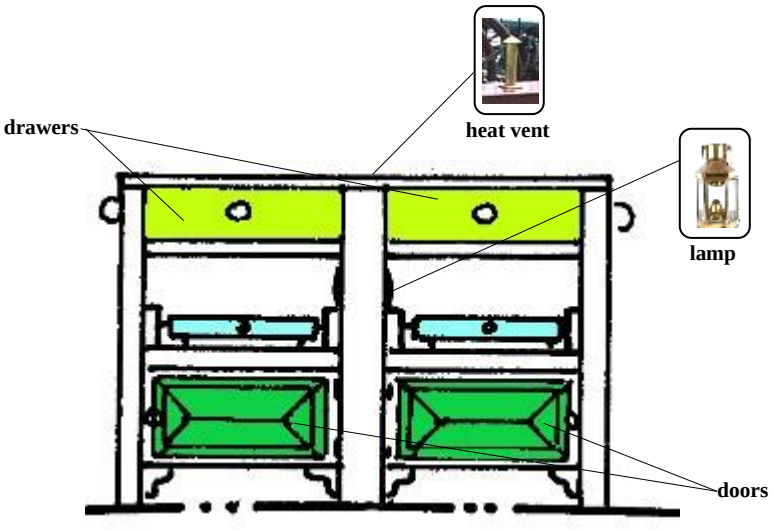


Figure 14:Binnacle

Figure 15: Binnacle from another Builder

In this ship, there are **two compasses** with a ship's lantern in the centre. The *illumination would be far from perfect* and without solid doors or shutters, there was the obvious *danger that the light could be seen* at a distance from the ship. On top of the binnacle, there would be a vent to allow the heat generated by the lamp to escape.

Small errors become magnified !!!

Lamp & vent: modified stanchions

Compasses: sections of 5 mm. rod

To create these thin sections, a very short length was glued on to a 4 mm. rod which acted as a supporting handle. Holding this very carefully against a sanding disc, the wood was reduced in thickness ... and the glue began melting ... which actually allowed the thin section to be easily removed from the supporting handle ! Little bit of practice but it became an easy exercise.

Figure 16: Binnacle Produced

Door & Drawer Handles: nails

argano di tonneggio

Capstans

The kit supplies …

11x16 mm. (1)

15x20 mm. (1) - [in this build, used for anchor capstan]

20x25 mm. (1) - [in this build, used for main capstan]

i.e. three capstans included, but only using two depending on skill level

Most builders utilize the supplied capstan – complete with dome, spindle and rounded base along with the whelps that are added around the spindle. That capstan, whether modified in size or not, is seated onto the planking at an appropriate place. Hence, the rounded base serves a useful purpose in a kit build.

The spindle continued down to the deck beneath. There is a square structure, the 'step' (yellow) embedded in the deck planking and this is explored in more detail later.

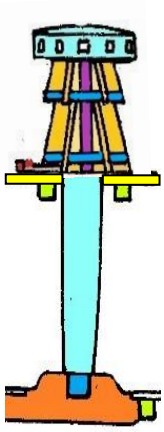


Figure 17: Main Capstan

If the step is to be included, the rounded base should be removed

Figure 18: Typical Kit Capstan

Main Capstan

argano di tonneggio

Located ***on the main deck aft of the main mast*** and used for general lifting

The capstan, ***15 x 20 mm.*** height, approximates to the drawing dimension – except for the smaller head. Using this capstan size is the easiest approach and all that is required is the assembling of the six whelps and creation of the bars (Fig. 15). A further enhancement could be to square the round holes.

There are at least two other approaches to the capstan construction…

A: *Modifying a 20 x 25 mm capstan (leaving the rounded base)*

There may be some earlier kits around that do not contain this size capstan. It was later included at my suggestion.

Fig. 16 shows both the original capstan (***15 x 20 mm***) and a modified form ***20 x 25 mm*** – the latter having a reduced height and head – now both similar to drawing sizing.

In this format, there was no intention of constructing the capstan step.

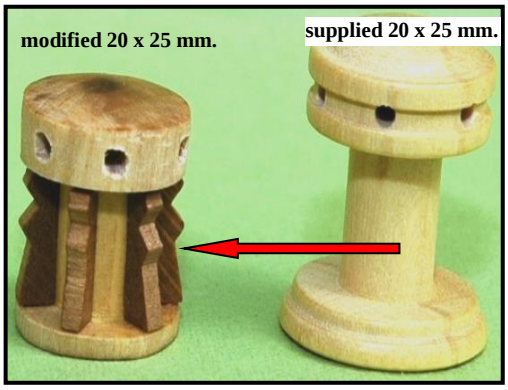


Figure 19: Modifying the Main Capstan

Modification Details

- the dome-shaped top sanded almost flat but retaining a slight curve.
- upper & lower 'lips' on the head were removed leaving head diameter at approx. ***16.45 mm.***
- base thickness reduced to ***2.1 mm.***
- base diameter reduced to ***15.5 mm.***
- head was cut off flush at top of spindle.
- head thickness reduced to ***6.0 mm***.
- spindle reduced in height slightly so that combined the dimension was then ***19.5 mm.***
- head was fixed back onto spindle.
- six whelps were fixed into position around the spindle.

head diameter = **16.45 mm.** (vs. *drawing size of 16.65 mm.*)
base diameter = **15.5 mm.** (vs. *drawing size of 15.3 mm.*)
overall height = **19.5 mm.** (vs. *drawing size of 18.50 mm.*)

B: *Modifying the 20 x 25 mm capstan sizing and removing the rounded base*

Without the rounded base, the intention was to create the capstan step and add the capstan directly over that.

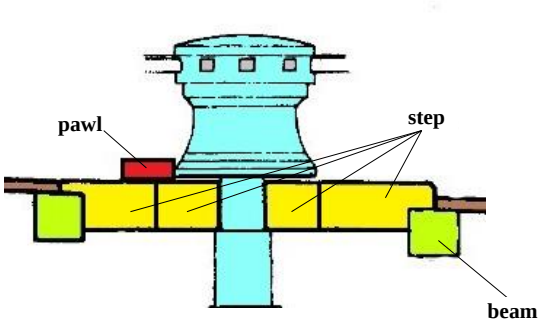


Figure 20: Capstan & Step

Underneath the capstan were massive timbers (shaded yellow in Fig. 17) that extended between two deck beams (shaded light green - one fore and one aft) to withstand the huge torque generated by the turning capstan.

These timbers were generally much wider (e.g. 20 – 24 inches/ ***7 – 8.5 mm.*** at this scale) than the deck planking.

When attaching to the deck, the capstan in this build was seated over a ***2 mm. x 42 mm. x 42 mm.*** step used to represent the small section protruding above deck level.

argano di tonneggio (cont.)
argano

Anchor Capstan

argano

Located on the gun deck aft of the foremast and used for raising/ lowering the anchor. Capstan spindle supported by a spigot/ step just below the deck.

Unless this is a *total scratch build*, the spindle and spigot shown below the gun deck would not be considered.

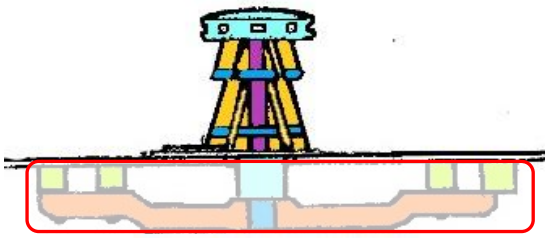


Figure 21: Anchor Capstan

The supplied capstan, ***11 x 16 mm.*** height, approximates to the drawing dimension – except for the smaller head. Using this capstan size is the easiest approach and all that is required is the assembling of the six whelps and creation of the bars (Fig. 15). A further enhancement could be to square the round holes.

A decision was made to use the ***15 x 20 mm.*** capstan instead and modify its dimensions.

Modification Details

- dome-shaped top sanded almost flat but retaining a very slight curve.
- upper & lower 'lips' on the head were removed.
- base thickness freduced to ***2.2 mm.***, thus removing the bottom 'lip'.
- spindle was cut through level with the top of the base.
- whelps were fixed into position around the spindle.
- top section of the capstan + whelps was reduced in height to ***14.0 mm***. by carefully sanding the base of the whelps.
- thin circular base was glued back onto the bottom of the whelps.
- ***3 mm*** rod was pinned into the capstan base

head diameter = **12.2 mm.** (vs. *drawing size of 12.25 mm.*)
base diameter = **12.3 mm.** (vs. *drawing size of 11.0 mm.*)
overall height = **16.1 mm.** (vs. *drawing size of 15.5 mm.*)

Fig. 19 shows the anchor capstan pinned to the gun deck immediately below the hatchway

Figure 22: Anchor Capstan

Historical Features of Capstans

(not generally included in kit builds)

Pawls

Plan Sheet 2 indicates the presence of pawls for the main capstan but on the anchor capstan that is barely discernible. Both pawl sets were included and constructed from scrap material.

