
Rigging Techniques
by Don Dressel

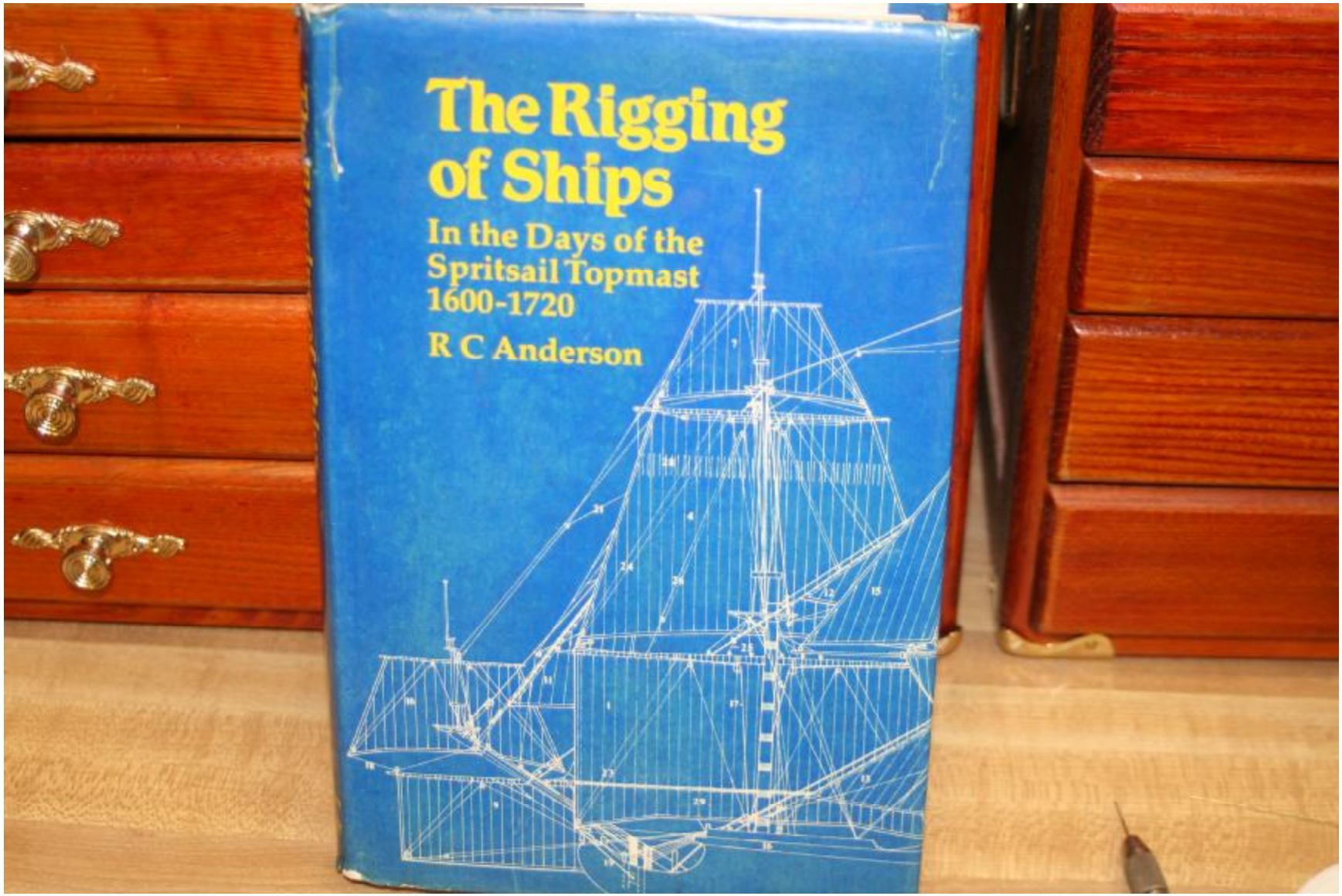
Preliminary Decisions

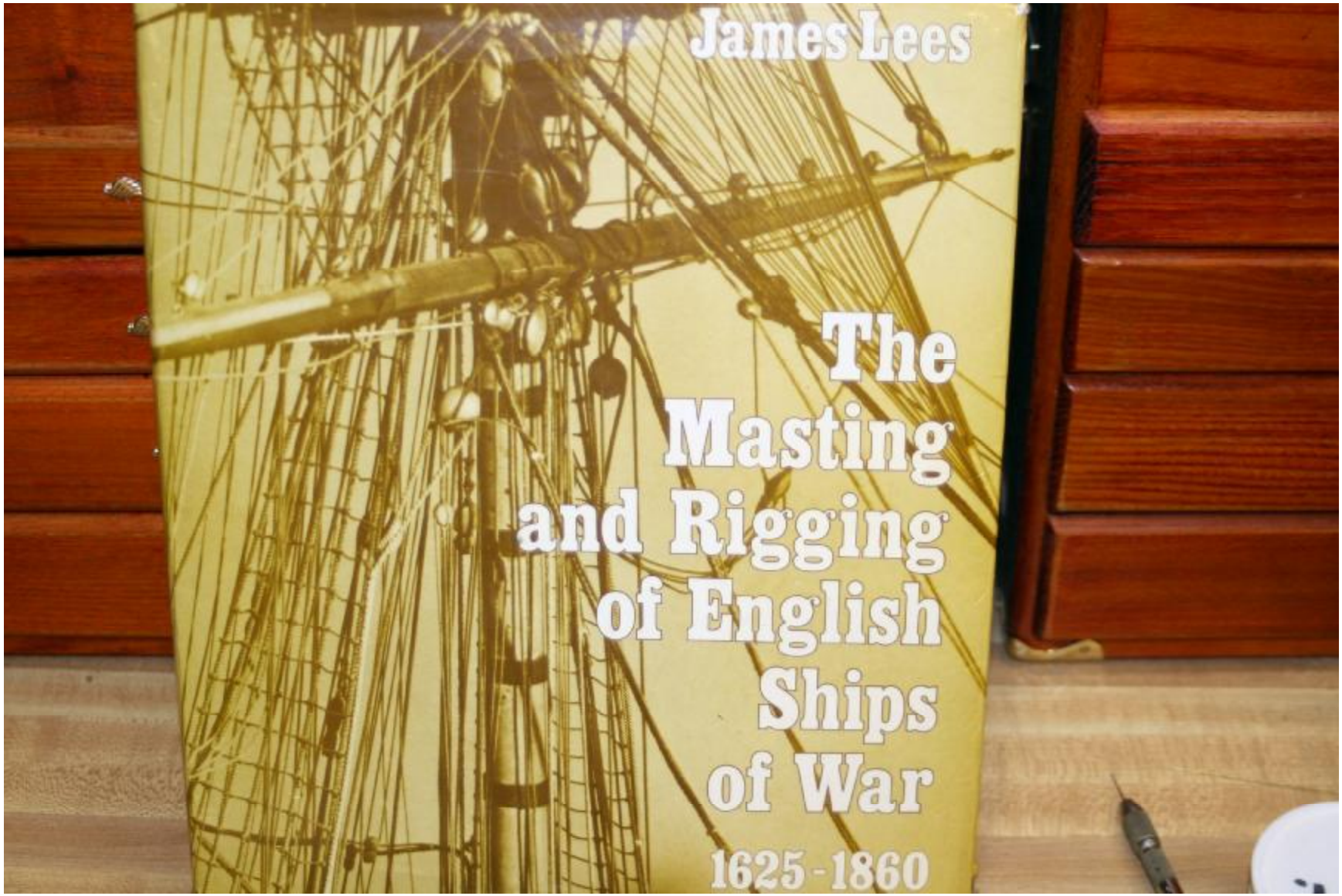
- Placement of Masts
- Angles of Masts
- Length of Main Mast – leads to length of all other masts, yards, sizes of rigging line, block sizes and other items.
- Main mast length for the Sovereign of the Seas was determined from Clive Millwards plans – based on the beam of the ship.
- Made other mast measurements based on Clive Millwards plans

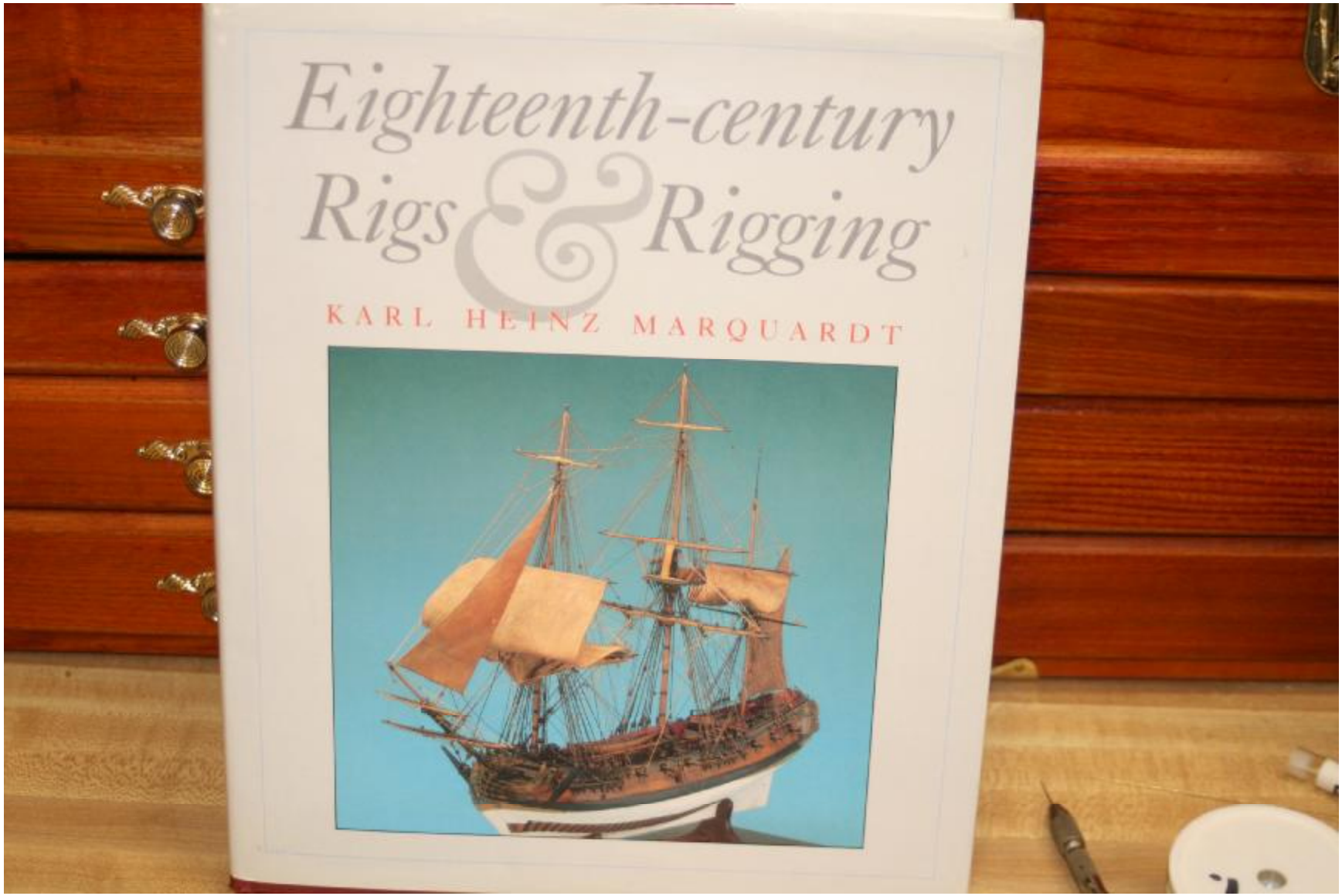
- Next determination if the thickness or diameter of the Main Mast. By using the general rule (stated by both Dr. Anderson and James Lee), which is that the diameter is 1 inch per 3 feet in length of the Main mast, thus it is 40 inches in diameter for the Sovereign of the Seas.
- This is basically rigging, so the diameter of the Main Mast determines the size of all the lines in the rigging.

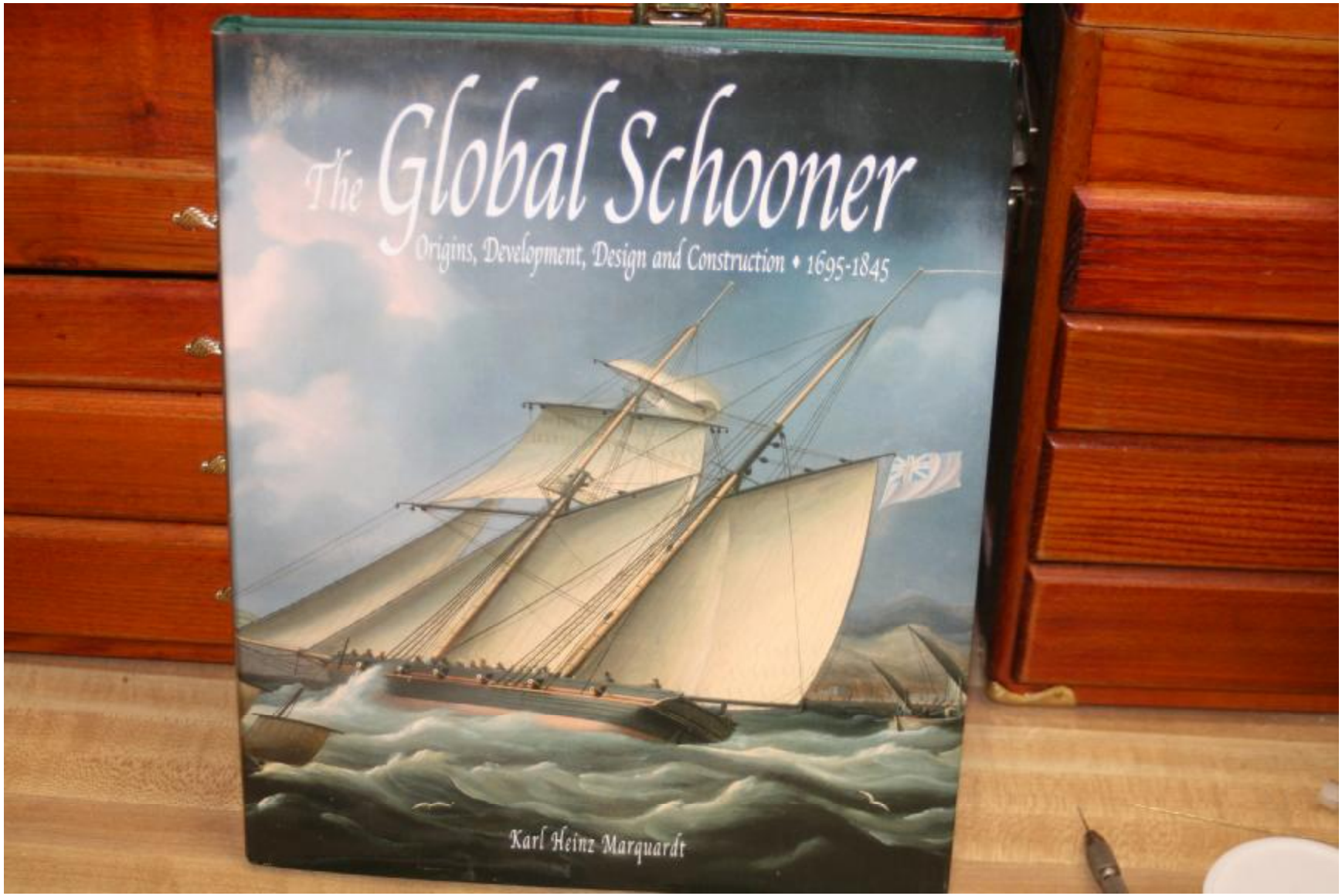
Basic Rigging details

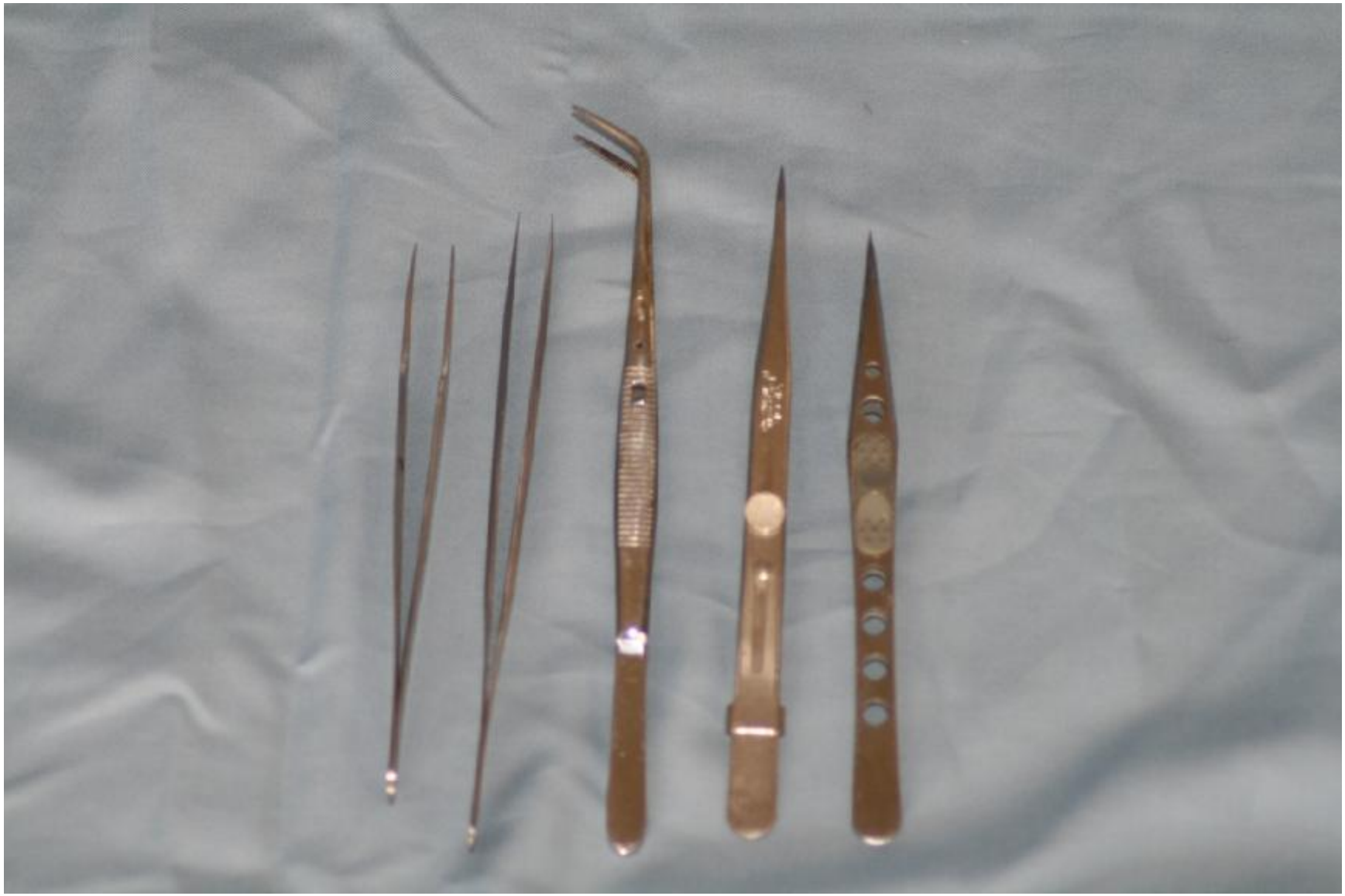
- Standing Rigging
- Running Rigging
- Hawser-laid Rope (three strand)
- Shroud-laid Rope (four strand)
- Cable-laid Rope (Left hand twist)
- Size of line determined from Lees, Anderson, or can be calculated from contemporary sources.

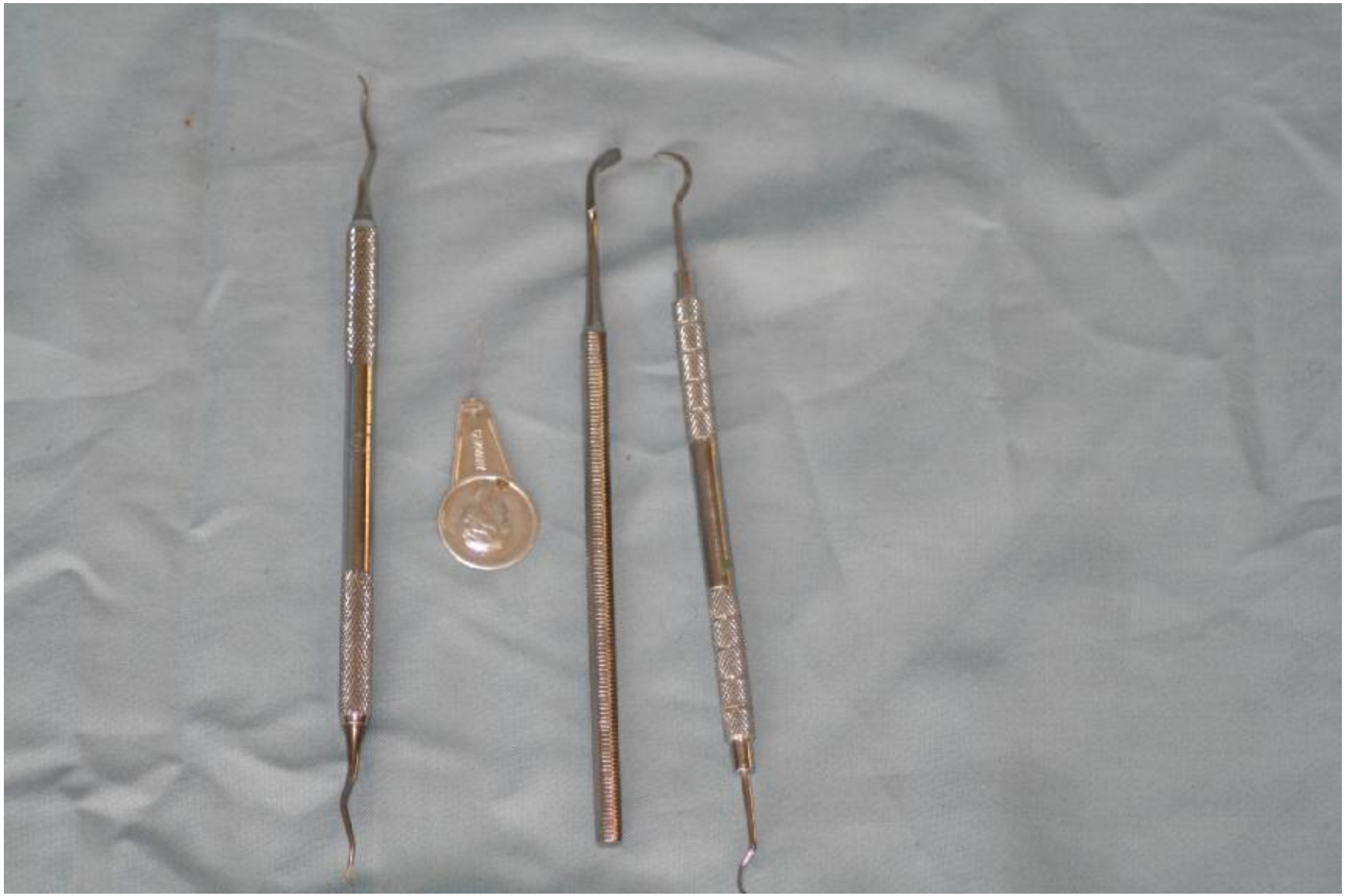

The Rigging of Ships
In the Days of the Spritsail Topmast 1600-1720
R C Anderson

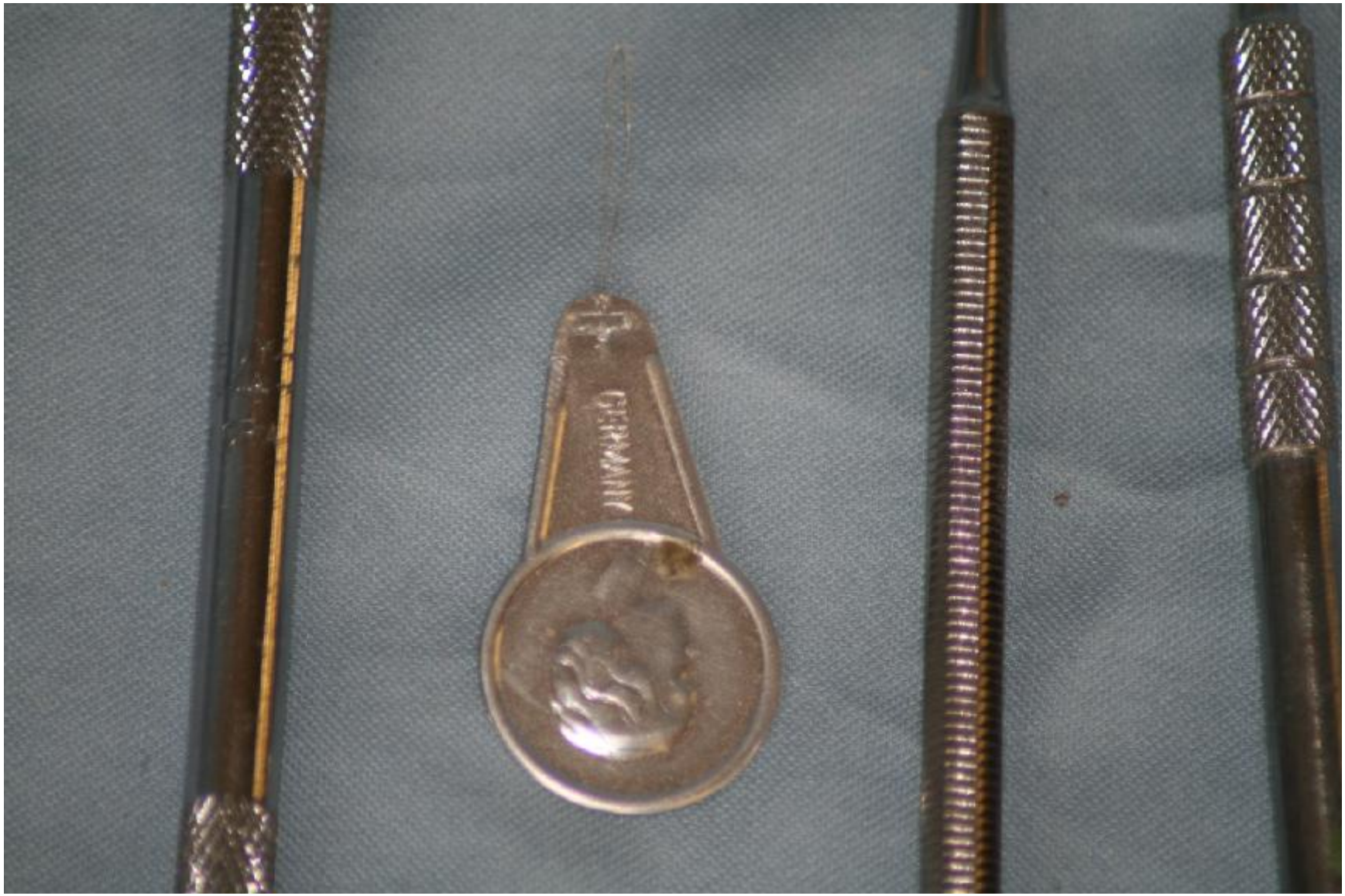

James Lees
The Masting and Rigging of English Ships of War
1625 - 1860

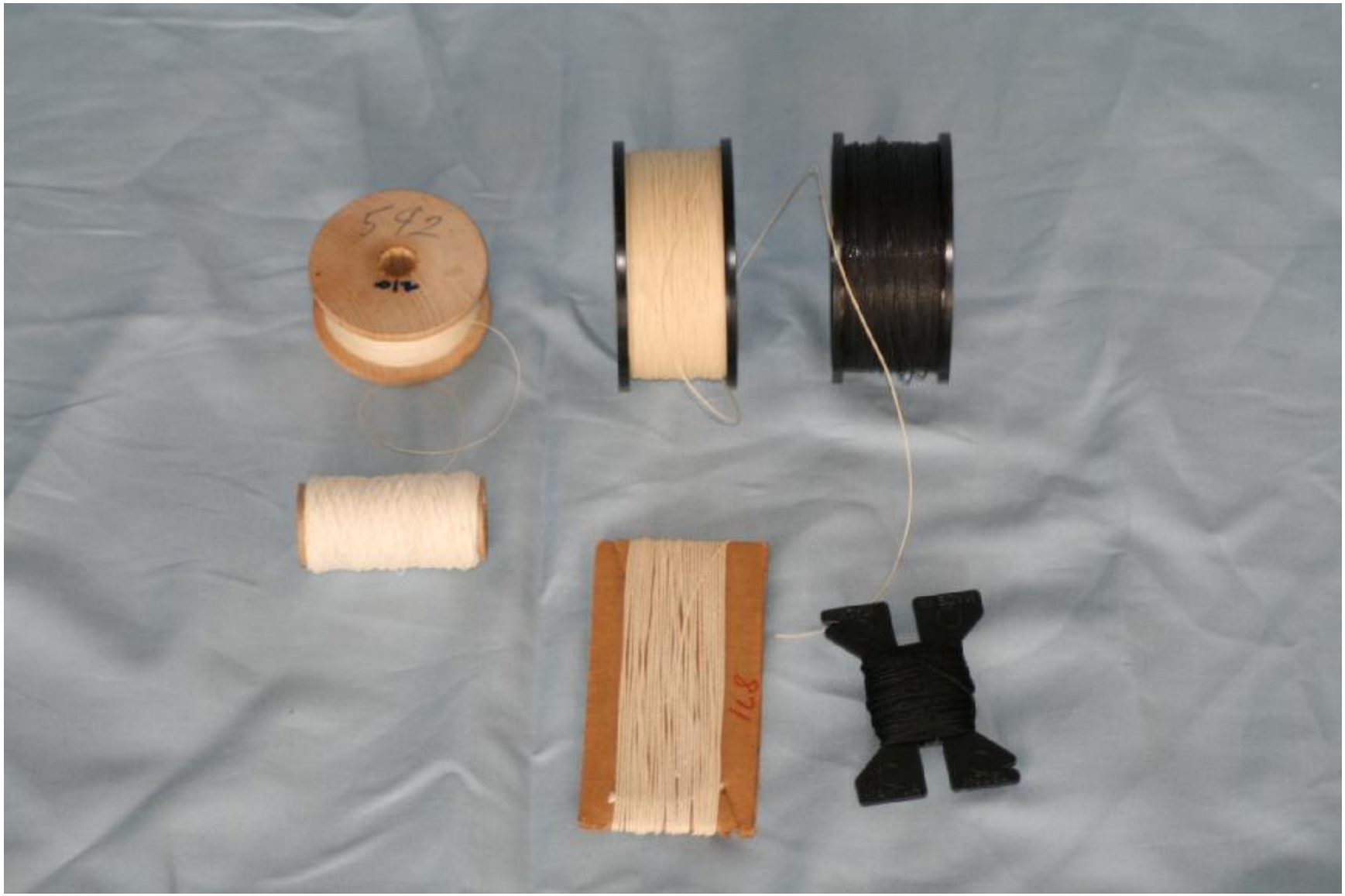

Eighteenth-century
Rigs & Rigging
KARL HEINZ MARQUARDT


The Global Schooner
Origins, Development, Design and Construction • 1695-1845
Karl Heinz Marquardt





