

From: *A Text Book Of Stationery Binding*, Monk and Lawrence, 1912

Early Modern Stationery binding -- overall aspects, not in a particular order

The features on the books discussed in this guild presentation relate to European record-keeping structures common in the 15th -17th century. Many of these features may pre-date this time, and many continued to be part of 20th century structures, especially springback account books.

This category of bookbinding has not been thoroughly defined, classified and researched at this point, at least not in English language sources. (as noted by Szirmai and Pickwood).

Account books in particular may have very specific features not found in all stationers bindings. The terms: account book, ledger, blank-book and stationery bindings and limp-bindings can be used differently in various sources.

The Italian humanist Paciolo popularized double-entry accounting in 1494. He recommended very specific practices for organizing different types of account book, such as ledgers, day books, memo books and so forth. Changes in accounting practice continue to influence bound record-keeping structures.

Stationery books are often in folio format, and can be made up of a great number of very thick sections. They can seem more like bound file-drawers than books. These very thick sections were easier to handle than a multitude of skinny sections – and may relate to the material culture of accounting at that time. Thick sections also cut down on swelling from sewing, and perhaps sewing/tacketing time.

Stationery books are typically case-bound

These books are meant to be flat back structures, though time has often given them concave spines through the mechanical forces at work when a mechanical tight-back is opened flat repeatedly and the spine creases.

Stationery bindings often have a fore-edge flap and fastenings-- both these features make them easy to carry around, and help also help keep things like tabbed alphabetical indexes and other loose paperwork inside the case.

The fore-edge flap on a limp case also allowed the owner to keep mechanically adding on sections, and they sometimes did so.

There is evidence that some institutions attached sections to a case-like structure as needed, leaving the case unfilled sometimes. (see Szirmai p.290) Perhaps in these situations ,the "binding" could have been done in-house by the accountant or other employee.

It is not clear when stationery binding became a truly separate craft from letterpress work. In a French 1772 bookbinding manual by Rene Dudin *L'art du relieur doreur de livres*, a fancy stationers style called "Lyon" is carefully described. It has all the typical features found in a 16th century stationers binding, including secondary tacketing and overbands.

By the 20th century stationery binders and letterpress binders have separate training manuals, at least in England. The 1912 *Text Book of Stationery Binding* notes (p. 1): "The branch of bookbinding with which we have to deal holds out far less hope of the recognition of skill for the simple fact that ...it is the internal and unseen processes which are of ultimate importance and are carried out purely to satisfy the demand for usefulness." But even this utilitarian textbook has an illustration showing 18 different variations on account-books, all more or less decorated and more or less expensive.

Medieval/Early Modern Stationers Bindings

Vocabulary:

Lacings: (from Etherington/Roberts Bookbinding and Conservation of Books Descriptive Terminology: <http://sul-server-2.stanford.edu/don/dt/dt1977.html>) "A form of book decoration usually used on blank books, and consisting of narrow strips of vellum laced to the outside of the covers.

Bands: (from Etherington/Roberts Bookbinding and Conservation of Books Descriptive Terminology: <http://sul-server-2.stanford.edu/don/dt/dt0226.html>) "2. Strips of reinforcing material (usually leather) which extend across the spine, or spring-back, and onto the sides of a book, usually a stationery binding. The bands may be placed on the boards before covering, in which case they are called "underbands," or over the covering material, where they are known as "overbands." Bands are used to strengthen large blank books in the area of the joints, and to provide additional leather at areas of heavy surface abrasion. ...When overbands are used, they are generally decorated in some manner, usually in the design of their lacing or riveting; this step is needed because adhesive alone will not keep the overbands attached to the book Bands were also used to some extent in limp vellum binding, in which case the bands were sewn through the sections of the book.

Tacketing: (from Etherington/Roberts Bookbinding and Conservation of Books Descriptive Terminology: <http://sul-server-2.stanford.edu/don/dt/dt3429.html>) "Early tacketing involved punching two holes through the center fold of each section, as well as the vellum cover, about 1/2 to 3/4 inch apart. The ends of a strip of vellum, gut, or leather lacing were passed through the holes from the inside, wound around each other and knotted at each end. When tacketing stationery bindings, the holes were punched through the sections, the cover, and the bands, and then wound around each other."

Materials needed: (the usual scissors, triangles, rulers, pencils)

Sturdy case materials to take the strain of lacing; parchment, laminated Tyvek, heavy paper etc. (available from arts and conservation suppliers)

Sturdy text materials to take the strain of tacketing--thick sections, sturdy, flexible paper

Tools to make designs: divider, compass

Tools to punch holes in cover: awl, lacing fid, screw/swivel punch with a variety of bit sizes

Lacing material: sturdy, not too stiff leather, imitation leather, plastic, artificial sinew, soft cord. Flat and or soft material usually works better than round hard material. Typically 3 mm wide lacings, 1-2mm thick.

Tackets: 3 mm wide or so parchment or other strips of skin or cord at least 6 inches long to twist into tackets.

Optional: lacing needles from Tandy or other leather supply house.

Suppliers:

Heavy handmade paper for covers (and will work for lacings too):

http://www.uiowa.edu/~ctrbook/Book_PaperStore/handmadepaper.html#western

Leather Lacings pre-cut: bead stores sell small quantities of thinner leather lacings or Tandy has thicker lacings and needles:

<http://www.tandy-leather.com/lacing.html>

Pieces of Leather and parchment to cut for lacing and tackets:

Lacings: Thinner leather is easier to work with, though not so thin it breaks when you pull medium hard. 1 or 1.5mm thick is a good place to start. You can buy skins, thin them, and cut them into regular strips yourself. Strips 6-8 inches long can still work for lacings. You can use vegetable tanned, chrome tanned, alum-tawed or oil tanned skin (chamois for drying cars) Leather can be purchased in a variety of places. Talas is one supplier in the US for vegetable tanned and tawed skins. <http://talasonline.com/>

Tackets: parchment can be purchased from conservation supply houses, as well as parchment makers directly like Pergamena-- <http://www.pergamena.net/products.htm> Pergamena also sells dyed parchment in addition to the usual natural tan/white color. For tacketing, you can use scraps instead of whole skins.

Parchment for covers: Pergamena and conservation supply houses like Talas are just a couples places that sell full skins of parchment.

Artificial Sinew for tacketing: Tandy leather is one of many craft stores that sell this material. It usually comes in a small variety of light brown colors in different widths, and is heavily waxed.

Selected References:

Account book lacings shown in: *Modern Bookbinding* by Alex J. Vaughan, first printed in 1929, with facsimile issued in 1996 by Robert Hale Limited, London.

Tacketings and Lacings: Limp Binding chapter, in *The Archaeology of Medieval Bookbinding*, by J.A. Szirmai, Ashgate, Burlington, 1999.

Appliqué and buttons: *Leather Braiding* by Bruce Grant, Cornell Maritime Press, Maryland, 2003.

Spanish lacings and tacketings: *Turning Leaves of Mind*, by Ligorano/Reese and poet Garrit Lansing, Granary Books 2003.

A Text Book of Stationery Binding by J. Leonard Monk and W.F. Lawrence, Raithby, Lawrence and Co., LTD Leicester, London 1912

L'art du relieur d'or de livres, by Rene Martin Dudin, 1772. Section on Lyon bindings has instructions (in French) and a plate showing working procedures to make this stationery style.

