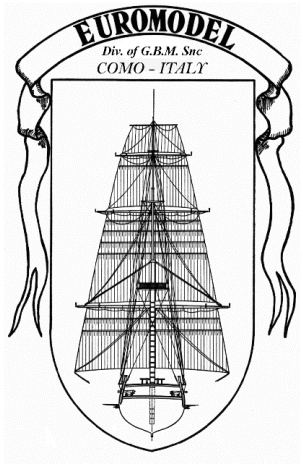
TRANSLATION LINKS

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 a European Frigate

Scale 1:72

Checked the *Essential* Resource Information File ?

09.SPAR LENGTHS & BOWSPRIT

October 2021 **(editing continues bi-monthly)**

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 is NOT an instructional manual

It shows how the build was interpreted **utilizing the provided kit … *and supplementing with additional material* which was dictated by my own personal choices. Many steps could have been simplified by only using the material as it was supplied.**

Euromodel Plan Sheets 1, 2 and 17 were used for the *base references*. If there was any question about other drawings, it was these three that were referred to.

References

Historic Ship Models by Wolfram zu Mondfeld (1989)

Seventeenth Century Rigging by R.C. Anderson (1955) [almost a complete copy of his earlier book ***The Rigging of Ships in the Days of the Spritsail Topmast, 1600 – 1720*** (1927)]

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

The Masting and Rigging of English Ships of War 1625 – 1860 by James Lee (Revised Edition, 1984)

An Introductory Outline of the Practice of Ship-Building by John Fincham (1821)

The Ship-builders' Complete Guide by Charles Partington (1826)

Contents

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

Ilustrations

[These figures are not hyperlinked]

ADDENDUM 1: CUTTING SPAR LENGTHS

(1765 version only)

Supplied Lengths		Total Calc. Lengths
10 x 330mm.	C Albero di maestra 9.5/ 321	[321]
10 x 520 mm.	A Bompresso 9.6/ 225 B Albero di trinchetto 9.0/ 279	[504]
8 x 650 mm.	C7 Pennone di maestra 6.5/ 331.5	[331.5]
8 x 490 mm.	D Albero di mezzana 6.5/ 265	[265]
6 x 510 mm.	B7 Pennone di trinchetto 5.5/ 290 B3 Albero di parrocchetto 5.5/ 199	[489]
6 x 240 mm.	C3 Albero di gabbia 6.0/ 235	[235]
5 x 560 mm.	D4 Pennone di mezzana 4.5/ 248 C8 Pennone di gabbia 5.0/ 236.5	[484.5]
5 x 600 mm.	C6 Albero di velaccio 4.5/ 167.5 D3 Albero di contromezzana 4.5/ 209.5 B8 Pennone di parrocchetto 4.5/ 207	[584]
5 x 160 mm.	A1 Asta di fiocco 4.5/ 160	[160]
4 x 450 mm.	D6 Asta di mezzana 4.25/ 302.5 1.Gruetta 4/ 144	[446.5]
4 x 550 mm.	A5 Pennone di civada 3.5/ 207 B6 Albero di velaccino 4.0/ 149.5 D5 Pennone di contromezzana 3.25/ 158	[514.5]
3 x 640mm.	C8 Stuns'l booms 2.5/ 204 B7 Stuns'l booms 3.0/ 244 B8 Stuns'l booms 2.5/ 180	[628]

3 x 600mm.

B9 Pennone di velaccino 2.75/ 124
C9 Pennone di velaccio 2.5/ 142
D5 Pennone di contromezzana 3.25/ 158 **[582]**

3 x 470mm. **12.Albero 2.5/ 90*
20 Asta di bandiera 3.0/ 156
**11.Albero maestra 3/ 120*
11.Albero di trinchetto 2.5/ 100* **[466]

3 x 400mm. A2 Asta di bandiera di bompresso 2.5/ 67
A4 Pennaccino 2.5/ 43 **[390]**
C7 Stuns'l booms 3.0/ 272

2 x 580mm. **11.Asta di maestra 2/ 110*
**11.Asta di trinchetto 1.75/ 90*
**12.Asta 2/ 120*
12.Asta della bandiera 1.25/ 216* **[536]

2 x 360mm. **11.Bompresso 2/ 64*
********15.Aspe di argano di tonneggio 2/ 240* *(not visible; not included)*
***10.Aspe di argano 1.5/ 292*
11.Remo 1.5/ 960* *(visible; space restricted, not included)* **[356]

Ship's Boats* * Capstans*

Figure 1: Spar Sets for A - D & Ship's Boats

ADDENDUM 2: FINISHED SPAR CHECK LIST

(1765 version only)

A:Bowsprit Mast
A1:Jibboom Mast
A2: Bowsprit Flagpole
A4: Dolphin Striker
A5: Bowsprit Yard

B: Foremast
B3: Fore Topmast
B6: Fore Topgallant Mast
B7: Fore Yard
B8: Fore Topsail Yard
B9: Fore Topgallant Yard

C: Main Mast
C3: Main Topmast
C6: Main Topgallant Mast
C7: Main Yard
C8: Main Topsail Yard
C9: Main Topgallant Yard

D: Mizzen Mast
D3: Mizzen Topmast
D4: Mizzen Yard
D5: Mizzen Topsail Yard
D6: Lateen Yard

20. Ensign Staff

ADDENDUM 3: FINISHED MAST COMPONENT CHECK LIST

(1765 version only)

Foremast

B1: Top
BB/BC: Crosstree
BA: Cheeks
BD: Bolsters
BG: Collar (s)
BF: Cleats
B2: Mast Cap

Fore Topmast

B4: Crosstree
B3B: Head Cheek Blocks
B5: Mast Cap

Main Mast

C1: Top
CC1+CC2/CD: Crosstree
CA1+CA2: Cheeks
CD: Bolsters
CE: Collar (s)
C2: Mast Cap

Main Topmast

C4: Crosstree
C3B: Head Cheek Blocks
C5: Mast Cap

Mizzen Mast

D1: Top
D2: Mast Cap

Chapter 1: BOWSPRIT COMPONENTS

Spar Names & Sizing

Explanatory Note
Where the size is described as ‘ 7 – i.e. 8 mm.’, this indicates that the drawing diameter is 7 mm. and that 8 mm. has been provided in the kit to allow the builder to reduce the size.

A:Bowsprit Mast – Bompresso **(‘9.4 - i.e. 10 mm.’)**
A1:Jibboom Mast – Asta di fiocci **(‘4.5 – i.e. 5 mm.’)**

A2: Bowsprit Flagpole – Asta di bandiera di bompresso **(‘2.5 – i.e. 3 mm.’)**
A4: Dolphin Striker – Pennaccino **(2.25 – i.e. 3 mm.)**
A5: Bowsprit Yard – Pennone di civada **(‘3.5 – i.e. 4 mm.’)**

CAUTION

Whilst the alignment of the bowsprit mast and the jibboom (Fig. 2, dashed red lines) is important, so is the alignment of the flagpole and the martingale (dotted black lines). As Fig. 3 illustrates, inattention to detail can cause a problem.

The ***two mast sections, flagpole and striker were first constructed*** and only then was the mast cap created – specific suggestions are provided in the following text.