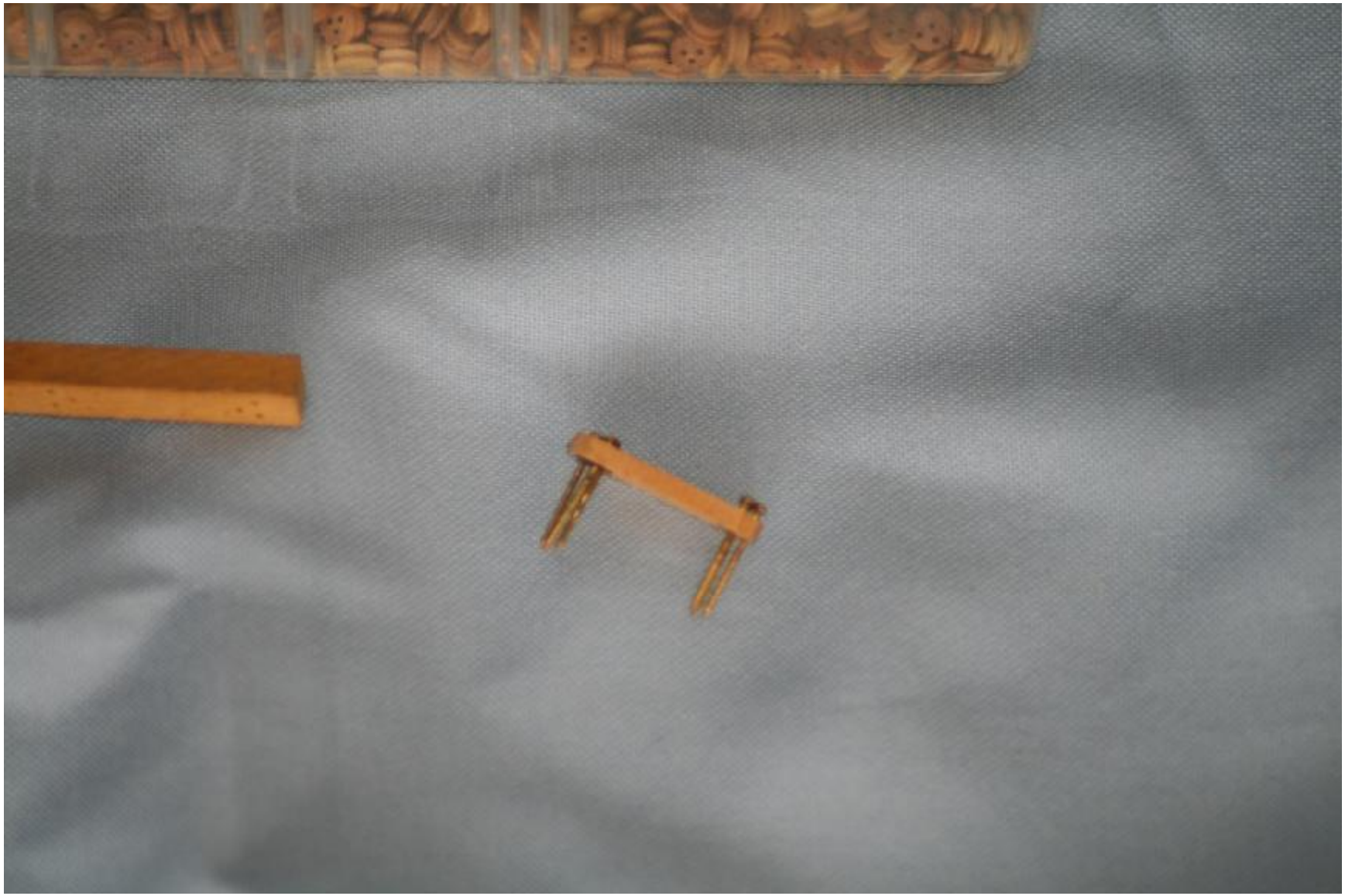

GERMANY


542
168


5 mm
4 mm
3 mm

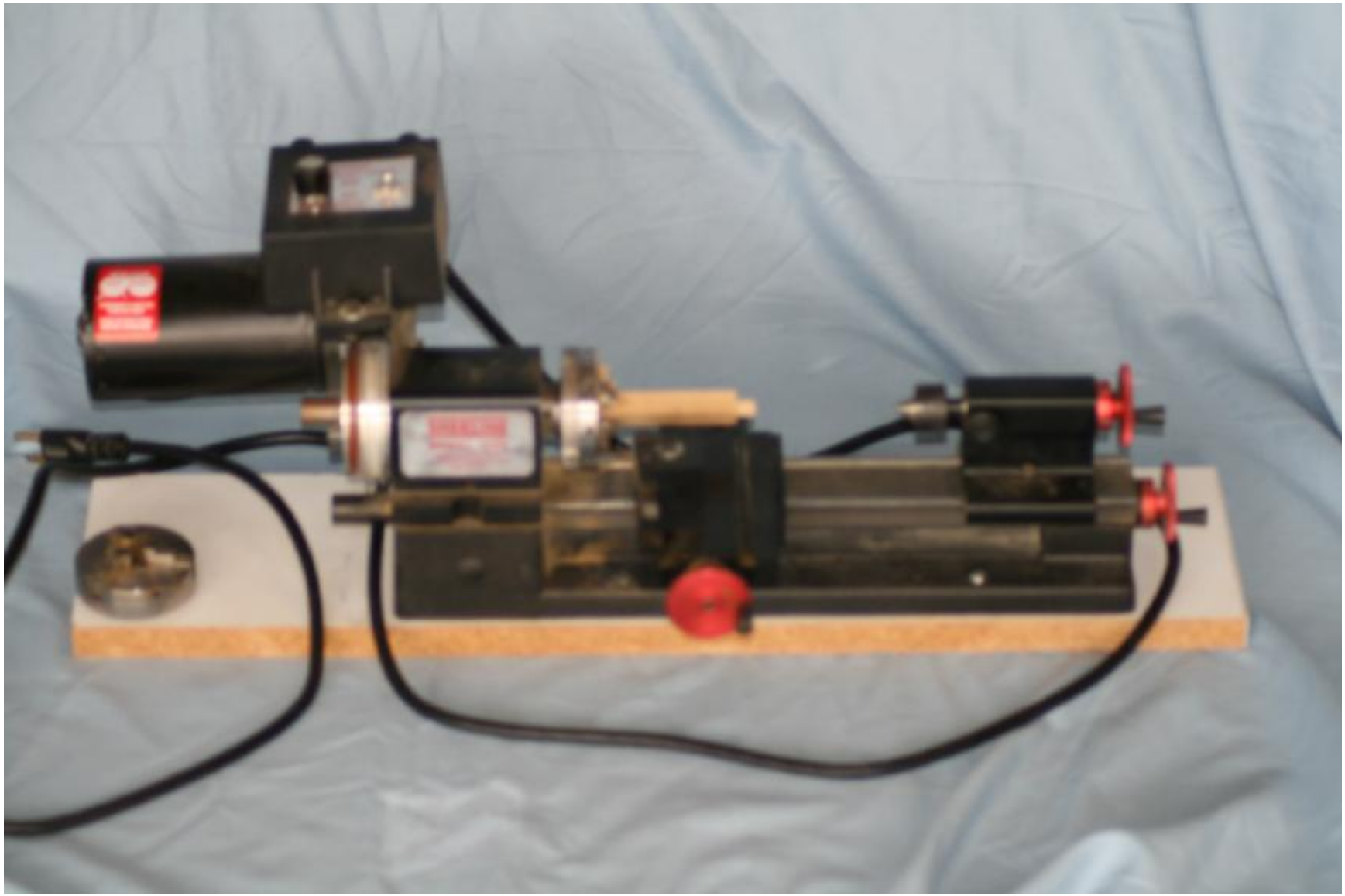

5 mm
5 mm


MS0339BX
Deadeyes, Boxwood, 1/8" (3mm)




Wire
$ 3.79
100 Ft.
28 Ga. Wire
Dark Annealed Steel
0 82751 40282 1
tower
SECURE
Madison, IN
Home
School
Workplace
Hobbies
tower
dispenser pack
SECURE


tower
manufacturing company
dispenser pac

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Ships Plans

- Kit models usually come with rigging plans, but some are much better than others. The Corel kits seem to have good plans from my experience. Other kits, such as the Sergal plans of Sovereign of the Seas are completely incorrect. For the Sovereign, I used plans by Clive Millward, which were the best I could find, along with information from Lee's book.

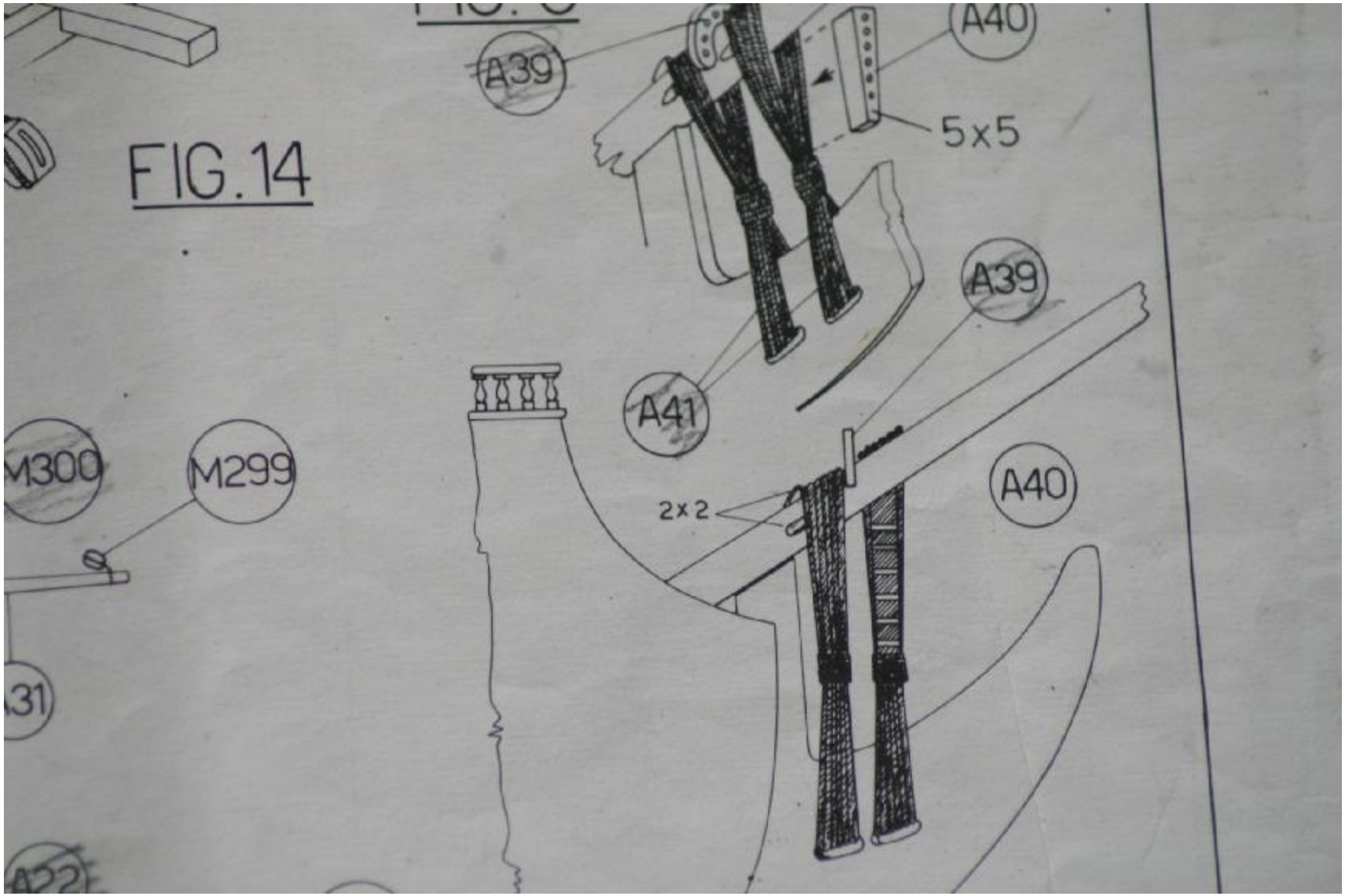
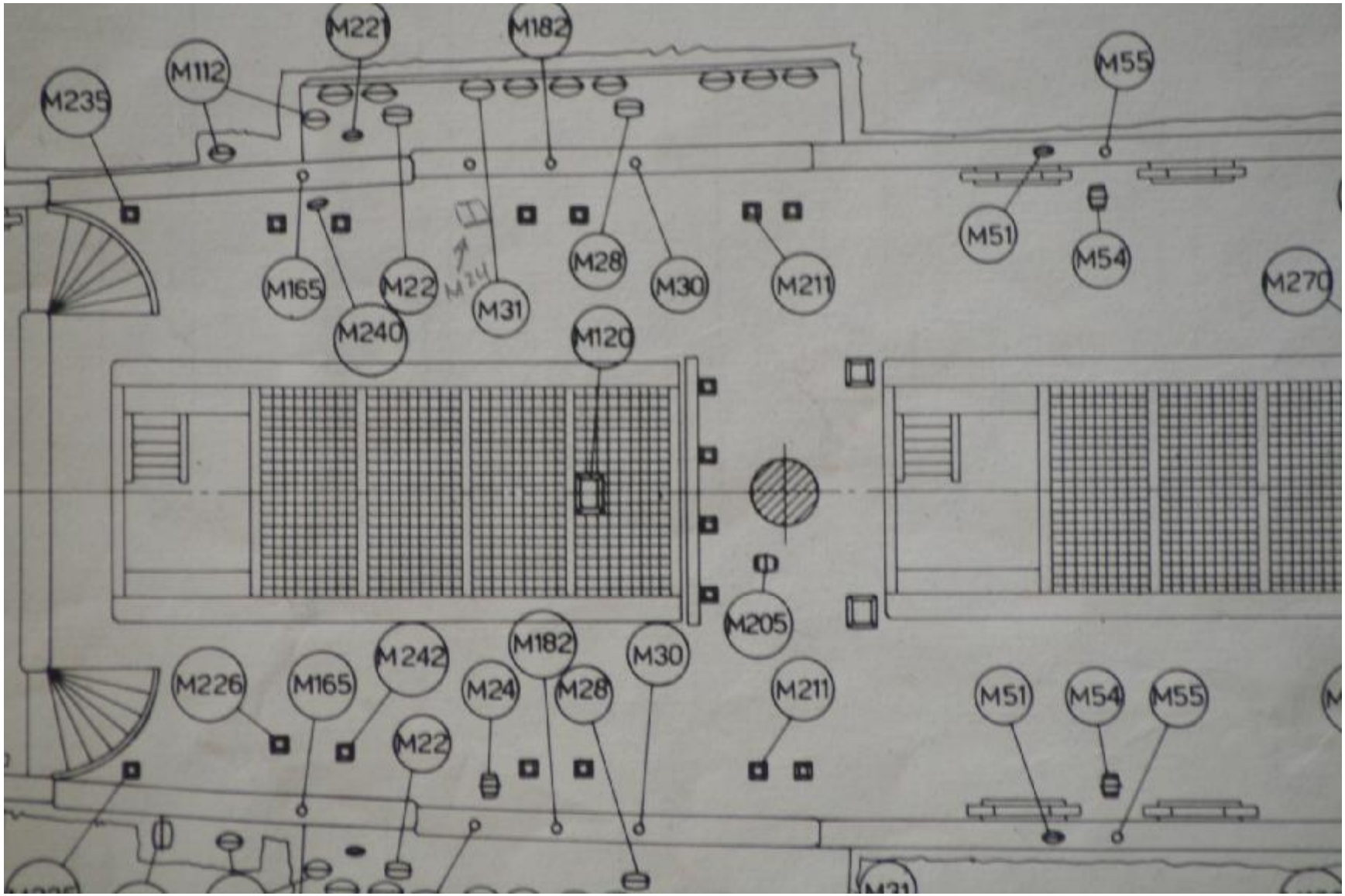


FIG.14
A39
A40
5x5
A39
A41
M300
M299
2x2
A40


M221
M182
M112
M235
M55
M51
M54
M270
M165
M22
M28
M30
M211
M24
M31
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M120
M205
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M226
M165
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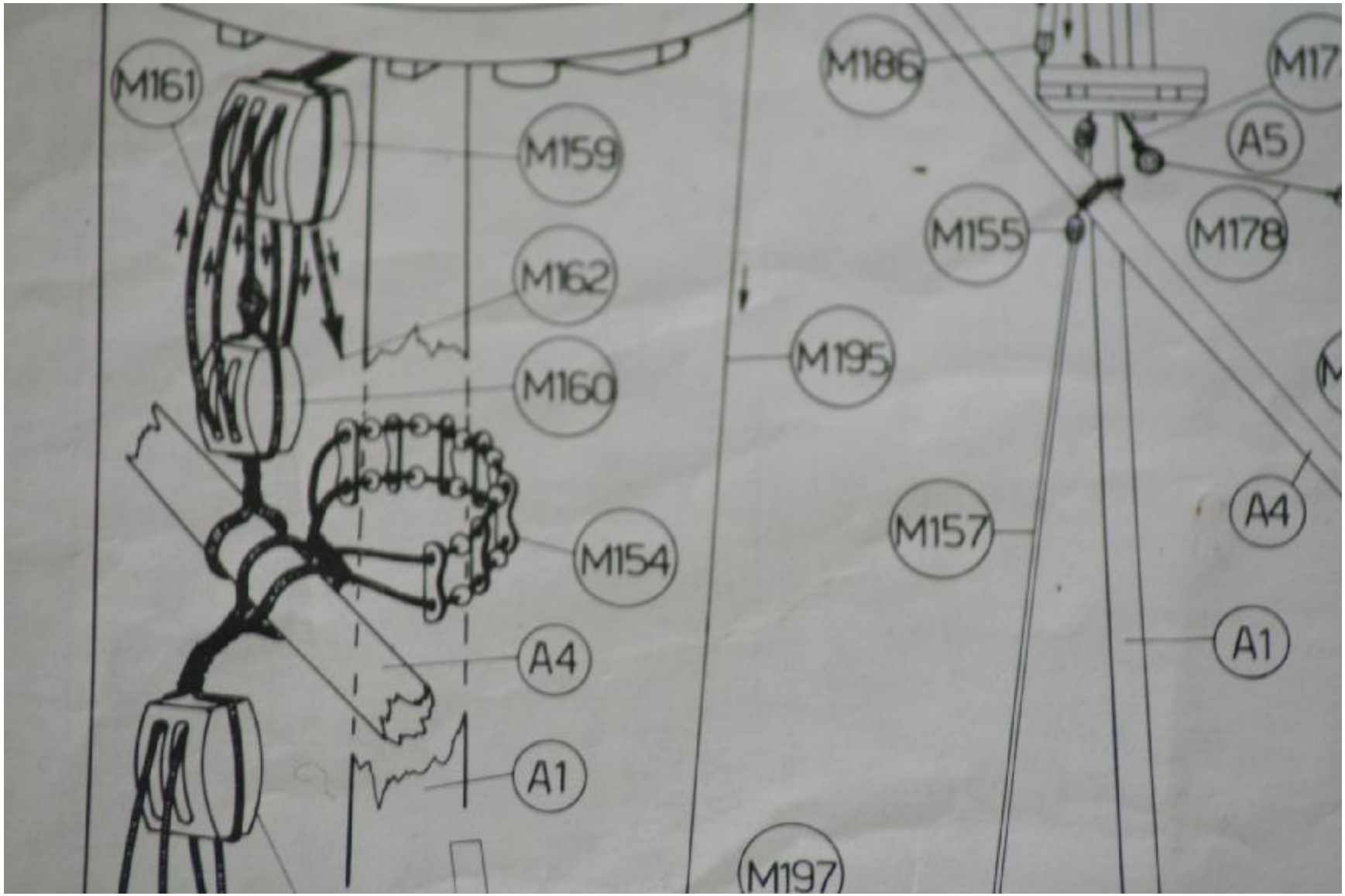
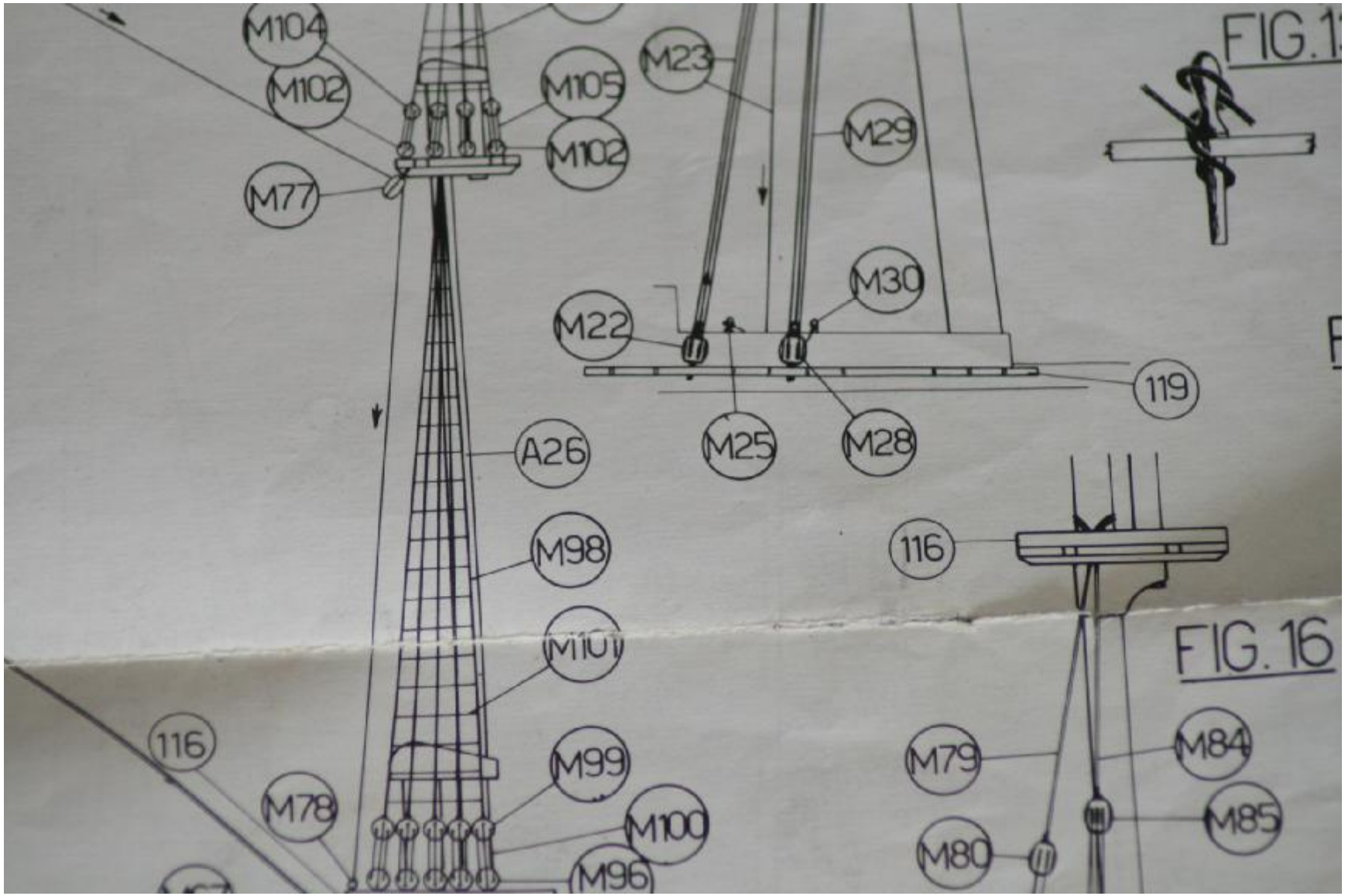
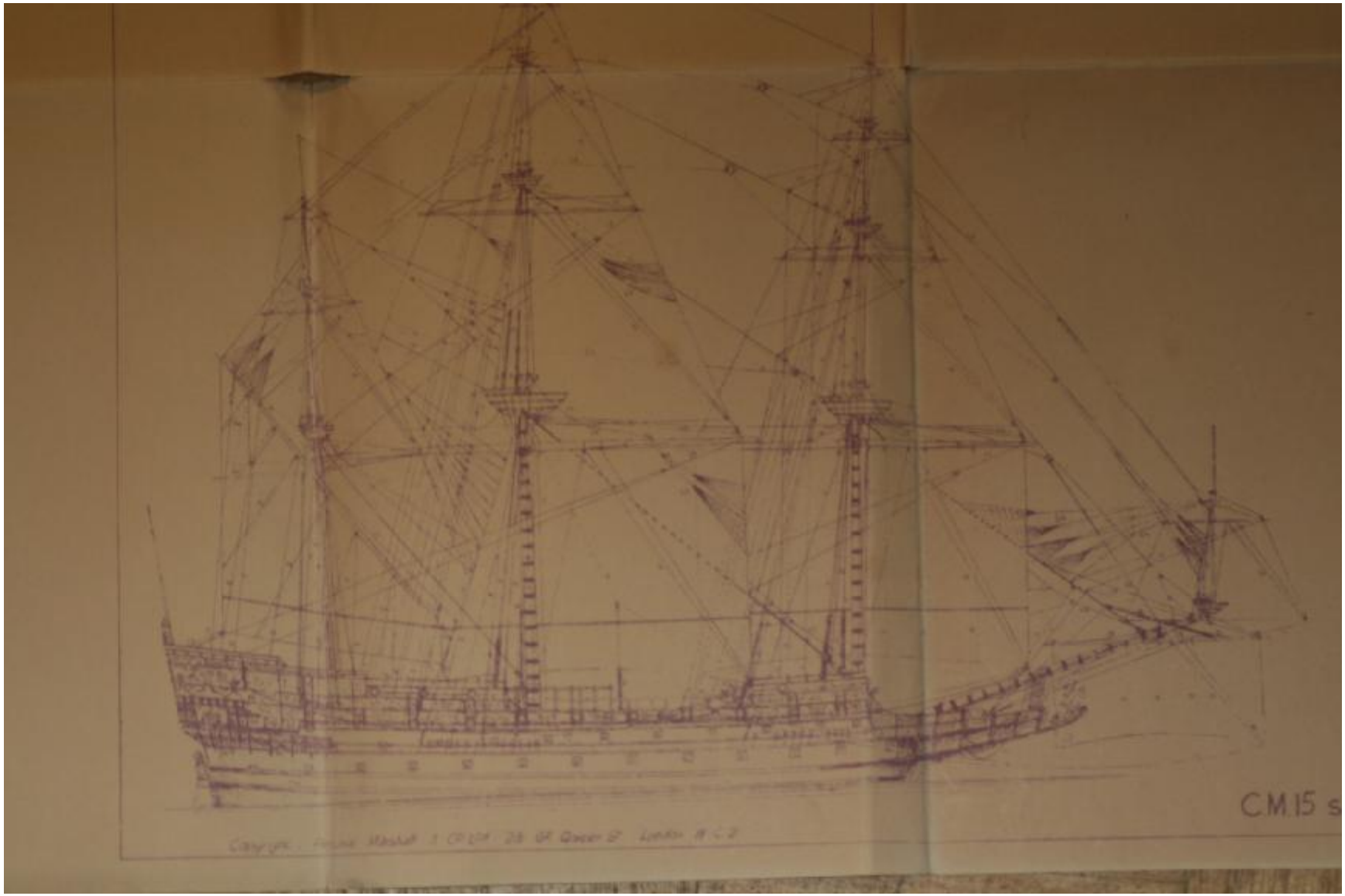
M30
M211
M51
M54
M55
M22


M161
M159
M162
M160
M154
A4
A1
M197
M195
M186
M155
M157
A5
M178
A4
A1


M104
M102
M77
M105
M102
M23
M29
M30
M22
119
M25
M28
A26
M98
M101
M99
M100
M96
116
M78
116
M79
M84
M80
M185
FIG. 16


CM15 s

Gammoning

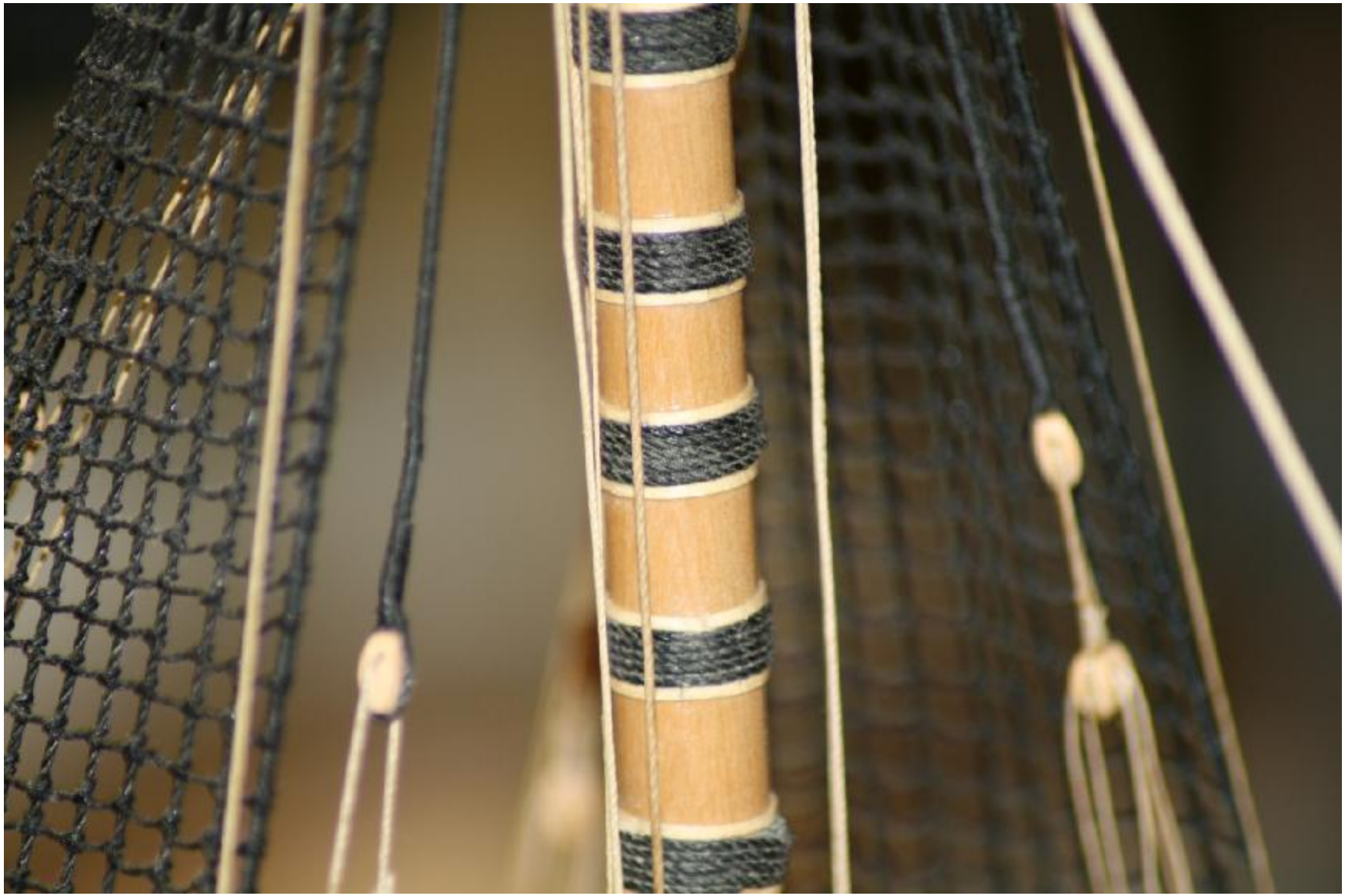
- A small eye-splice is made in one end and slipped over the bowsprit at the proper location. The other end is passed under the bowsprit from port to stbd. The turns start from aft on the bowsprit and forward in the slit for the gammoning. Six or seven turns for each gammoning is sufficient.
- One more time up and over the bowsprit, bring the line half way down and make a half-hitch round the round the port half of the gammoning, take the end around the stbd half from forward aft and go on round outside everything pulling the two sides closely together, wrap several more turns and tighten the entire job. More difficult to try and explain than to do.