ABC of Bookbinding by Jane Greenfield, 1998. Very useful source for clear drawings of stationery bindings.

Excellent article on secondary tacket patterns and structures used on monographs in Europe, "Tacketed bindings - a hundred years of European bookbinding", by Nicholas Pickwood, in *'For The Love of The Binding' Studies in Bookbinding History Presented to Mirjam Foot*, edited by David Pearson, Oak Knoll Press, 2000.

Through 100 years 1843-1943, by the National Blank Book Company, 1943. Company history of a stationery company meeting the changing needs of the business community.

Stationery Binding Textblock Preparation

- Sections often very very thick
- Folio size not uncommon
- Final volumes with spines as wide as over 1 ½ feet not uncommon
- Edges can be decorated or used to write date of the records, sometimes left rough
- Paper can be ruled before sewing
- Sections can be folded into thirds lengthwise before sewing to mark off accounting areas, depending on the expected use
- Tabbed alphabetical index often placed or sewn into the front of the volume

Adhesive: Adhesive consolidation not possible for primary tacketing, and is optional in secondary tacketing. Adhesive may make handling the textblock easier during the endbanding process.

Textblock shaping: Emphatically flat back

Sewing supports and sewing style:

Can sew sections all along on thick single or double supports, often thick, relatively wide (1 ½ - 2cm) tawed or tanned skin.

There are examples of long-stitch textblock sewing through a rigid backplate.

Use heavy thread

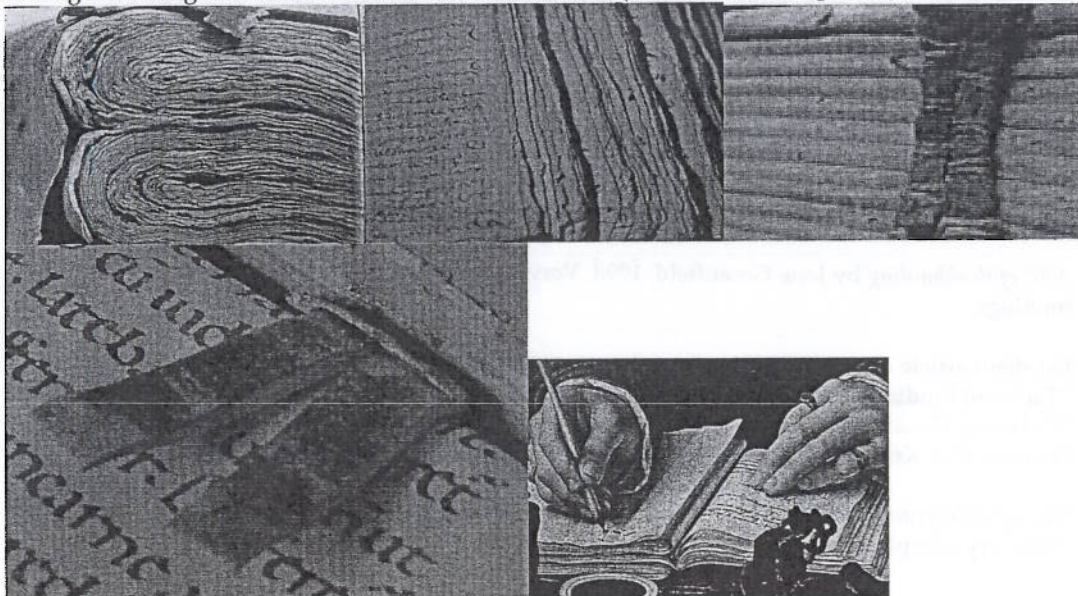
Supports often left oversize in width inside of the case, visible at the opening

Variations:

Sew all along on metal supports to force spine flat

Sew on wood supports to keep spine flat

A 1772 French bookbinding manual by Dudin suggests Combining supported and link-stitch sewing for stronger mechanical textblock consolidation (noted in Szirmai p. 310).



Clockwise from upper left: Spanish Archives, N. Ligorano; Spanish Archives, N. Ligorano, Cortona Italy archives, E. Wallace, Cortona Archives, E. Wallace, Detail "Portrait of a Merchant" by Jan Gossaert c. 1530, National Gallery of Art, Washington .

Stationery bindings – Primary Tackets

Geography: European, though the idea of tacketing can be seen in many cultures.

Time: 3/4th century AD (Nag Hammadi Codices) to 20th century springbacks.

Characteristics: Tackets are like staples---the tacket material goes through two holes, and holds things together. For primary tackets, loosely or tightly twisted cord, parchment, tanned skin or tawed skin is pushed through two holes in the spine fold of the section to mechanically attach folded gatherings of text to a cover or overband. The two ends of the tacket material can be simply twisted together to secure the tacket, or knotted together. Can be carefully planned or done haphazardly as the sections are added to the cover.

Historical Features: The twist or knot of the tacket ends can be on inside or outside of folded text material. Tails of the tacket can be left free or pushed back between the case and the text, or under the overbands.

Variations: Pickwoad noted (p.140) German example of two colors of parchment twisted together for barber-pole effect. He also documented the use of deliberately toned tacket material. (Note: he was not looking at bindings in archives). Knots can be done at each end of the tacket to finish it off.

Planning Guidelines:

- Choose strips of tacket material of the desired color to work with that will give the final twisted dimension that fits your plan, and are long enough to work with comfortably. Usually this means pieces 4-6 inches long. Long pieces are easier to manipulate than short ones. Try different twist tensions and tacket thicknesses to see how they look and behave.
- Decide if twists/knots will be on the inside or outside of the sections, or vary as desired.
 - For planned look, use punching template to punch section spine folds with whatever number and spacing of paired holes make sense for the design of the case (number of overbands, width of overbands, for example) and height of sections. You could punch the spine of the case at the same time as the sections, but mistakes may interfere with a planned look.
 - For unplanned look, punch paired holes as desired as you attach sections to the case.
- Make sure you have enough material to tacket all the sections you will be placing in the case. You will need about 4-5 times the space between the paired holes if twisting, less if knotting.

Punching holes in the sections and the case:

Note: A glovers needle might help in piercing the spine of the case if it is leather.

- Punch spine of case with a template to match the holes in the sections, or use each pre-punched section as a template and punch case as you tacket each section.
- Watch to be sure holes enter overbands in the desired area if you have overbands.

Techniques:

- The attachment of section to case can be done with untwisted material so the tacket lies flatter in the fold or on the spine, then the final bulk of twisting/knotting can be done as a second step, typically after wetting the two ends of the tacket to be twisted or tied together.
- Or, pre-wetted material can be laced through the tacket holes and the twisting or knotting done while the tacket is still wet.
- Use moisture and pliers if needed to twist or knot tackets on inside or outside of section.
- Push tails of tacket material between case and section or overband and case as desired, and trim to any length or tie excess into knots.

Stationery Bindings – Secondary Tackets

Geography: Europe and her colonies

Time: 15-19th century

Characteristics: Loosely or tightly twisted cord, parchment, tanned skin or tawed skin used to attach an already sewn textblock to a case. In Stationery bindings, the most typical style seems to be looped around the supports vertically in regular intervals across the width of the spine, and twisted or knotted on the inside of the textblock or outside of the cover.