Continental and early ships featured timber pawls (red) that were pivoted on a timber plate (brown) adjacent to the capstan; they were designed to engage in square holes in the base plate. This prevented the capstan from rotating backwards when the pressure on the cable was uneven.

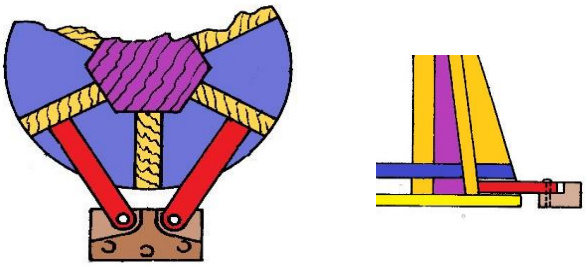


Figure 23: Early Pawl Design

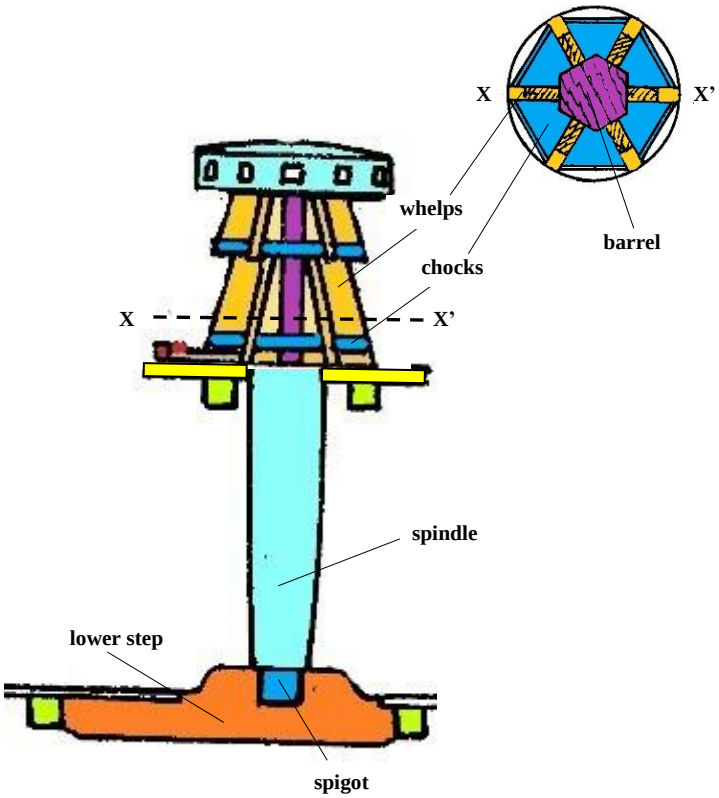


Figure 24: Main Capstan

- ***Whelps*** (supplied; orange) arranged around the barrel to help prevent the rope from slipping.
- C***hocks*** (dark blue) fitted between these whelps to strengthen the capstan.
- ***Spindle*** (light blue) an extension downwards of the capstan barrel (purple).
- ***Spigot*** (dark blue) at the spindle base fitted into the ***lower step*** *(dark orange)*.

gru di capone

Cathead

This was a heavy beam extending well out from the hull to allow the lifting of large metal anchors without damaging the wooden hull.

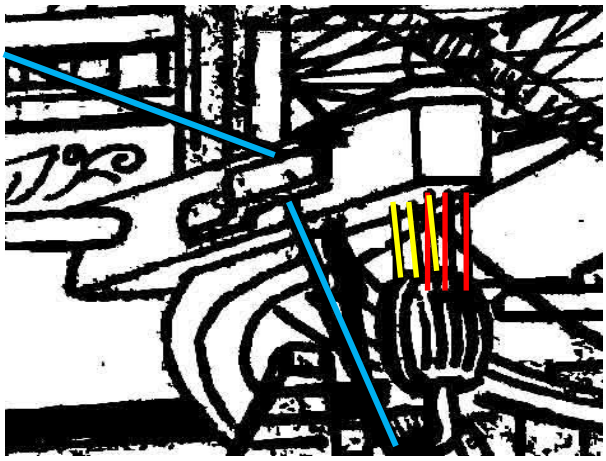


Figure 25: Cathead Rigging

The anchor tackle is reeved through sheaves (outer, front holes shown in red & rear in yellow) in Fig. 22) and belayed to a cleat or timberhead on the forecastle rail.

The drawings in Plan Sheets 1, 2 & 4 (not 'bis 02' as indicated on Plan Sheet 2) show a fourth sheave on the side of the cathead (rope passing through this sheave shown in blue) with the function of securing the bow anchor if it is left hanging from the cathead.

The six holes simulating the three sheaves in the cathead beam were produced using a very fine drill. The hole drilling was done slowly to ensure that the bit was at right angles to the surface. Even so, each hole was started ***from both sides*** and with some patience, the holes were formed and channels carefully cut into the surface between each pair of holes.

Simplified Fourth Sheave

Measurements from two different drawings indicates a thickness of ***3.5 mm*** or ***2.8 mm.*** For the sheave ('pulley') on the side of the cathead beam, the sheave could be represented by just inserting a brass planking nail or even a thinned-down small deadeye.

Enhanced Fourth Sheave

A ***2.5 mm.*** diameter brass sheave (thickness of ***1.1 mm***.) was used on the side of the cathead beam as shown in Fig. 23. The housing for the side sheave was made from a piece of ***4.75 x 3.5 mm.*** wood piece (by laminating some scrap planking material followed by some sanding).

Figure 26: Cathead with Metal Fourth Sheave

Chain Plates

(dimensions shown are for deadeye strap diameter + length of strap below)

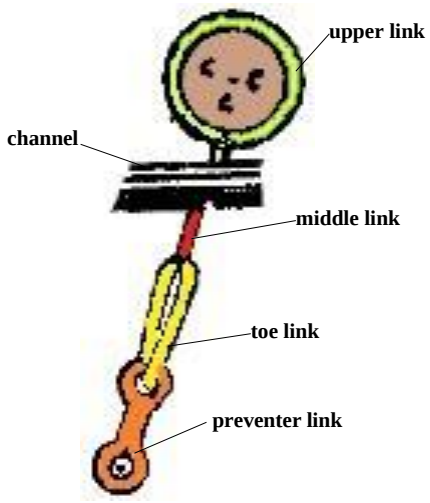


Figure 27: Chain Plate Terminology

(6) 3mm. + 21 mm.
(18) 5mm. + 21 mm.
(22) 7mm. + 22 mm.

The lower deadeyes of the shroud rigging are encased by a metal strap ('upper link') which passes through the channel and is attached to the hull side via a set of other metal links as shown in Fig. 24.

However, Euromodel have provided the full chain plate length and not any of the individual links.

The reality is that in builds from kits produced by many companies, the link assembly is replaced by a single 'chain plate'. The majority of builders of the Aiax will follow this more simple method. Euromodel included the metal links in their drawings out of historical interest without the intention that builders should follow that pathway.

2D Perspective

The interesting aspect of the drawings is that they can only show the chain plates in a 2D perspective (Fig. 25, black line). For the foremast shroud plates, the length is shown as approx. 20 mm. The 3D perspective of a chain plate (broken blue line & actual length on the build) is actually of a greater length (approx. 22 mm.)

The chain plates provided are often perceived as being too long but when the above comment is taken into account, they are much closer to what is required.

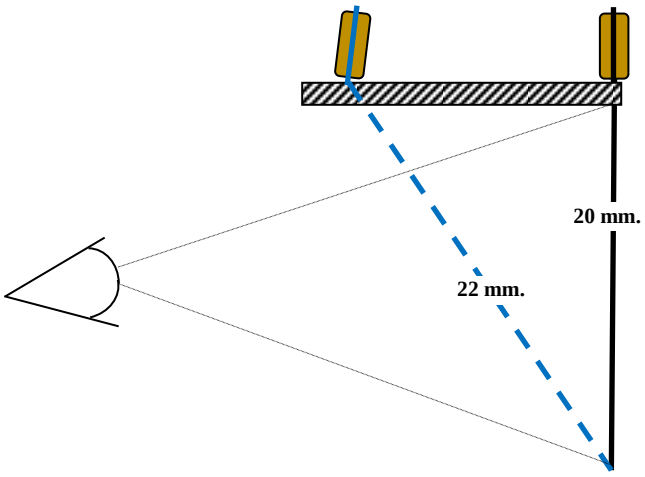


Figure 28: Foremast 2D & 3D Chain Plate Perspectives

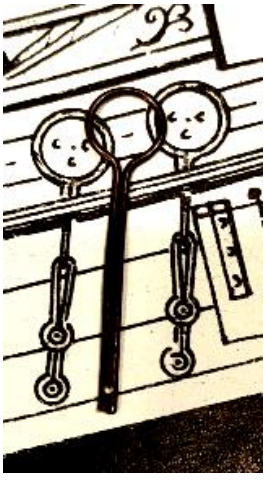


Figure 29: Not a Difference in Length !