Bobstays and Bowsprit shrouds

- Bobstays appeared about 1690 or1691.
- Bowsprit shrouds came in even later, probably around 1706.
- This brings up the detail you rig on your model. Obviously, the Sovereign of the Seas would not have bobstays or bowsprit shoruds.

Tackle Pendants

- The first item rigged on the lower fore mast is the tackle pendants, if your ship has them. The line used is the same as the shrouds, which is usually hawser line (right line twist). The tackle pendants are served their full length. **You always start with the starboard side first.**

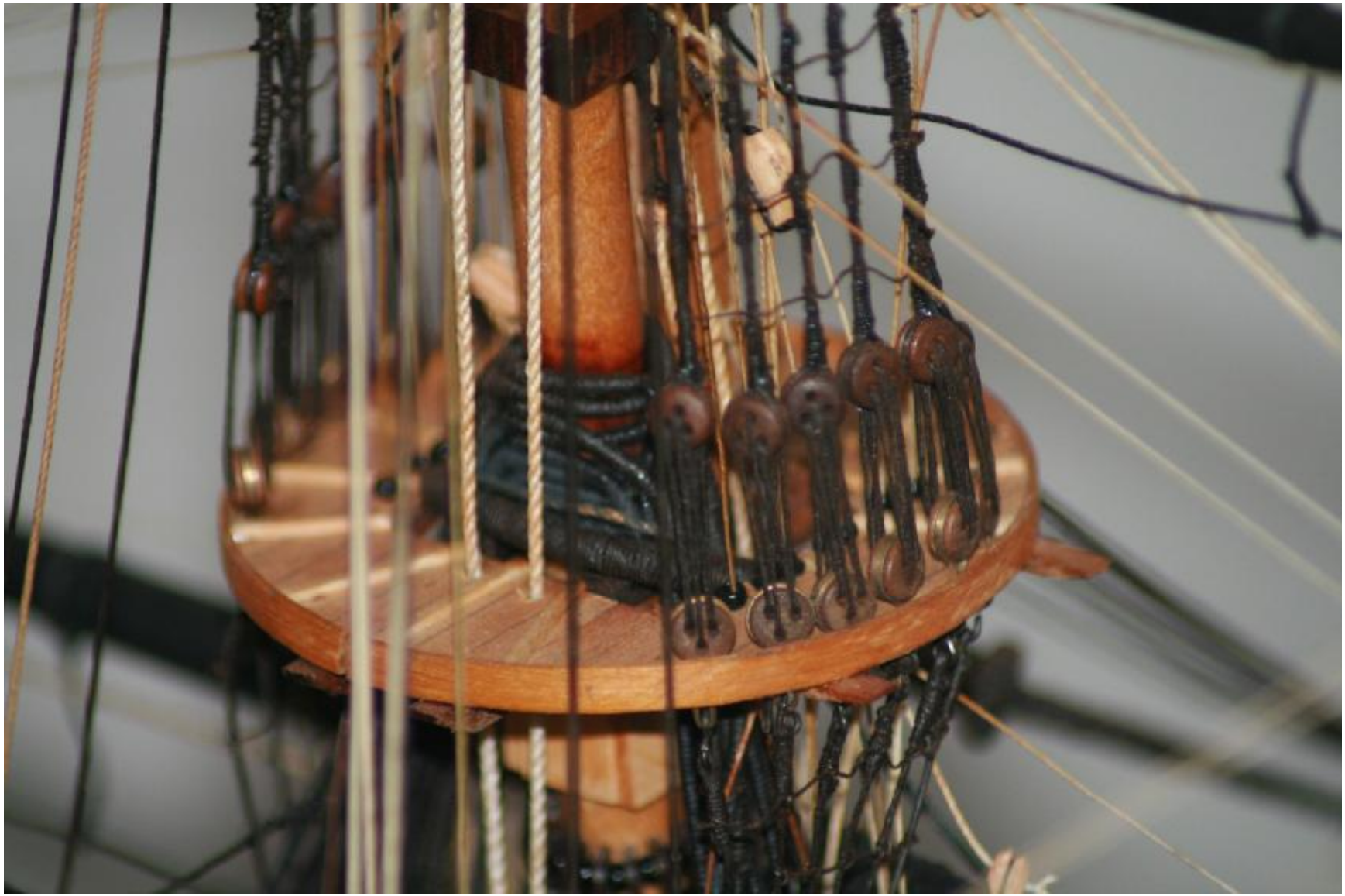


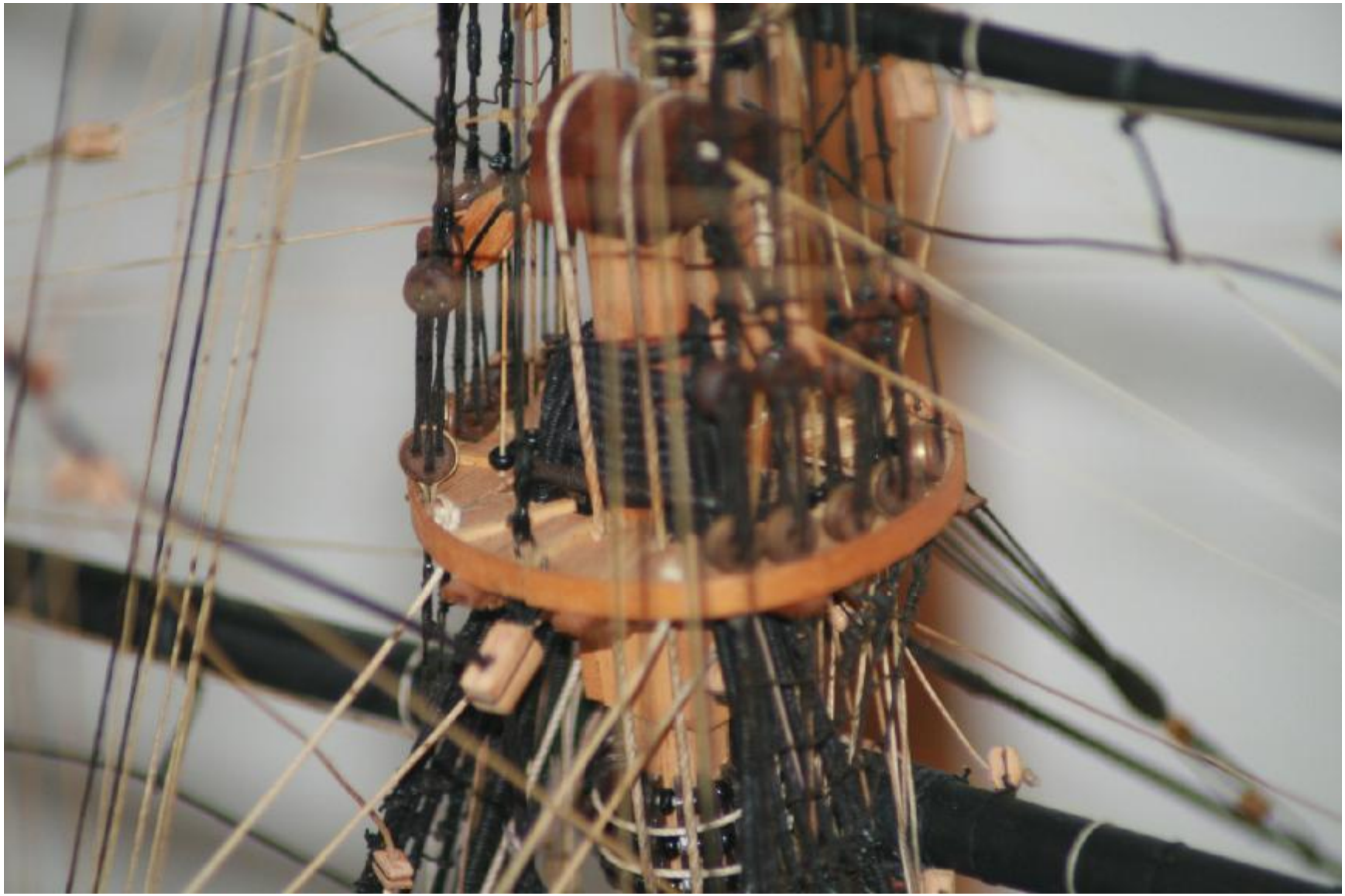
- Showing the tackle pendant, fully served, with tackle employed, which is unusual for a ship model to show.

- Picture of serving technique used to serve all the line. Technically, it is wormed, parceled and served, but the serving is all you can see, so that is the only thing that is done.

Shrouds

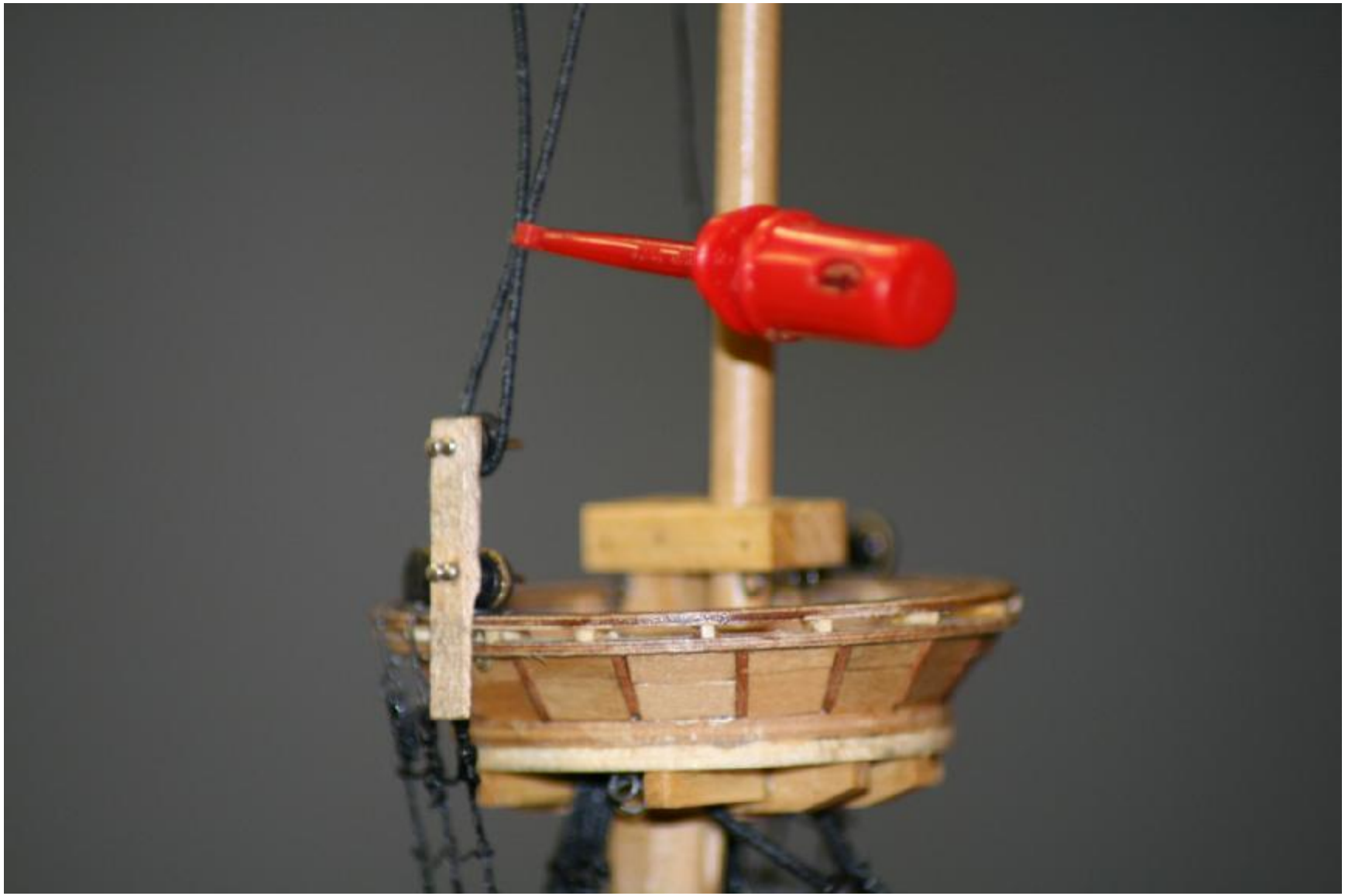
- The next step is the shrouds, which are installed in pairs, **the starboard side first.** The foremost shroud is served its entire length, as the sails chaffed the line. All shrouds are served at the throat or the part that goes over the mast. They go over the tackle pendants already served. Don’t forget the bolsters.

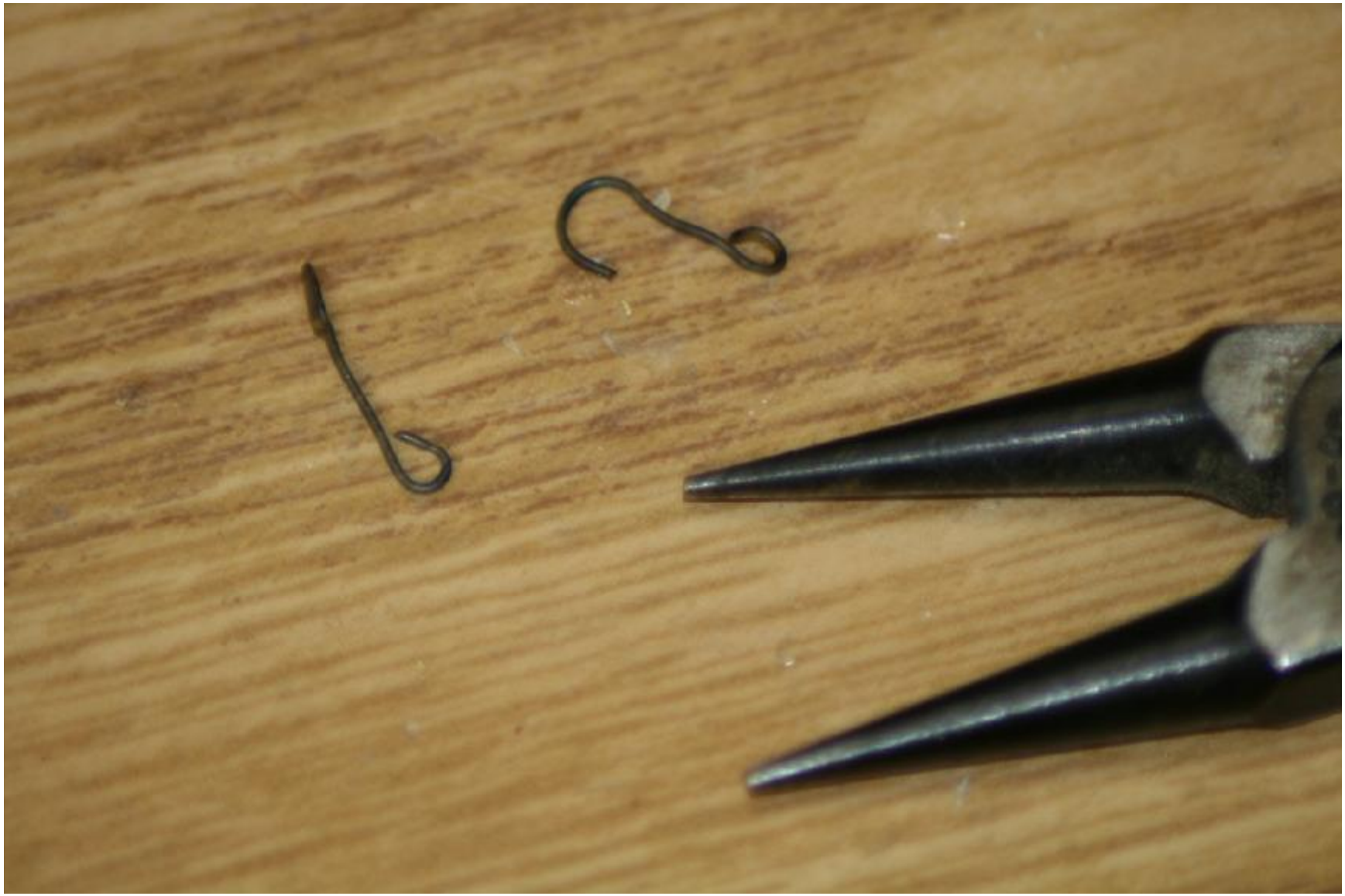


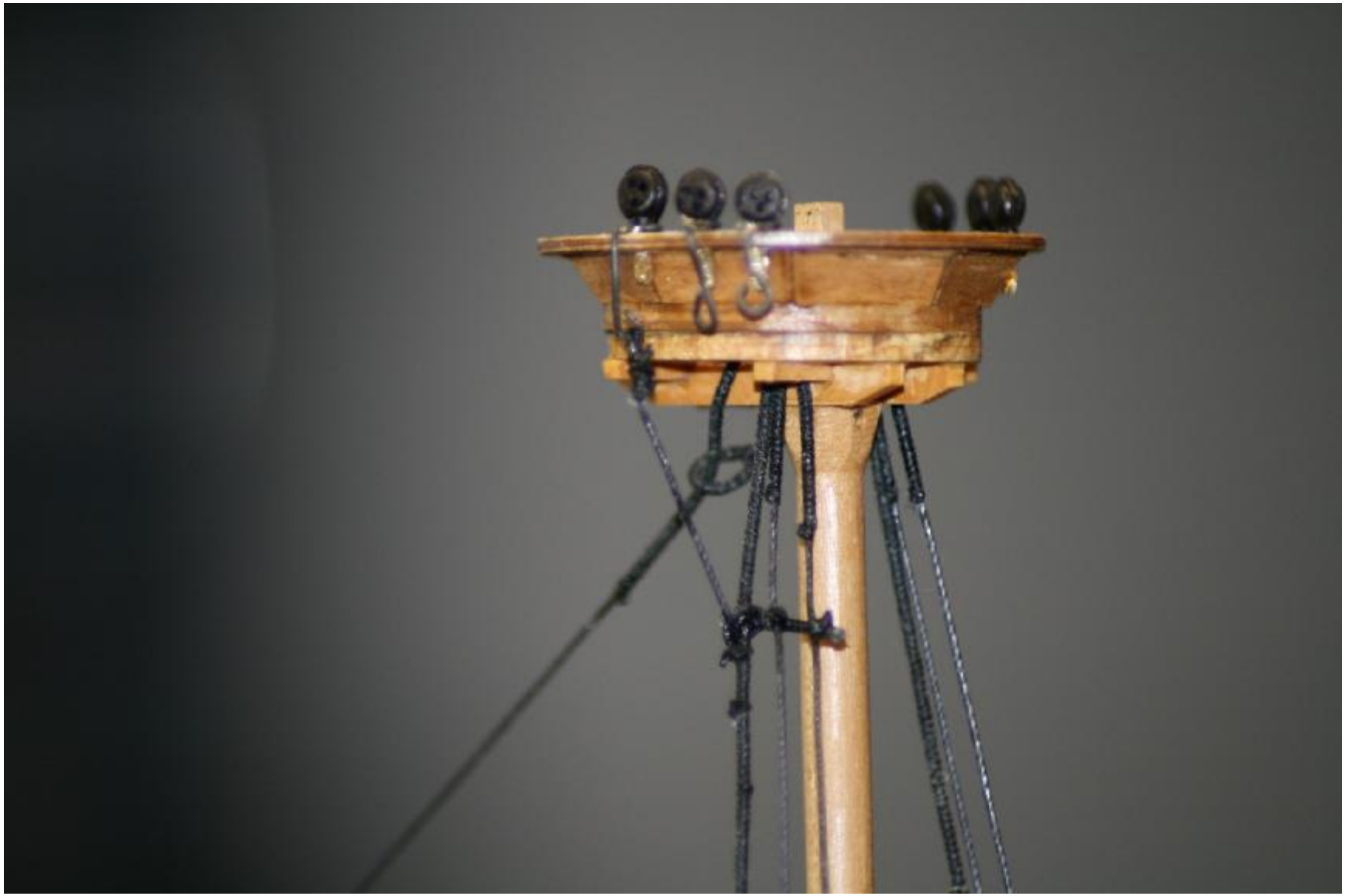


Deadeyes and Lanyards

- The shrouds go down to the deadeyes and are connected to the channels or the top as shown in the pictures. The deadeyes are joined by the lanyards. As a general rule, the lanyards are ½ the thickness of the corresponding shroud and are right hand twist (Hawser) line.

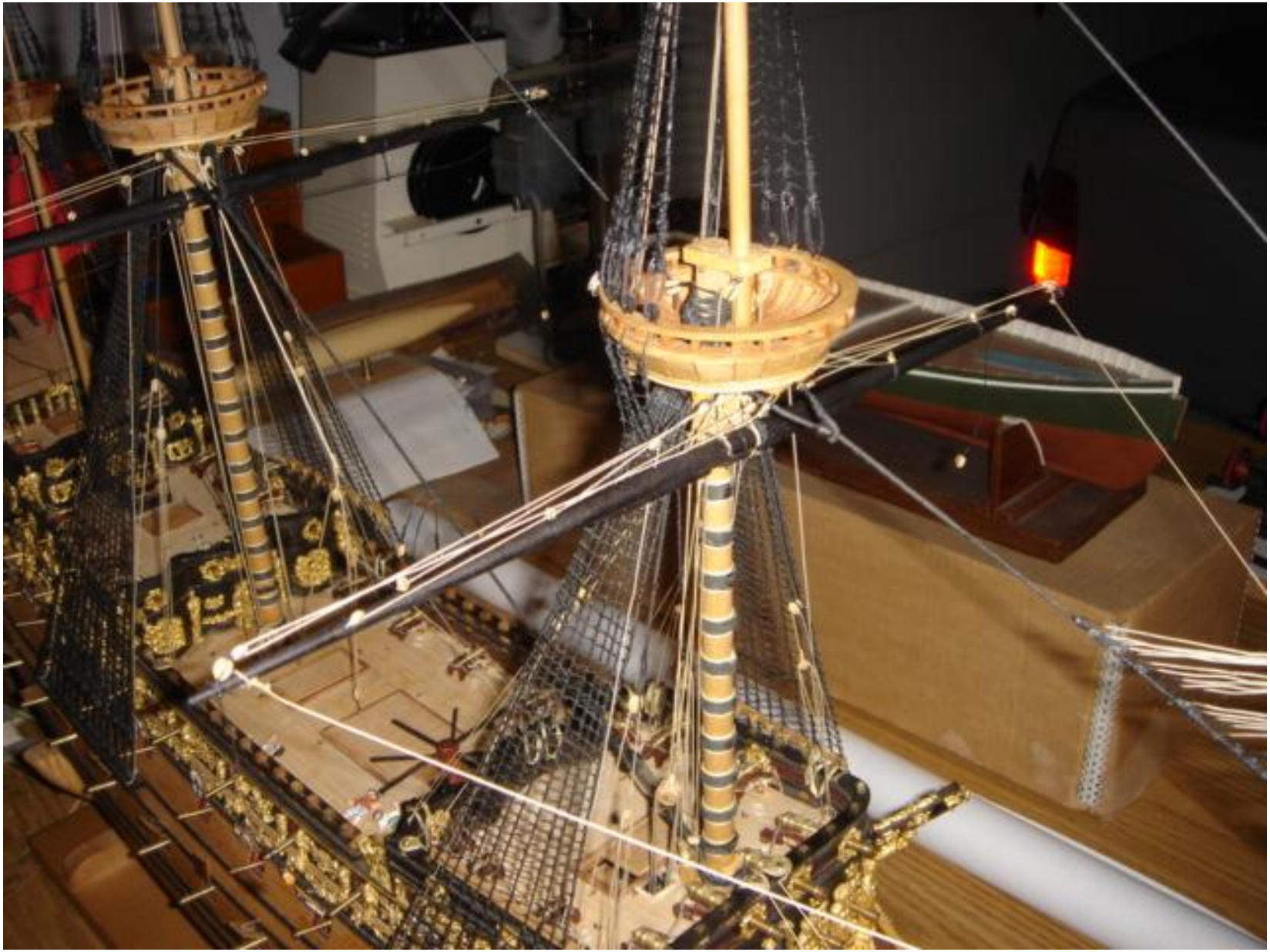






Stays

- The stays lay atop the shrouds and are served again where they go over the top. The stays are left hand twist (cable) laid line which has to be made on a rope walk, as most purchased line is right hand twist.
- Later ships had preventer stays also, which were in addition to the regular stays.
- Stays were set up with blocks, deadeyes, or hearts, depending on the period and nationality.