Historical Features: Most secondary tacketing examples look tidy and planned, not haphazard. The twist or knot of the tacket ends can be on inside or outside of folded text material. Tails of the tacket can be left free or pushed back between the case and the text, or under the overbands.

Variations: (Pickwood classifies secondary tackets on monographs into 33 types, Szirmai describes two for types for medieval bindings, but notes that "...secondary tacketing may be carried out at any arbitrary position, independent of the sewing stations or block supports. (p. 306). Knots can be done at each end of the tacket to finish it off.

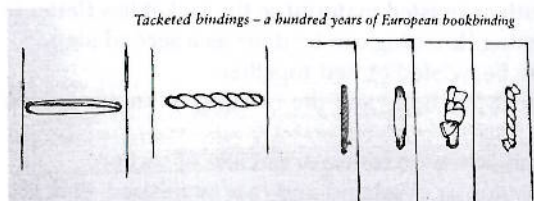
Planning Guidelines:

--Choose strips of tacket material of the desired color to work with that will give the final twisted dimension which is hoped for, and are long enough to work with comfortably. Long pieces are easier to manipulate than short ones. Try different twist tensions and tacket thicknesses to see how they look and behave.

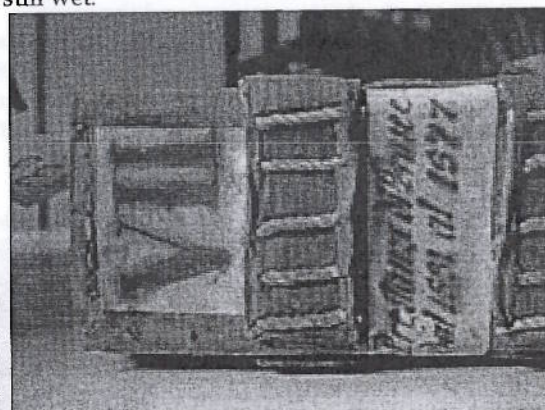
-- Make sure you have enough material to tacket all the sections you will be placing in the case. You will need about 4-5 times the space between the paired holes if twisting, less if knotting.

--If tacketing through overbands, make sure to pierce the case within the overband area. use punching template to punch section spine folds with whatever number and spacing of paired holes make sense for the design of the case (number of overbands, width of overbands, for example) and height of sections.

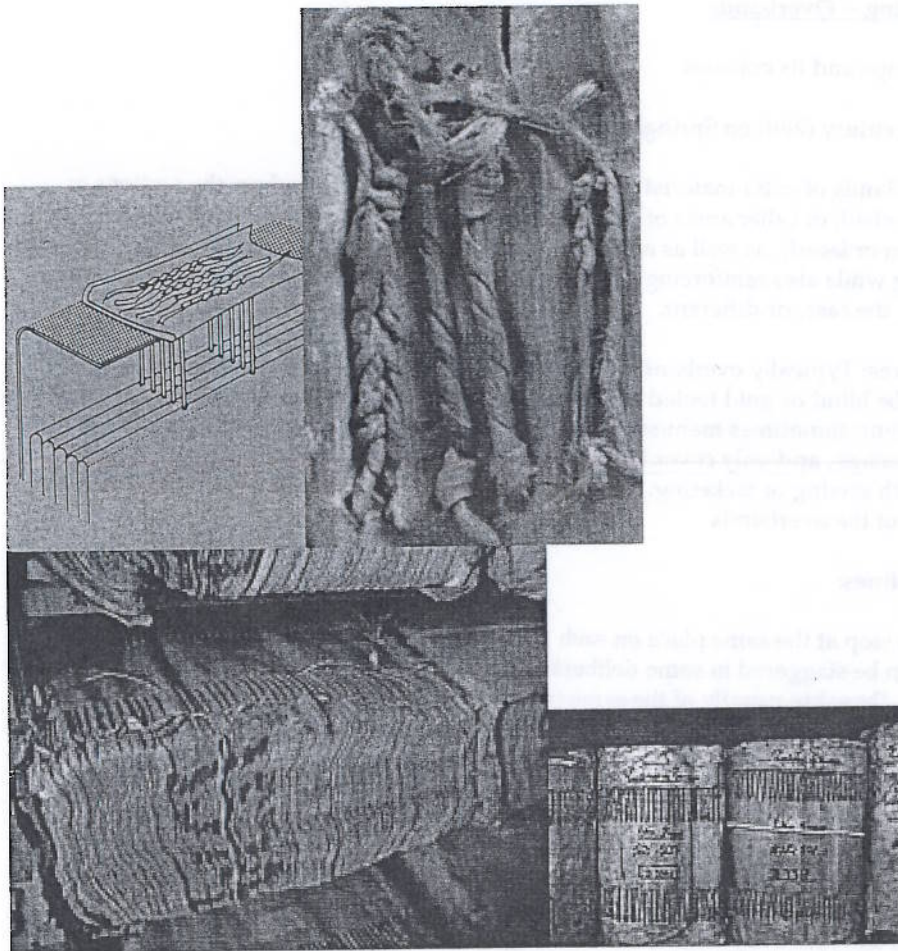
Techniques: The attachment of section to case can be done with untwisted material so the tacket lies flatter in the fold or on the spine, then the final bulk of twisting/knotting can be done as a second step, typically after wetting the two ends of the tacket to be twisted or tied together. Or, pre-wetted material can be laced through the tacket holes and the twisting or knotting done while the tacket is still wet.



Tacketed bindings – a hundred years of European bookbinding

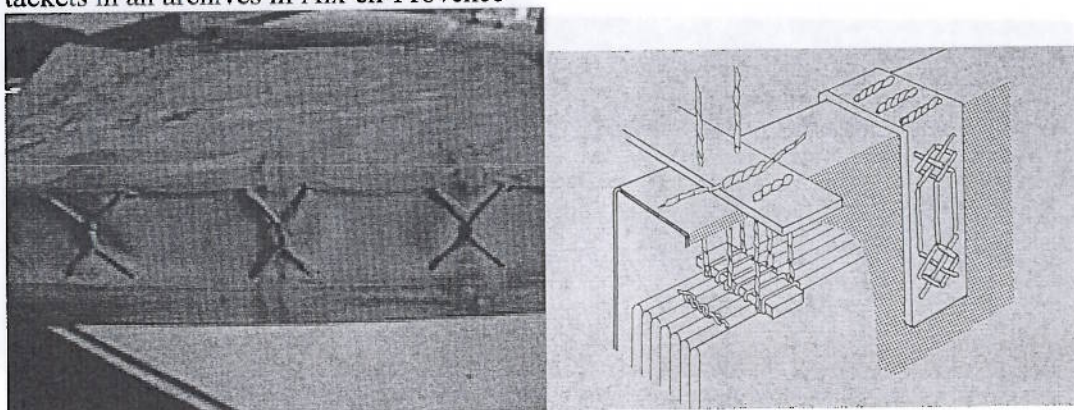


Right: Drawing by Nicholas Pickwood, Left: Cortona Italy archives, E. Wallace



Primary Tacket examples

Clockwise from upper left: Szirmai drawing of Primary Tacket; close-up of primary tackets from Nora Ligorano's book *Turning Leaves of Mind*; two photo's of primary tackets in an archives in Aix-en-Provence



Secondary tackets: left, from Cortona Archives, E. Wallace; right: Szirmai drawing