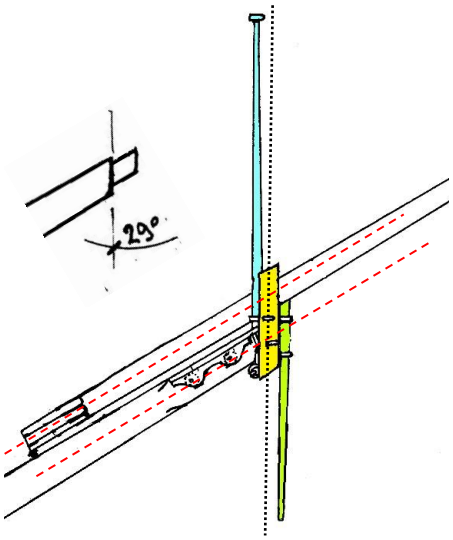


Figure 2: Mast Cap Alignment

Figure 3: Mast Cap Mis-Alignment

bompresso

Bowsprit Mast – Part A

The construction of features such as the bee blocks, jibboom saddle, gammoning saddle, etc. are covered in 'Bowsprit Mast – Part B'

Tapering …

tapered circular CS, plus
tapered square CS towards the forward end

Tenon … foreward end ***3.5 x 4 x 4 mm.*** … determines dimensions of square hole cut into mast cap.

asta di fiocco

Jibboom Mast

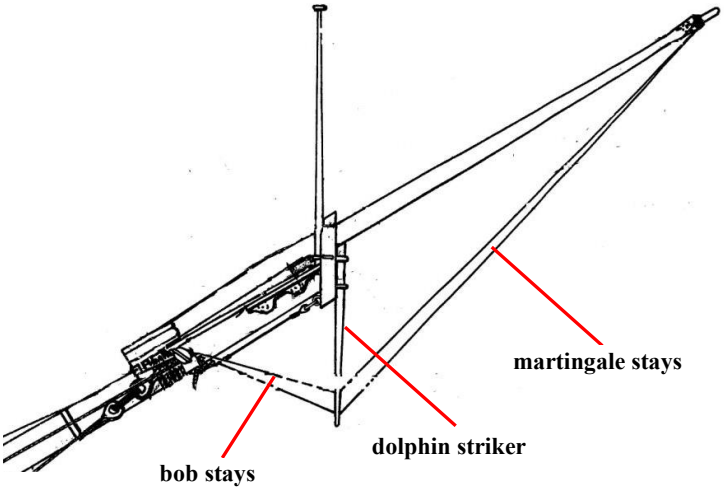


Figure 4: Jibboom and Stays

The jibboom is mounted directly above, and in line with, the bowsprit. To counteract the upwards forces generated by this mast section, the design includes four stays (2 x martingale stays and 2 x bobstays) fixed to a downward projecting 'dolphin striker' (*A4, pennaccino).*

- the inboard end of the jibboom is ***octagonal*** in shape
- there are two ***in-line sheaves*** mounted into the mast – the outboard is vertically aligned (shaded blue in Fig. 5) and the inboard is inclined at a 45° angle (shaded yellow)

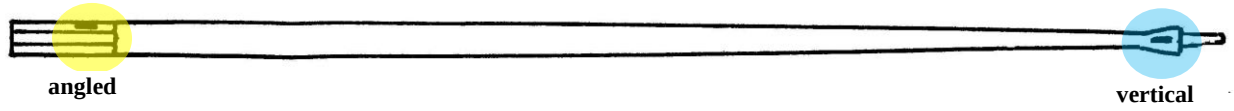


Figure 5: Jibboom Pulley Inclinations

Construction of the jibboom at this point is useful so that its alignment through the mast cap could be checked at this early stage. Whilst the jibboom pulleys could be incorporated, this delicate construction was ignored and opted for the standard 'two holes + channel either side' configuration (Fig. 10).

Figure 6: Jibboom

Figure 7: Heel Sheave

Figure 8: Sheave and Octagonal Heel Shape Omitted

The heel of the jibboom mast is octagonal and contains a sheave (Fig. 7)… both sometimes omitted.

The drawings were unclear as regards the line that passed around this heel rope sheave where both ends were seized against the mast cap. It appears that the starboard line is fixed to a ring set in a metal band supporting the sprit topmast but that was uncertain and so an extra eyebolt was utilised alongside the bowsprit.

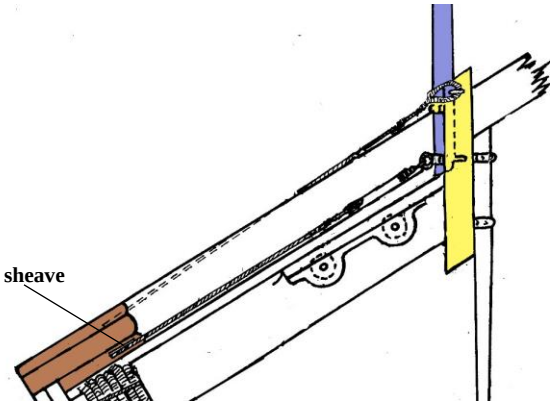


Figure 9: Heel Sheave

Traveller Ring

This was a common feature of the jibboom found in English ships but for those builders not planning to add the outer jib sail, the ring could be ignored. This singular piece of construction will be added at a much later stage in the build.

Historically, the iron ring thickness was between 5/8 – 1.25 inches which at this scale would be 0.23 – 0.45 mm, depending on the ship size. The drawing suggests 1.0 mm so a compromise thickness of ***0.6 mm*** was selected.

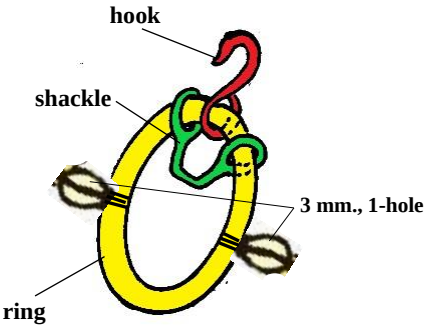


Figure 10: Traveller Ring

Generally, ring diameter = 1.25 x jibboom diameter.

i.e. 1.25 x 2.85 mm = 3.56 mm. (Plan Sheet 9 shows the diameter to be approx. 9.2 mm.)

Diameter selected was approx. ***4.5 mm.***

(to allow the ring to slide over the foreward sheave housing of the jibboom)

Thickness shown in drawing for the shackle and hook is 0.8 mm but a lesser dimension of ***0.4 mm*** was selected. Historically, the ring was covered by leather.

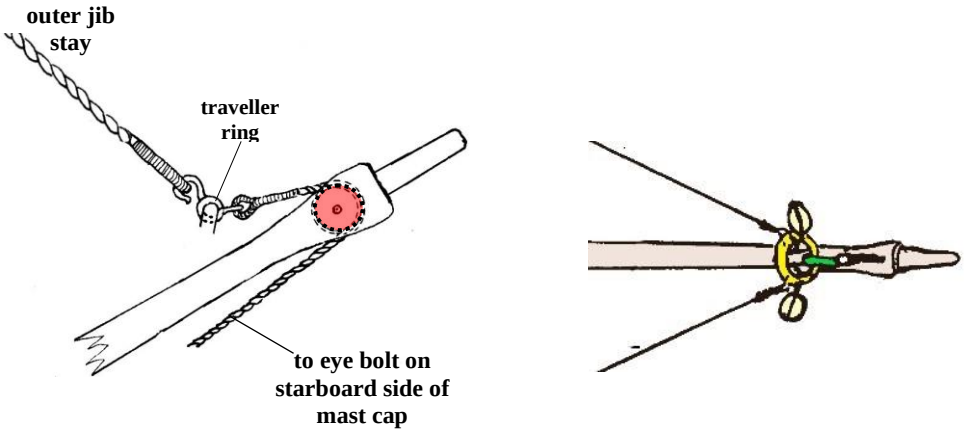


Figure 11: Head Sheave

bompresso (cont.)