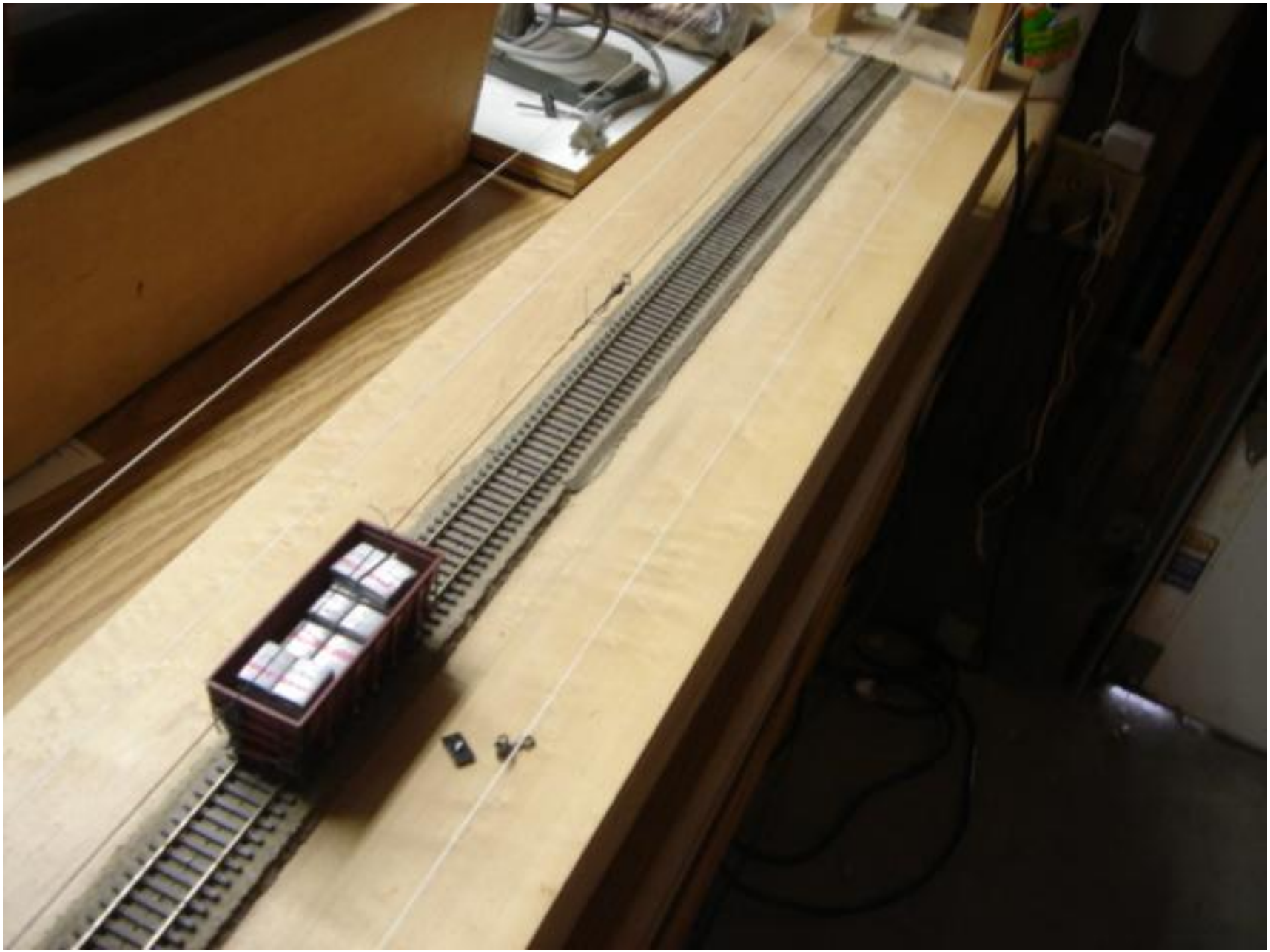


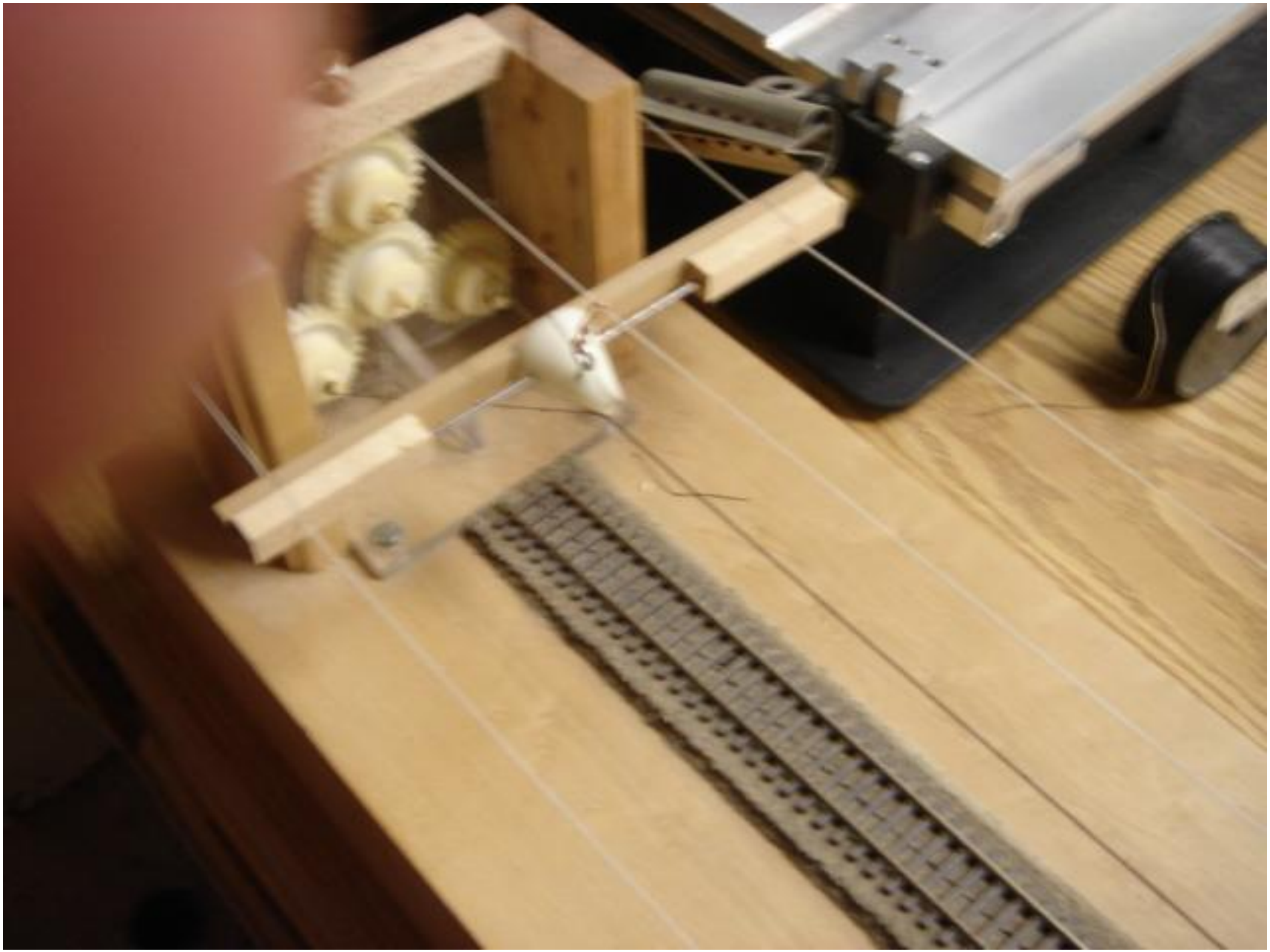
Preventer stays

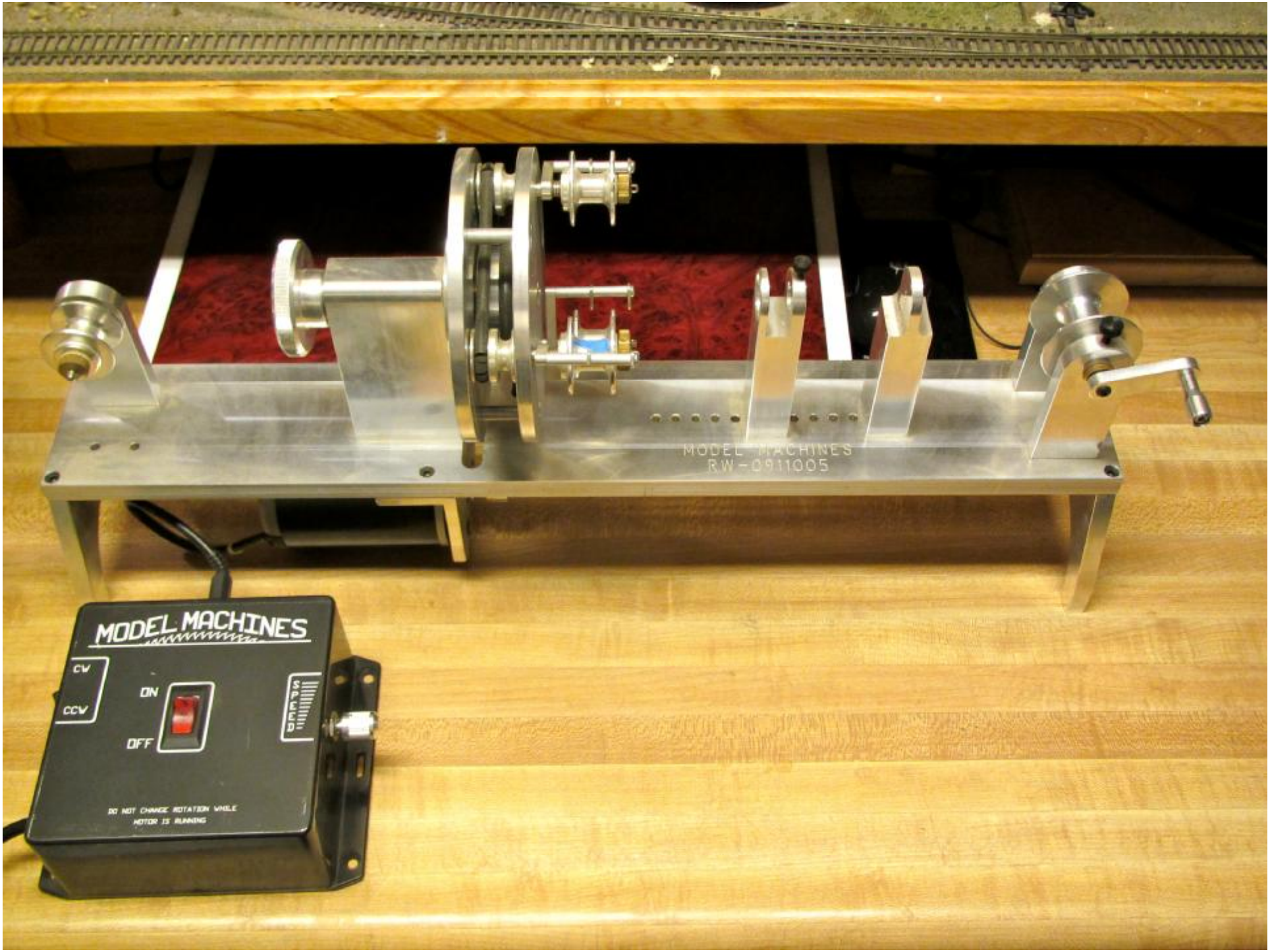
- This was introduced about 1700 according to Lees, and is therefore not installed on the Sovereign of the Seas. I do not at the current time have a ship model that has this rig. Almost a duplicate of the stay.

Rope Walk

- The rope walk is necessary due to the fact that left hand twist linen line is not available commercially. All the stays should be left hand twist, which is made up of three strands of right hand twist linen. There are many variations of the rope walk, some better than others. Mine is simple, but it works. Then there is the new one which also works great.



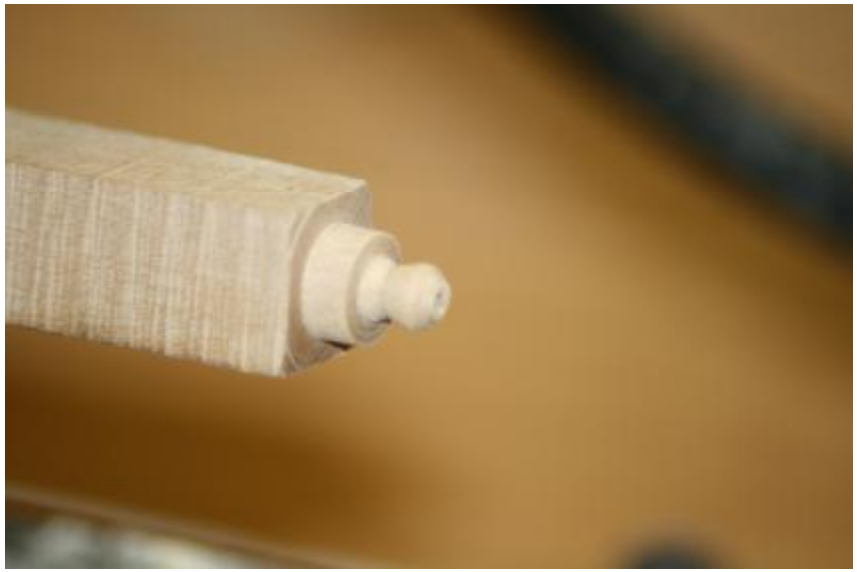



MODEL MACHINES
RW-0911005
MODEL MACHINES
CW
CCW
ON
OFF
DO NOT CHANGE ROTATION WHILE
MOTOR IS RUNNING

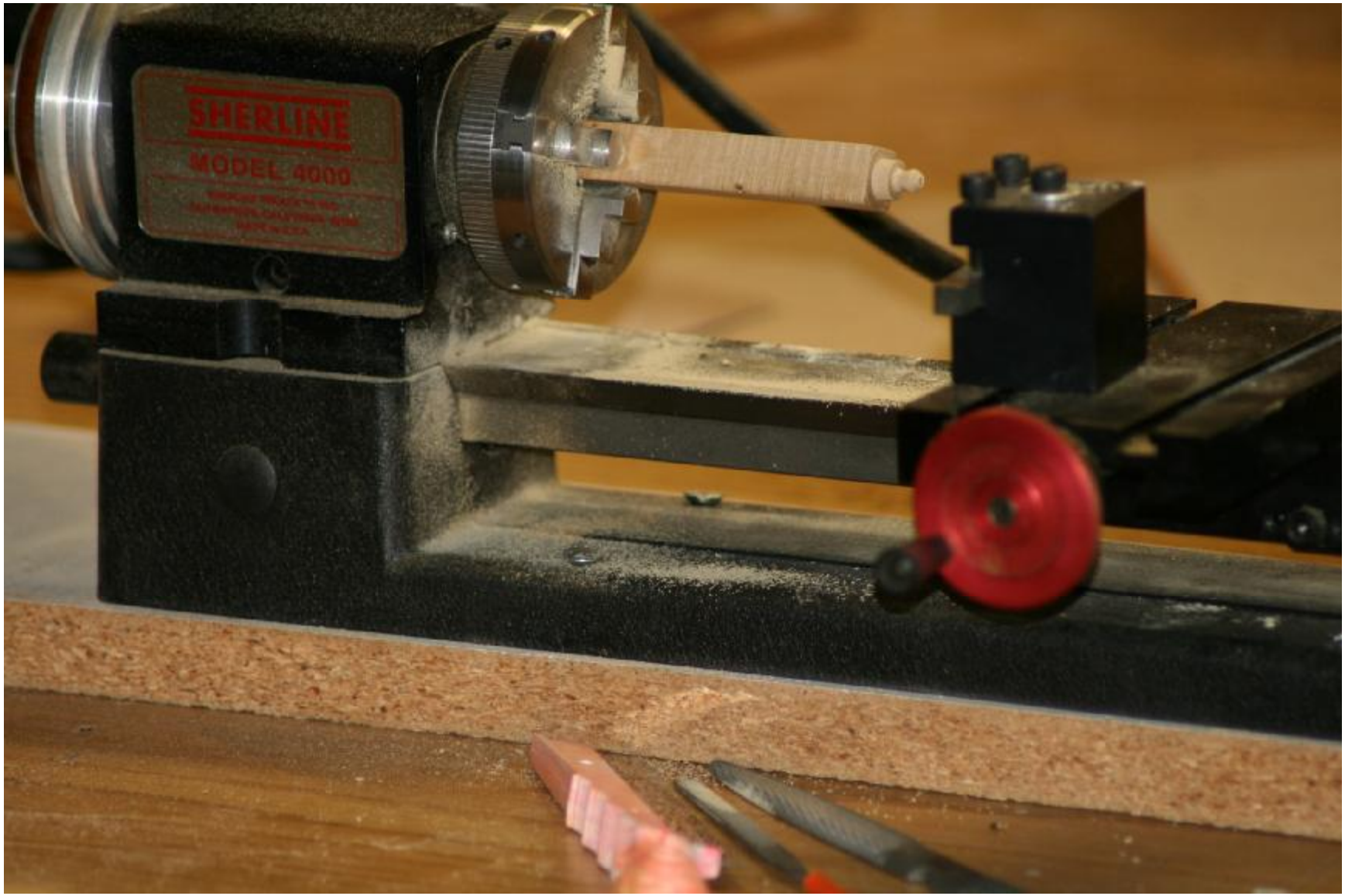
Mouse

- The lower and topmast stays had mouse's as part of the upper stay. A loop was installed at the end of the stay, the stay was turned around the head of the mast, the other end of the stay was put through the loop, and a MOUSE was installed to keep the stay from slipping through the loop.

Mouse Construction

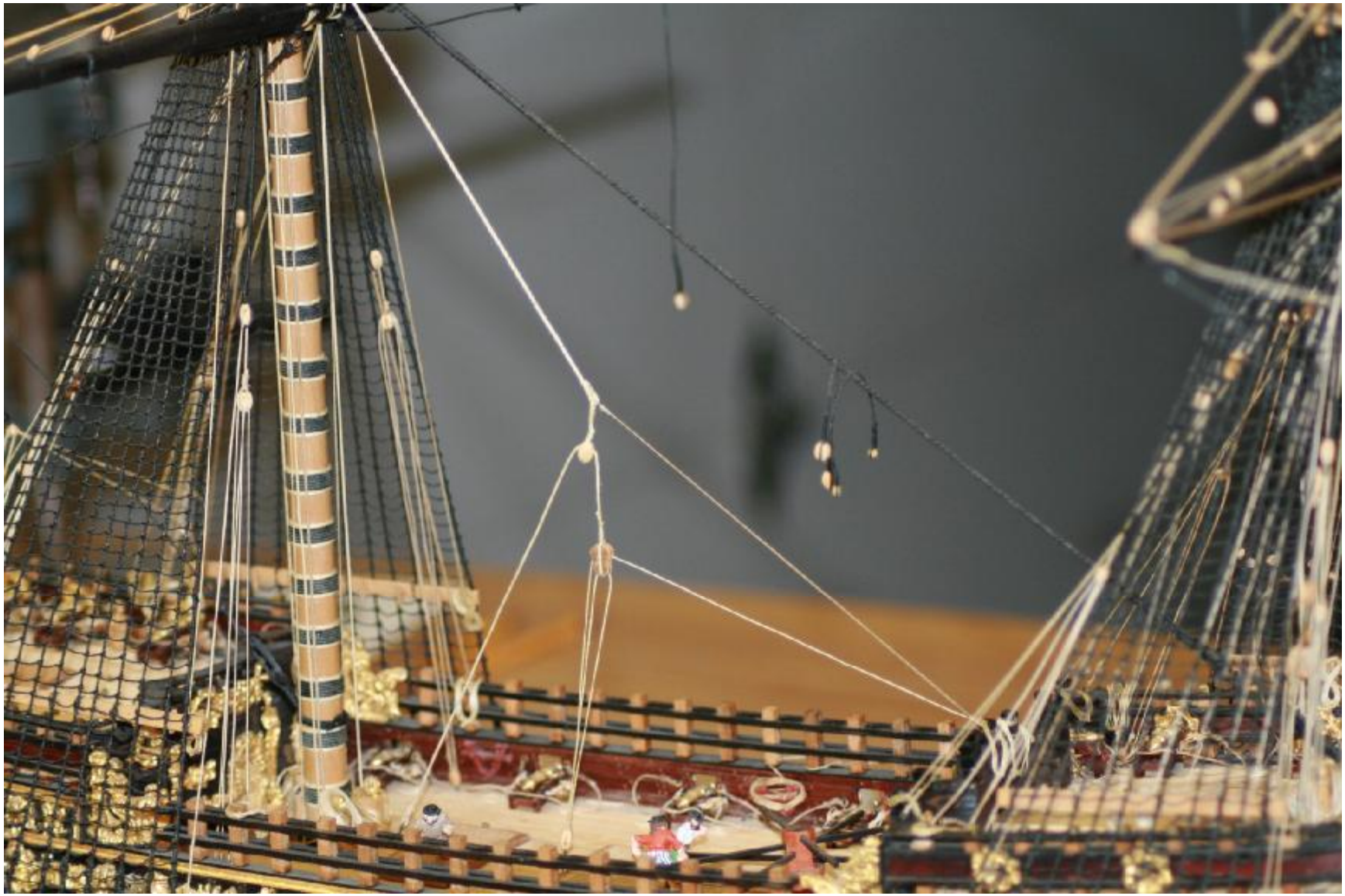


- The Mouse can be made the real way (see Anderson) or made out of wood using a small lathe, as I did, and stained or painted black.


SHERLINE
MODEL 4000

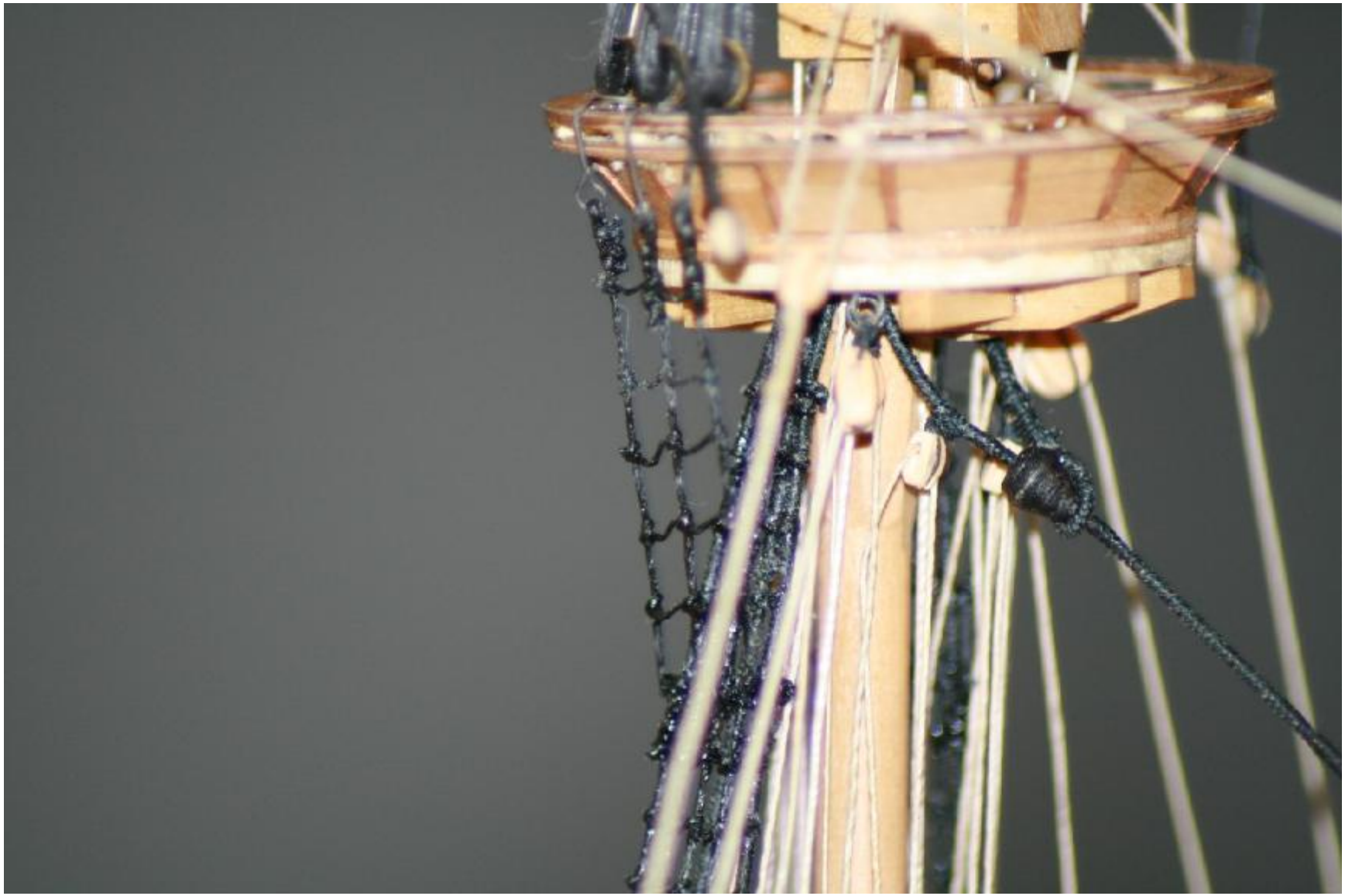
Garnet Tackle

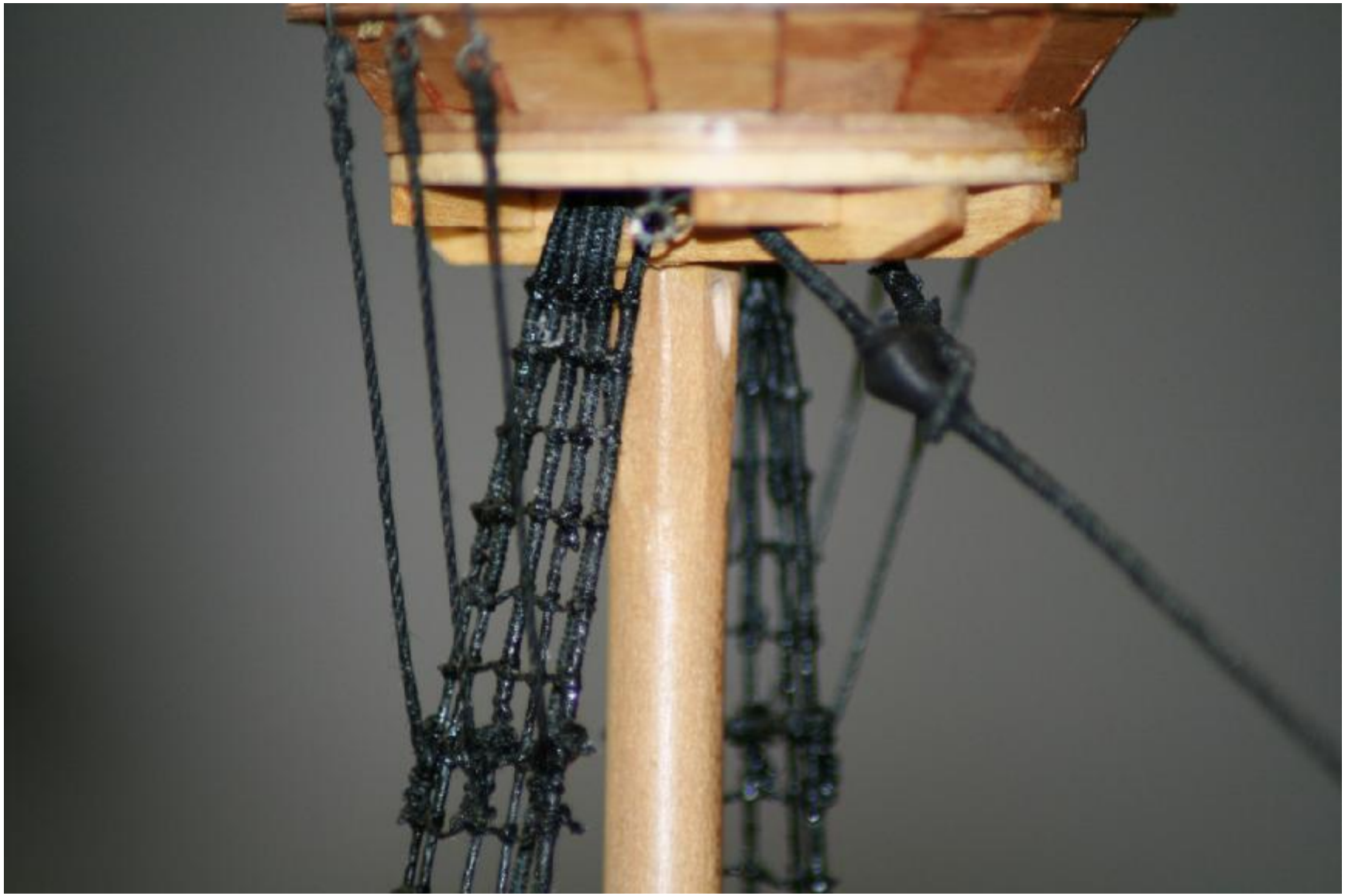
- The garnet tackle is also part of the standing rigging, although it could be considered running rigging also. Check with the proper authority to determine the correct tackle to use, since it varied by nationality and period. Used to hoist boats, guns, etc.



Futtock Shrouds

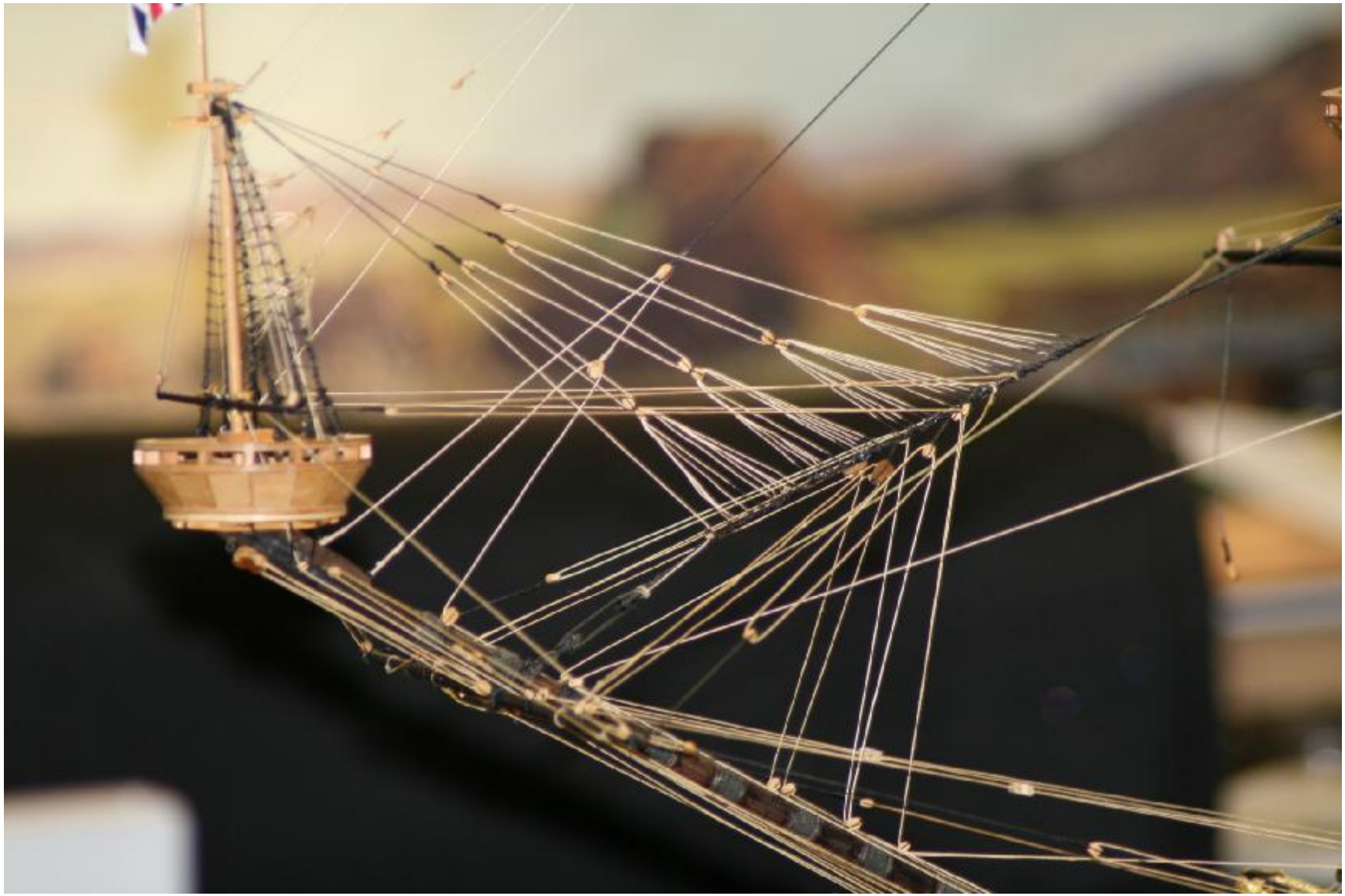
- First, the futtock staff has to be installed. This was sometimes served line. As a general rule, the futtock staff was about as far below the top as the masthead extended above it.
- The futtock shrouds were then installed, assuming that the lower deadeyes of the topmast have been installed.





Special Stays

- Some of the more ornate ships, particularly the older ships, had very ornate stays. The Sovereign of the Seas excelled in this area. The next slide pictures the bow area with the only “normal” stay being the lower one. All the rest of the stays were highly ornate – the rigger had a ball

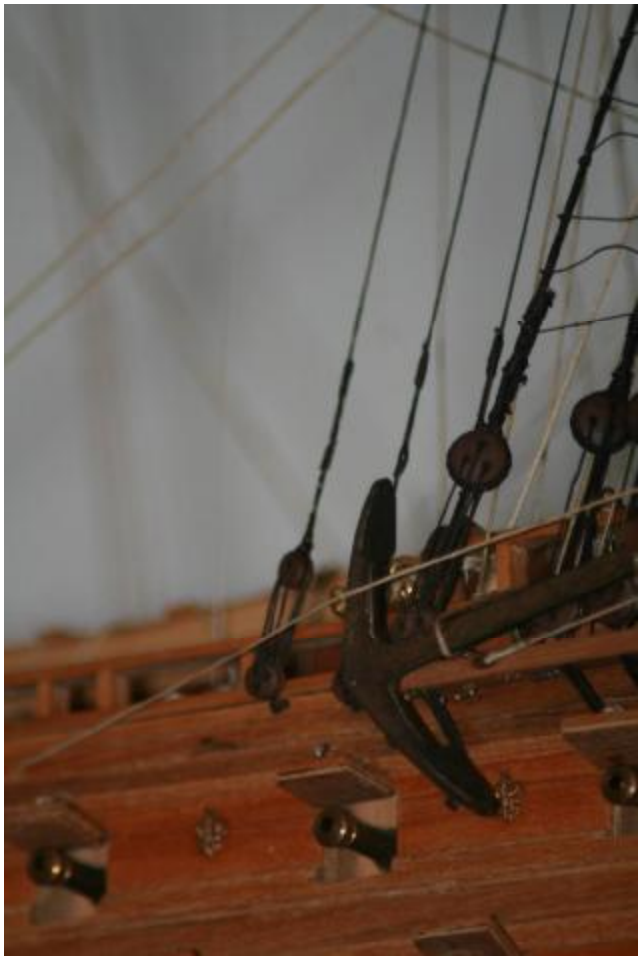


Standing backstays

- Again, not on the Sovereign. Introduced around 1670, they were in addition to the shrouds. You had standing backstays, breast backstays (few English ships were fitted with them), Running breast backstays (introduced around 1733), and shifting backstays (usually not seen, as they were only installed when additional support was needed for an additional stay to the mast).