Stationery Binding -- Overbands

Geography: Europe and its colonies

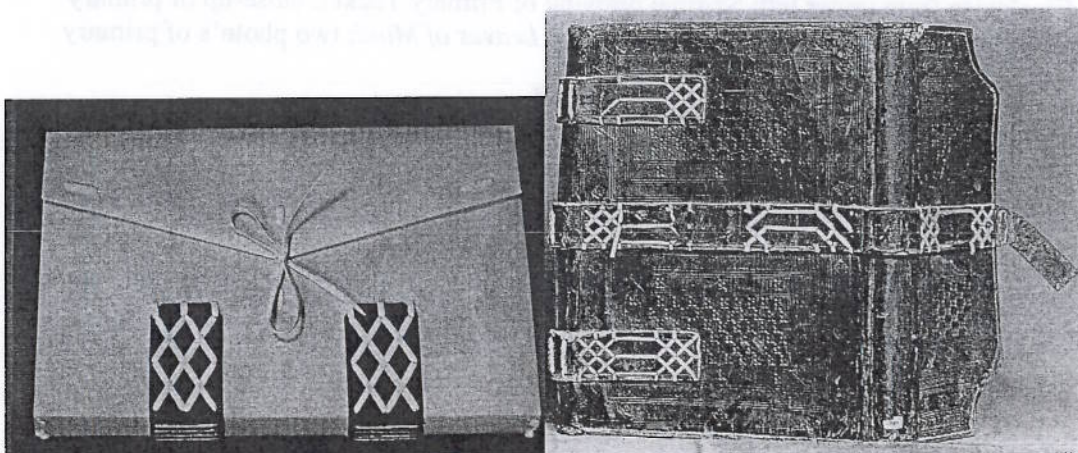
Time: 15 – 19th century (20th on Springback bindings)

Characteristics: Bands of extra material reinforce a case over the spine where the sections or textblock are attached, or other areas of the text. The attachment of overbands to the case is often mechanical (sewn or laced), as well as adhesive. Mechanical attachment gives an opportunity for decorative lacing while also reinforcing the case materials. Overbands can be made from the same material as the case, or different.

Historical Features: Typically overbands are of leather. Can be an odd or even number of overbands. Can be blind or gold tooled as well as laced. Leather overbands are often laminated to paper or parchment, sometimes manuscript/print waste. Overbands can be abbreviated to square "spine patches", and only cover the spine where the text block or sections are attached mechanically with sewing or tacketing. Some binders tucked the tails of the tacketing material under the edges of the overbands.

Planning Guidelines:

- Overbands can stop at the same place on each side as they wrap around the spine onto the cover, or they can be staggered in some deliberate way. If you will have a belt-band in addition to other overbands, these are usually of the same material and width as the overbands.
- Overbands will typically have either primary or secondary tackets through them on the spine of the case (archival long-stitches are also an option)
 - plan primary tackets so the sections are given even support.
 - For secondary tackets the overbands must be placed in relation to the sewing supports on the textblock.
 - You can have decorative overbands in addition to structural ones, and even place decorative tackets through decorative overbands.
- It is easiest to at least partially adhere the overbands to the case before punching any desired lacing pattern and attaching the band mechanically. Over time the edges of overbands tend to lift, despite adhesion.



Left: Historical model of Italian style, by Maria Fredericks. Right: Spanish stationery binding, from Edith Diehl's Bookbinding, 1946.

Stationery bindings – buttons and loops to close book at the fore-edge

Geography: Perhaps more prevalent in southern Europe, and often associated with Spain.

Time: 15 – 19th century

Characteristics: Buttons are mechanically fastened to the fore-edge flap or the fore-edge of the case. Loops are mechanically fastened to the front cover if there is a fore-edge flap button, or the opposite side of the button if there is no fore-edge flap. Larger books typically have two fastenings, and smaller books one.

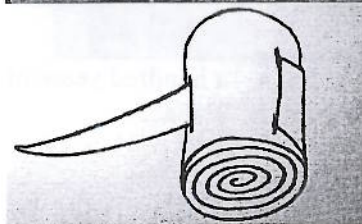
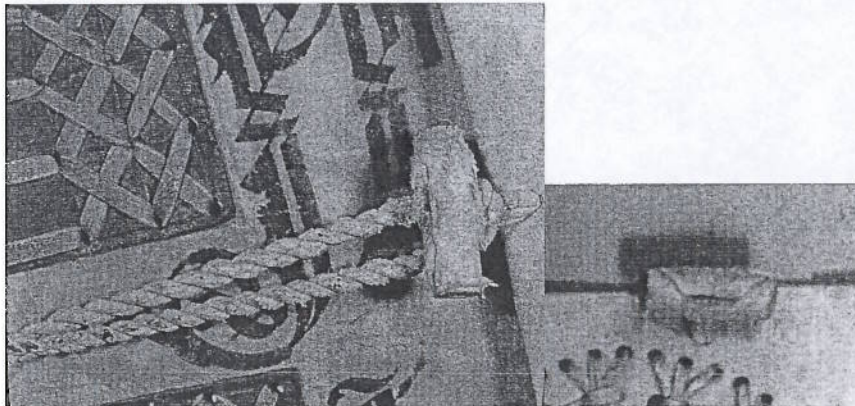
Historical Features: Buttons can be of leather, wood or ceramic or glass. Leather buttons can be rolled or knotted. The loops can be of twisted cord or leather. There are a variety of ways the buttons and loops can be attached to the cover, and the effect of the attachment is often decorative as well as structural. Some examples have an extra “stay” or reinforcement of parchment to help strengthen the attachment, especially of the loops. A stay can also be used to help protect the text from the bulk of any knots used to attach the button or loop. The loops and buttons were typically done with material that harmonized well with other parts of the book--they are not haphazard.

Planning Guidelines:

--The buttons and loops are under tension, so should not break easily. Stretch the material you plan on using, and if it breaks -- it's the wrong material.

--Make sure you plan to keep buttons and loops in a good structural and aesthetic relationship to bands, tackets and lacing.

--The size of the loops determines the final amount of tension it takes to close the book...this must be judged carefully, but thankfully, the loop tension is easy to adjust until you tie the final knot and trim the tails.



Clockwise from upper left: Spanish stationery bindings, N. Ligorano; Detail of Spanish stationery binding, N. Ligorano; rolled leather, from Bruce Grant *Leather Braiding*.