Sprit Topmast/Flagpole and Dolphin Striker

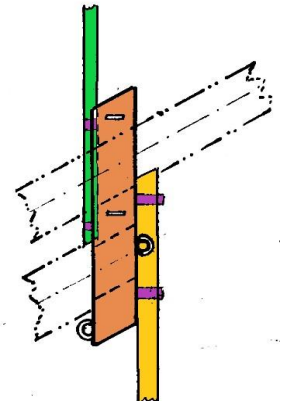


Figure 12: Dolphin Striker & Flagpole

Figure 13: Bowsprit Flagpole

asta di bandiera di bompresso

Flagpole/ Sprit Topmast

This mast was secured into a groove on the aft side of the mast cap… after the mast cap had been constructed. The mast drawing shows a taper upwards to only ***1.0 mm*** which meant that the truck had to be constructed separately and then glued on top. This was a very fragile piece.

The truck is a more complex feature than is generally realized – a more detailed discussion is to be found in *file.09. Foremast Structure* BUT most builders, whether it be of a Euromodel ship or other kit forms, would ignore the complex points made in that file.

Dolphin Striker

The martingale (Fig. 14) is structurally divided …

a. upper ***12 mm.***, rectangular CS (***2 x 2.5 mm***), non-tapering.
b. lower ***31 mm.***, circular CS & tapering to approx. 1.5 mm.

Each of two rings (at the lower end) – measure ***3 x 1.5 mm***. A ***4 mm.*** diameter rod was the starting point. The object was hand-carved using a sharp blade and sand paper. The outcome was not perfectly symmetrical and some sanding still to be done. Drawings show holes of ***0.6 mm*** but ***0.75 mm***. was drilled through.

Striker not added until the mast cap was constructed.

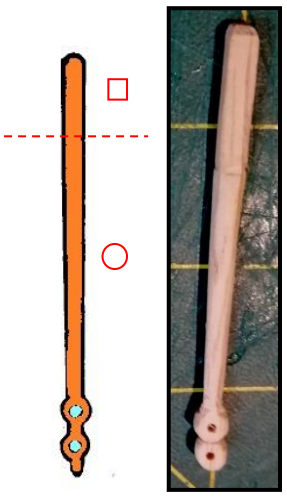


Figure 14: Dolphin Striker

Mast Cap

Shape *Problem* and the *Solution*

Euromodel supplies a block (***9.2 x 19.4 mm.***) with the upper and lower edges *already bevelled* and it was assumed that the degree of bevelling was correct. However, this caused considerable grief with the alignment of the bowsprit and jibboom masts.

At a second attempt, …

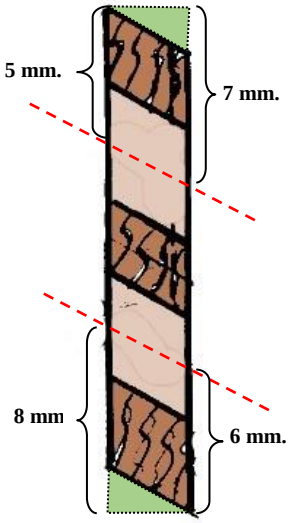


Figure 15: Mast Cap

- different block used was ***not bevelled***. Fig. 15 show how the initial dimensions were made on such a block.

- a ***larger*** block (***4.98 mm. x 11.85 x 22.74 mm.***) was used that would would be wide enough to accommodate the bowsprit flagpole – asta di bandiera di bompresso) which, being ***2.5 mm***. wide at the base, would be a very tight fit in the space on the original block alongside the jibboom.

  The thickness was reduced to ***3.5 mm*** and length to ***22.0 mm*** as per the drawing dimensions before any measurements were made onto the block. After construction, the width was later adjusted to ***11.7 mm***…. **refer to Fig. 20**.

  Fig. 16 shows a Euromodel museum model with the flagpole omitted. It is suspected that this was due to insufficient width of the mast cap ?

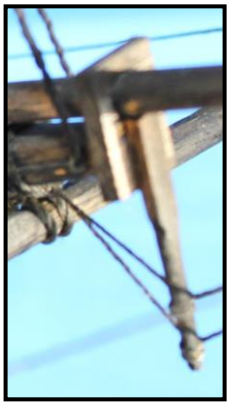


Figure 16: Omission of Flagpole

Figure 17: Forming the Hole Openings

- holes were marked out on both sides and a number of holes drilled to enable the easy removal of the timber.

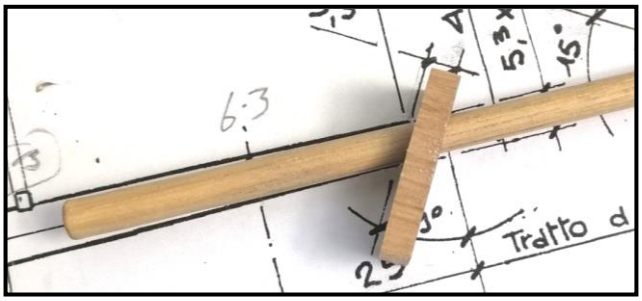


Figure 18: Checking Jibboom Alignment

- after forming the two holes, alignment was checked (bowsprit appears to be slightly off but that was due to incorrect placement using the dry fit).

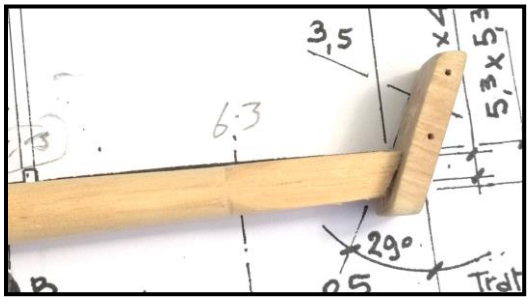


Figure 19: Checking Bowsprit Alignment

bompresso (cont.)

Mast Cap (cont.)

- block was bevelled – this being one of the last steps rather than one of the first steps.
- corners were rounded
- groove formed on aft starboard side for flagpole (Fig. 20)
- eight eyepins were ***blackened*** – see below - and then fixed into drilled holes (Fig. 21 & 22)

Figure 20: Mast Cap Groove

Figure 21:Aft View of Mast Cap

Figure 22: Forward View of Mast Cap

Proving the Solution

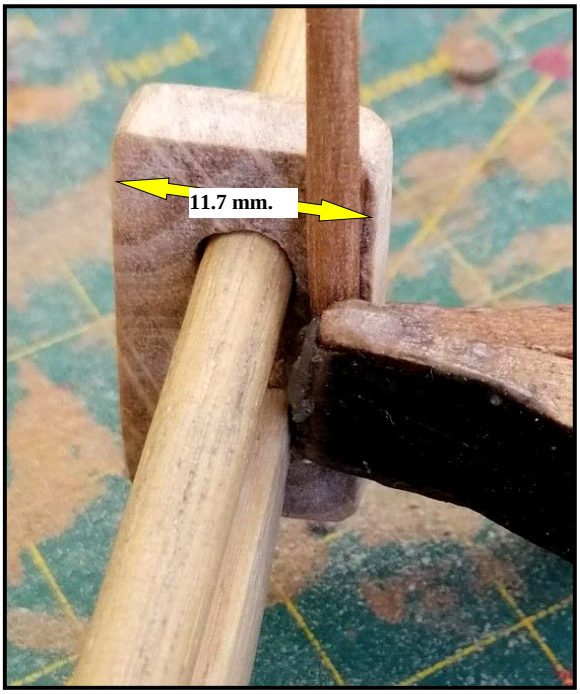


Figure 23: Increased Mast Cap Width

After constructing the mast cap using the supplied ***9.0 mm.*** wide block, it was judged to be too narrow to accommodate the upright flagpole alongside the jibboom. A new mast cap was utilised with the height and thickness being kept the same, but it can be seen from Fig. 23 that with the ***11.7 mm*** width (an extra ***2.7 mm***.), the flagpole more easily fitted into position.