Backstays

- Although the Sovereign of the Seas did not have backstays, later ships did. An example is the model of the Le Mirage, which is a French ship.



Catharpins

- Not all ships had catharpins, which were upper and lower, usually on the fore and main lower ratlines only. They are difficult to rig and not seen on many models. You also have to make sure that they are contemporary with you particular ship model.

Ratlines

- Everyone’s favorite thing to install. The ratlines are installed using clove hitches. To be perfectly correct, they should be siezed at either end, but I use clove hitches throughout. When installing the ratlines, I use drafting dividers to keep the spacing correct and a sewing needle to install the ratlines.

Crowsfeet

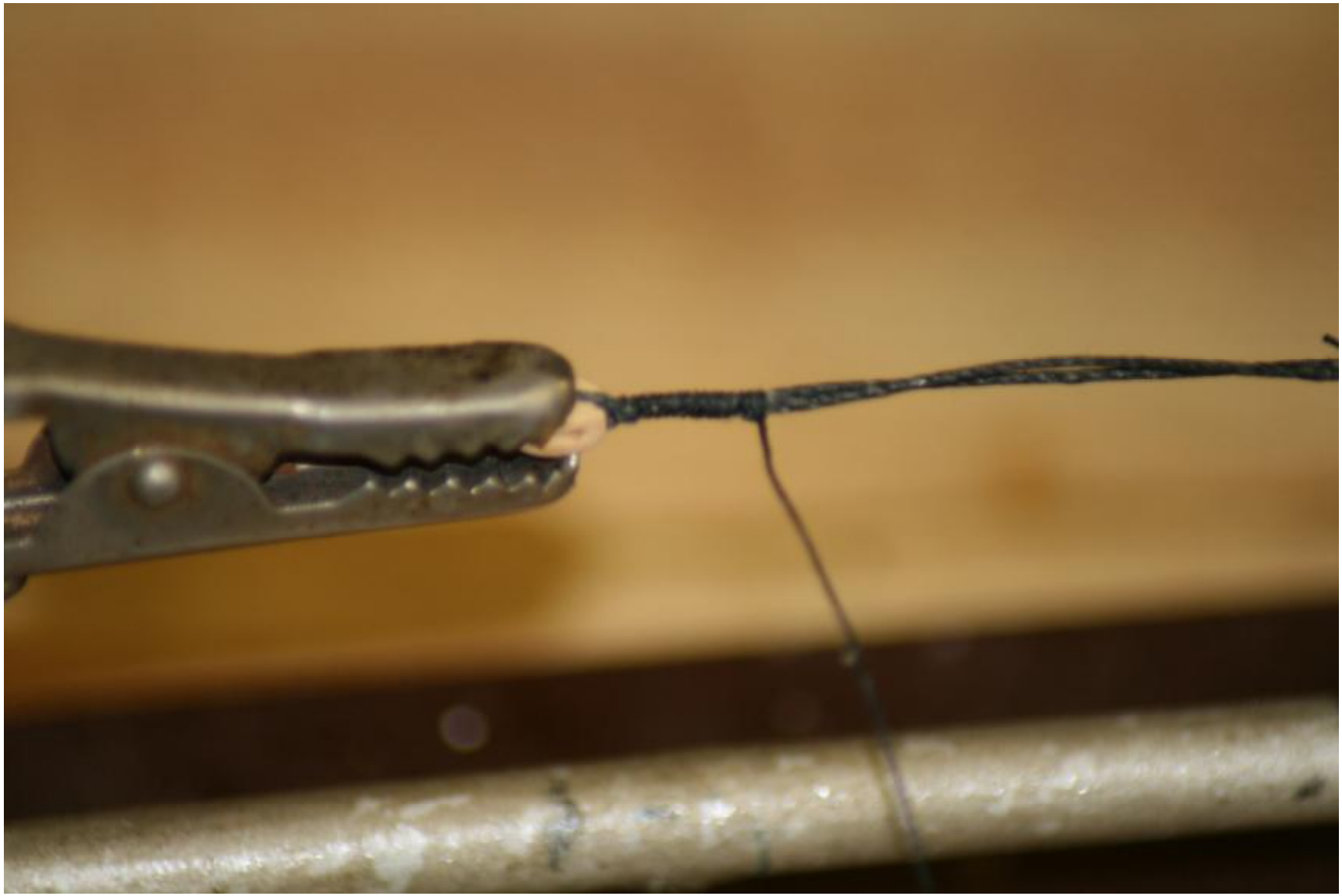
- This part of the standing rigging is not on the Sovereign of the Seas, but is on my Le Mirage. You have to make an Euphroe for each installation, which is lashed to the respective stay. Again, you have to make sure that the proper rigging is installed for your era of ship and nationality.

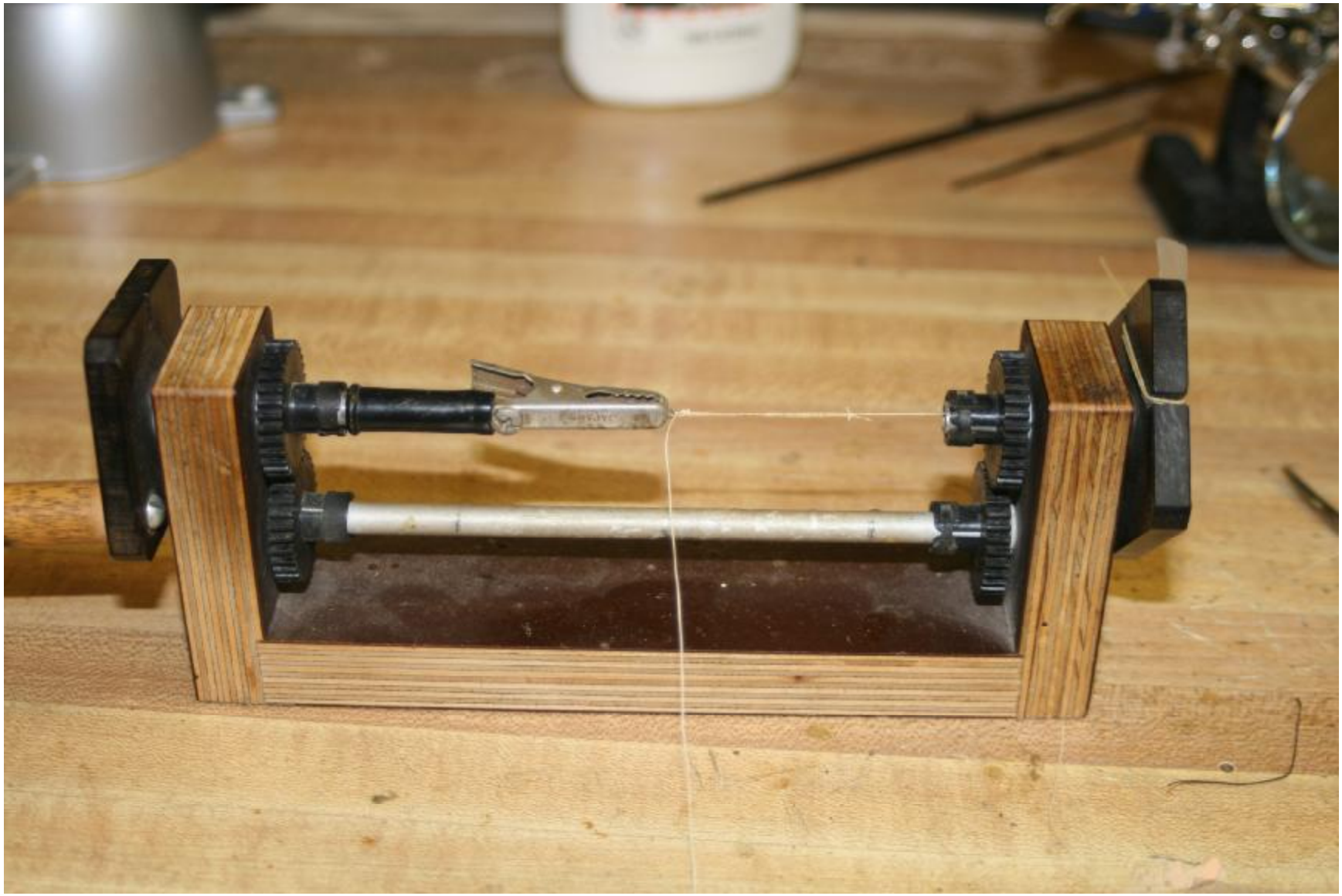
Running Rigging

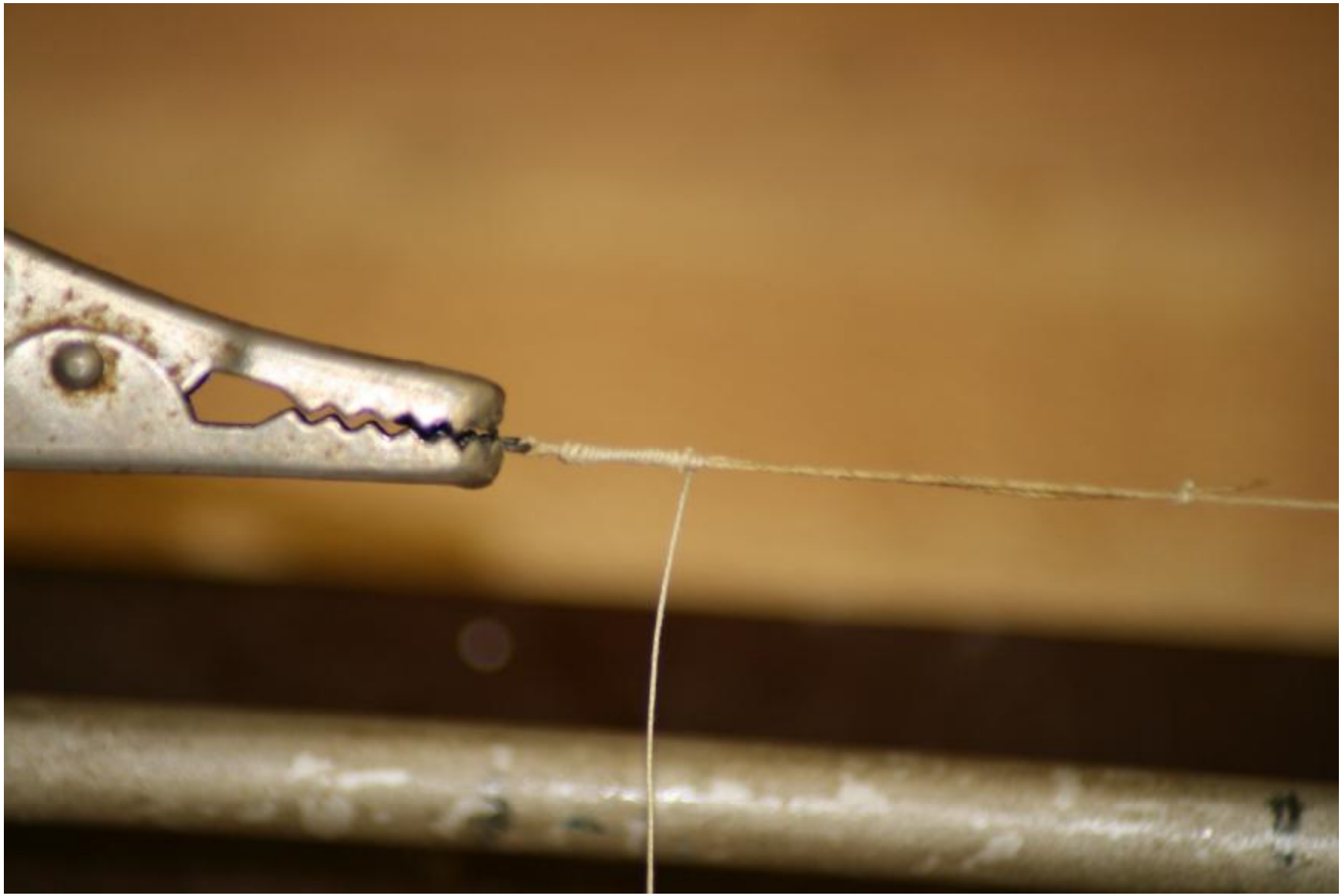
- The second phase of the rigging process is the running rigging. This rigging is usually a light brown color as against the black line of the standing rigging. There are two types of running rigging, those lines controlling the yards (ties, halliards, jeers, lifts, braces, footropes and yard tackles) and tacks, sheets, bowlines, clew garnets, buntlines and leechlines for the sails.

Seizing blocks

- The following views show the method I use to seize the blocks to the line. It looks very neat and is essentially the way it was really done. This is one of the major uses of the “String-Along” devise. I plan on cutting a second one in half and extending it to a longer length to make the seizing of line easier.

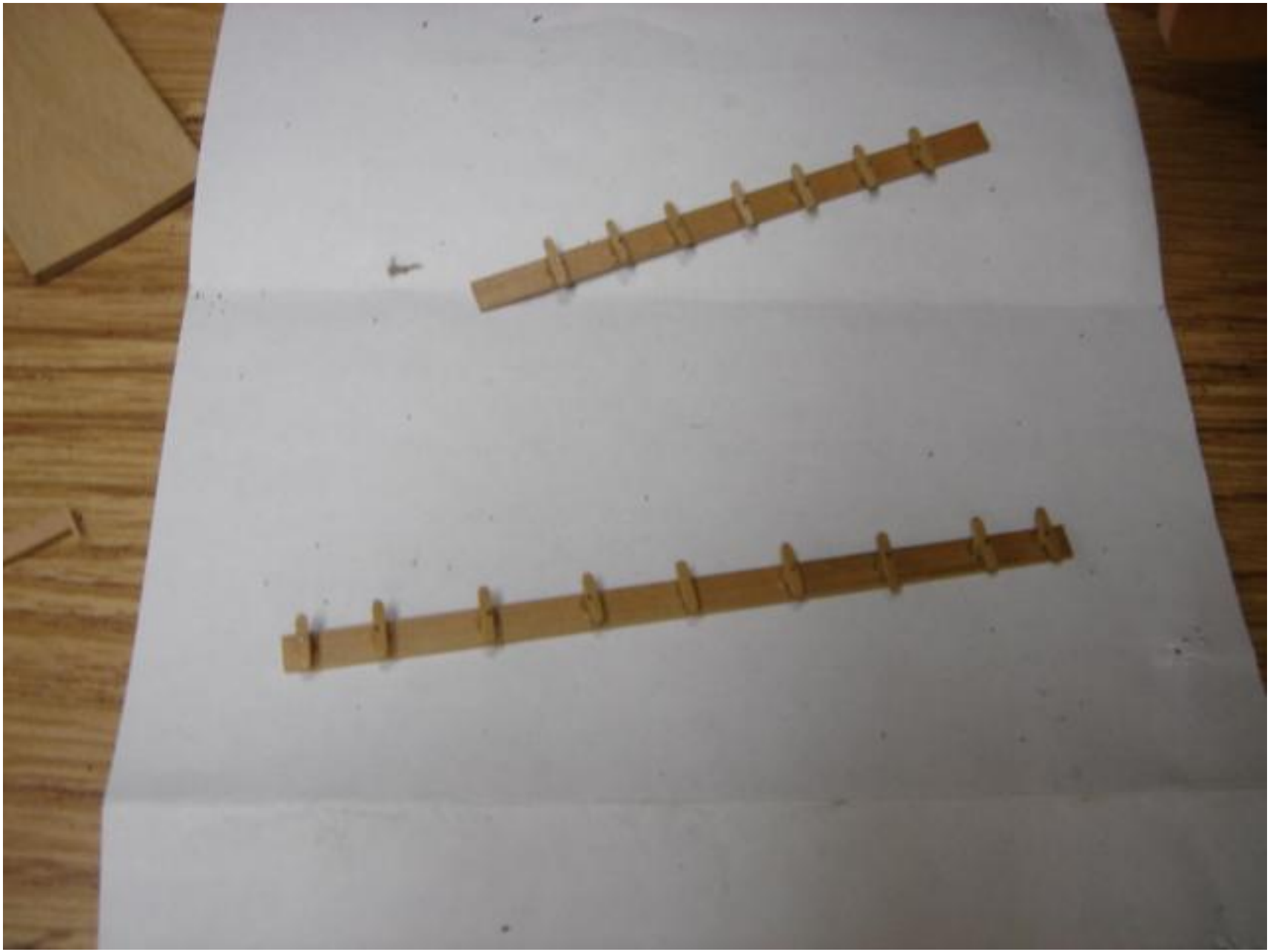


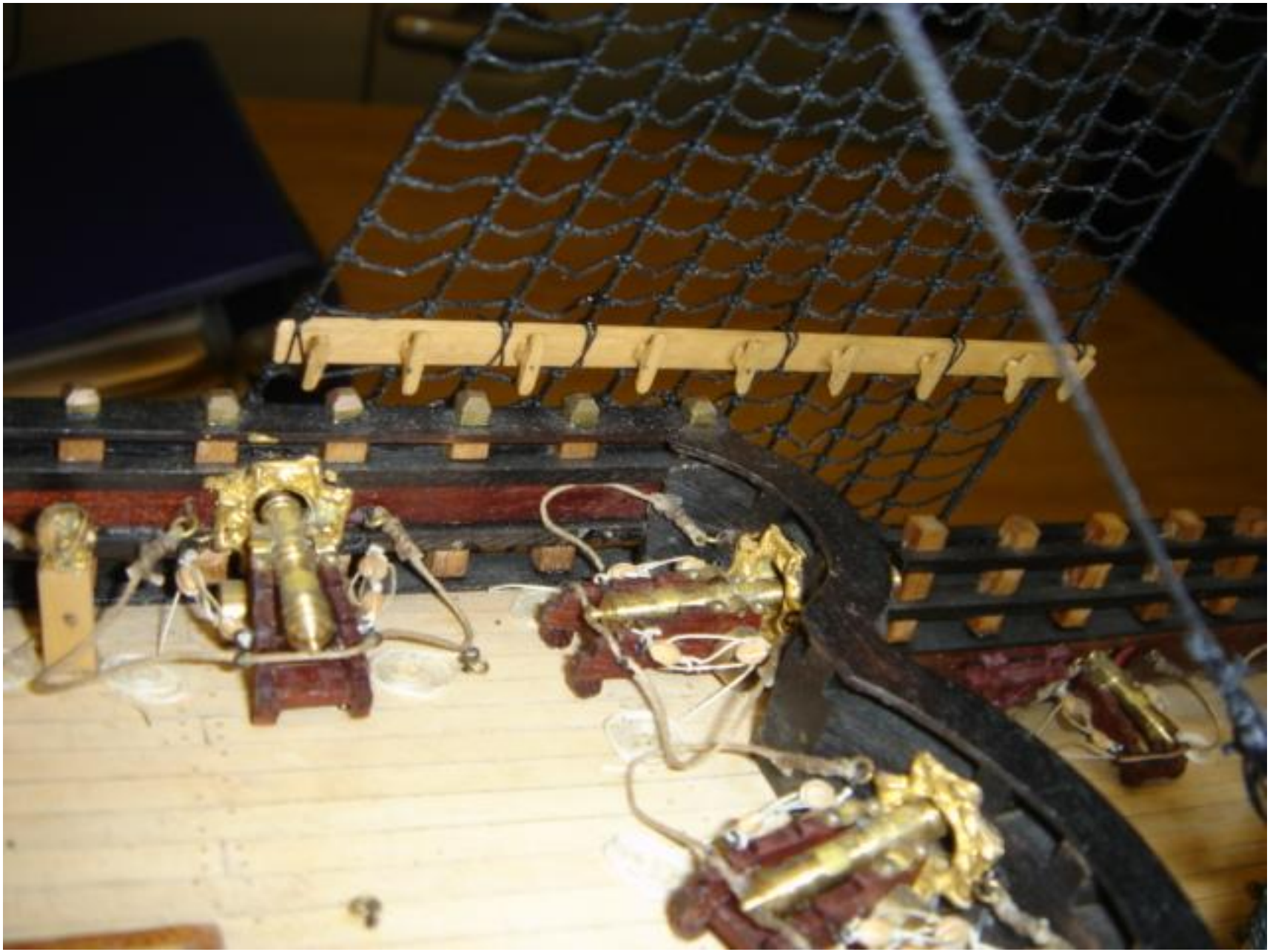


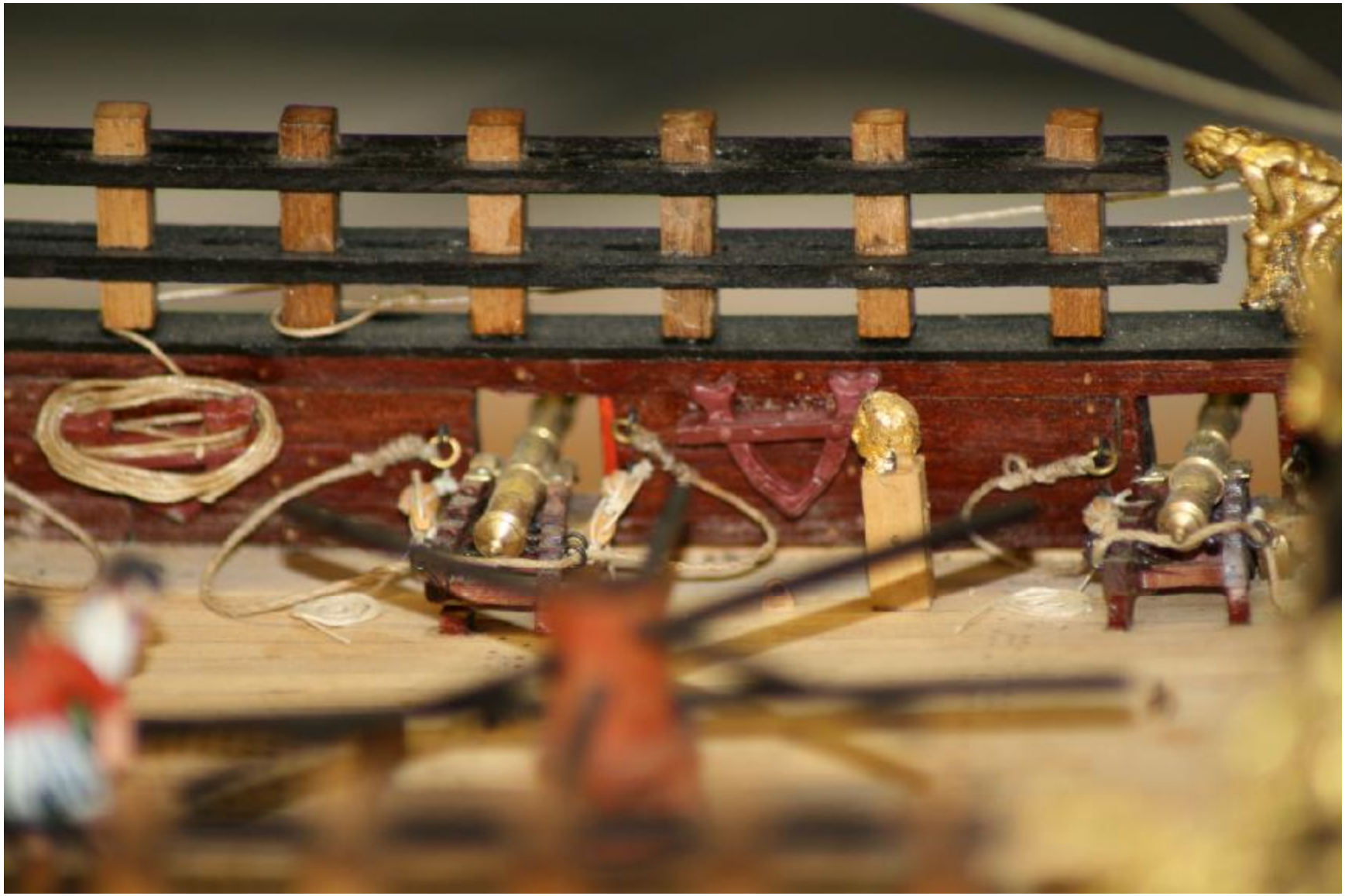


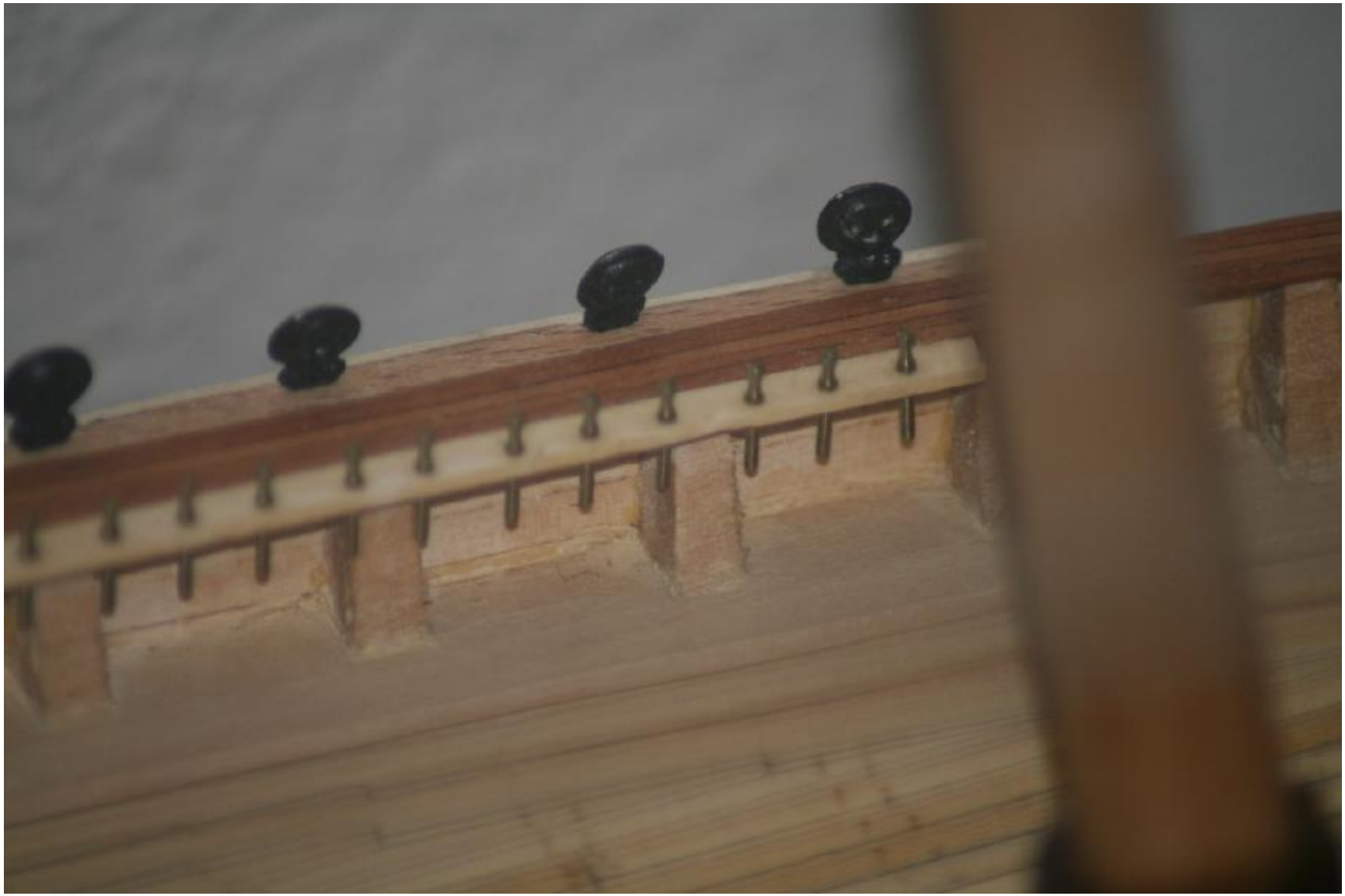
Belaying devices

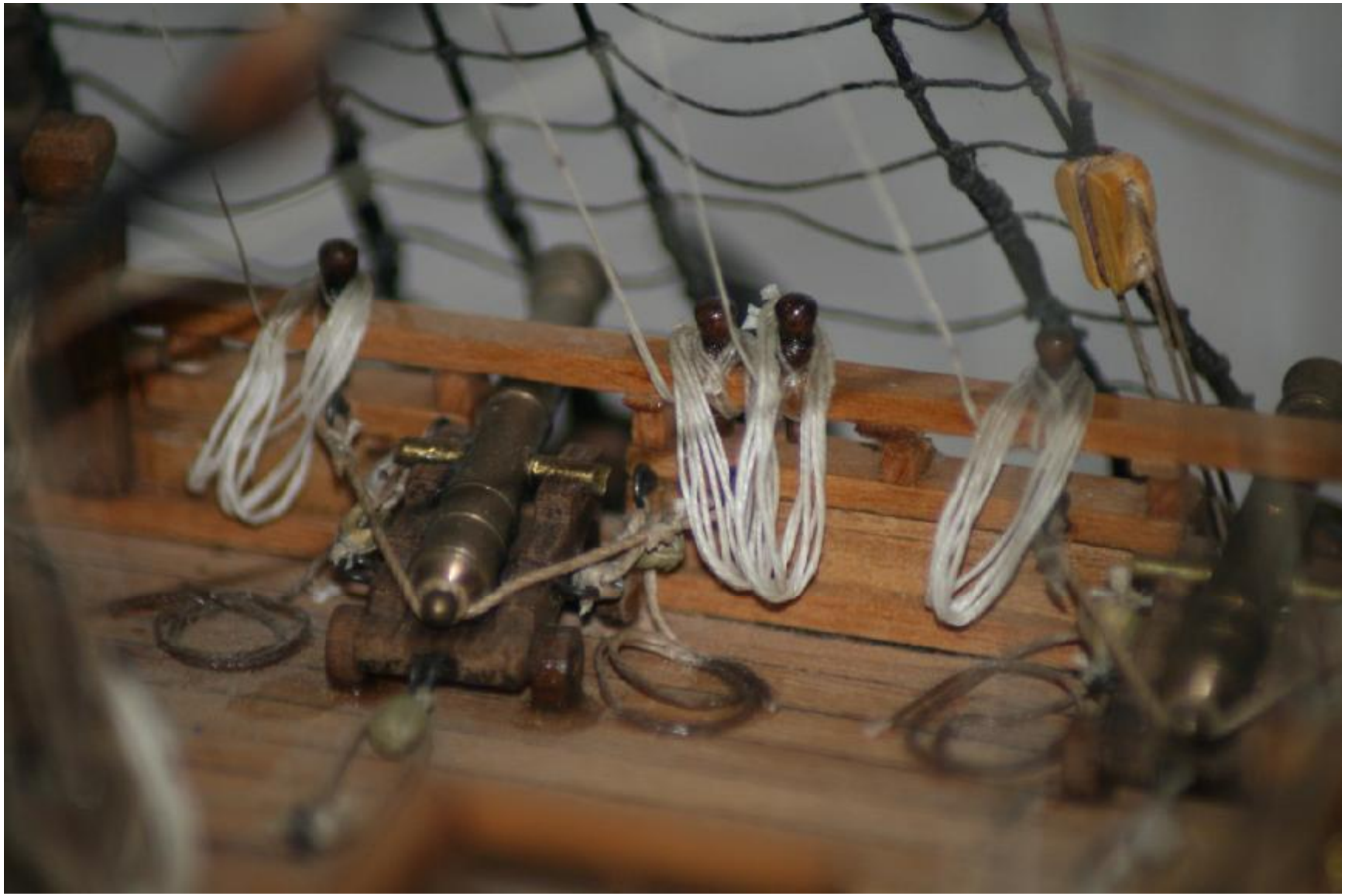
- The running rigging lines are all brought down to the deck or to the various tops in the masts and belayed in some fashion. There were no belaying pins on the Sovereign of the Seas, but shortly after belaying pins came into use. Kevels are also in use. In some cases the line is simply tied or hitched off to the railing.