Stationery Binding -- Endband Tackets:

Geography: Typical feature on Stationer's bindings

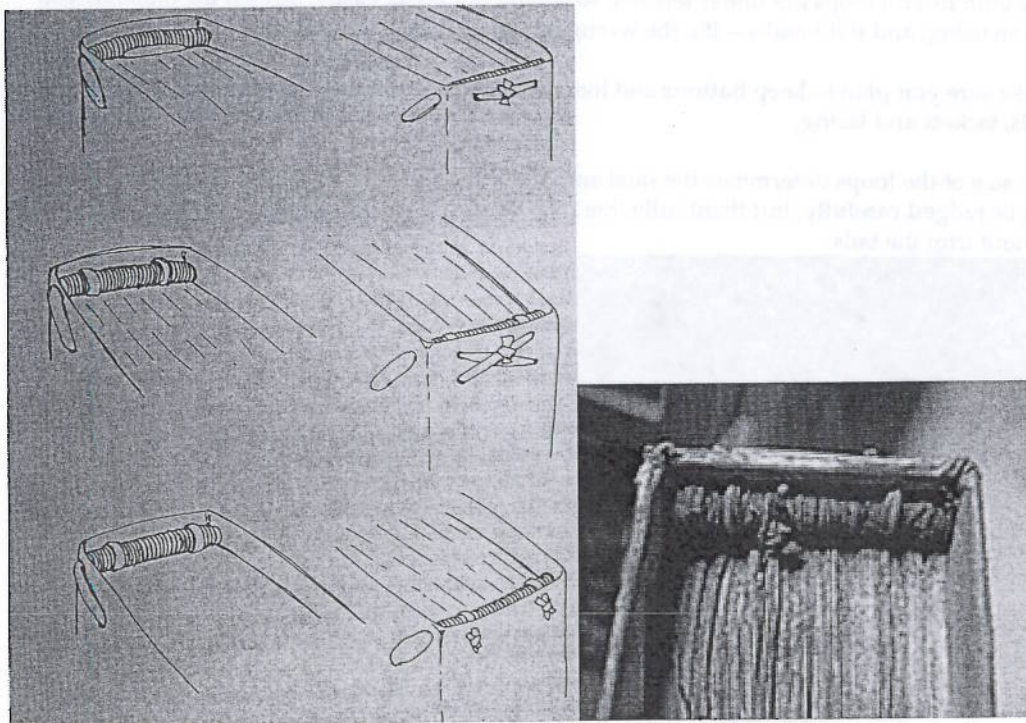
Time: 15-19th century

Characteristics: additional case attachment by securing a loop around a sewn endband and through the spine of the case. The tacket is always visible in the spine of the case where it is tied off, and often easily seen when looking at the endband head on.

Historical features: tackets made of parchment, tanned or tawed skin, or cord, usually of much narrower material than the material used for primary or secondary tackets. Can be horizontal, vertical or crossed on the spine. Endband tackets can be seen on both volumes with plain primary structural endbands, and those with a secondary decorative endbands over structural primary endbands.

Planning Guidelines:

- Requires a sewn textblock with an endband, so cannot be combined with primary tacketing.
- Requires a very sturdy structural endband to anchor the tacket.
- Easier to sew after secondary tacketing is complete.



Right: Drawing by Nicholas Pickwoad from his "Tacketed bindings – a hundred years of European bookbinding" article, 2000. Left, Cortona Italy archives, E. Wallace.

Stationery bindings - Belt Closures

Geography: Europe and its colonies

Time: 15-19th century

Characteristics: Leather belt and buckle (belt-band) attached to the case mechanically, used to close the book securely. Often made from leather the same width and color as the rest of any other overbands on the book. Typically placed near the middle of the height of the book. Carefully planned, with attention taken to strengthen the area likely to be strained when the belt is cinched.

Historical features: The buckle seems to be brass, and often is quite flat and without any extravagant decoration. The belt is sometimes laminated to parchment, paper or additional leather and saddle stitched at the edges where it must pass through the buckle. The belt-band is usually attached to the case with decorative lacing that matches lacing on other overbands, and is often attached to the spine with tacketing. A belt loop of twisted material is sometimes mechanically attached to the case. Some examples show only one hole in the belt, so the user does not have the option of over or under tightening.

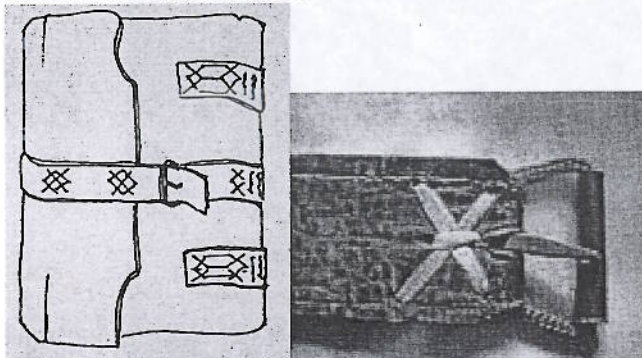
Planning Guidelines:

--Belt bands that match the leather covering a case must be planned for when cutting out the leather originally, especially if you are planning on using the same leather for the case covering, and overbands in addition to a belt-band.

--If planning on a buckle, it should be a "heel bar" style, not "center bar" style. The width of the buckle where the leather will wrap around it must be in relation to the width of the belt-band, and that belt-band width will (historically) generally be the same as other overband widths. Historically, the buckle was relatively flat shaped metal.

--The overband that will function as a belt must be long enough to wrap completely around the case and fasten in the front. This can mean using a very long band for folio size books. Historically you see that they sewed 2 bands together to make the belt-band if more length was needed.

--Belt can have exposed laminated edge secured with the same edge stitching as the rest of the case, if there is edge stitching, or a more typical saddle stitch can be used on the belt edge to secure lamination if needed.



Right: Drawing by Jane Greenfield, ABC of Bookbinding 1998; Left Cortona Italy archive, E. Wallace.

Stationery bindings--Spanish "Mudahar" lacing on the fore-edge flap

Geography: Found on stationers bindings in Spain and Spanish colonies

Time: 16th - ? Century

Characteristics: This lacing holds down the turn-ins on a case, and in particular the multitude of folds on a fore-edge flap. It was not done through overbands. Lacing was usually flat material: tawed, or tanned skin. The final effect of the pattern is very regular on the outside and inside of the cover.

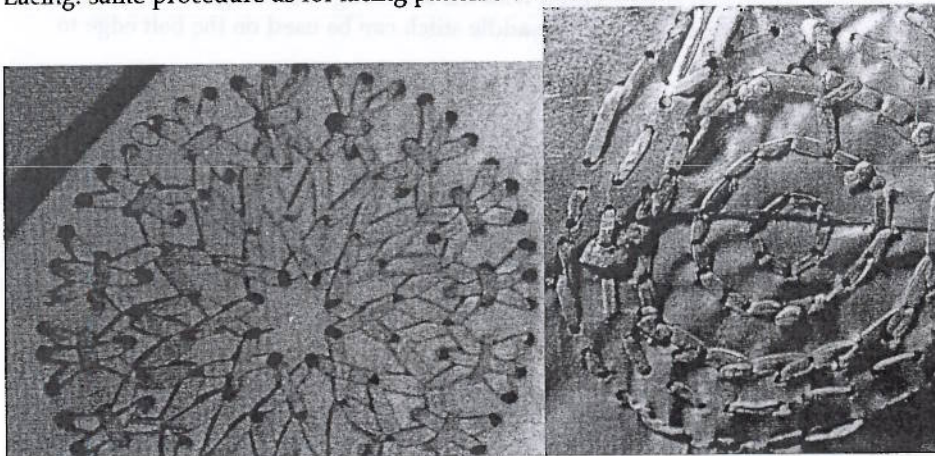
Historical features: Spanish Lacings patterns make complex stars on the outside of the case and some regular pattern inside the case which may not be covered-up by any case lining or paste-down. Holes are generally used multiple times as the pattern is completed, with the lacings laying on top of each other in layers of 2 or more in the back. New Lacing strips can be knotted to the old inside the case, or simply slipped under an old lacing to keep the tail in place.

Variations: Sometimes the skin material was dyed, and contrasting colors used for accent. Or the suede side of skin was used for color contrast.