That was obviously a personal choice

bompresso (cont.)

Bowsprit Mast – Part B

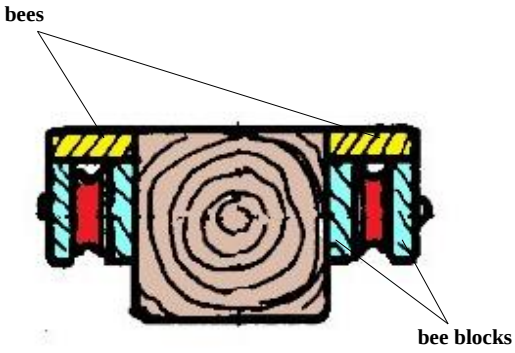


Figure 24: Bees and Bee Blocks

Bees & Bee Blocks

The fore topmast stay and preventer stays were rove through the bee sheaves but some builders choose alternative and more basic methods.

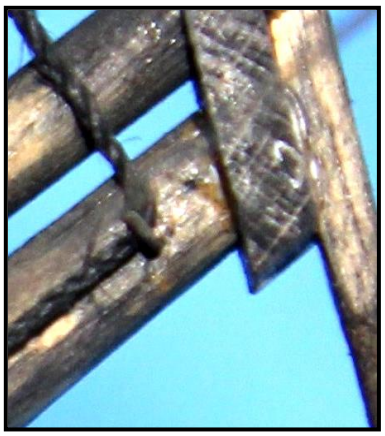


Figure 25: Basic Bee

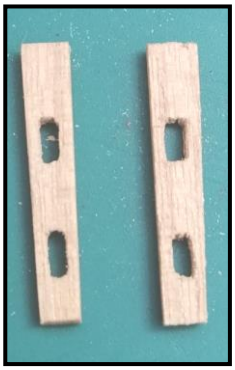
Construction of the bees and blocks could be simplified by producing a separate bee and then placing that over a solid piece to simulate the bee blocks (Fig. 26).

Figure 26: Simplified Bee Blocks

Construction of Bee & Bee Blocks as per the Drawings

The direction taken here was to construct the bee blocks as per the drawings but that was an endurance test to say the least. However, the outcome was reasonably satisfactory although the photos that follow do not do it justice.

As explained earlier,
there are alternative approaches
that could be taken.



Bees (Fig. 27, yellow) – ***1.0 x 18 x 2.5/3.4 mm.*** (slightly tapered and shorter length of 18 mm. necessitated by my having slightly shortened the squared head).

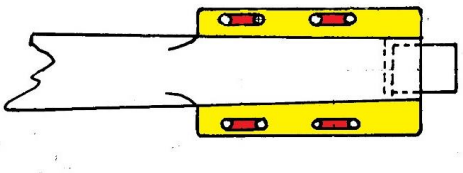


Figure 27: Bees

bompresso (cont.)

The drawing indicates the bee block width/ depth to be 2.5 mm. but that is an error and should be ***3.5 mm.*** The bee blocks (Fig. 28, pale blue) supported the bees and the sheaves. Although simulated sheaves could have been used, this build utilised brass sheaves of ***1.11 mm.*** thickness, leaving the inner and outer blocks to be only a combined maximum of ***1.39 mm***.

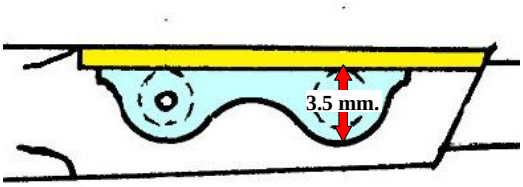


Figure 28: Bee Block

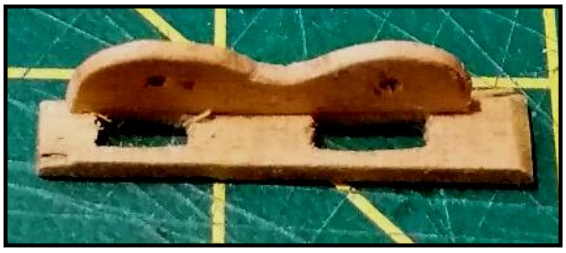


Figure 29: Outer Sheave Fixed in Position

Dimensions (theoretical) **…**

Bee blocks

inner ***0.47 mm.***

outer ***0.75 mm***.

Sheaves ***1.11 mm.***

Total width of blocks + sheave = ***2.33 mm.***

Given the bee tapered from ***2.5*** to ***3.4 mm***, this overall thickness fitted !

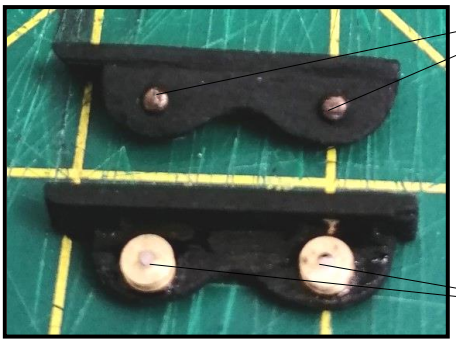


Figure 30: Adding Sheaves

A ***small sliver of packing*** was first placed over the forward sheave on each side before fixing in place the inner block. That inner block was the same shape as the outer block but without any holes.

Figure 31: Jibboom Saddle

Jibboom Saddle

The drawings suggest a height of ***0.75 mm.*** above the bowsprit mast but a saddle height of ***0.9 mm.*** was judged to produce a better result. A larger piece was fixed onto the mast and then reduced to the required profile and size.

Figure 32: Simplified Jibboom Saddle

bompresso (cont.)

Gammoning Saddle

The drawing indicates the saddle (purple) to be made from leather of 0.1 mm. thickness. Rather than using leather, suitable paper or cardboard could be substituted.

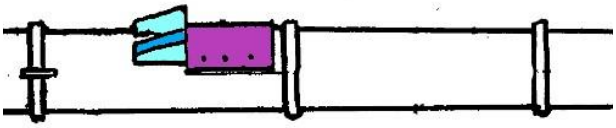


Figure 33: Gammon Saddle and Cleats

gruetta

Boomkin

(researched)

At its outer end, a block was present to take the tack line from the sail crew back to a chesstree located in the waist of the ship. The boomkin spar projected out from the ship such that when the fore yard was braced sharply, the yard arm and the boomkin were in a straight line.

The spar was generally held in position by two shroud lines (Fig. 34). Its final fixing in this build will be determined *only after the bowsprit and head rails are in position* as its inboard end will be butted into a shallow depression – either in the hull planking or knightheads.

Figure 34: Boomkin Shrouds

Figure 35: Rail Support for Boomkin

According to Lees (1984, 36), the spar projected outwards, forwards and ***curved slightly*** downwards and rested on a carved support on the upper edge of the top beakhead rail (Fig. 35).

The outboard diameter was generally 25% less than the heel inboard diameter.