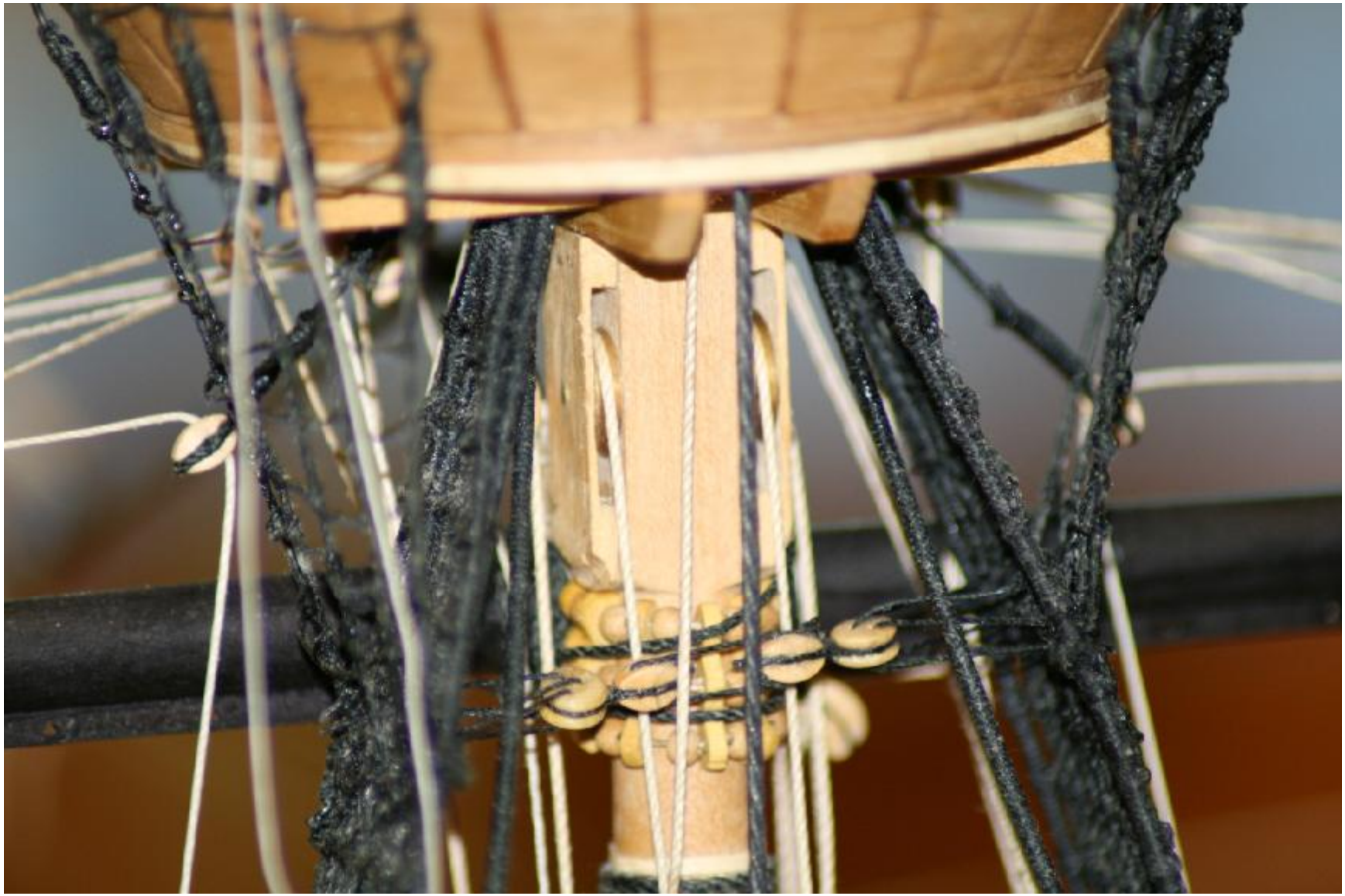


Tie, Halliard and Jeer

- The first order of running rigging is the installation of the yard. Prior to about 1650 the Tie and Halliard were in use, after that date is was the Jeer (English ships). This is one major area where forethought must be involved when installing. The Sovereign had both Jeers and tie and halliard, which is unusual.

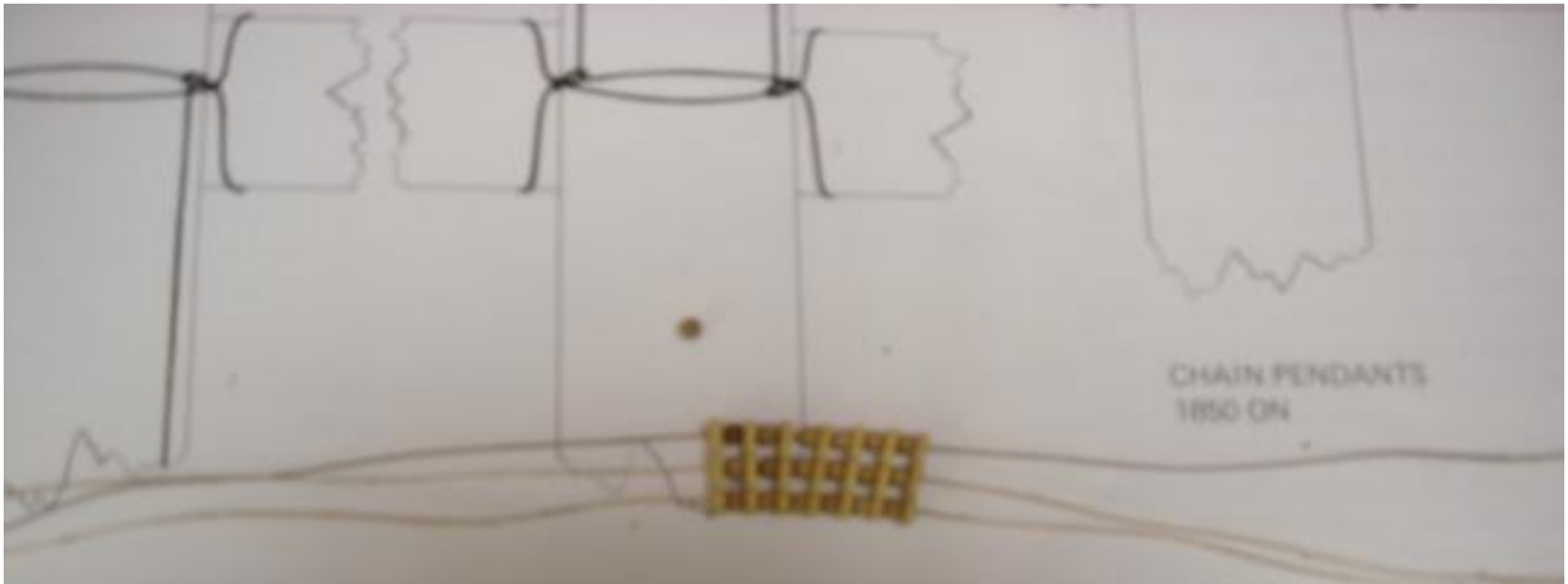
Installation of Tie, Halliard, Jeer

- This varies from country to country. The English reeve the tie through sheaves installed on the side of the mast at the top, the French, Dutch and others run it over the cap.



Parrels

- These are also installed at the same time as the ties and halliards or jeers. This also brings us to the installation of many of the other lines. The blocks that these lines go through on the yards are best installed before the yards are installed.



yard, one to port, the
d of the mast, and
to their own parts
yard, leaving the
r abaft the yard. The
taken behind the mast
gh the opposing pen-
ey then led down on
mast, and a block
oked, in which case
eized round a small
ds; other blocks were
olts in the deck, close
of the mast, and

were placed on the after ends of the trestletrees to replace the blocks previously hooked there, but not all vessels were rigged in this manner, some retaining the eyebolts and blocks instead of sheaves. In about 1850 some ships had the pendants leading up through the tops, and the fall was rove between the truss pendant blocks and other blocks hooked under the lower cap on either side. From about 1840 the pendants were once again made longer and were taken through single blocks hooked under the after ends of the trestletrees; double blocks

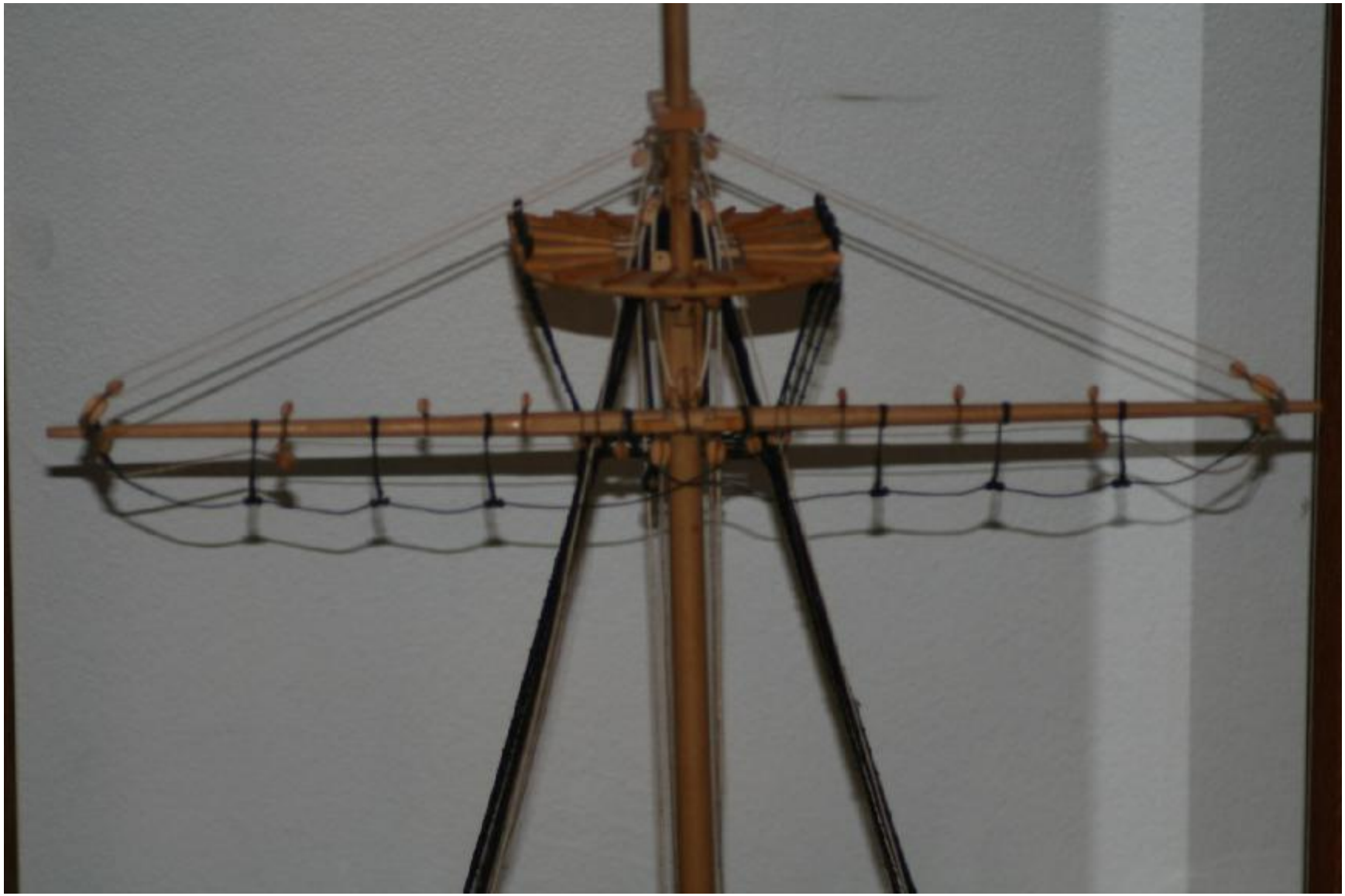
to which the truss pendants w
shackled were small ones, whil
shackles for reeving the penda
through were larger bow shac
small shackle on the starboar
thy slings was on the inerme
strop, while the small shackle
port side was on the outer tr
thus allowing each pendant t
clear hauling part. The truss
were shackled to the strops,
round the mast, through the
shackles, up through iron bl
shackled to eyebolts in the
of each trestletree and led
deck. Double blocks were h

Breast Rope

- This is a line that went around the parrels on the outside. This and the Naveline were not installed on the Sovereign since I was not sure of the period of introduction.

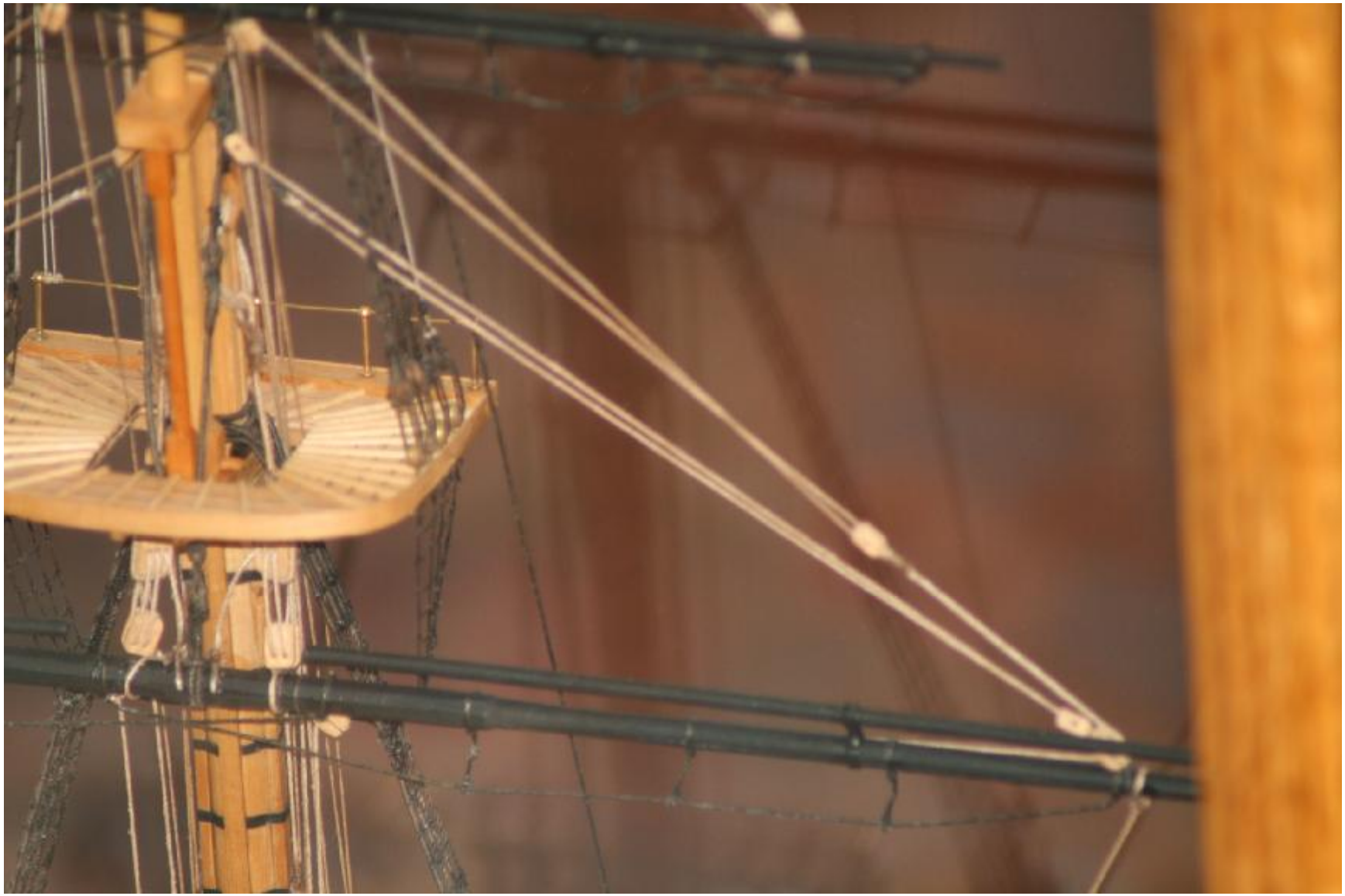
Footropes and Stirrups

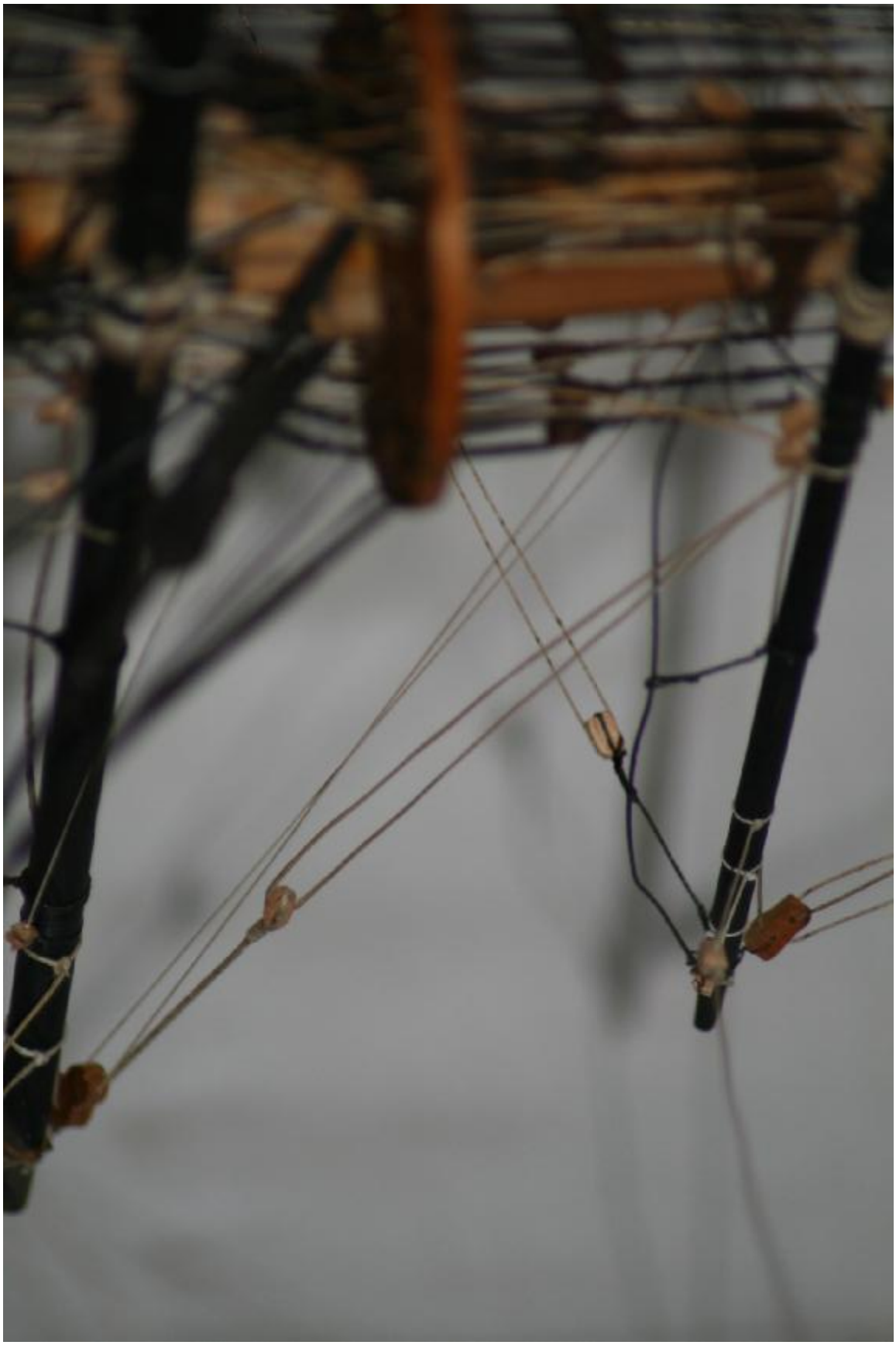
- There were almost no footropes on the Sovereign of the Sea, certainly not in 1637. However, around 1650 they started to install them on English ships, so my Sovereign has one only – on the main yard (according to Lees). It is also best to install the footropes prior to installation of the yard on the mast.



Lifts

- Again, one has to be careful that the lifts are installed the correct way for the period the ship represents. The lifts on the Sovereign of the Seas are different from the lifts on the French ship and changed according to Lees by period.



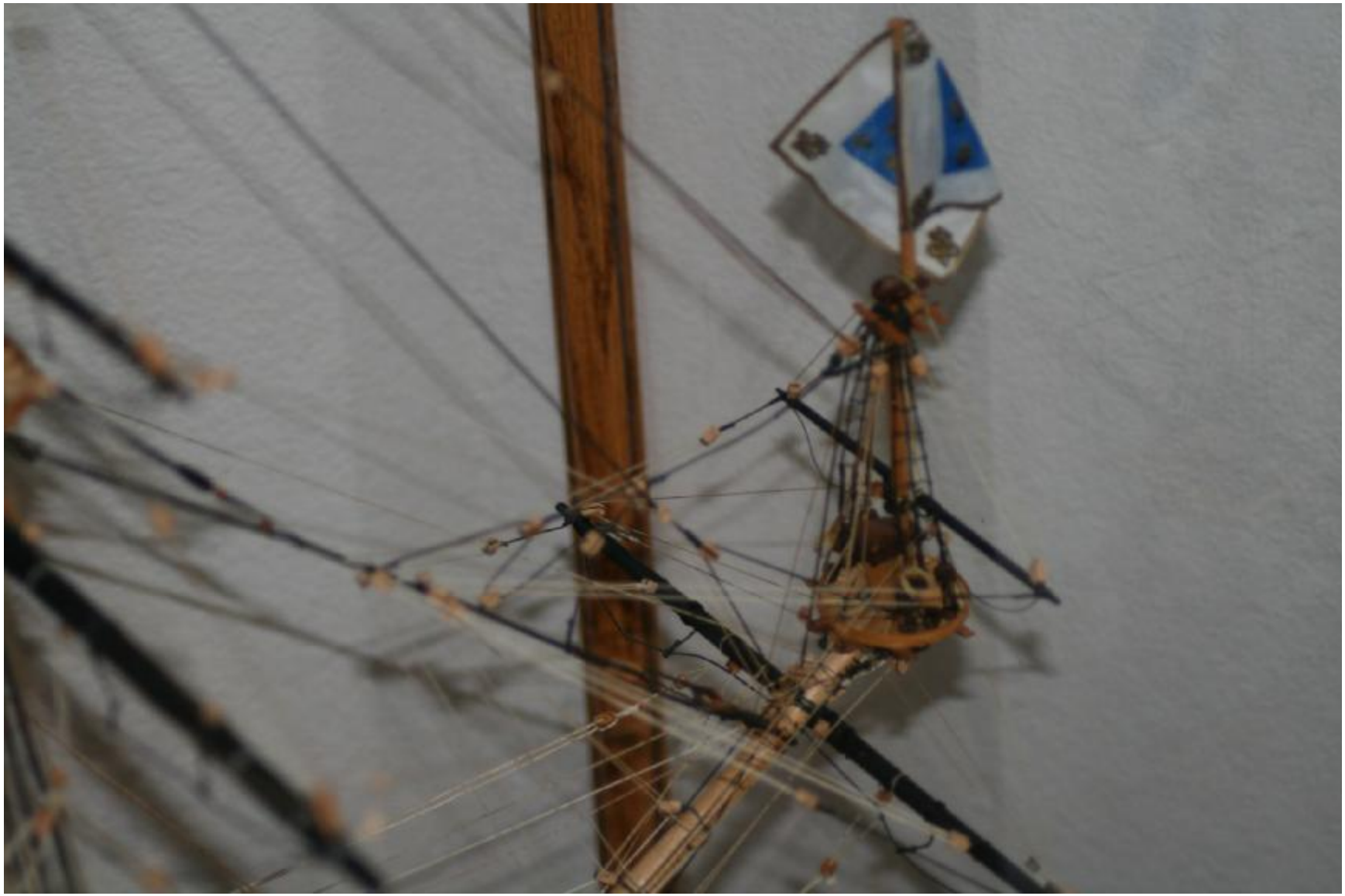


Jigger tackle

- This was used to assist the hoisting up of the yard by being seized to the lifts. Once the yard is lifted, it was removed. Not usually on models, but is mentioned in some of the rigging lists.

Braces

- The last lines installed on the ship when rigging, since they will get in the way of everything else and are relatively easy to install at the end. Some variations are noted, but not many. Mostly location on the stays of the blocks.

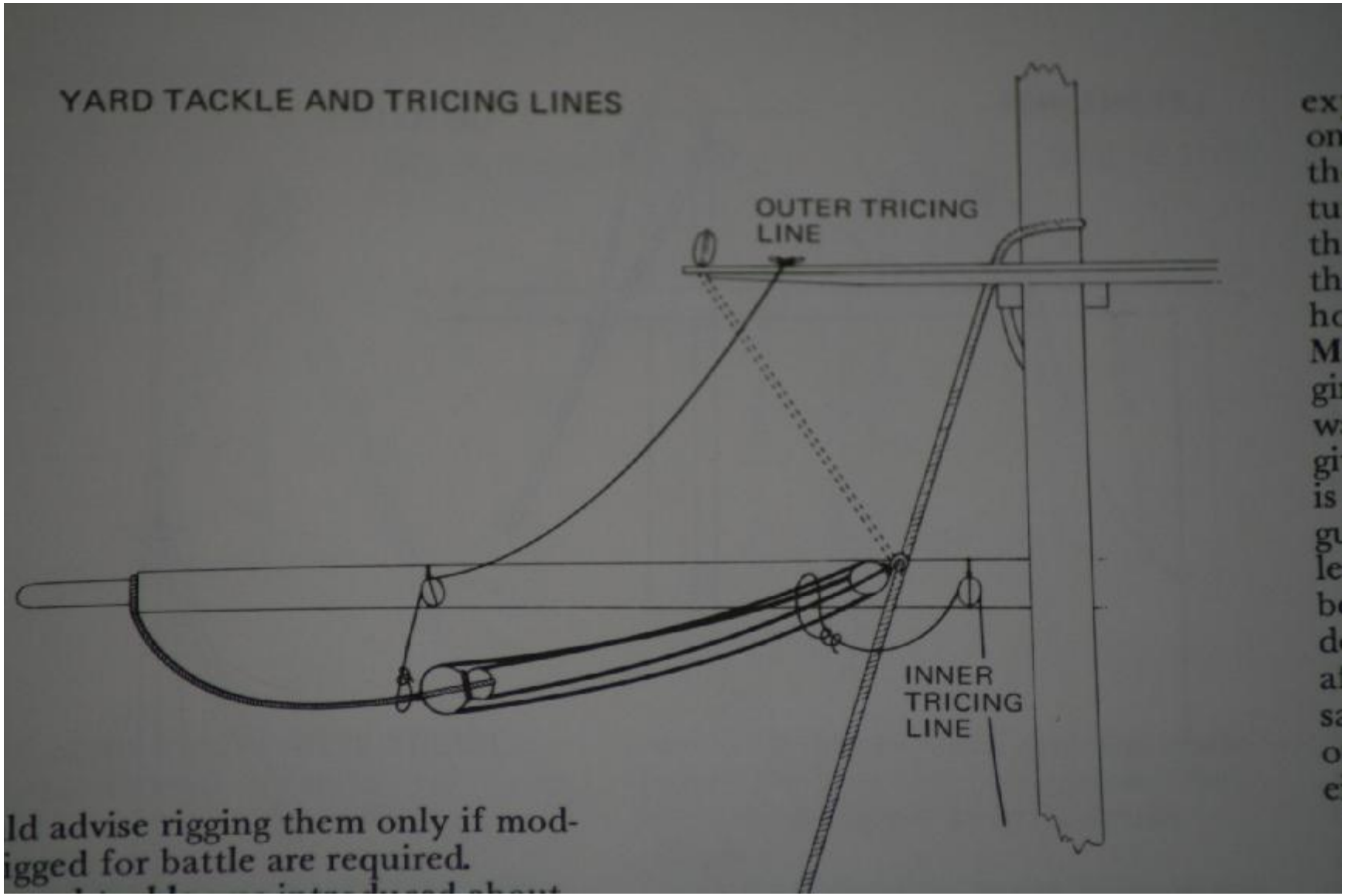


Preventer brace

- Used only in wartime. Very seldom seen on models. Rig only if presenting the model as rigged for battle.