Planning Guidelines:

- Decide on lacing pattern size, shape and the lacing material.
- Make a template for lacing holes: (really, its easiest to copy the pattern from a real book, or photo of a book, but you could create your own new pattern)
 - Use a square piece of paper close to the size of the final star pattern you want to create with the middle marked (origami paper works well).
 - With a compass, create concentric circles from that middle point, with equal or different distances between the circles.
 - Fold the square as needed to get fold-lines that make a number of rays bisecting the marked circles. Mark the intersections of the fold and the rays with a pencil to make points for the star pattern you want to create.
- Use the template and an awl to prick the case where you intend to punch the lacing holes. Double check.
- Use large size awl, lacing fid or hole punch to increase hole size to accommodate lacing width.

Lacing: same procedure as for lacing patterns on overbands.



Edge sewing on case of stationers bindings

Geographical Local: Have seen on Italian stationer's bindings. Possibly examples exist in other parts of Europe.

Time: 14(?) - 18th century

Characteristics: Running "saddle" stitch, near edges of the case, fairly thick thread about 1/4th inch (5-6 mm) from edge and 5-6 mm apart.

Historical features: Holds laminated material together at the exposed edges. Thread crosses over the edge of the laminated case at every stitch, or at regular intervals. Can be done in two color threads, matching the endbands. Extra care taken to secure corners of case, and shaped edge of fore edge flap.

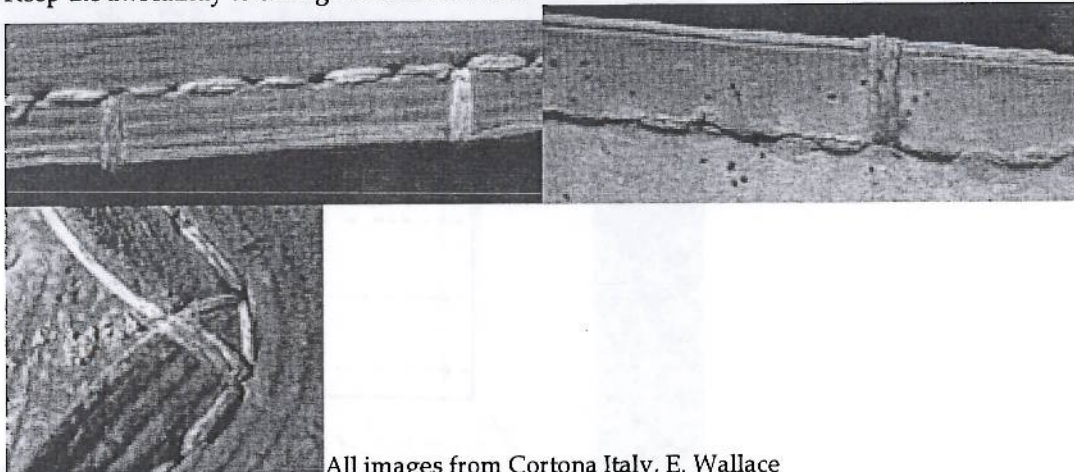
Features: Planning needed to be sure the distance between holes of the running stitch allow the thread to support the layers and shape of the case.

Variations: one color, two color, crossing the edge of case at odd number intervals to alternate colors of the crossing thread.

Planning Guidelines:

NOTE: For use on case made from laminated materials, typically leather, paper and parchment

1. Use pounce wheel or dividers to mark holes around the edge of the case, stopping at the joint. Case material may begin to delaminate from force of punching or piercing.
2. Pierce holes with awl or punch holes to width large enough for number of thread you want to share a hole. Historically, the holes seem pierced, not punched.
3. Use strong thread long enough to finish one side of the case, if you want to avoid knots.
4. If using 2 colors, tie them together and put a needle on each side, if using one color, put a needle on each side. Wax might help work with the thread as it shares holes.
5. Wrap around exposed edge of case either at each hole or at regular intervals. Do not over tighten or case can distort. A latex "needle grabber" can help pull needle through thick material. Keep the awl handy to enlarge holes as needed.

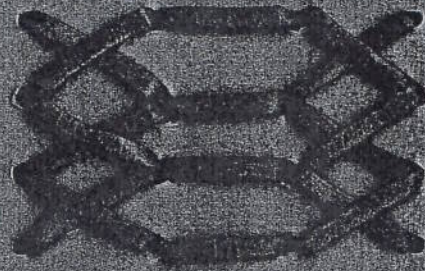


All images from Cortona Italy, E. Wallace

#3 Design

"Single Band"

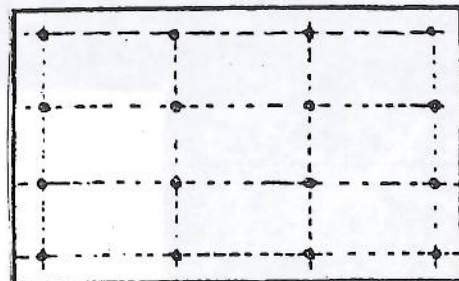
front
View →



#3 Design

"Single Band"

Back
View



template

#3 Design instructions

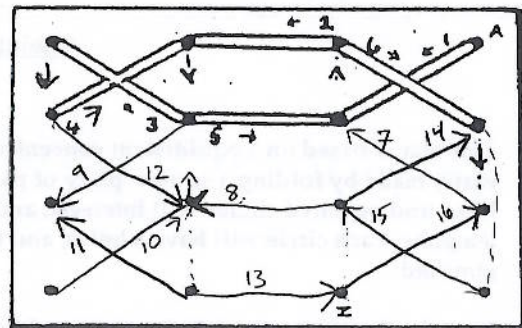
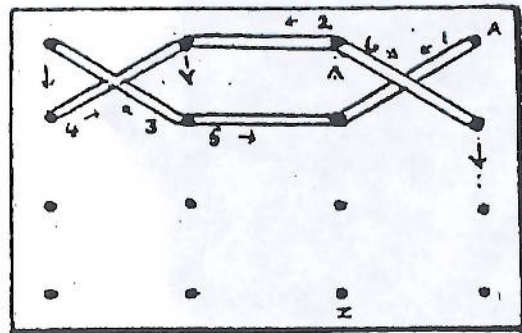
Single Band

- Most holes will be used twice in this design

- After completing #14, travel down two holes in the back, skipping one hole.

from
Modern Bookbinding

Alex Vaughan

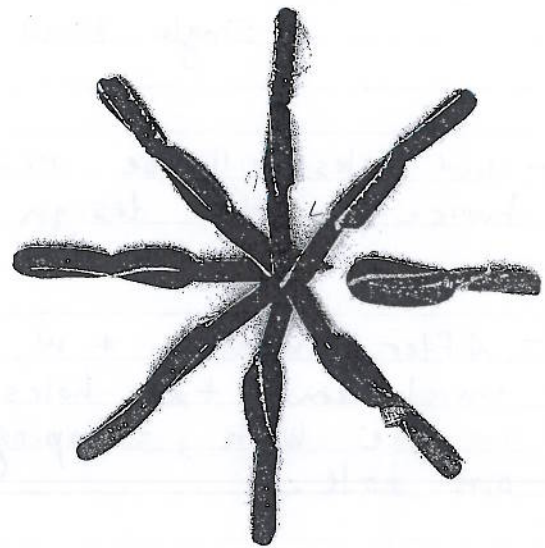
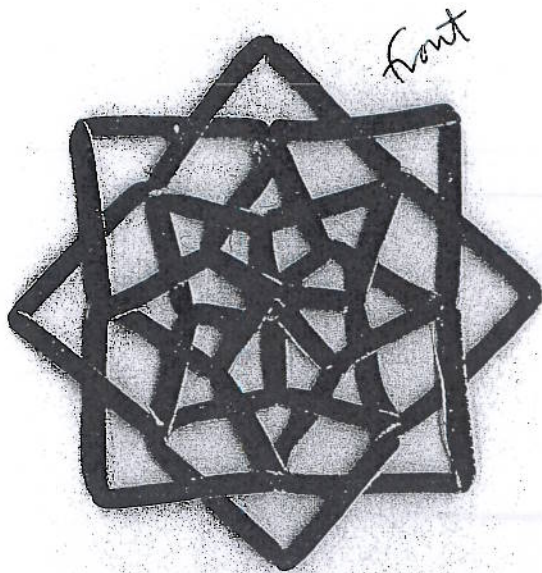