Contradiction & Interpretation:

Historically, the spar was *octagonal inboard* with the remainder being *rounded* in cross-section tapering outboard. The Aiax drawing in Plan Sheet 4 shows the ***opposite*** in cross-section.

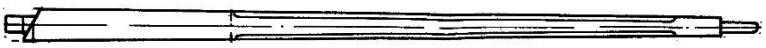


Figure 36: Boomkin Drawing

The same drawing also shows the boomkin with a heel of ***6.25 mm*** tapering outboard to ***2.0 mm***. (tapering was necessary to prevent the tack block from sliding inwards). From the above comment on percentage reduction, the inboard heel would be approx. ***2.75 mm.*** based on the stated outboard diameter. Fig. 37 supports this far more closely. Having initially produced the boomkin at ***6.25 mm,*** it was obviously too large.

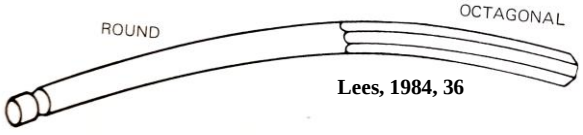


Figure 37: Boomkin Curvature

No curvature is indicated in the Plan Sheet 4 drawing but is shown in Plan Sheet 1. The curvature was discussed by both Anderson and Lees, with the latter including a diagram (Fig. 36) showing a necking (notch) for both the tack block and the shroud lines. Producing a curved boomkin requires only a little more patience.

Plan Sheet 4 shows a 'yard arm' (Fig. 36) at the outboard end of this spar but with a slight downwards displacement, the shroud lines could slide off. **Historically, a notch !**

gruetta (cont.)

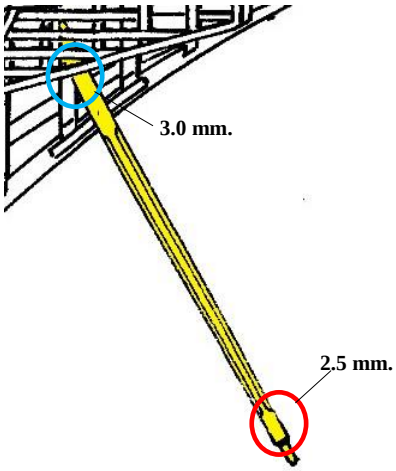


Figure 38: Boomkin Dimensions (Plan Sheet 2)

Plan Sheet 2 shows *more appropriate dimensions* for the boomkin compared to Plan Sheet 4.

The spar for this build was formed from some ***4.0 mm.*** rod with the following features …

- tapering from ***4.0 – 3.0 mm.***
- slight longitudinal curvature
- rounded outboard section
- octagonal inboard section
- length of ***72.0 mm***
- pinned with a metal nail

A straight boomkin is an easy solution but the traditional curved form was preferred.

Fig. 39 shows two curved timber blocks (cut with a bench scroll saw) forming a gap of ***4.0 mm.*** with a curvature created by a ***8 mm.*** difference centre – outer edge (after drying, the timber always 'springs back' a little, thus reducing the curvature, so a little excess in curvature is best to start with).

A section of ***4.0 mm.*** rod, approx. ***155 mm.*** in length, was immersed in tap water for 12 hours and then pressed into the curved form.

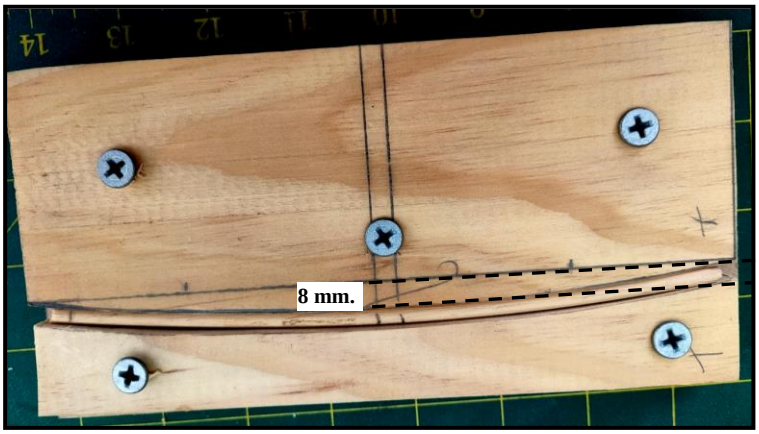


Figure 39: Two Curved Forms Screwed onto a Base

The assembly was placed into a warm/hot oven for 30 minutes, removed and then allowed to dry out at room temperature for 24 hours. Without cutting into two separate sections, the octahedral inboard section was formed for each of the two boomkins (Fig. 40)

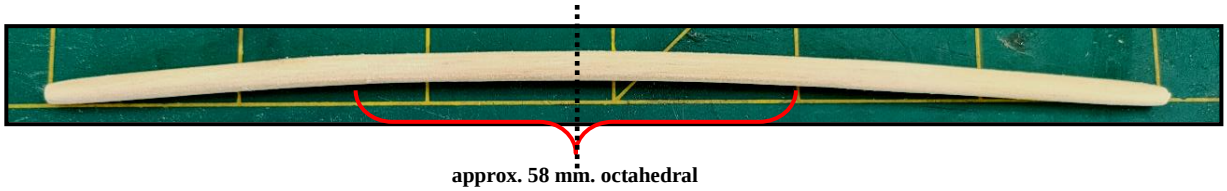


Figure 40: Octahedral CS for Two Boomkins

Notch formed, ***3.5 mm*** from outboard end (refer back to Fig. 38)

Figure 41: Notched Boomkin

Boomkin Support

From Plan Sheet 2, approx. dimensions…
length ***16 mm.***
thickness ***1.5/ 2.0 mm.***
height ***5 mm.***

How the above data is interpreted is up to the builder.

Figure 42: Boomkin Support

Collar Fitting

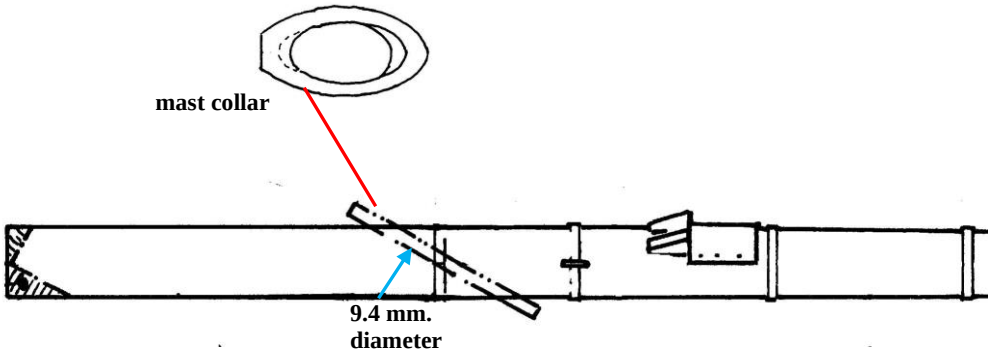


Figure 43: Bowsprit Configuration - Lower Section

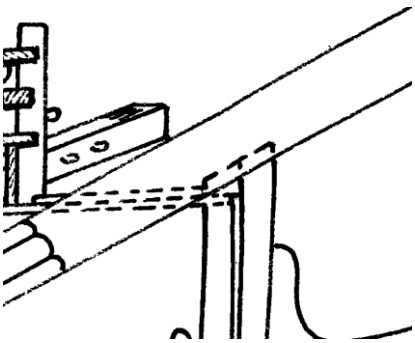


Figure 44: Minimal Space Between Bowsprit & Stem

In this build, there was no space foreward of the bowsprit mast that would allow the mast collar to fit in as shown in Fig. 41. That theoretical space was completely filled with the stem post structure. Fig. 44 (not this build) shows an absence of the collar and the fitting of planking against the mast.