Yard Tackle

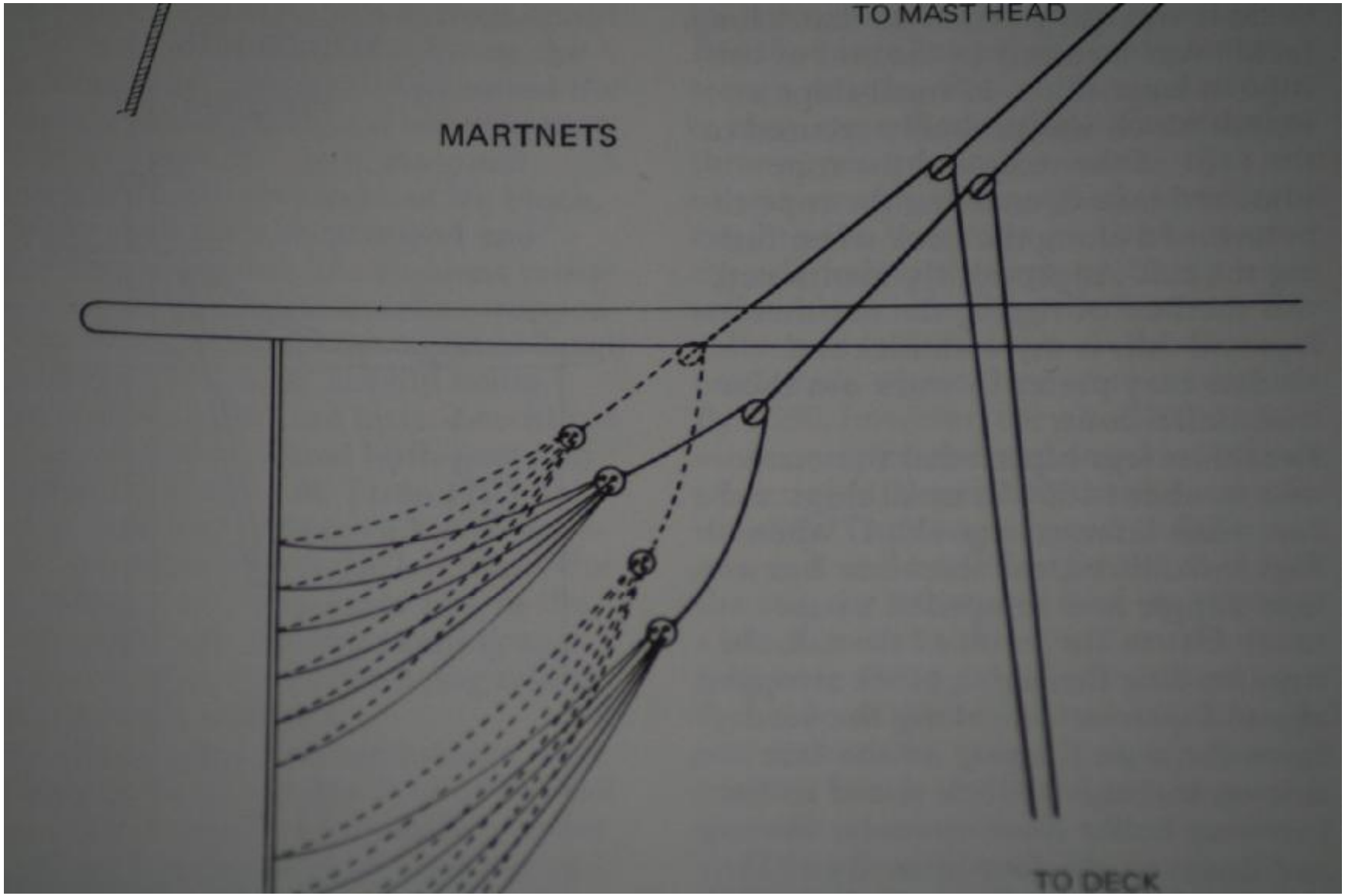
- Introduced around 1685, they are again not installed on the Sovereign. Another bit of rigging that can be installed on a ship of a later period. An interesting bit of rigging, since it includes yard tackle falls and yard tackle tricing lines.



ld advise rigging them only if mod-
igged for battle are required.

Martnets

- I did not install these on the Sovereign since I did not have sails. If I had sails, I think I would have installed them. They were superseded by the leechlines, which I did install.


TO MAST HEAD
MARTNETS
TO DECK

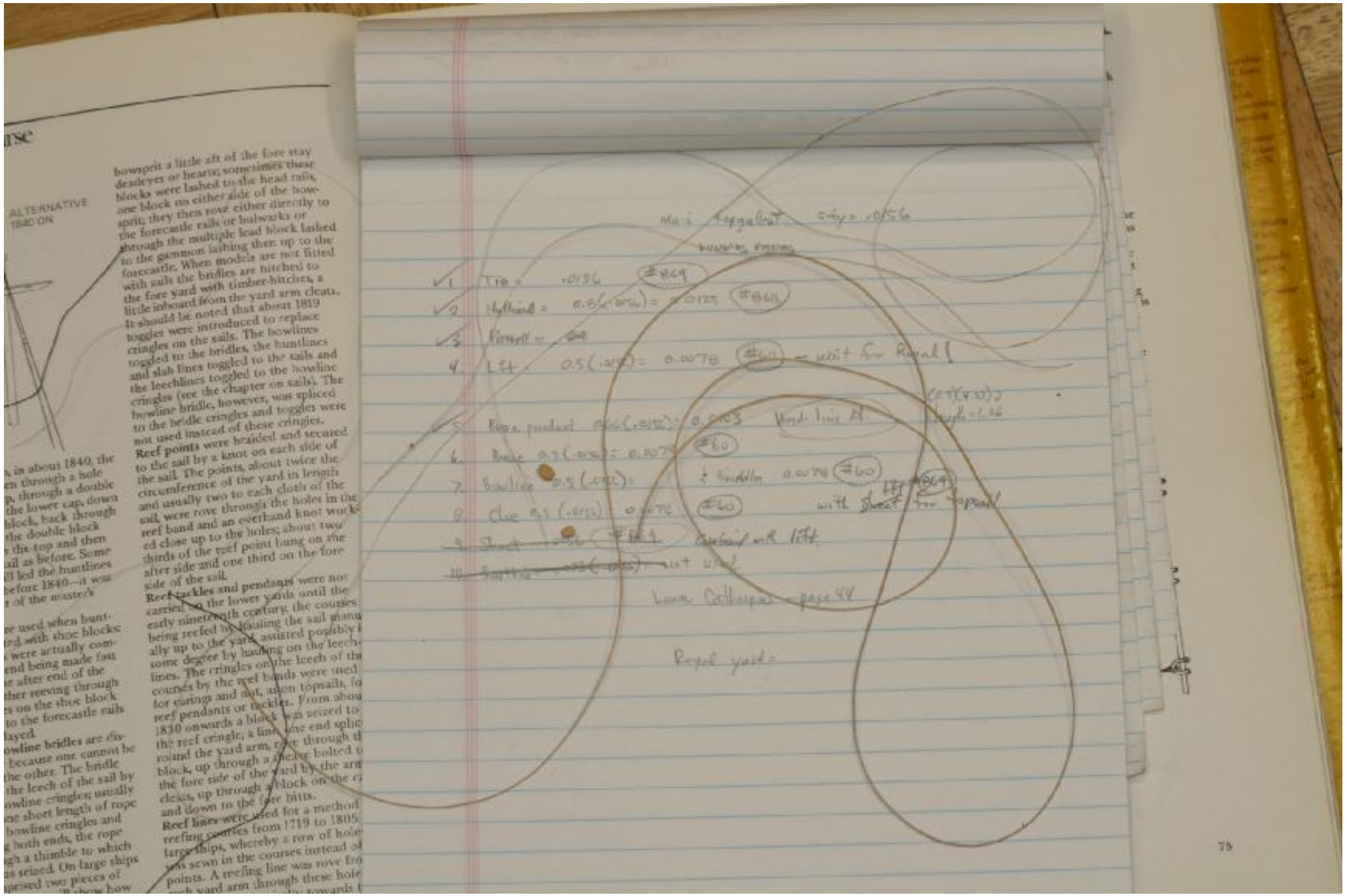
Tacks, Sheets and Clue Garnets

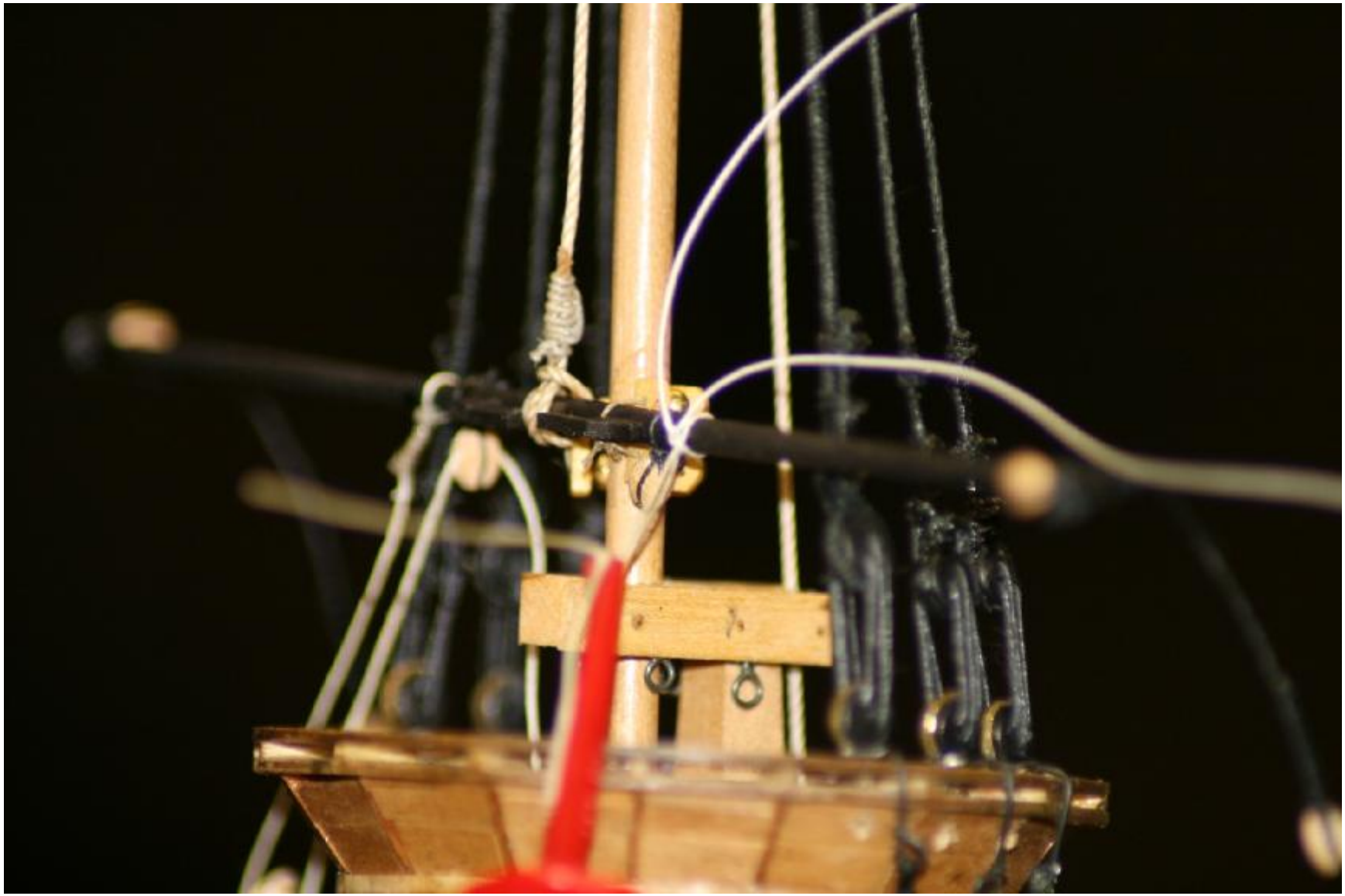
- These are the next item of running rigging to install and pertain to the sails. Some of these blocks have already been installed on the yards. If you are installing sails, then the sails have to be installed prior to rigging these lines. Otherwise, rigging can continue. Some individuals do not install the sail rigging if sails are not installed.

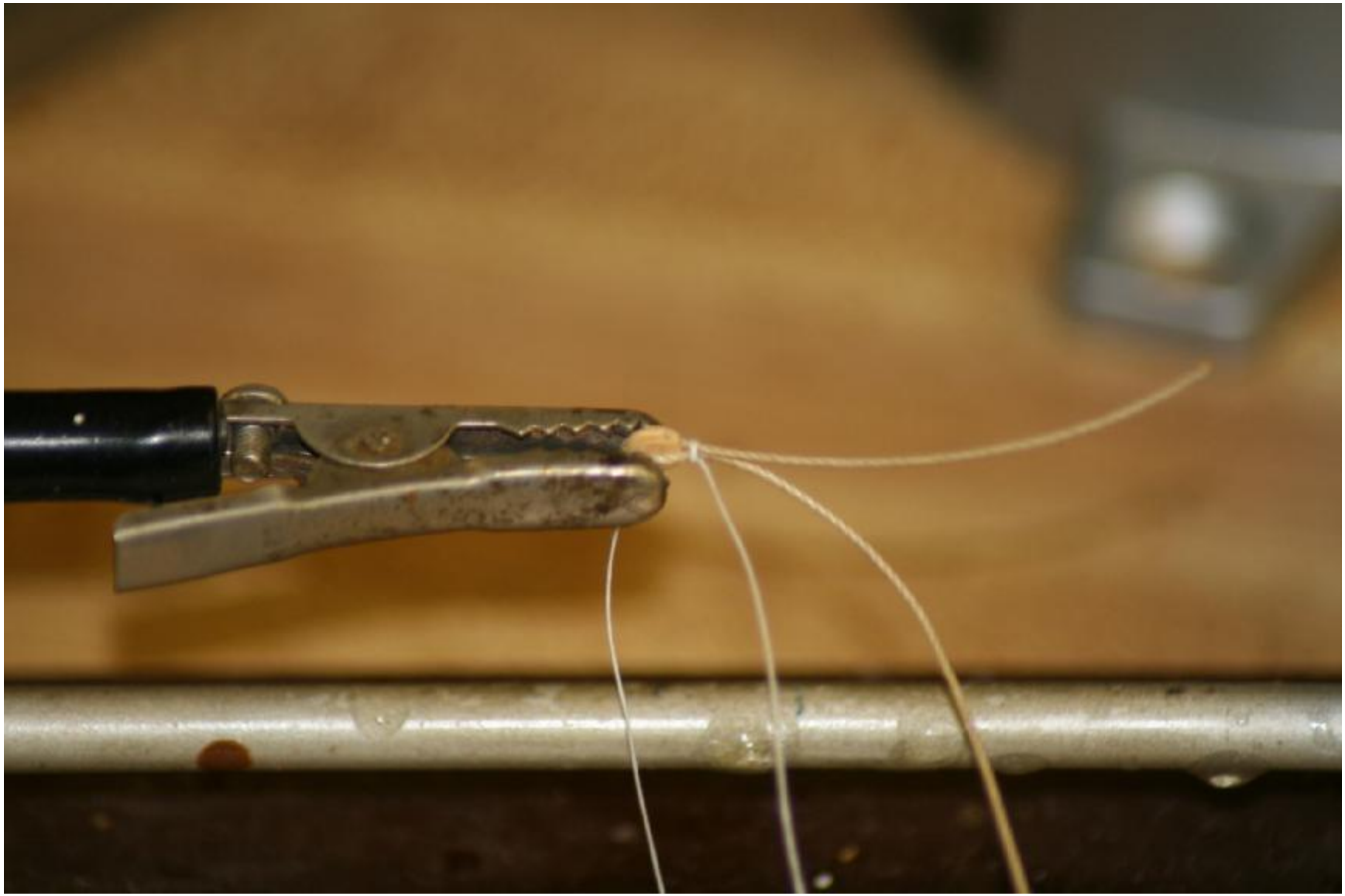
- The tack, sheet and clue garnet attached to the lower corner of the fore and main sails and control the “clew” or lower corner of the sail. The tacks hauled the clews downward and forward, the sheets hauled them downward and aft, and the clew-garnets (called simply clewlines on all other sails) hauled them up to the yards for furling. Again, these lines ran in different ways according to country and time. Check your plans.

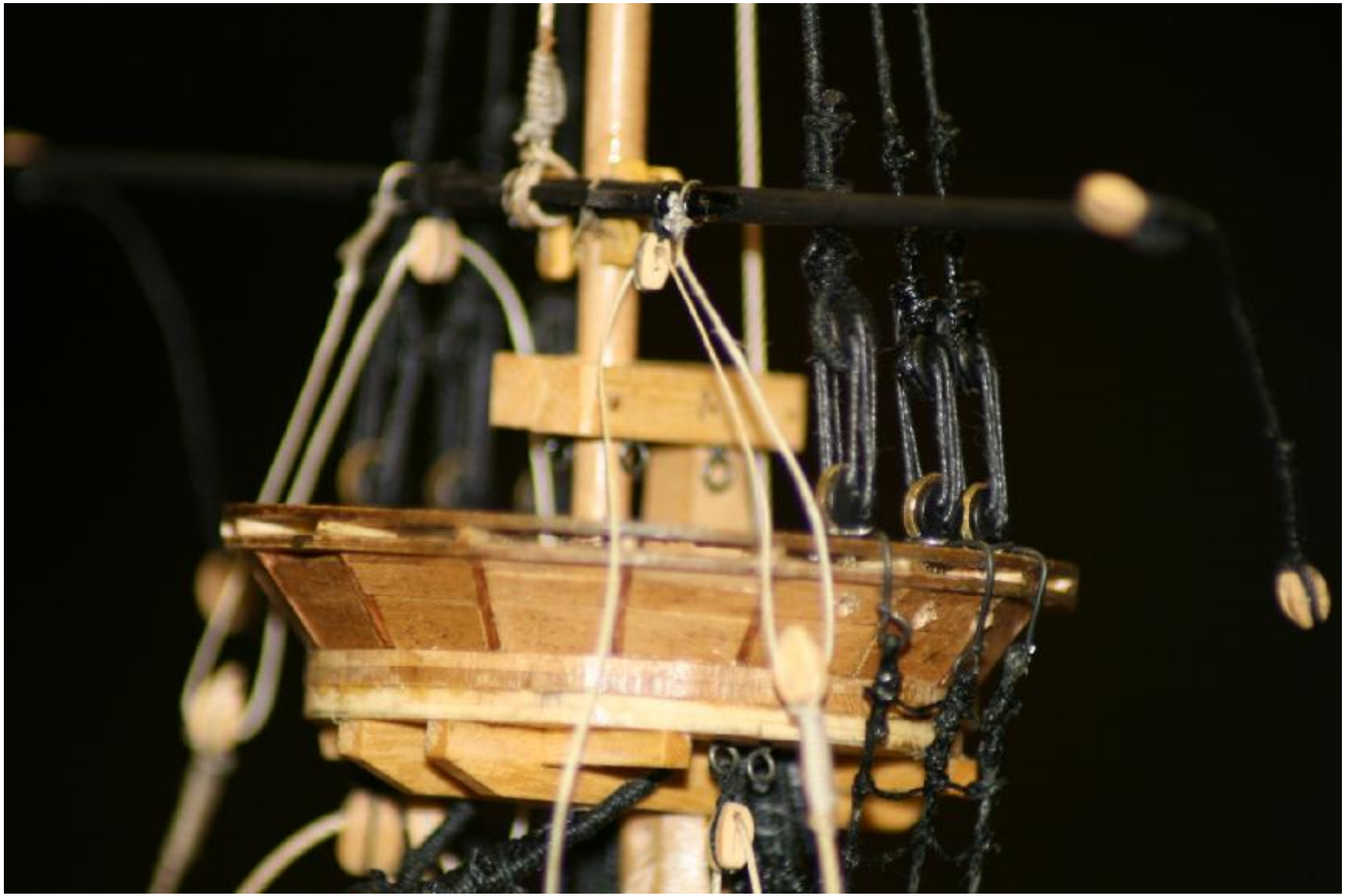
Topgallant clue & Sheet/lift

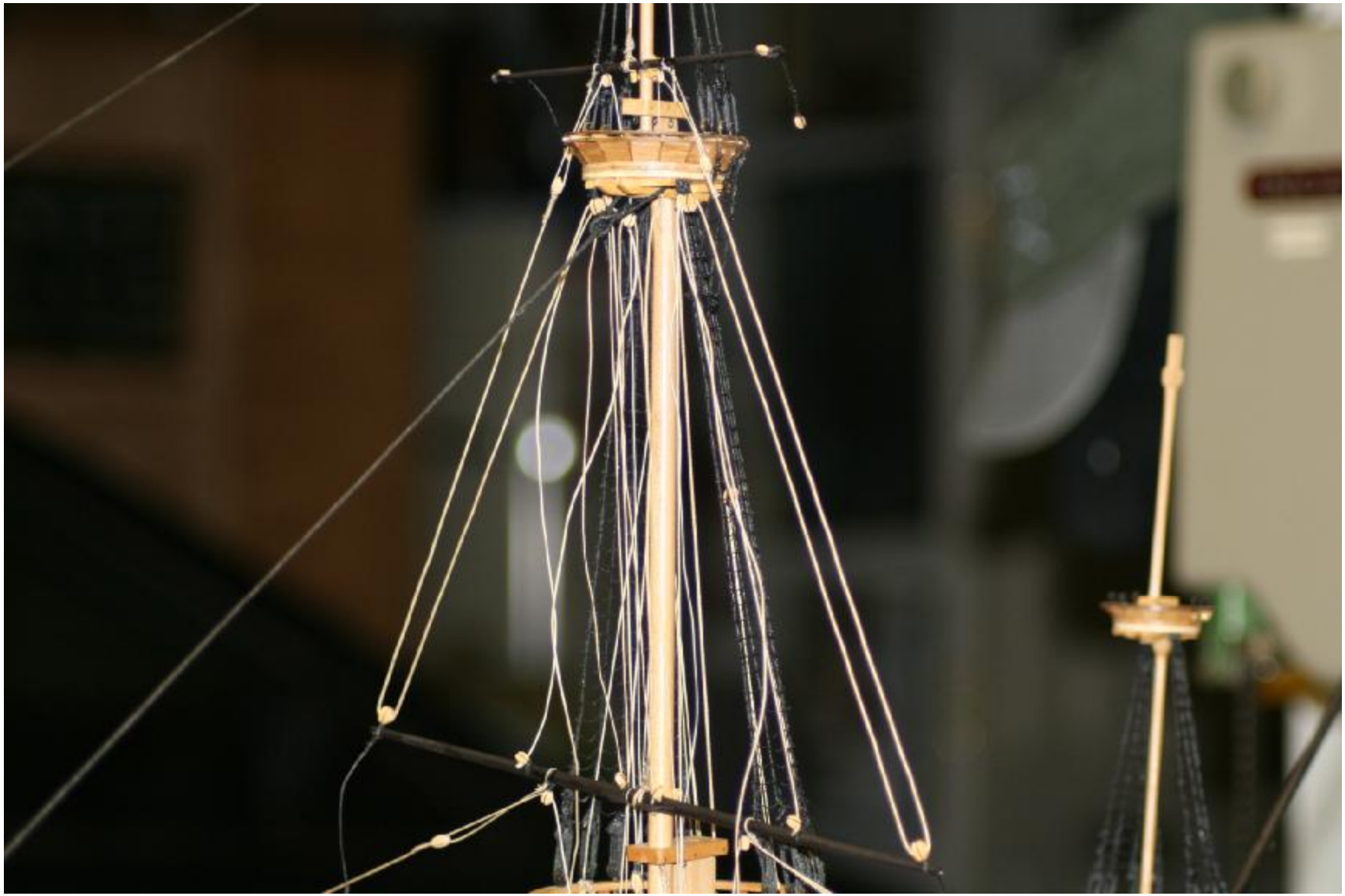
- The following group of slides show the installation of a typical topgallant clue and sheet/lift.


ALTERNATIVE
1840 ON
bowsprit a little aft of the fore stay
deadeyes or hearts; sometimes these
blocks were lashed to the head rails,
one block on either side of the bow-
sprit; they then rove either directly to
the forecastle rails or bulwarks or
through the multiple lead block lashed
to the gammon lashing then up to the
forecastle. When models are not fitted
with sails the bridles are hitched to
the fore yard with timber-hitches, a
little inboard from the yard arm cleats.
It should be noted that about 1819
toggles were introduced to replace
cringles on the sails. The bowlines
toggled to the bridles, the huntlines
and slab lines toggled to the sails and
the leechlines toggled to the bowline
cringles (see the chapter on sails). The
bowline bridle, however, was spliced
to the bridle cringles and toggles were
not used instead of these cringles.
Reef points were braided and secured
to the sail by a knot on each side of
the sail. The points, about twice the
circumference of the yard in length
and usually two to each cloth of the
sail, were rove through the holes in the
reef band and an overhand knot work-
ed close up to the holes; about two
thirds of the reef point hung on the
after side and one third on the fore
side of the sail.
Reef tackles and pendants were not
carried on the lower yards until the
early nineteenth century, the courses
being reefed by hauling the sail manu-
ally up to the yard, assisted possibly
some degree by hauling on the leech
lines. The cringles on the leech of the
courses by the reef bands were used
for earings and not, as on topsails, fo
reef pendants or tackles. From about
1830 onwards a block was seized to
the reef cringle, a line, one end splic
round the yard arm, rove through t
block, up through a sheave bolted
the fore side of the yard by the arm
cleats, up through a block on the
and down to the fore bitts.
Reef lines were used for a method
reefing courses from 1719 to 1805
large ships, whereby a row of hole
was sewn in the courses instead o
points. A reefing line was rove fro
each yard arm through these hole
Main topgallant
Royal yard
page 44
75



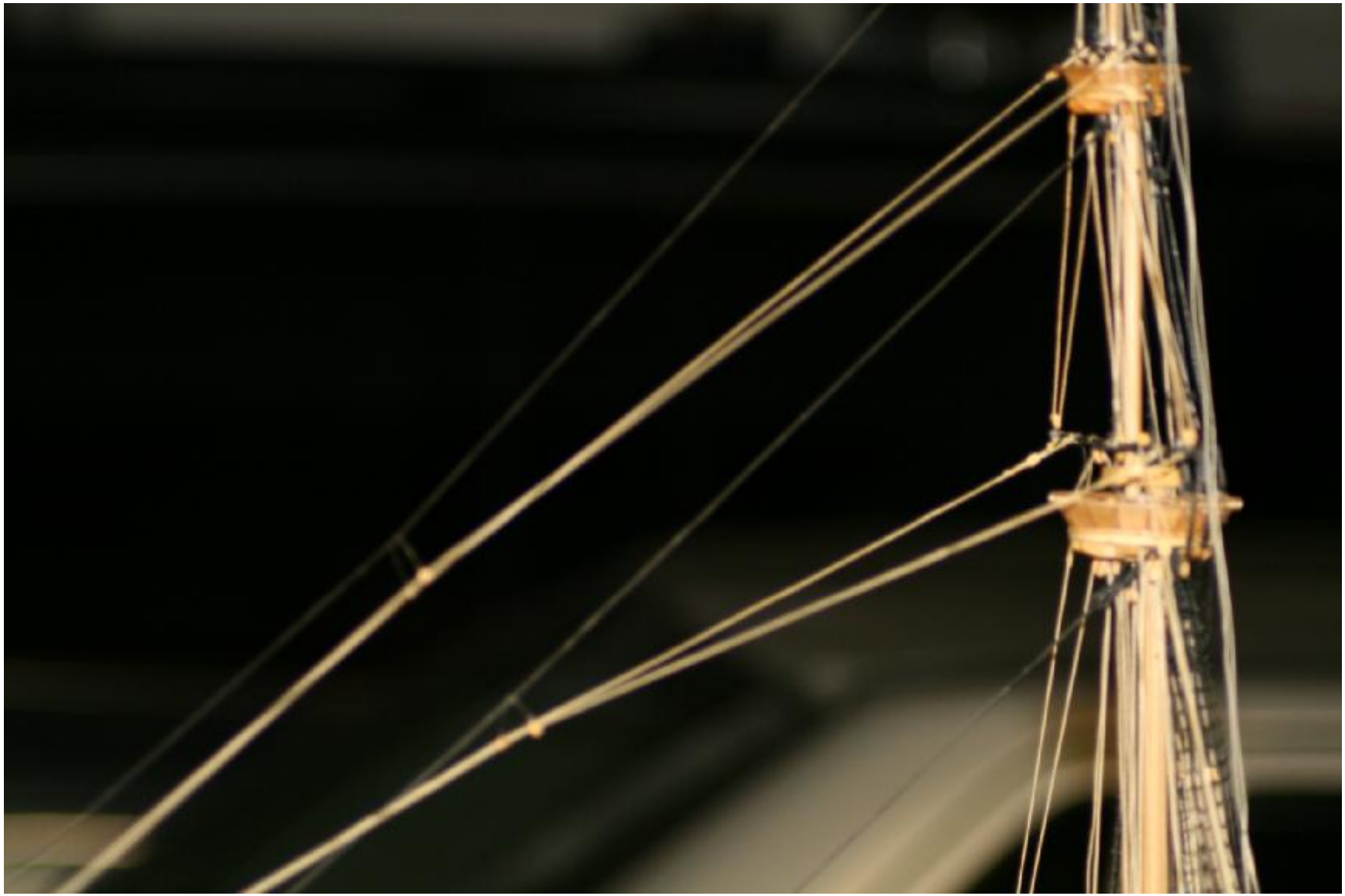






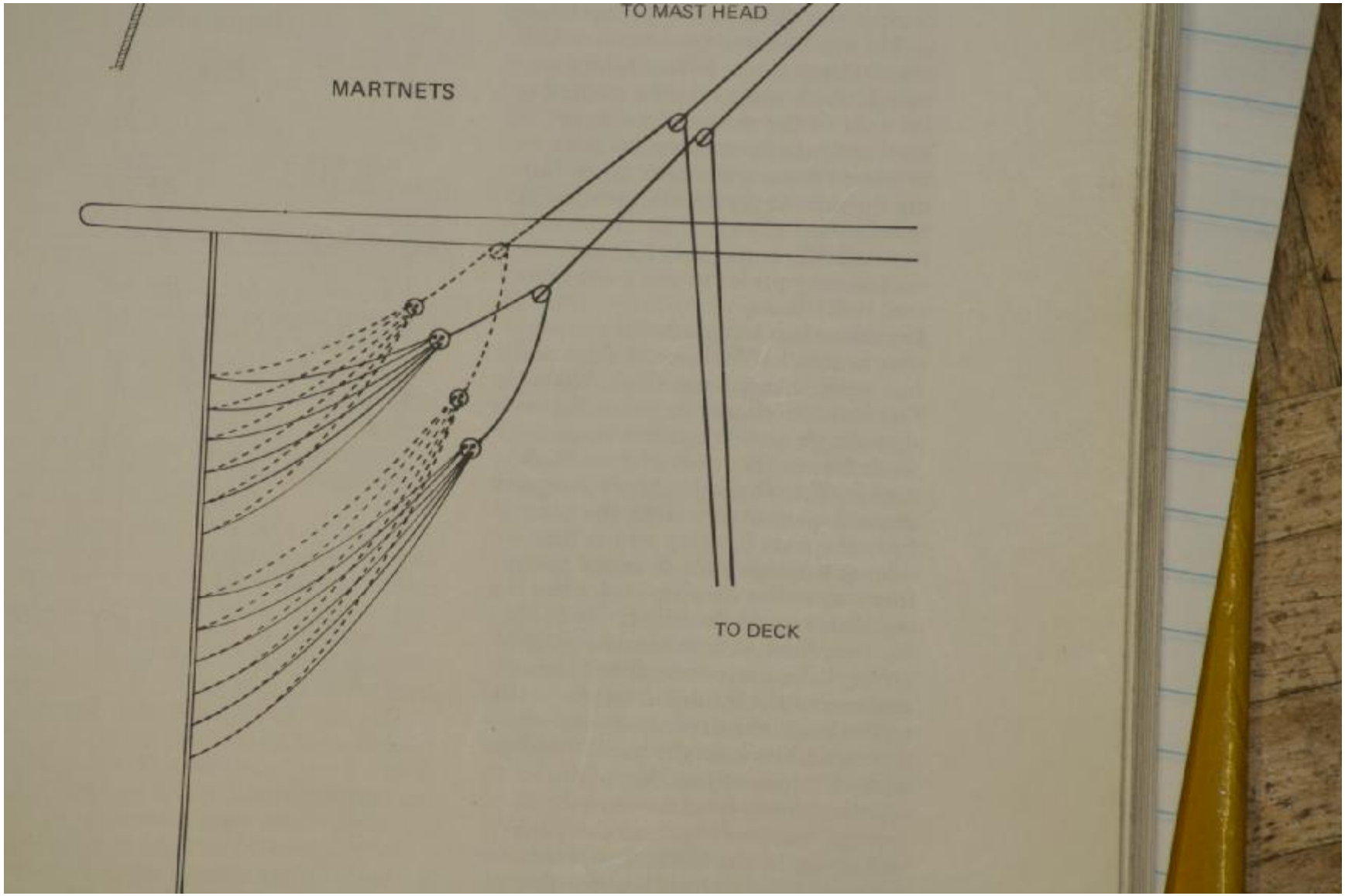
Bowlines

- Another sail line, used to hold the weather leech of the sail up to the wind when close hauled or nearly so. Bowline bridles actually attached the bowline to the sail.