Having stated the above, modifications of the length ***will*** be required at certain positions along the ship.

Another aspect to take into account is that most builders will bend the bottom section of the provided chain plate to provide better fitting against the hull (and so forming a 'preventer link'.

parasartie di trinchetto

Channels

Fore Channel

- Width of the working piece needs to be a minimum of ***13.4 mm*** wide to allow for the curvature of the interior edge.

- Supplied piece is only ***11.0 mm.*** wide
  an additional strip added to the inner edge.

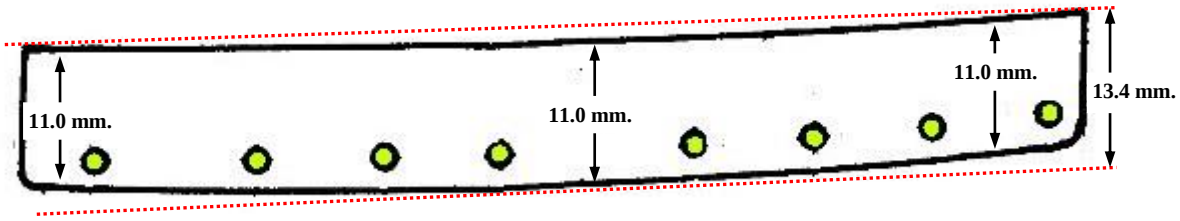


Figure 30: Fore Channel Curvature

It is suggested that the channels be made ***slightly longer*** and then shortened as necessary before fixing.

Holes vs Slots

From two respected authors, there is a slight contradiction regarding introduction of slots for the chain plates instead of the holes.

Anderson (1955, 37) ....”*Deadeyes in the period 1650-1720 and **later** were set in slots on the outer edge of the channels, and covering strips were nailed over them*”

Goodwin (1987, 187) ... ” *In 1771, an improvememnt was made to facilitate removal of the deadeyes, for replacement or maintenance. This modification required slots to be cut into the outer edge of the channel, in place of the original holes through which the chain plates passed. Over these slots, along the edge, a thin capping was nailed, to prevent the deadeyes and chainplates from being unshipped. This batten was made to **2/3 of the thickness of the outer edge** of the channel, and was generally fashioned with a plain moulding*”

Anderson’s research was based on an examination of a vast array of ship models that were built in the same time period that the actual ships were built and so his comments are generally quite accurate. Based on his comment, there is little doubt that channel slots would have been used on the Aiax instead of holes.

In building the Aiax, whether holes or slots are used is entirely up to the builder. Either approach would be acceptable; in this build, it was ***decided to remain with the holes***. However, some of the following photos (from other ships) show slots but they are included to clarify certain points of construction

If the holes or slots are created too early in the building process, then the photo in Fig. 28 illustrates a likely outcome.

Figure 31: Slots for the Chain Plates

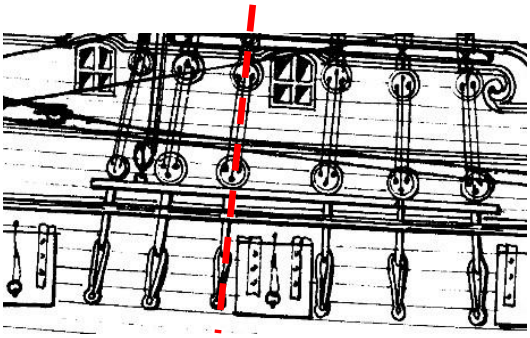


Figure 32: Shroud and Chain Plate Alignment

Fig. 29 shows the necessary alignment of the shroud lines with the underlying chain plates. It is recommended that the holes/ slots ***be determined only after the shroud lines are ready to be installed***.

Supports

Due to the lateral stresses that the shrouds control, the channels were typically pinned through the hull side and greatly strengthened by the presence of knees and spurs (Fig. 30) located along the channel upper surface. No ship of this size would have been built without them but strangely, they are absent from this Euromodel-designed ship.

Due to the presence of gun ports, their distribution along the channels was invariably uneven.

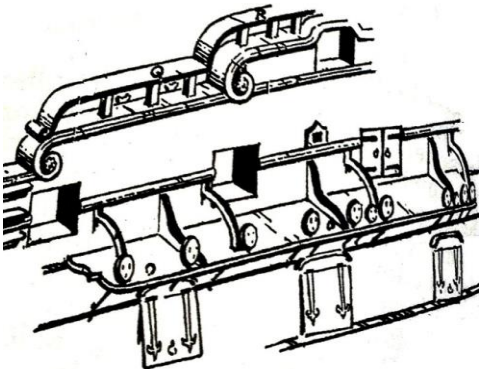


Figure 33: Channel Spurs & Knees

How they are produced is up to the individual but one person made the comment … "the metal spurs were made from 0.8 x 1.5 mm. brass strip using a combination of looping & needle nose pliers". Brass pins were installed to help hold the channels in place.

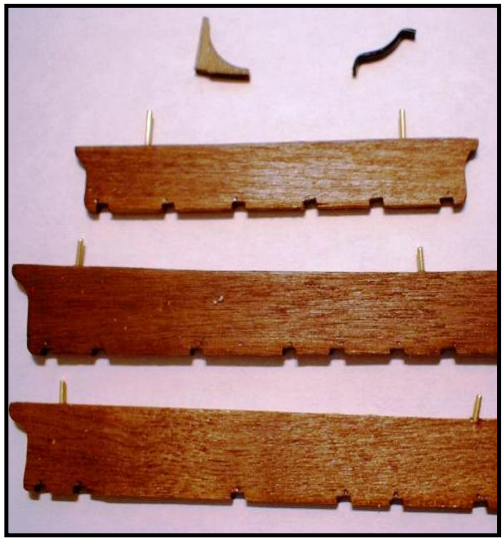


Figure 34: Channel Support

In contrast to the pinning shown in Fig. 28, one builder simplified matters by resting the channels on brass pins (Fig. 32) - not a recommended practice.

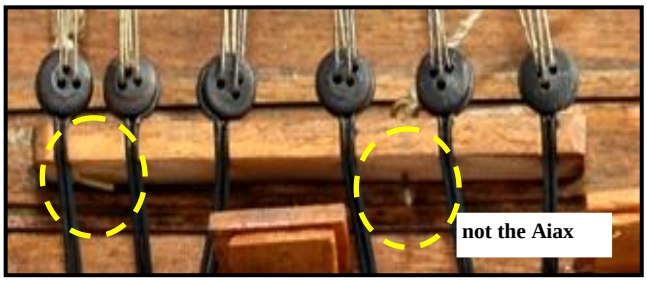
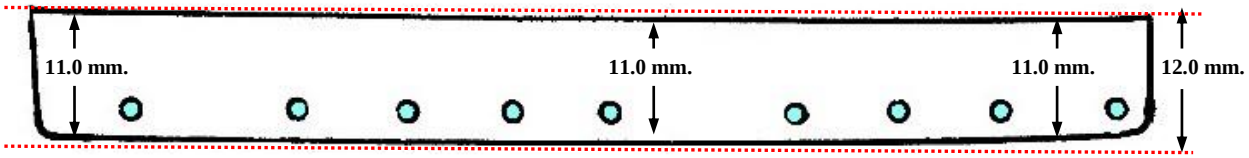


Figure 35: Pinning Underneath a Channel

parasartie di maestra

Main Channel

- Width of the working piece needs to be a minimum of ***12.0 mm*** wide to allow for the slight curvature of the interior edge. There is some variation in the drawing width but it was taken to be a constant ***11.0 mm.***



parasartie di mezzana

Mizzen Channel

- Width of the working piece needs to be a minimum of ***11.0 mm*** wide to allow for the slight curvature of the interior edge. There appears to be a slight change in the curvature at both forward and aft ends in the drawing width but it was taken to be a constant ***10.5 mm.***