Figure 45: No Bowsprit Mast Collar

A solution was to carve out a close-fitting mast collar with a small opening at the foreward end (Fig. 45) to allow the bowsprit mast to seat against the stem. The opposite end of the collar had to be adjusted (broken red line) when fitting against the bulkhead. Before installation, the mast collar had ***cuts put into the surface*** to represent a number of planks.

Figure 46: Bowsprit Mast Collar

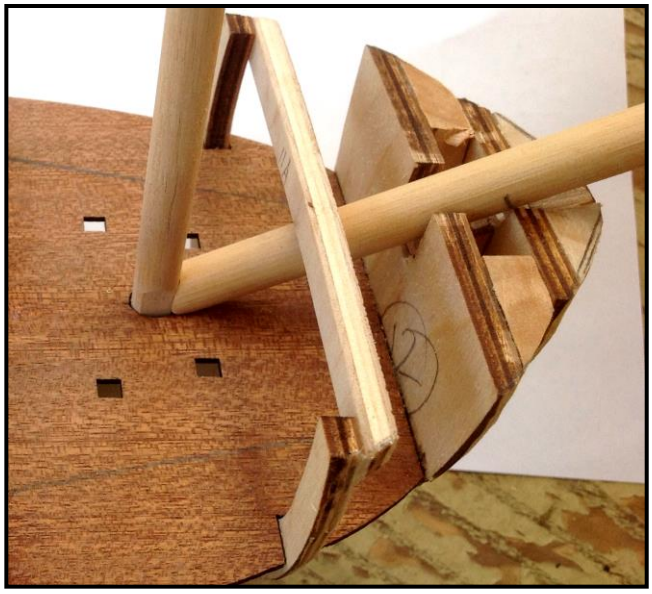


Figure 47: Bowsprit Seating

In order to fit this mast in position, two adjustments were required:

- forming a ***concave channel*** in the sloping top edge of the stem/ beakhead supplied,
- forming a ***concave surface*** at the end of the bowsprit mast that will allow it to fit against and partially around the foremast.

Woolding

Up until 1800, the bowsprit mast (and the fore and main lower masts) were generally strengthened by rope ‘woolding’.

Figure 48: Mast Woolding

After that time, they were then replaced by metal bands such as indicated in the Euromodel drawings (0.1 mm. thickness) but this does not match what would be expected for a ship built in 1765! The model in the Euromodel museum has no rope wooldings on the bowsprit but does show some on the masts (Fig. 48). The number of turns in the wooldings varied between two and six (Lees, 1984, 51) and for this ship, six turns of 0.4 mm. rope were chosen.

The Euromodel drawings show
the sole use of metal bands to strengthen the bowsprit mast
but for an English ship of this era,
it is clear that rope wooldings were in vogue.

To construct them, one end of the rope is bent into an extended loop and then served over as shown in Fig. 49.

Figure 49: Beginning Woolding Serving

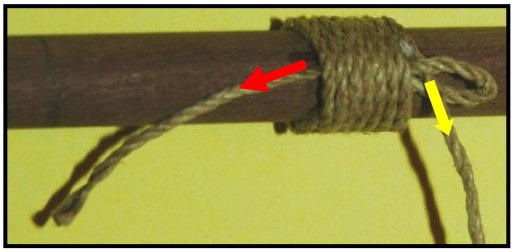


Figure 50: Finishing Woolding Serving

After creating the correct number of turns, the end (yellow arrow) is inserted through the loop and the opposite end (red arrow) is pulled tightly to bring the rope passing through the loop underneath the top few turns (Fig. 50). Any conspicuous bulge is gently tapped down with a hammer. The ends are then cut off.

bompresso (cont.)

*As each mast section is completed, it is useful to add certain **blocks** & **deadeyes** before the full rigging starts. For that reason, a discussion of both types follows…*

Rigging Blocks

The drawings shows a wider variation of block sizes than that provided in the kit. This kit has amalgamated a number of blocks with similar sizes together – e.g. Y and H are used along with L. Some blocks (or groups of blocks) will show different dimensions to that intended in the drawing and so some judgement is required.

As to what blocks are actually used depends on the individual builder …

- as supplied
- block tumbler treated to create rounded edges
- commercial sources (at a considerable cost)

  e.g. https://syrenshipmodelcompany.com/boxwood-rigging-blocks.php

A:1-hole, 2-hole & 3-hole

L/Y/H:	3mm., 1 hole(176) - Bozzelli da mm. 3 a 1 foro (Art.22/026)
2H/2L/2Y:	3mm., 2 hole(123) - Bozzelli da mm. 4 a 2 foro (Art.22/031)
M:	5mm., 1 hole (40) - Bozzelli da mm. 5 a 1 foro (Art.22/028)
2M:	5mm., 2 hole (2) - Bozzelli da mm. 5 a 2 fori (Art.22/032)
3M/ 3L:	5mm., 3 hole (37) -Bozzelli da mm. 5 a 3 fori (Art.22/113)
N:	7mm., 1 hole (9) - Bozzelli da mm. 7 a1 fori (Art.22/030)
2N:	7mm., 2 hole (8) - Bozzelli da mm. 7 a 2 fori (Art.22/034)

B: violin/ sister

F: Violin, 7 mm. (4) - Bozzelli a violino da mm. 7 (Art.22/083)
(substituted for drawing size of 6 mm.)

C: closed heart

33*,: **3 mm. (4) …** jibboom horses - forward end; not supplied, refer to notes
34: **7 mm. (6)** .... size to be reduced to 4.5 mm.
35/36*: **10 mm. (3)** ... 35 is used as a substitute for 36
foremast stay and preventer stay (2); main stay (1)

* not available commercially

Figure 51: Modified Trucks for Block 33

Closed Heart 33

These small blocks are not available commercially; in this build, they were fashioned from ***4 mm.*** cannon wheels/ trucks. Euromodel currently supplies 24 wheels but hopefully this will be increased to 28.

Closed Heart 34

The blocks presented here are the four used for the bowsprit shrouds as well as two for the mizzen stay (Fig. 52).

Fig. 50 is included here simply to indicate where blocks 34 will be finally placed and ***not to suggest that rigging take place at this stage***.

Euromodel supplies closed heart blocks approx. 7 x 6 x 3.3 mm. so ideally they need to be *strongly* modified.

The finished dimensions in this build were approx. ***5.4 x 4.9 x 2.3 mm***. (Fig. 53 below) – slightly larger than that shown in the drawings; the internal scoring was ignored.

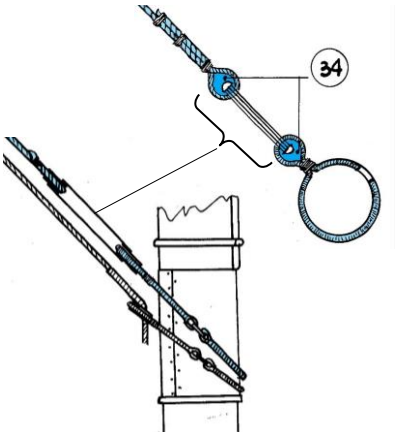


Figure 52: Mizzen Stay Blocks 34

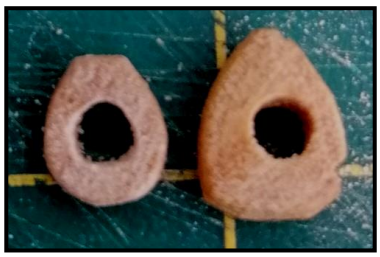


Figure 53: Modification of Supplied Heart Block 34

Closed Heart 35 & 36

Supplied blocks are an close to required dimensions but can be *slightly* modified as seen in Fig. 54.