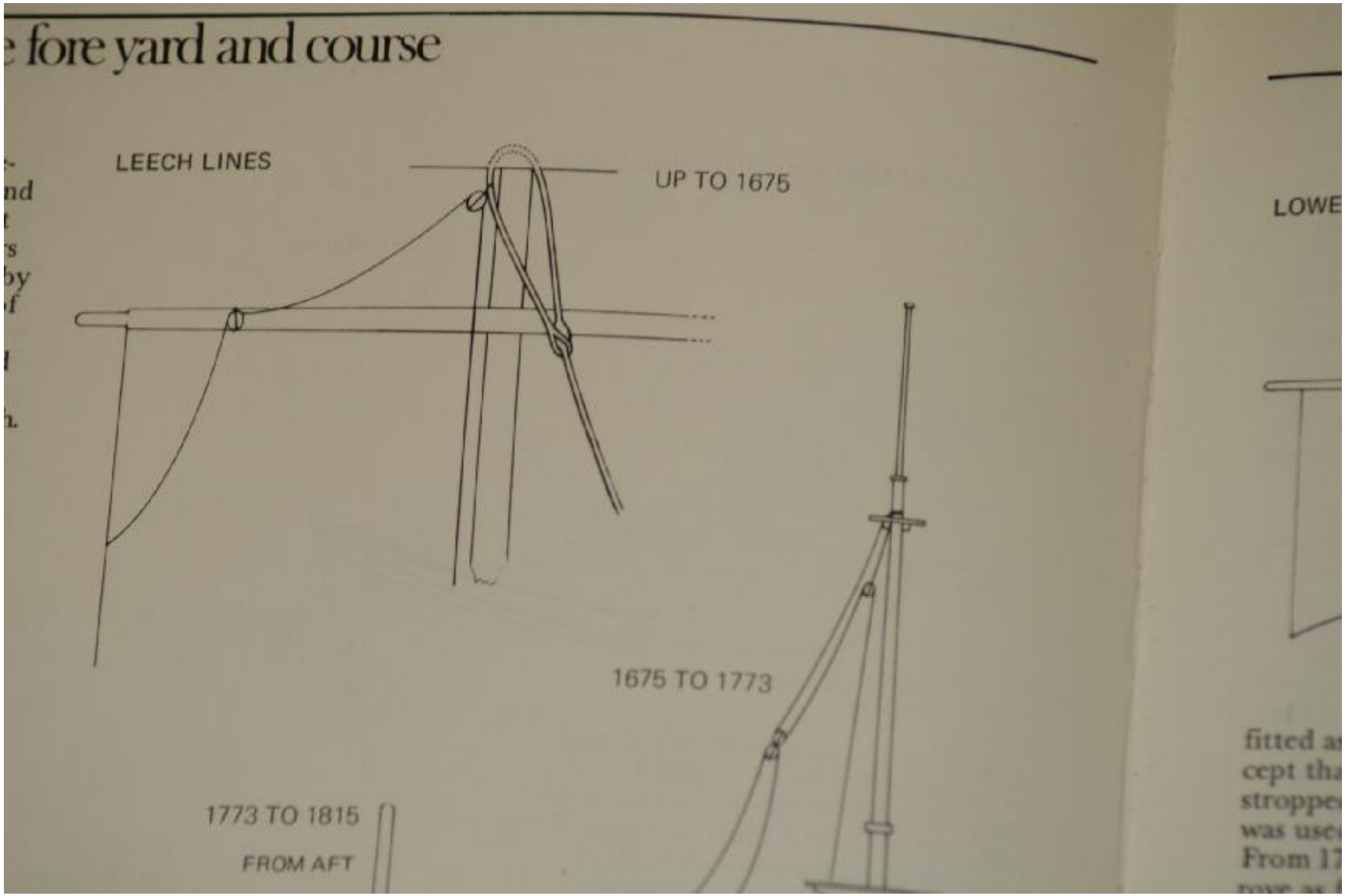


Leechlines (Martnets) and Buntlines

- In reference to leechlines (or buntlines), these lines have to be researched before installing, as they varied by ship, period and nationality. If you have good plans, go ahead and install. If not, research. If this fails, leave the lines off. Lees is a great source, as is Anderson. Buntlines are not as complicated and are easily installed.

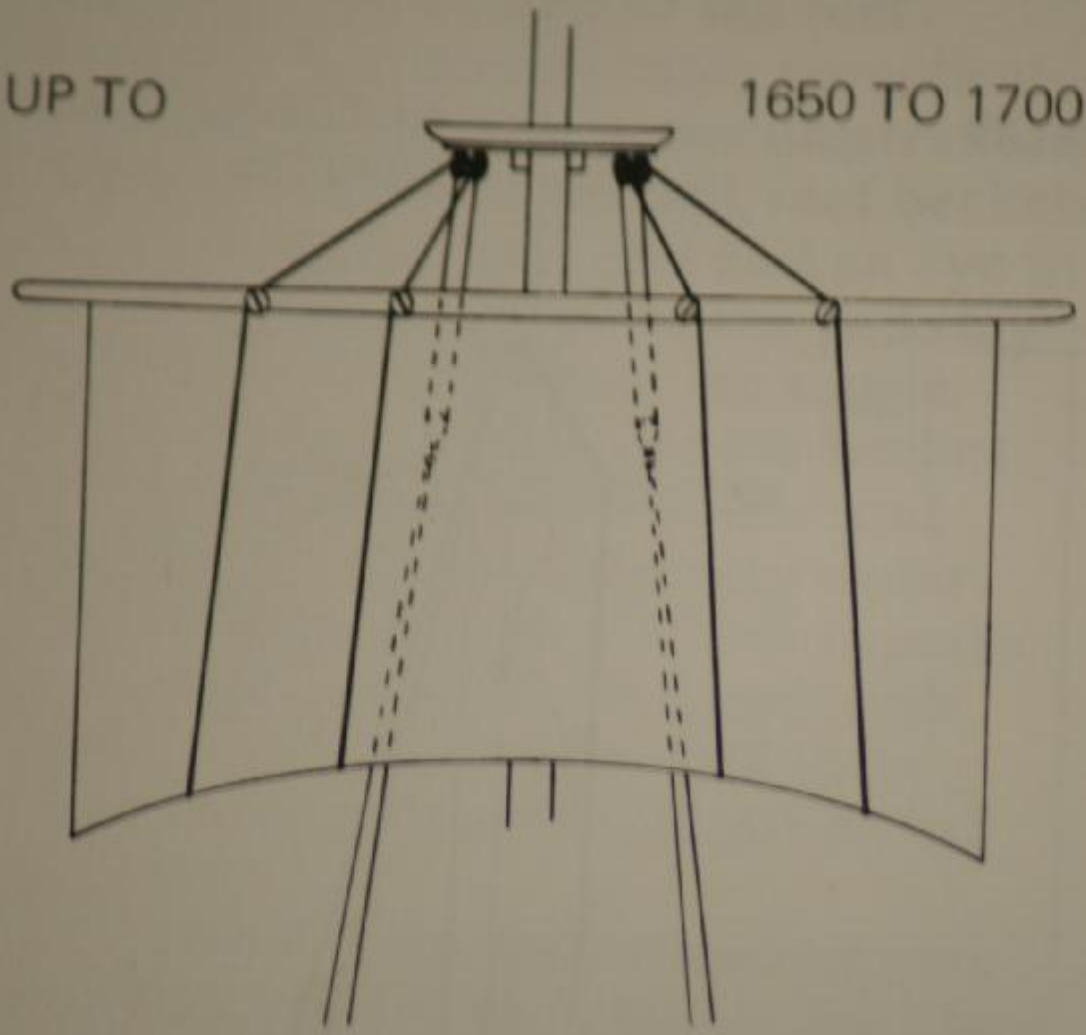

TO MAST HEAD
MARTNETS
TO DECK

e fore yard and course



AD UP TO

1650 TO 1700



ADDITION
BLOCKS U

two a side were carried one was made

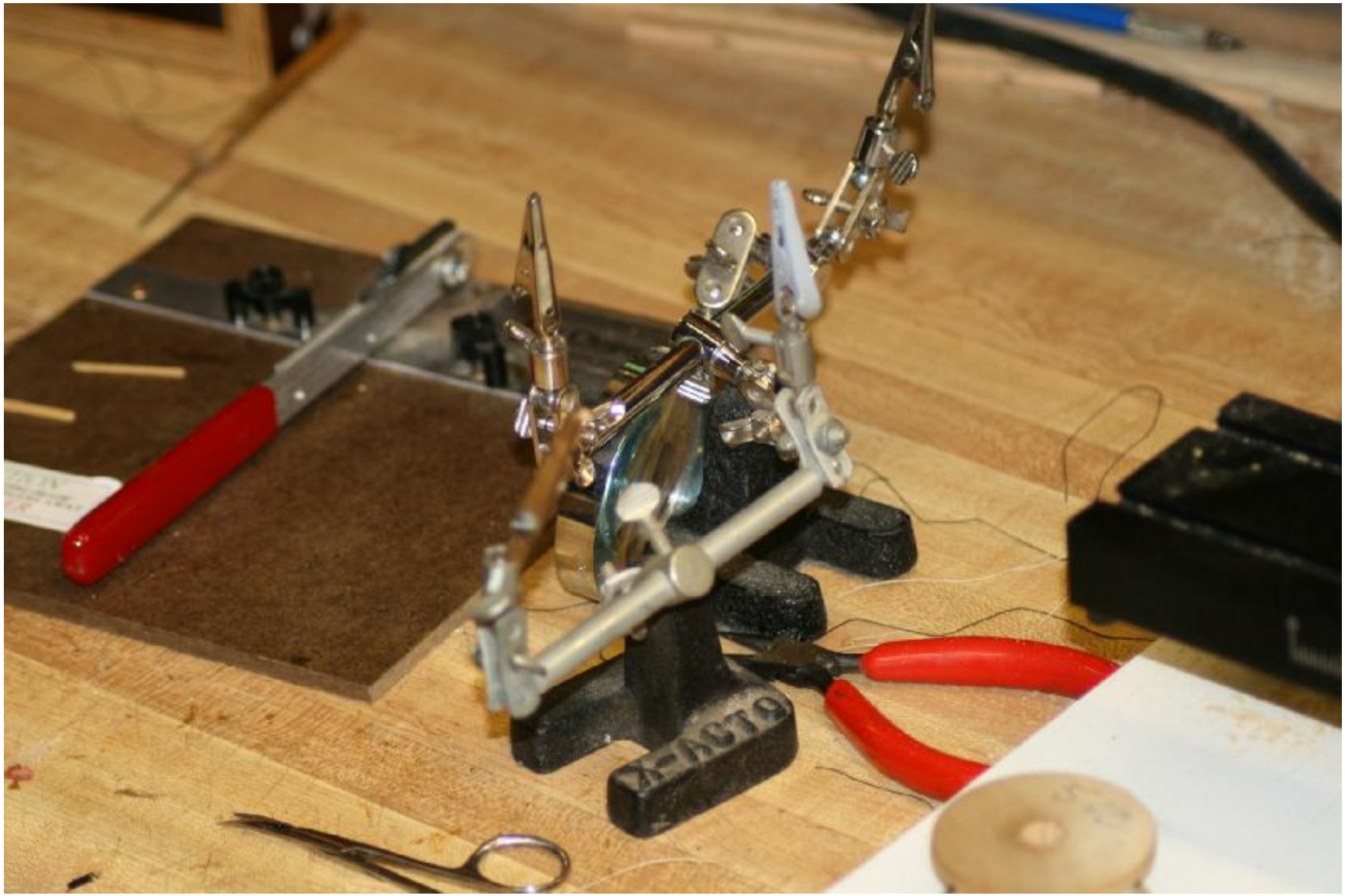
- These lines are very difficult to show on the model by taking pictures, since there are by this time many other lines which are getting in the way. So, to make things a little clearer, I took pictures of several of the drawings in Lees book – I hope he will forgive me.

Top Rope

- The upper yards are almost the same as the lower ones, so most of the lines you have already been introduced to. The one line that is different is the Top Rope, which is a line installed to lift the upper spars up so that they can be removed. The topmast top rope should be installed and has to be done before the yard is installed, another example of forethought.

Extra tip

- When working toward the topgallant and the royal yards, the line and blocks get smaller and smaller. When I get down to the 2.5mm and 2.0mm blocks, I can no longer hold them in my hand to strop the block. So, I use the helping hands.


X-ACTO

Slab lines

- Designed to lift up the foot of the sail for clear visibility when sailing under a pilot, they are not on the Sovereign. Lee makes reference to them but does not specify an introduction date.

Sails

- My personal preference with respect to sails – if the model is a four and aft rig, such as the Yacht Mary, then sails are a great idea. If the model is a square sail rig, then sails are not such a good idea, since most of the rigging you do is hidden. Sails are made from drafting linen with a bolt rope seized around the perimeter. You can spend a lot of time making sails.

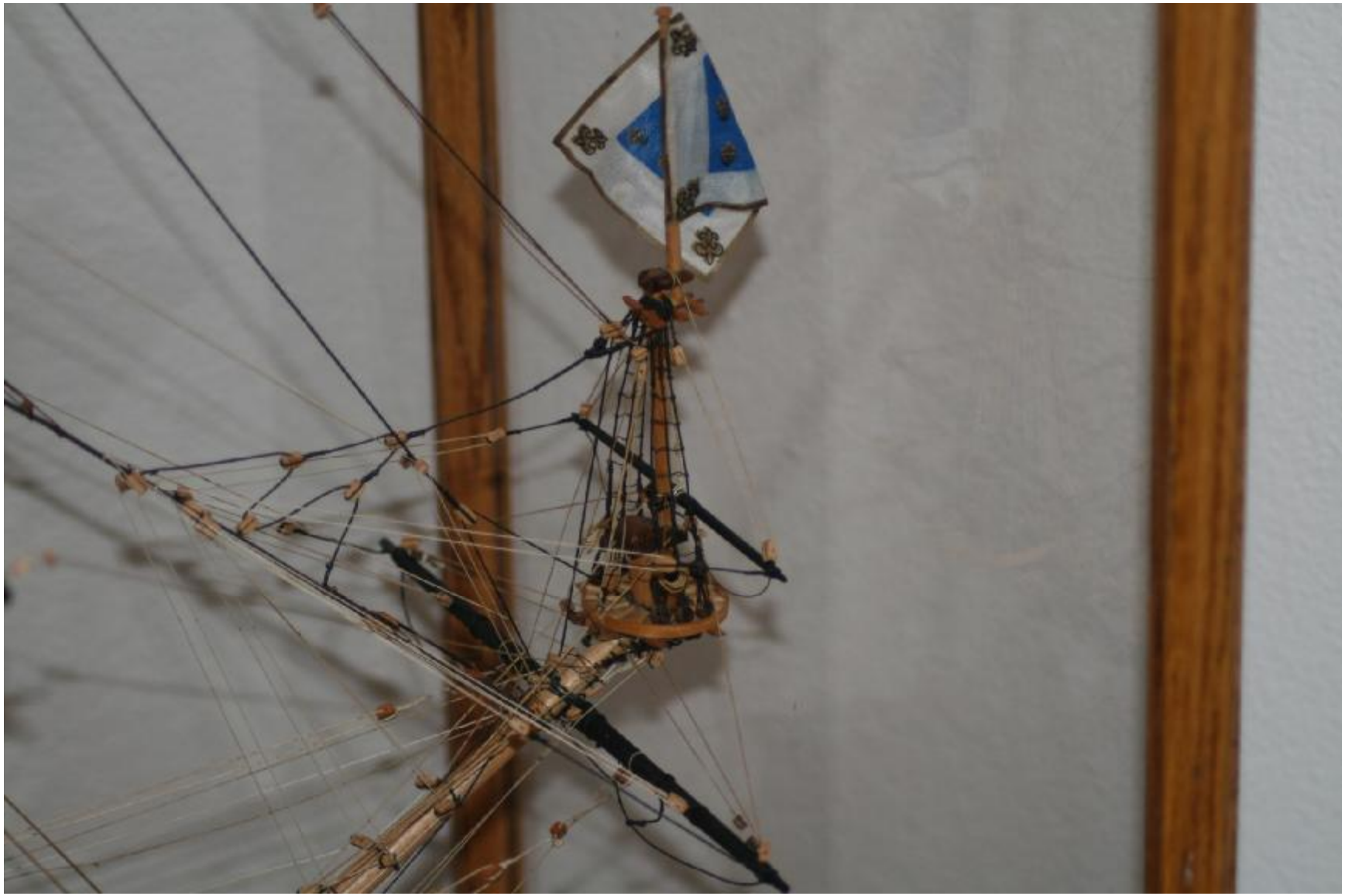
Spritsail and Spritsail Topsail

- The spritsail topmast was adopted by the English Navy in 1618 and abolished in 1719, but this was official recognition. The spritsail is the sail on the bowsprit, the yard being attached to the bowsprit by a sling. The sails were basically the same as the other yards with the exception of a “standing lift”, installed with deadeyes.

- The spritsail also had additional braces called “Garnets”. All these lines are shown in both Lees and Anderson with excellent descriptions of the lines.
- All the sizes of line and blocks required are listed in the back of Lee’s book “Masting and Rigging of English Ships of War”. Rigging was so common place back in the days of sail that no one made any comment about it.

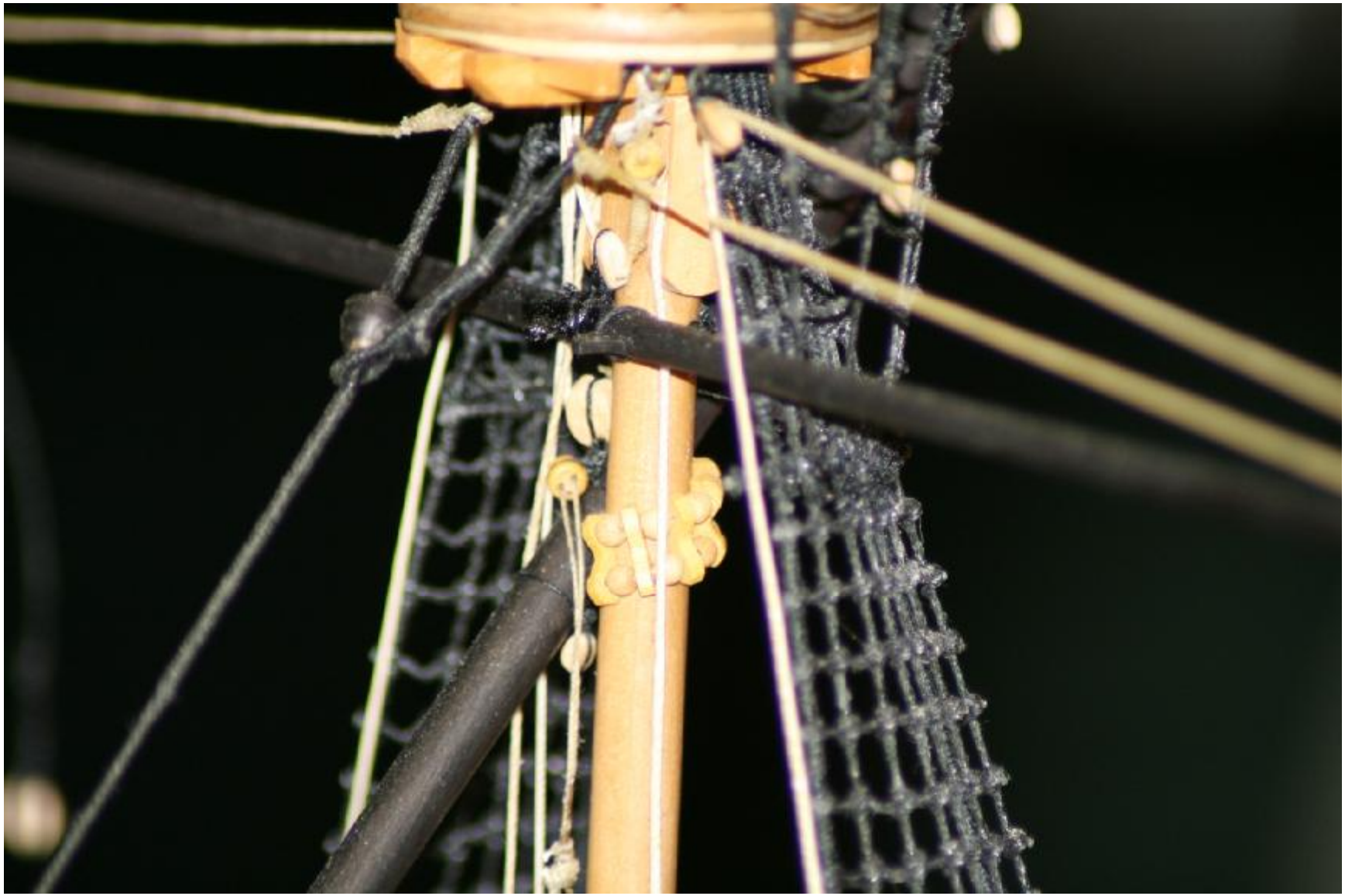
Spritsail Topsail

- This is one of the really fun things to rig. It is simple once the standing rigging is done, as the running rigging is just like the topgallants.

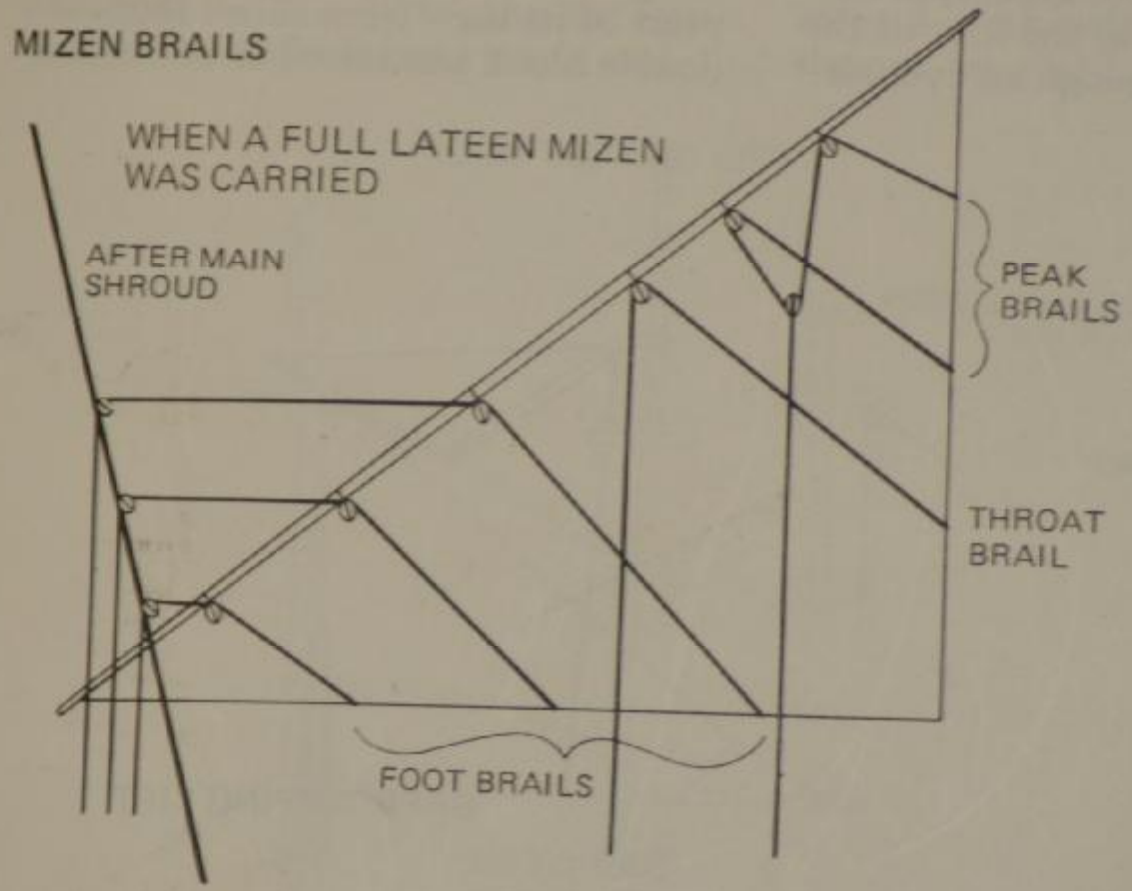


Mizzen Lateen sail

- This is the last bit of running rigging that is different but no difficult. This yard is a fore and aft yard with tie and halliard rigged a little different. Full description again in both Anderson and Lee.



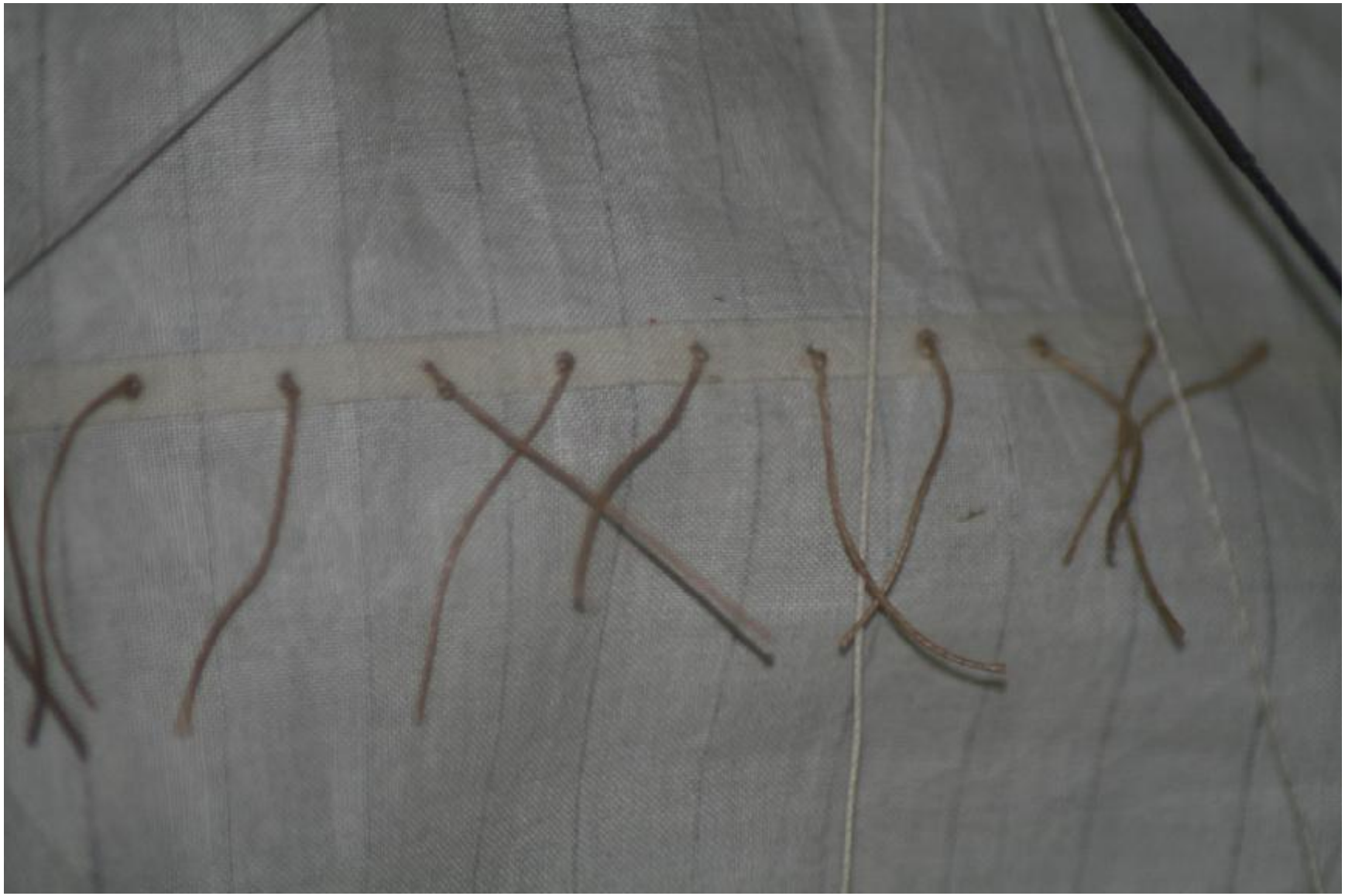
of the ship. The blocks on the yard at most brail blocks stropped just forw



WHEN THE
LACED TO
MAST AND

Additional sail lines

- If installing sails, you also have additional lines to be installed. First, you have the reef points. These were braided and secured to the sail by a knot on each side of the sail. Obviously, you cannot install these without the sails.



Reef tackles and pendants

- These were not carried on ships until the early 19th Century. Not on any of the ship models I have built.
- Reef lines were used as a method of reefing courses from 1719 to 1805 replacing some of the reef points on the sail.

Earings

- Earings spread the upper corners of the sail out to the yard arm. Again, part of the sail.

Robands

- These were rope bands that fastened the head of the sail to the yard or, in a later period, to the jackstay.

Harbour gaskets

- Used to keep the sail furled. Between eight and twelve harbour gaskets were required for the sail, depending on the size of the sail
- There were also sea gaskets or furling lines introduced in about 1650 which were used at sea for furling the sail.