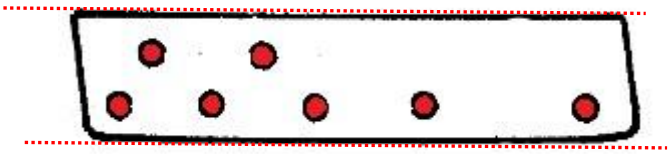


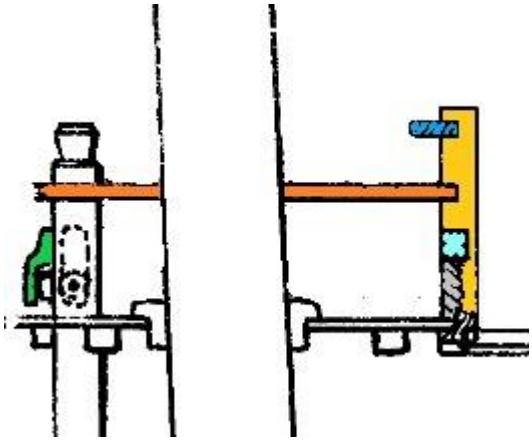
Figure 37: Mizzen Channel

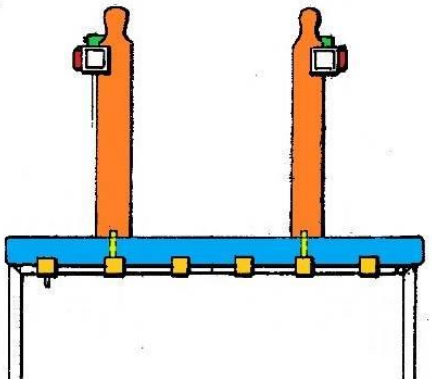
pazienza

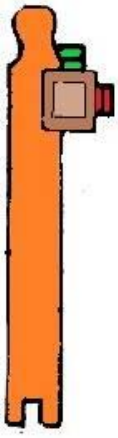
Fife Rails

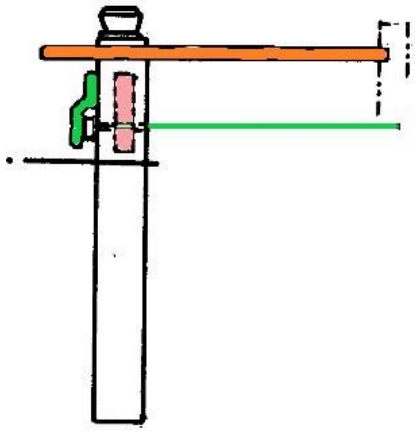
Fore Mast

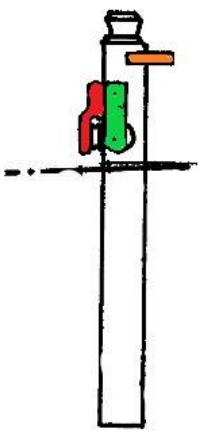
Main Mast











cucina

Galley Stove

Complete Stove

As a diversion, a representation of a stove was constructed. Using some pieces of scrap timber and some basic tools, a stove was easily produced in a few hours. Whilst the stove would not be visible, the effort was still worthwhile!

Constructional Points:

Overal dimensions (without lower chimney section) … ***15.5*** height ***x 21.0*** depth ***x 30.0*** width

- stove oven produced from some scrap 10 mm. plywood.
- oven top surface was from some scrap mahogany plywood which was glued on top and then sanded back to 1.5 mm. thickness.
- base of the stove itself was created from some 5 mm. thickness scrap timber.
- two 'hotplates' were small sections of 8 mm. rod glued on and then sanded back to approx. 0.75 mm. thickness – a delicate operation.
- oven doors were added along with some handles – from 6 x 1 mm. walnut planking scrap.
- stove body painted with a 'metal' wash followed by a black wash. The latter served to create a well used stove.

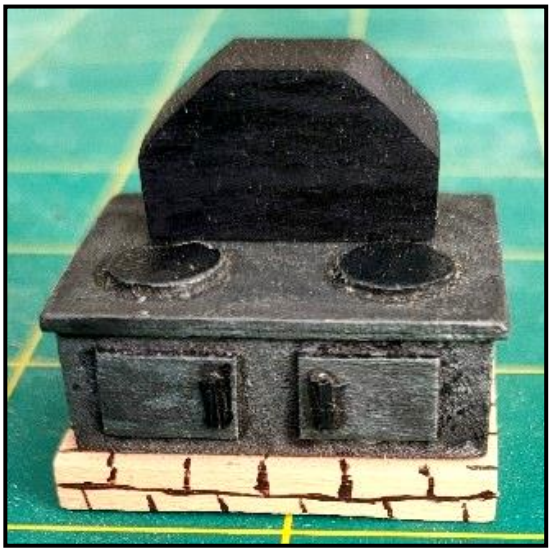


Figure 38: Stove with Part Chimney

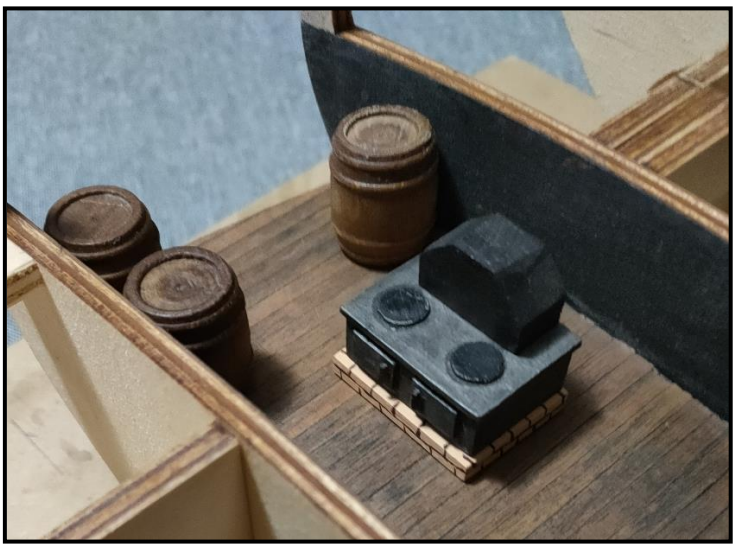


Figure 39: Chimney Base Just Below Gun Deck Level

- base was made from some scrap 5 mm. timber and reduced down to 4 mm. It represents two layers of heat insulating refractory bricks. They tended to be a ceramic base rather than clay and so usually white or cream in colours.
- stove was fixed in position *using the gun deck chimney opening* as a reference.
- bulwarks forward and aft could have been planked and a door included.

camino della cucina

Chimney

Figure 40: Chimney Dry Fitting

Making only the chimney and fixing that onto the gun deck surface would be the easiest approach since the stove cannot be seen. The drawings show the chimney is built up from four sections of planking fixed together … in this build it was made from 10 mm. thick timber, tapered, a ***3 mm.*** hole drilled in the top which was then squared (Fig. 37).

The gun deck opening needed enlarging.

Figure 41: Chimney Seated on Adhesive

Adhesive was placed onto the gun deck in the appropriate position or the top of the stove underneath and the chimney placed over that.

Figure 42: Chimney Position Determined by Main Deck

In either case, the main deck was temporarily placed in its position so that the chimney could be correctly determined.

Neither the chimney or deck had been fixed at this stage – at a later stage, an enclosing set of ***0.5 x 1.0 mm***. pieces were added around the chimney where it passes through the deck.

Gunports

The *vertical sides, following the frames, would always be perpendicular to the keel* but generally the upper and lower sills followed the planksheer curvature creating a slight parallelogram towards each end of the ship (refer to Fig. 40 below). On a large ship with largely flat decks, this would be minimal but on smaller ships, this curvature would be more accentuated. Fig. 40 shows, a distinct planksheer curvature causing the upper and lower timber sills to be angled.

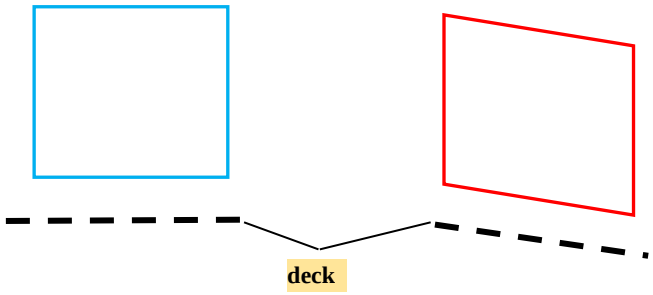


Figure 43: Planksheer and the Timber Sills

There are debates and arguments over the fitting of the gunport lid so that it is flush with the hull surface when closed. Two different approaches to achieving this are shown below.

The following description was found some time ago but cannot be exactly referenced ….