- internal hole from circular to sem-circular
- thickness from ***5 mm.*** to ***4 mm.*** (36) or ***3 mm***. (35)
- 'point' end slightly flattened
- 'square' end rounded
- internal scoring

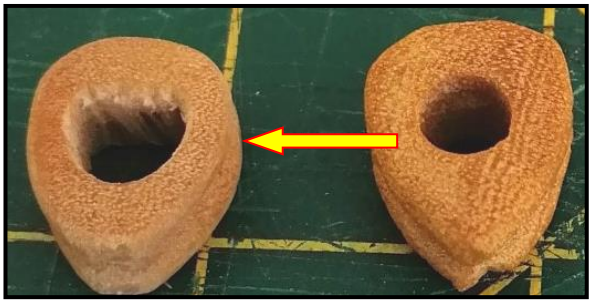
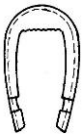


Figure 54: Modification of Supplied Block 35

D: open heart



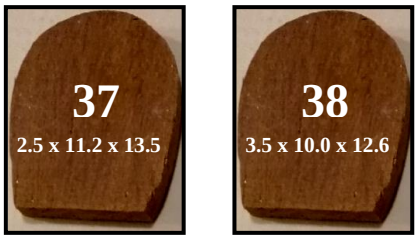
(produced by the builder – many choose to use alternative blocks such as the closed heart block)

‘37’ (18.5 x 11.2 x ***2.5*** mm.) - foremast stay (1); foremast preventer stay (1)

‘38’ (12.6 x 10.0 x ***3.5*** mm.); main stay (1)

Open Heart Block 37 Ammendment

Block 37 is clearly shown in Plan Sheet 14 as having an overall length of 18.5 mm. Measurements taken off various Aiax/ Ajax plan sheets consistently showed an overall length of approx. ***14.0 mm.*** This was in accord with Lees (169, 1984) “… *these open heart blocks had proportions that were the same as given for the closed heart, the only difference being that they were made in the shape of a horseshoe* …” On the basis of this reference, there was no hesitation in constructing the open hearts with the shorter length dimension .



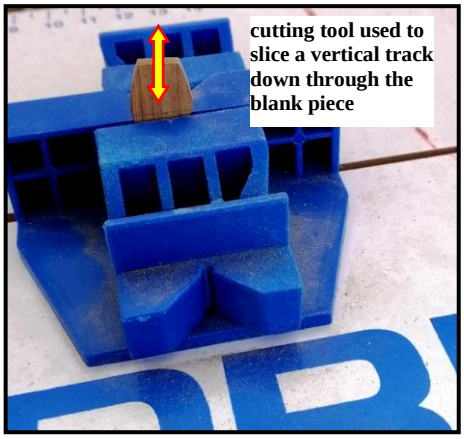
not shown, but block 38 requires a distinctive bevel across the base of the blank

Figure 55: Forming the Blank Shapes

groove formed with a sharply narrowed file

Figure 56: Grooved Block

Figure 57: Dremel Cutting Tool



cutting tool used to slice a vertical track down through the blank piece

Figure 58: Dremel Portable Bench

internal cut-out easily & safely done with a special Dremel cutting tool

channel formed on front, rear and internal surface of each ‘leg’

Figure 59: Channeled Block

scores made on block to prevent lanyard from slipping out of position

Figure 60: Scored Block

bompresso (cont.)

G: lashing block

This block is seized on both sides of the gammon and has part of the running rigging reeved through it which can be seen in Plan Sheet 01.

Having a significant function, its omission from every build observed is surprising and yet given its small physical length of only 17 mm, it must be assumed that the technical difficulty in its construction has deterred people from including it.

The block construction was not that difficult – it just took time and patience. To the naked eye, the result was good but when photographed, the result was a little questionable (Fig. 63)

The block shown in Plan Sheet 14 has a statement … '*incollare no. 4 bozzelli da mm. 4*' which translates as … 'this block is made up of four 4 mm. blocks joined together'. That is one possibility for its construction.

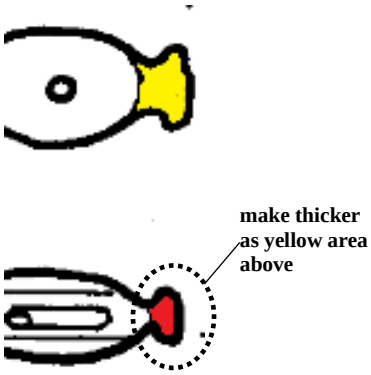


Figure 61: Lashing Block End Views

However, these two blocks were made from a strip of timber approx. ***2.2 x 3.2 x 17 mm***.

The two blocks were ***made together at the same time on the one strip*** (Fig. 62).

Shaping/ carving was important here …

- outlines of the four sheaves for each of the two blocks
- profiling to producing larger ends to both blocks – seen as necessary to increase the strength (Fig. 63).

Figure 62: Combined Carving of Lashing Blocks

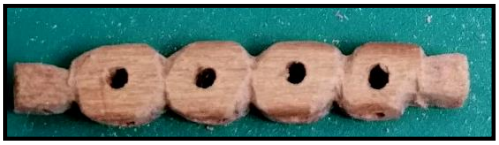


Figure 63: Single Lashing Block Requiring Some More Detailing

Deadeyes

E/33: **3mm.(1-hole) (3) -** Bigotte da mm. 3 (Art.22/136)

C: **3mm.(3-hole) (50) -** Bigotte da mm. 3 (Art.22/018)

D: **5mm.(1-hole) (2) -** Bigotte da mm. 5 (Art.22/137)

X: **5mm.(2-hole) (2) -** Bigotte da mm. 5 (Art.22/138)

B: **5mm.(3-hole) (128) -** Bigotte da mm. 5 (Art.22/020

bompresso (cont.)

Fore Topmast Stay & Preventer Stay Rigging

The fore topmast stay roves through the *aft* starboard sheave whilst the fore topmast preventer stay roves through the *forward* port sheave. ***This commentary is to make builders aware of the stay and preventer stay tackles and fixing to the bowsprit.***