* reprinted from

Vaughan, Modern Bookbinding.

originally published in 1929.

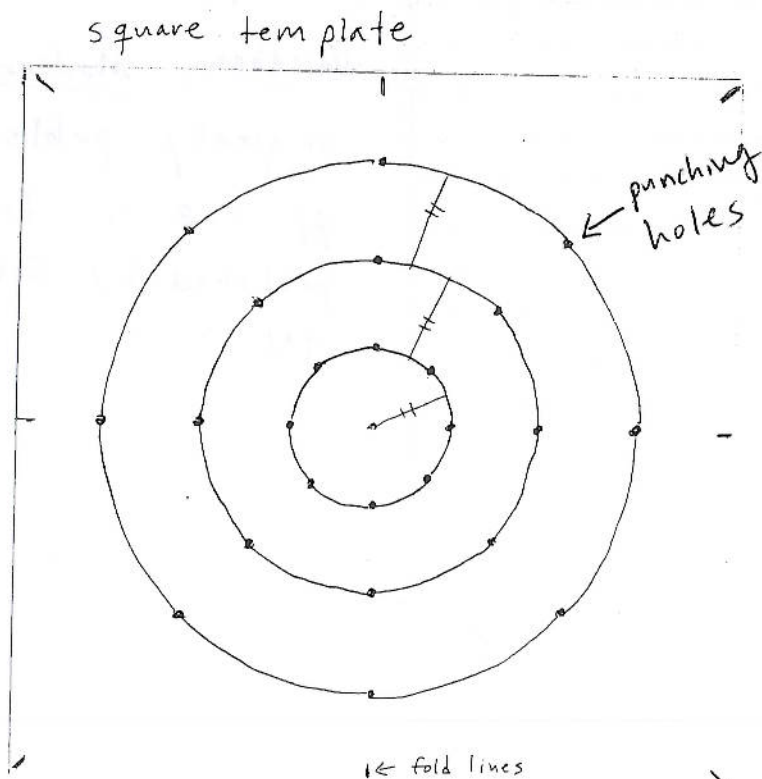
pp. 128 in facsimile edition
published by Robert Hale, London,
1996.



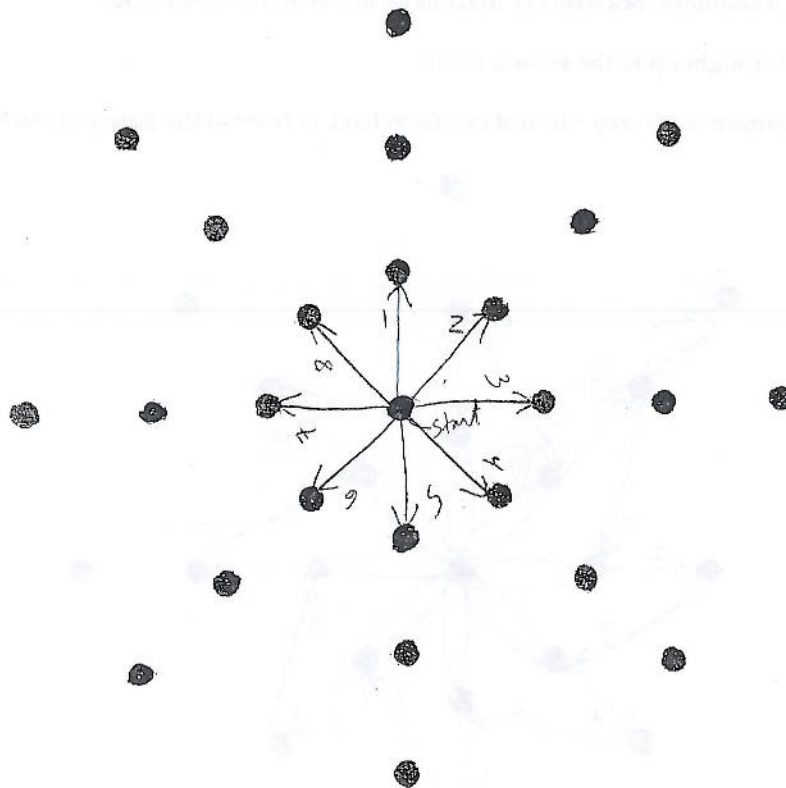
8 pointed star:

This star is based on 3 equidistant concentric circles . The pattern for punching the holes is easily made by folding a square piece of paper in half and then into quarters. The creased lines and penciled circles will intersect, and each intersection will be punched to complete the template. Each circle will have 8 holes, and the middle of the inner circle will also need to be punched

To make the pattern seen in Spanish Archival Bindings, the middle hole will be used at least 7 times, A lacing needle can help negotiate this star, and the hole will need to be widen as the sewing is completed.



In the diagrams, the dotted lines are in the design in the back, and the solid lines are the design as seen from the front. The start and end point are indicated in the diagrams, and the steps are numbered there as well as in the written instructions below. The steps that say (front) are written as if you are looking at the front of the design. The steps that say (back) are written as if you are looking at the back of the design. All written instructions assume you are turning material as you work so the design is on top in front of you.



Star 1

#1 Start in the back in the middle hole, leaving a 1 cm tail in the back as you move to the front.

#2(front) Enter any hole in the inner circle from the front.

#3 (back) enter the middle hole again and adjust the tension.

#4(front) travel to the next open hole in a clockwise direction (when looking from the front), repeating steps #2 and #3 until your thread is on the back, and you have 8 rays in the front.

At step 8, either enter the middle hole from back to front and cut off the excess and start the next step with a new thread, or continue on to circle #2.

Star 2

With a new or same lacing, enter the specified starting hole from the back in the second circle.