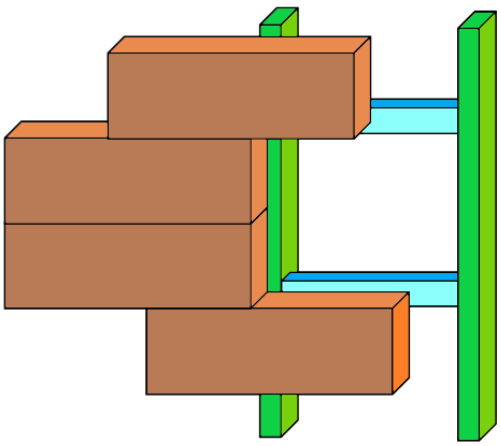


Figure 44: Gunport (diagrammatic)

… the typical gunport was formed from two vertical ship's frames (green) and an upper and lower horizontal sill timber (blue).

The strakes were so arranged to form a ***partial overlap*** of the four gunport timbers.

From Fig. 41, it can be seen that the lid will fit in the recess and therefore be *flush with the exterior hull surface.*

battuta portelli cannoni

Gunport Battening – Plan Sheet 11

*The gunport lid should cover the opening **and** the surrounding exposed framing.*

The additions of battens to the inside edges of the gunport opening is an attempt to portray the exposed part of the framing (sills and frames) that physically forms the opening. Fig. 42 shows a 'passable' representation of a gunport (not this build) *without any framing for the gun and main decks* !!! Perhaps that explains why no batten material is supplied in the kit ? What is evident is a raw cut-out opening with the gun carriage visible behind.

Figure 45: Gunport Framing Omitted

The squares shown in the ***mid-line sections*** in Plan Sheets 1 & 11 (Fig. 43) illustrate the area (***12 x 12 mm***.) occupied by the gunport lids.

The ***outside view drawings*** indicate the gunport opening size but the drawings show considerable variations. Overall, it could be interpreted that the openings are ***10 x 10 mm.*** with a ***1 mm.*** thick battening.

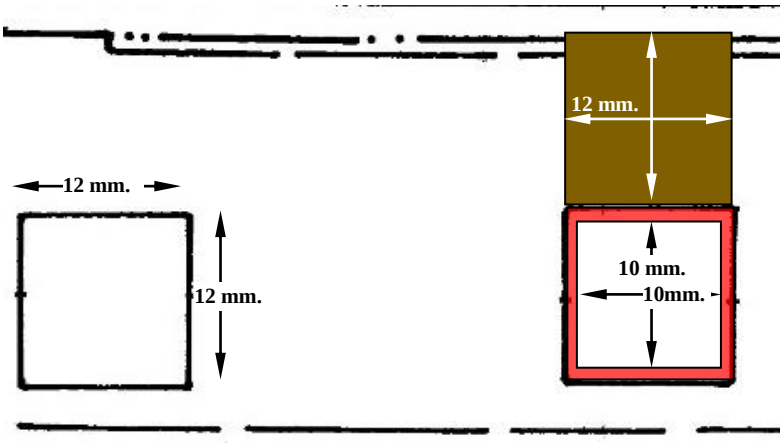


Figure 46: Plan Sheet 11 Gunport Openings (1 mm. battening)

Batten Lining

If, after forming the gunport opening through the first and second planking, the intention is to line the gunport opening with ***1 mm.*** batten material (Fig. 44), an opening of ***12 x 12 mm.*** would be cut out of the hull side.

The inserted battens would be set in slightly from the hull surface but given that the total hull thickness is not great, *the tendency will be to go flush* to enable those replicating strips to be fixed satisfactorily against the cut-out surfaces. A small dilemma.

Figure 47: Gunport Lining Strips Set Back

Framework

Figure 48: Framing Inset Into Hull

A common alternative to battening is the construction of a separate framework which is inserted into the hull opening (Fig. 45) *before adding the second planking*.

The framework will need to be sourced outside of what the kit provides.

‘Sills’ and ‘frames’ are constructed from ***2 x 2 mm*** timber with the overlying second planking covering just ***1 mm.*** of the ***2 mm.*** width.

With a ***14 mm.*** x ***14 mm.*** cut-out, this still retained the ***10 x 10 mm.*** opening surrounded by an exposed timber lining thickness of the intended **1 mm.**

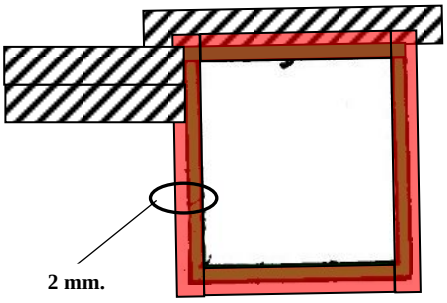


Figure 49: Second Planking Overlying Part of Framing

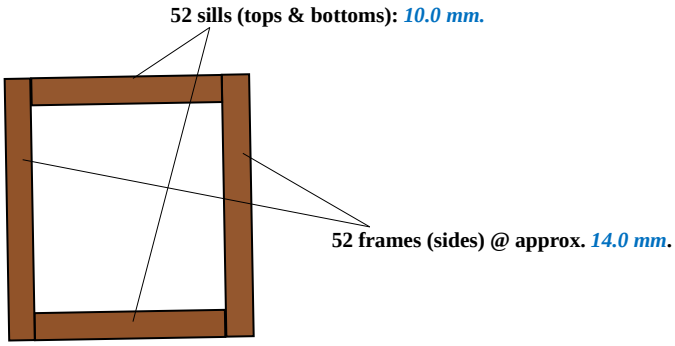


Figure 50: Opening Strips to be Cut

Cutting of the upper and lower sills was more critical as the frame sides could overlap and be trimmed back.

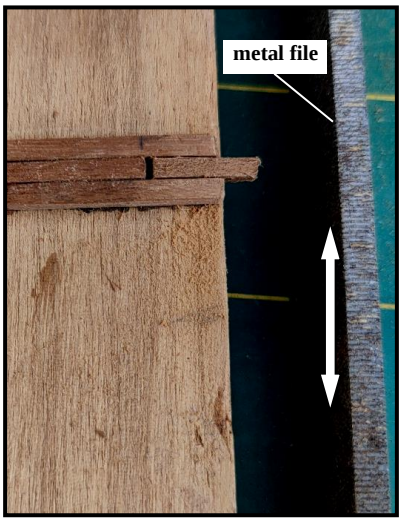


Figure 51: Trimming the Opening Strips

The sills were cut and carefully filed back to exactly ***10.0 mm***. using a flat metal file (Fig. 48). Three strips fixed to a board made the holding and filing a simple task.

The four pieces were formed into a complete framing using a standardised former (Fig. 49) consisting of five squares, each ***10 x 10 mm*** and approx. ***2 mm.*** high. *Five* formers was just a spontaneous choice.

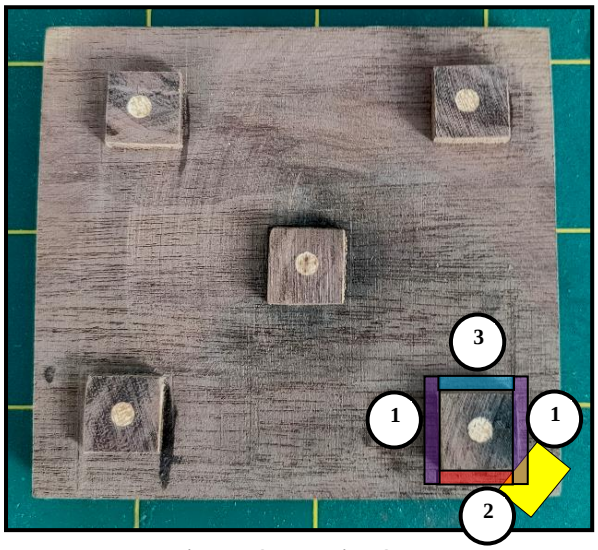


Figure 52: Framing Steps

- longer lengths (***purple***) were put in position – Step 1,
- a small spot of PVA (using a toothpick) was added to each end of one of the shorter piece (***red***) – Step 2,
- three pieces were pressed together tightly,
- other short piece (***blue***) was carefully placed in position – Step 3,
- after about 2 minutes, a thin blade (yellow) was carefully slid under *each corner* to slightly lift the framing (adhesive has not fully set and is still flexible); making sure to lift & support both adjacent sides at the corners together with the blade,
- framing was carefully lifted off and left for 24 hours

- any protruding lengths were sanded back on a bench sander,
- both faces were lightly sanded,
- edges sanded to +/- ***14.0 mm.*** .. still to be done in Fig. 50.

Figure 53: Framings .. require edge sanding

Lids

Kit supplies ***2 x12 x 400 mm***.