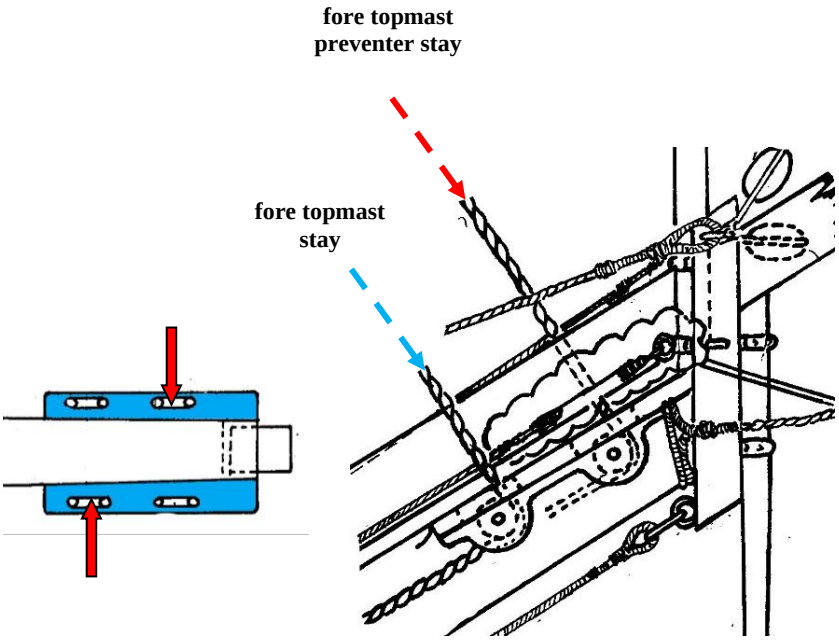


Figure 64: Fore Stay and Preventer Stays

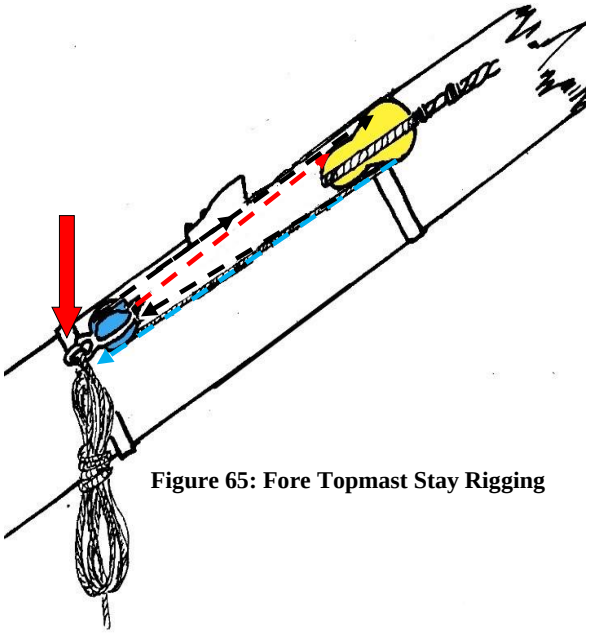


Figure 65: Fore Topmast Stay Rigging

Rigging tackle for both stays is seized to an eye-pin further down the bowsprit (Fig. 65, red arrow).

stay tackle blocks on each side:

F (yellow; 7 mm. violin) +
2L and *not L* as stated in drawing (blue; 3 mm., *double* sheave)

Rigging between the blocks in Fig. 64 commences with the red broken line to black broken line and continues through to the blue broken line.

The excess line allows for changes in the length of both the foremast stay and its preventer stay.

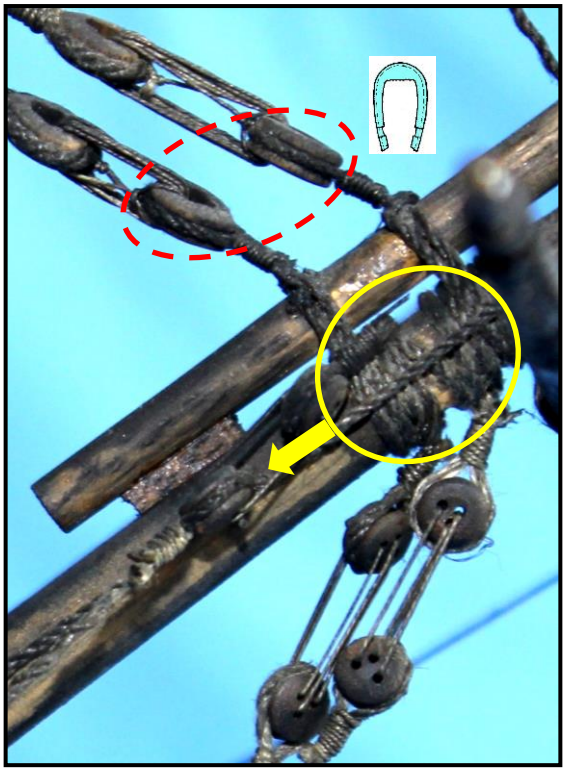


Figure 66: Basic Rigging on Bowsprit

Preliminary Rigging

Fig. 66 shows a very basic attempt to rig the stays and shrouds to the Aiax/ Ajax bowsprit mast with little attention to the drawing details. One 'error' is the position of the rigging as shown in the yellow circle – too far forward (and separated into two groups).

Another classic variance shown is with the open heart blocks ('37') that are ***designed to fit over the jibboom*** and touching the bowsprit mast but they have been substituted with closed heart blocks ('35') that are distinctly above the mast line.

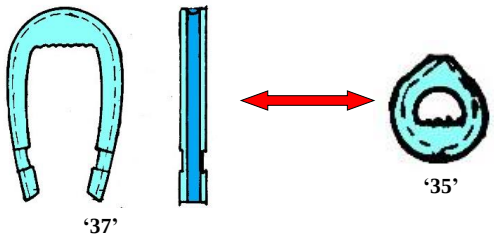


Figure 67: Block Simplification

This substitution of blocks is understandable given the complexity of carving the open heart profile.

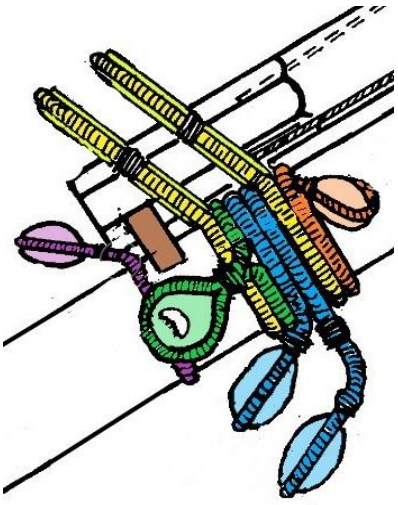


Figure 68: Initial Rigging

Fig. 68 portrays the basic rigging best added before fixing the bowsprit onto the ship.

Yellow (2 x '37' open heart blocks/1.25 mm rope; served)
fore stay & preventer stays,

Blue (2 x 5 mm. deadeyes/0.75 mm rope; served)
bobstays

Green (2 x 7 mm heart blocks/0.75 mm rope; served)
shrouds

Orange (2 x 5 mm, 1 hole blocks/0.75 mm rope; served)
martingale backstays

Purple (1 x 3 mm, 2 hole block/0.75 mm rope; served)

pennone di civada

Chapter 3: SPRITSAIL YARD

From around 1680 to 1700, English ships used the ‘eight squaring’ method (Fig. 69) around the central part of the spritsail, fore, main and mizzen yards as well as the fore and main topmast yards (Lees, 13-15, 1984). This ‘eight squaring’ was soon replaced by nailed-on battens.

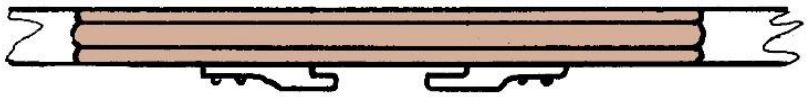


Figure 69: Eight Squaring/ Octagonal Battening

This feature is to be seen on the yards as described above for the Aiax drawings but not on the spritsail yard and this was viewed as an oversight rather than an absence of such a feature. So octagonal battening was added.

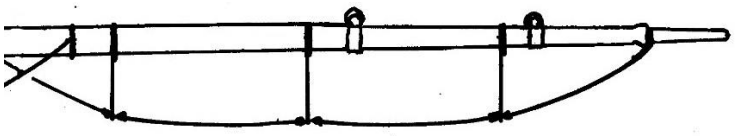


Figure 70: Absence of Eight Squaring on Spritsail Yard