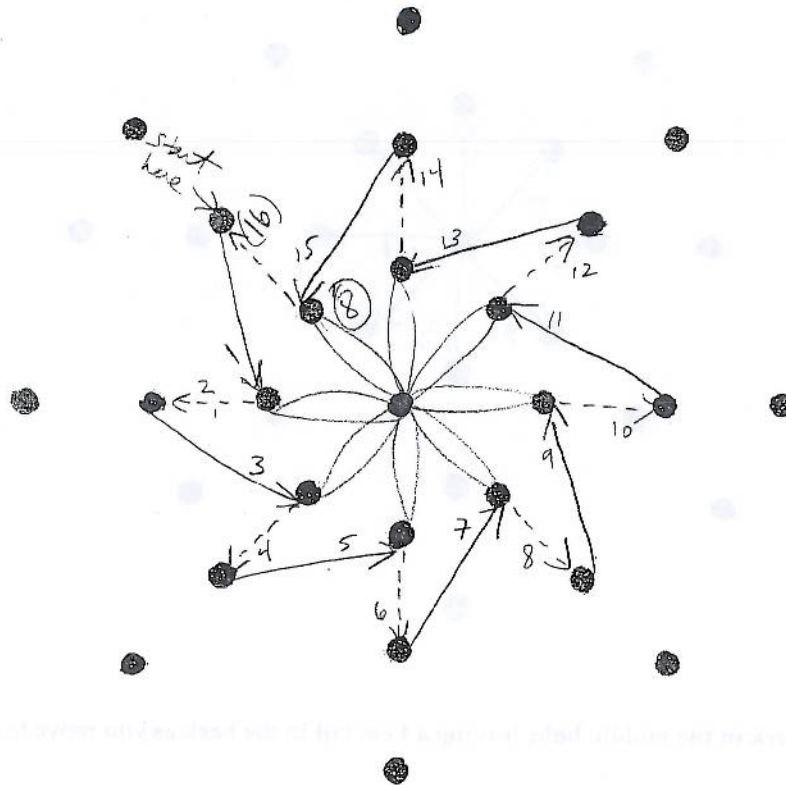
#1 (front) make a counter clock-wise ray diagonally down to the first circle.

#2 (back) travel up straight up to the second circle.

#3(front) make a counter-clockwise ray diagonally down to the first circle.

#4 (back) travel straight up to the second circle.

Continue this pattern up to step #16 and exit from back to front at the hole you started in.



Part 2 of Star 2

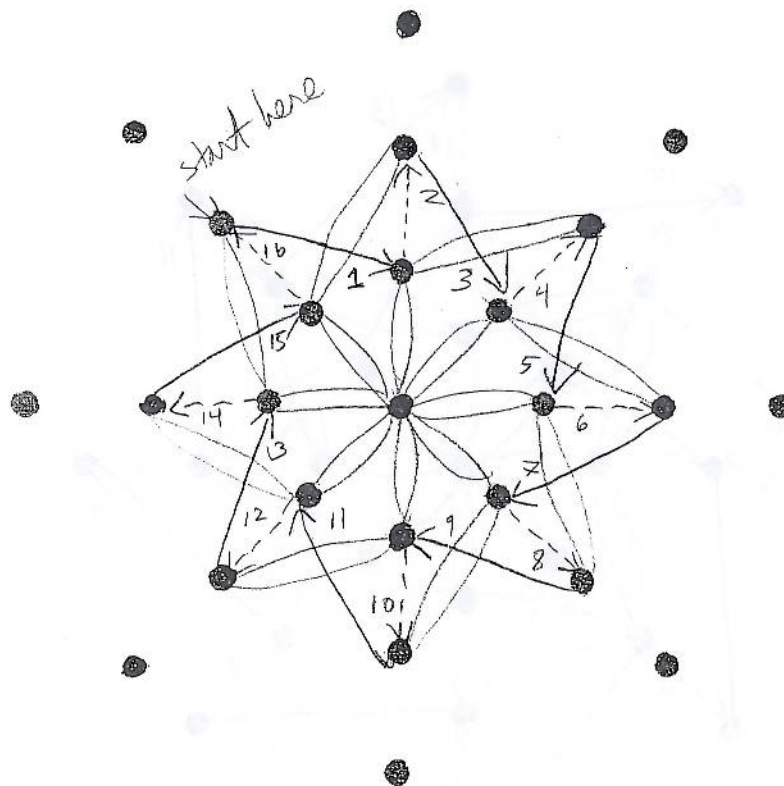
This step is the reverse of the pattern made previously, and makes a set of "X"'s in the front.

#1(front) make a diagonal ray in the clockwise direction down to the next hole down in the first circle, making the first circle.

#2(back) travel straight up to the hole in the second circle. This will make a double layer in the back.

#3(front) make a diagonal ray in the clockwise direction down to the next open hole in the first circle.

Continue this pattern to #16 and enter from the back to the front in the hole you started in.



Star 3

This star is similar to star 2, using holes in circle 2 and 3

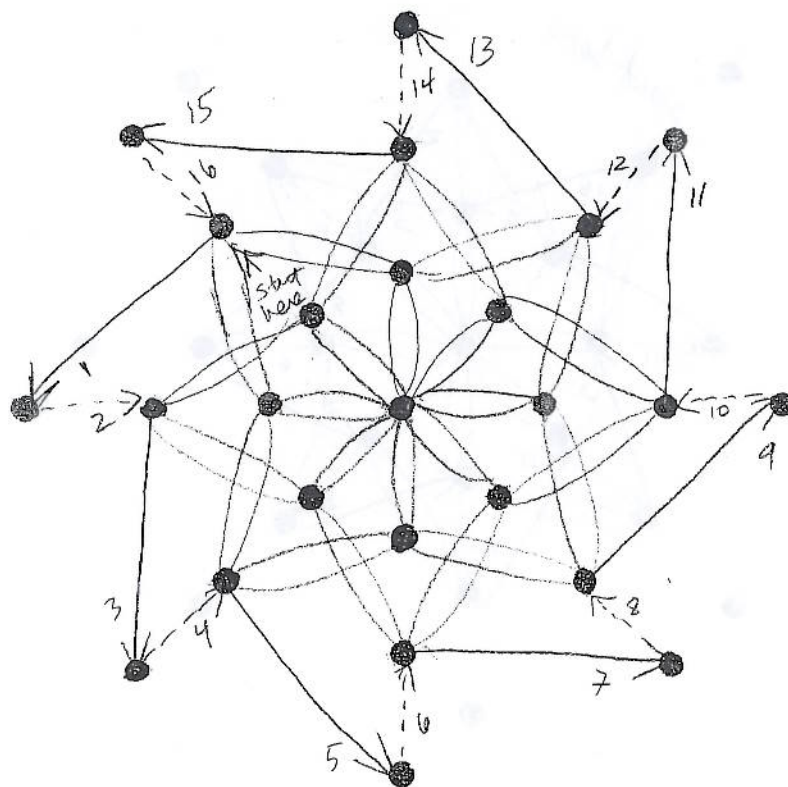
#1(front) Make a ray moving from the start hole making a counter-clockwise ray moving UP to the next counter-clockwise hole in the 3rd circle.

#2(back) Move straight down to a hole in the 2nd circle.

#3(front) make a diagonal ray moving counter-clockwise UP to the 3rd circle.

#4(back) move straight down to a hole in the 2nd circle.

Continue until you exit from the back to the front in the hole where you started.



Part 2 of Star 3

This step is the reverse of the pattern made previously, and makes a set of "X"s in the front.

#1(front) make a diagonal ray moving from the start hole UP clockwise

#2(back) Move straight down to a hole in the 2nd circle. This will create a double layer in the back.

#3(front) make a diagonal ray moving clock-wise up to the 3rd circle.

#4(back) move straight down to a hole in the 2nd circle. This will create a double layer in the back.

At this point, cut off excess lacing in the back and tuck it under another lace, or glue ^{it} ~~is~~ down.