*Allowing approx. **30 mm** at one end of this strip for the mizzen mast pin rail, twent six (26) gunport lids can be cut out as well, each finishing at **12 x 12 mm.** As a matter of convenience, shaping the pin rail is more easily accomplished when holding the full 400 mm. strip.*

The lid was composed of a number of timbers butted together with the inner lining timbers at 90º to the outer lid. This detail is not often observed in model builds.

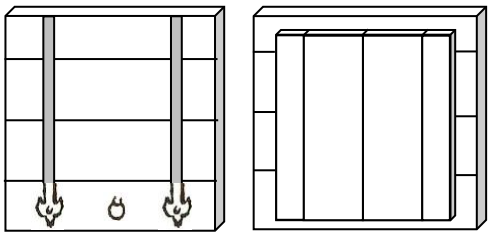


Figure 54: Gun Deck Port Lid
17C/ early-mid 18C

Plan Sheet 1 shows all gunport lids for the 1765 version in the closed position vs the 1802 version in Plan Sheet 2 where they are all open ! In this build they were all placed in the open position.

Figure 55: Hinge with Flory End

In the 17C to mid-18C, the extreme ends of the hinges finished in a ‘flory’ (cross with flowers on the ends) whilst the late 18C were just basic straps with square ends. The Euromodel metal hinge (Fig. 52) has such a flory and with a length of approx. ***9.1 mm***, it creates a correct embellishment to the lid.

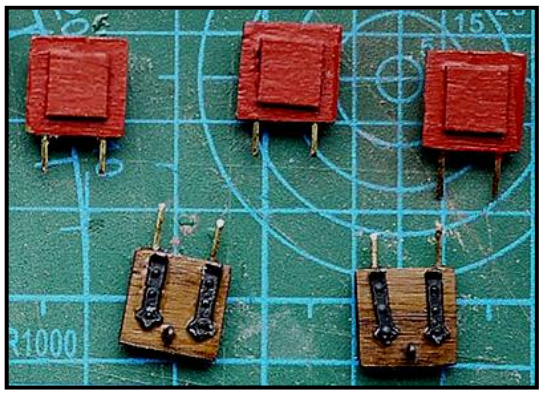


Figure 56: Gunport Lid Supporting Pins

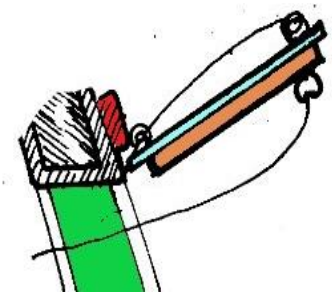


Figure 57: Gunport Lid Tackle

Tackle

By the 1750's, many ships had a ***double tackle*** to operate the lid movement requiring the presence of two rings on the outside - but in these drawings, only a single tackle (and ring) is evident.

boccaporti

Hatchways

Main

This opening in the waist had the obvious dual function of loading/ unloading armament and goods as well as providing ventilation for gases and powder emanating from the firing cannons.

How the edge of the hatchway is handled is very much up to the individual builder.

Fig. 55 shows one builder's ***logical and simple solution*** to forming the edge from scrap second planking material. This has caused a lowering of the skid beams but that would not be considered an issue by many builders ?

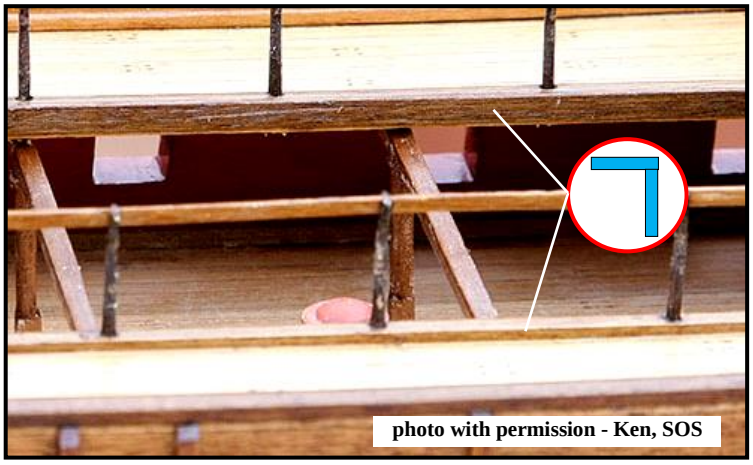


Figure 58: Hatchway Surround

The Euromodel drawings show a distinctly different configuration for the hatchway edge as shown in Figs. 56 & 57.

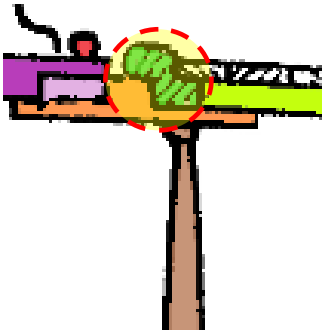


Figure 59: Waist Hatchway (Side Edge)

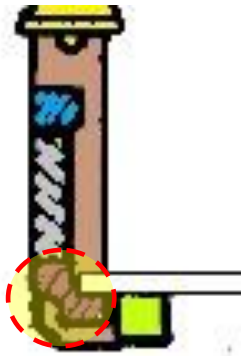


Figure 60: Waist Hatchway (Forward Edge)

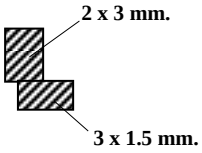


Figure 61: Projected Edge Dimensions

Given that the drawings show a deck thickness of approx. +/- ***1 mm***., this ship build has a deck formed from a plywood base planked over giving approx. thickness of +/- ***1.9 mm.*** Fig. 58 shows an allowance for this by increasing the size of the ***2 x 2 mm.*** upper strip.

Secondary

These smaller openings through the deck allowed for the passage of both crew and goods. They had a surround of edges (coamings) and an inner ledge onto which either a grate (warships) or solid hatch cover (merchant ships) would fit. The cover could take a variety of shapes and the quandry in this build is what style did it have ?

Coamings:

Above the deck, dimensions for the coamings are shown as ***1.5 x 3.5 mm***. (6, 9 & 16) but *anticipating the addition of stanchions* (see below), the ***1.5 mm.*** width would need to be increased as follows.

Material used in this build: ***2.25 x 4.10 mm***. + ***0.75 x 6.0 mm.***

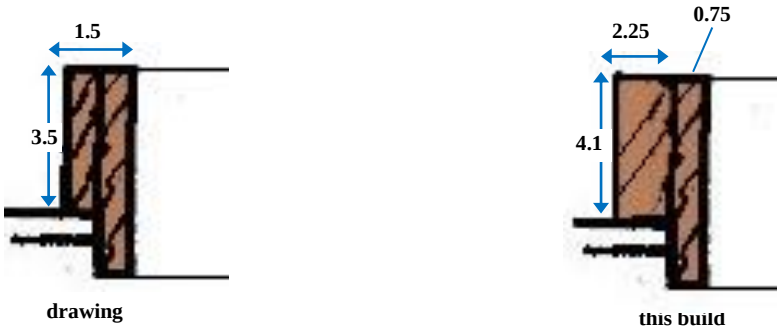


Figure 62: Coaming Modification

Hatchway Overall Dimensions:

main deck forward (6): ***17.5 x 19 mm***
main deck aft (16): ***19 x 27.5 mm.***
gun deck forward (9): ***16 x 16 mm.***

Stanchions

Around the open hatchways, protection was required from …

- crew accidentally falling through to the lower deck,
- water washing across the deck and down through the opening.

Figure 63: 'Flat' Coamings

Builds often include supporting stanchions on each corner linked by rope or wire. Now, the average height for sailors at that time was ***63 inches/ 1600 mm.*** Therefore, if wishing to add stanchions around a hatchway, care should be taken with their height – suggestion would be approx. ***800 – 900 mm.*** (i.e. ***11 – 12.5 mm***.) Anything greater than that immediately gives a disproportionate appearance.

Raised edges (coamings) were constructed around the opening – so often, these edges are added on the flat and so serving little or no function historically in preventing water entry through the hatchway. However, the ‘flat’ coamings shown in Fig. 61 make the addition of the stanchions far easier.

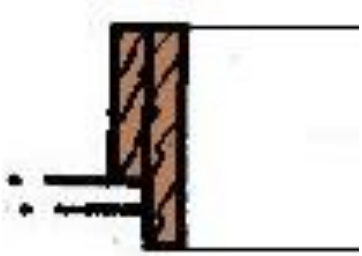


Figure 64: Raised Coamings

scale

Ladders

Three ladders were constructed and stained at this stage – all identical. To avoid difficulty in fixing these in position at a later stage, a guiding base was fixed to the gun and lower decks.

Consideration might be given by some builders to a continuing ladder (**16 +**) – using extra material - extending down from the gun deck to a lower deck. This is unlikely to be attempted by most builders since it is difficult with the way the frames are constructed for this kit.

Due to restricted deck space caused by capstan useage, the aft hatchway (16) is smaller than the forward hatchway (6).

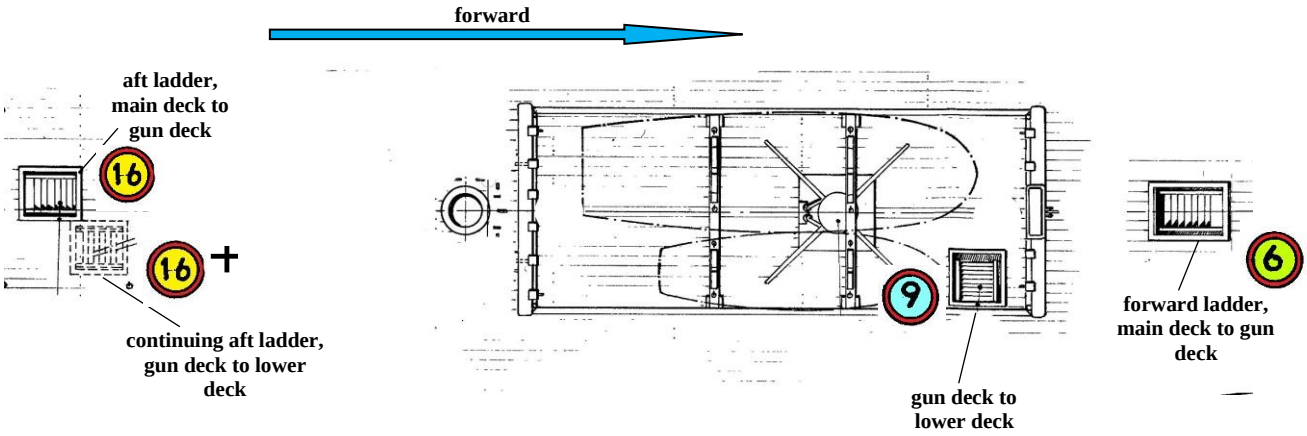


Figure 65: Ladders and Hatchways

Diversionary comment: *"Better access from the main deck down to the gun deck" has been suggested by some builders (Fig. 63)*

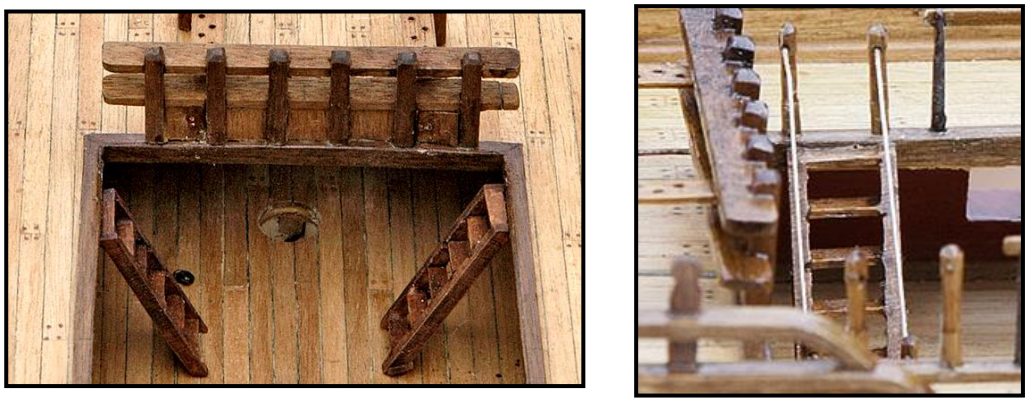


Figure 66: Two Extra Ladders Added From Main Deck

N.B. The two ladders, built from scrap material, shown in Fig. 63 …

- are not built to the same scale as the other ladders on this ship – historically, all ladders on the upper decks had the same tread spacing and the same pitch.

- the two ladders are too close together on the gun deck – even one ladder would have been restrictive on this busy deck. **This additional ladder was therefore not considered.**

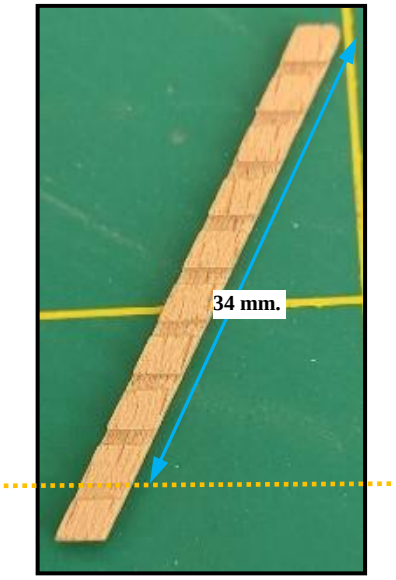


Figure 67: String Shortening

All three ladders were reduced by the same amount in both string (side) and tread (step).

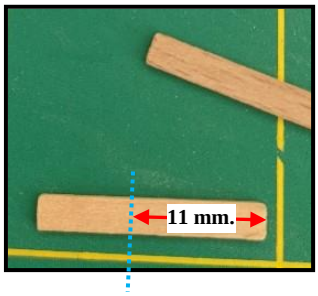


Figure 68: Tread Shortening

There is space for only eight treads rather than the 11 shown in the drawings.

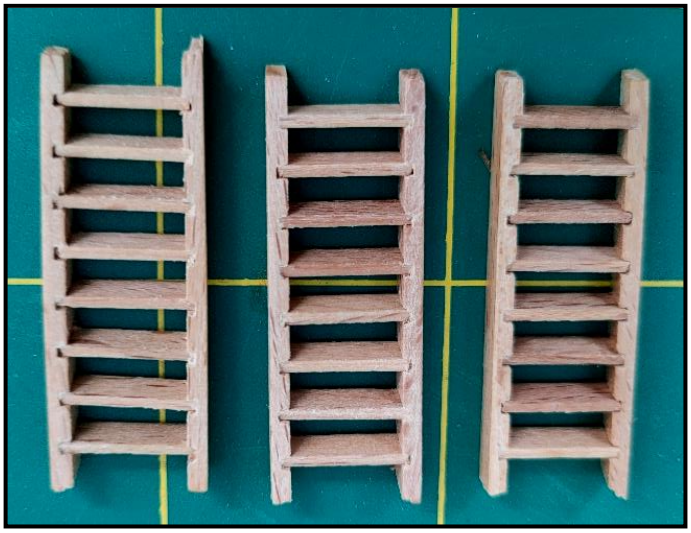
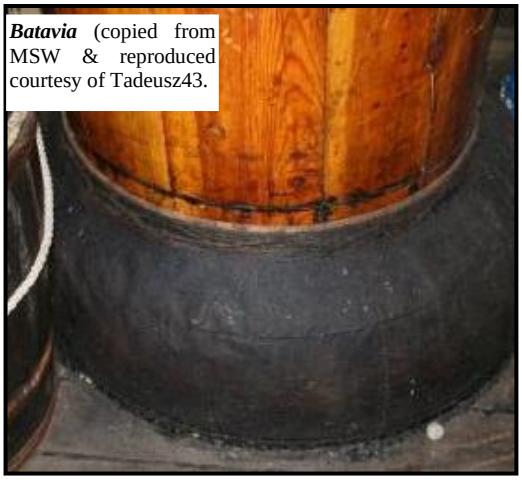


Figure 69: Three Essential Ladders

Mast Collar & Coat



Batavia (copied from MSW & reproduced courtesy of Tadeusz43.

Figure 70: Tarred Canvas Mast Coat

Masts were held in position at each deck level by a series of mast **wedges** or *partners* forming a **collar** between the decking and the mast itself (Fig. 67). On the upper deck levels, this collar was usually covered by a canvas fairing, the mast **coat.**

Figure 71: Typical Collar Configuration

In kit builds, the mast collar was …

- usually made from one piece of timber (Fig. 67). In many builds observed, this ring was left in its natural state and yet Fig. 67 portrays the necessary & historical water-proofing of this feature, so at least it should be ***painted black.***

- shown on the upper deck but not often included for lower levels. In this build, it was ***added to both decks.***

Dimensions (as at gun deck level)

foremast: ***1.5: 16.0 (OD)*** + approx. ***9.0 (ID) mm.***
main mast: ***2.0: 18.0 (OD)*** + approx**.** ***10.0 (ID) mm.***
mizzen mast: ***1.25: 11.0 (OD)*** + approx. ***6.6 (ID) mm.***

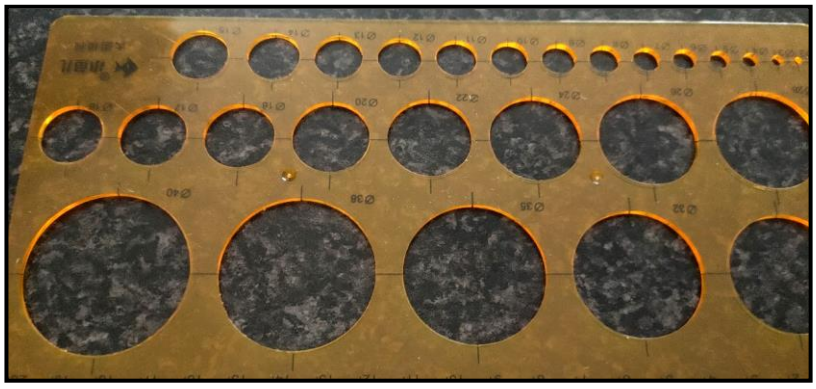


Figure 72: Circle Template

Scrap timber (***1.90 mm.*** thick) used but reduced for both the foremast and mizzen mast collars.

A template was used to create the inner and outer circles – without this, the guesswork just did not work.

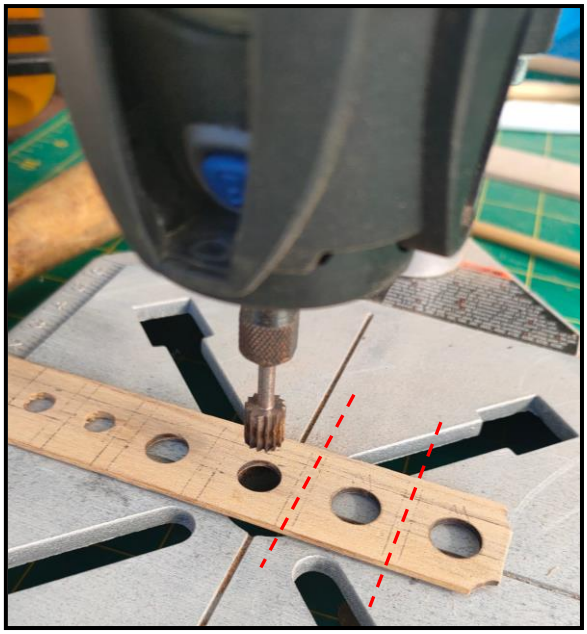


Figure 73: Cutting the Collar Inner Holes

Various Dremel drill bits allowed the three different hole sizes to be cut out (filing by hand using a round file readily caused splintering underneath so the high-speed tools were far better). It is easy to understand why some builders omit the mast collar altogether.

Each ‘collar’ section was cut out as shown (broken red lines, Fig. 70) with a bench coping saw

Caution

Due to the mast taper, internal diameter of each collar on the main deck will be slightly less than that on the gun deck

Using the template again but aided by the eye for judgement, the outer ring was marked out and then formed using a bench sanding belt.

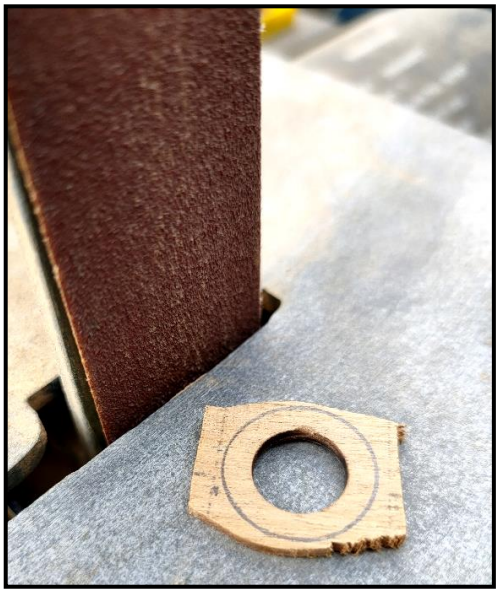


Figure 74: Sanding the Outer Edge of Mast Collar

pompa

Pump

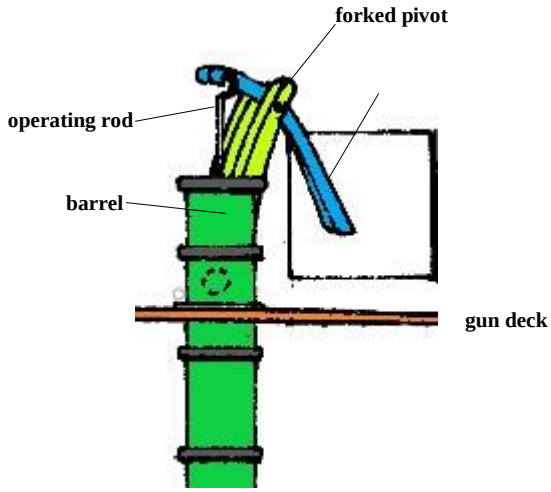


Figure 75: Pump (as drawn on gun deck)

Euromodel does not include the pump as an accessory in this kit simply because it is unlikely to be visible through the main deck hatchway.

A ship of this size undoubtedly would require at least two pumps and it was decided to custom-build them.

Figure 76: Shaving Octahedral Faces

- ***8 mm.*** rod marked with eight evenly spaced sections around its circumference (6 mm. indicated but larger diameter made for easier handling).

- holding the rod with one marked section in an upright position (Fig. 74), a mini-plane was used to shave a flat surface between the two adjacent marked lines; rod was rotated one section at a time and other seven faces produced.

Figure 77: Clamped Ready for Drilling

- starting with a ***1.0 mm*** drill bit, a hole was drilled to an approx. depth of ***8 mm.***

- the same hole was *progressively drilled* out with a series of larger bits (important to use a number of bitts to avoid splitting the wood) and finishing with a ***6.0 mm*** bit. This gave a diameter of ***6.5 mm.***

- approx. ***12 mm*** section of the rod was cut off to allow squaring and finishing of each end resulting in a final length of ***11 mm.*** ; this was repeated for the second piece.

Figure 78: Two Barrels

pompa (cont.)

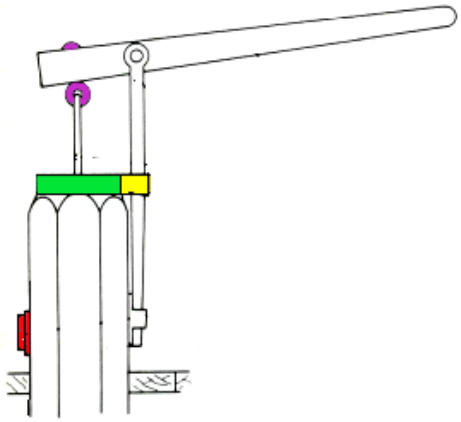


Figure 79: Pump Variations

Mondfeld (1987, 190) illustrates a slightly different drawing of a pump and logically includes a metal band (green) at the very top of the barrel and considering the depth/ length of the barrel, then only one would be seen above deck ?

There is an outlet (red) for bilge water to exit the pump, pass across the deck and exit via one or more scuppers at the base of the bulwark walls.

It is difficult to interpret the Euromodel drawings regarding how the operating rod and brake are connected. Fig. 76 includes what amounts to an eyepin (purple).

Forked Pivot

The forked pivot was assembled from three pieces of ***6 mm.*** wide strips sanded down to dimensions shown and then glued together. Some simple cutting, shaving and filing soon produce the required shape.

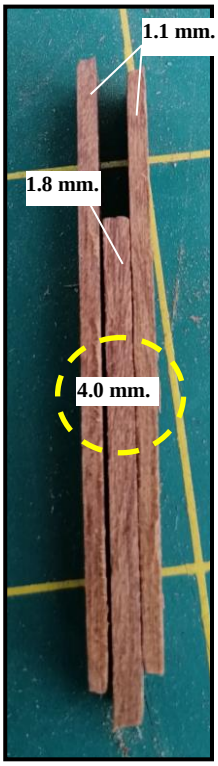


Figure 80: Forming Forked Pivot

Figure 81: Forked Pivots

Figure 82: Brakes

Plan Sheet 4 has a drawing of a pump. How the brake shape turns out will be a variable thing (e.g. Fig. 79)

This build required some experimentation to allow the upper valve to align correctly. A ***0.4 mm***. hole was drilled through this end.

Another hole was drilled through the brake to form a fulcrum with the forked pivot.

Installation

Two laser-cut openings (holes) mark the pump positions. Some builders may choose to anchor the pumps more efficiently using a small rod fixed into the pump base and passing through the holes.