

The Round Closed Seam in Shoemaking

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The butted, or 'round' closing seam is used in almost all pre-mechanised shoemaking. It is the most common seam in medieval and renaissance shoes, making its construction an core skill for the reenactment cord-wainer.

This handout introduces the structure of the seam and the tools and techniques used in making it. It is intended to serve as a take-home reference for people who have had the technique demonstrated and tried it out in a class.

Structure of the Round Seam

The round seam is formed by butting the edges of two pieces of leather together, and joining them with a stitch that penetrates the face of the piece to be joined, emerging from the edge of that piece, penetrating the edge and emerging from the face of the second piece.

This results in a seam showing a double row of stitches on one face of the work and no visible stitching on the other. In shoemaking, the stitches usually sit on the flesh side of the leather which is the inside of the shoe[3, 4].

The seam usually has a slightly raised ridge of leather between the rows of stitching caused by the additional volume of the thread in the leather. This can be damped and smoothed down with a polished bone after the seam is complete.

It is possible to sew a round seam on the grain side of the leather, but care needs to be taken to penetrate deeply enough to prevent the stitches tearing out. The grain surface of leather is weaker and more prone to tearing than the fibrous corium layer underneath it.

Tools

Awl

Unlike modern shoemaker's awls, which usually have curved tips, medieval awls are straight[1]. An example can be seen in Figure 6 on page 3.

The awl should be round or oval in cross-section and highly polished. A harnessmaker's diamond awl is designed to stab completely through the thickness of leather and will tend to tear out the kind of holes needed for shoemaking stitches, but suitably shaped, polished, and sharpened they can work.

Figure 1: Awl path through the leather

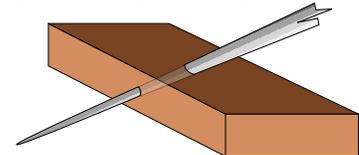


Figure 2: Longitudinal section through the round closing seam

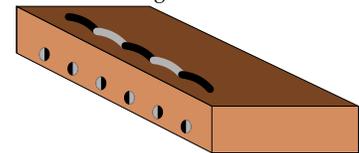


Figure 3: lateral section through the round-closed seam

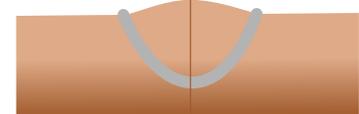
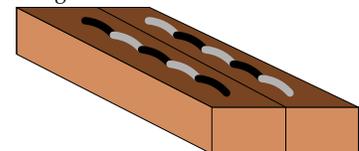


Figure 4: Appearance of the round closing seam



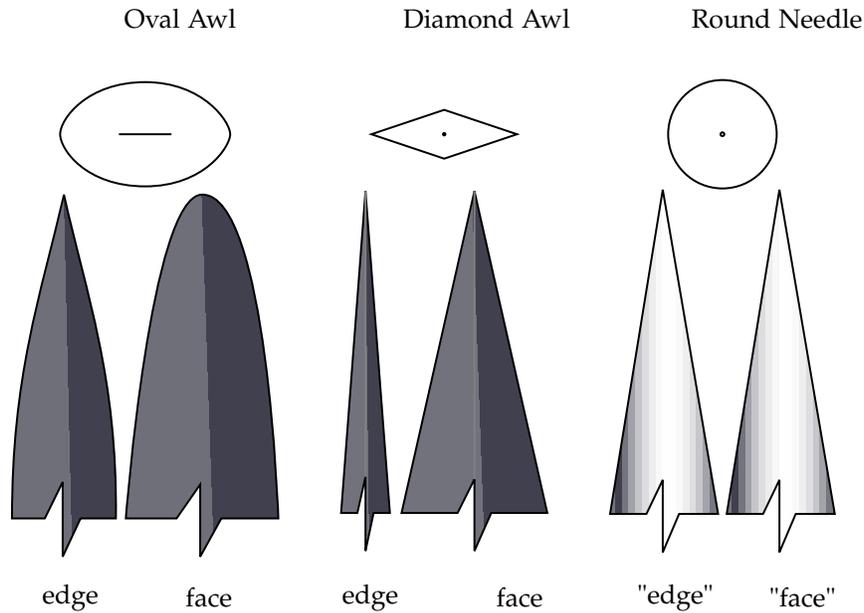


Figure 5: Oval, diamond, and round needle cross-sections and points. The diamond awls and needles come to a sharp point, while the oval awl has a slightly bladed tip.

The awl tip is not a needle point, it is more of a rounded chisel shape with distinct width to the cutting tip. The tip is designed to cut a small slit in the leather which the polished blade of the awl spreads open into a hole to permit the thread to pass through. This hole will close up again with time and burnishing of the seam, leaving a tighter and more watertight stitch.

A modern shoemaker's closing awl will work very well for making round closed seams - it is what they were designed for - but they are no longer made commercially and are difficult to obtain. Diamond-shaped harnessmaker's awls can be re-shaped to serve as cordwainer's closing awls by narrowing the body of the blade and rounding off the edges of the diamond section then re-shaping the tip. It is easiest to do this with a dremel tool, but care must be taken to avoid overheating the blade.

Perfectly usable straight awls can be made from any small length of tool steel. I have made several by cutting off the short angled part of a 2-3mm allen key with a dremel and grinding a taper into the remaining part while it is spinning in a drill clamped to a bench.

The awls used in this class were made by grinding down 3.75x100mm concrete nails after first carefully grinding the chrome plating off. 3.75mm is far too large a diameter, but 2.5mm nails didn't come in a long enough shaft. At around 55c each, concrete nails are a convenient, but comparatively expensive, way to buy steel. Drill rod is a lot cheaper but you typically have to buy at least a metre unless you can find somewhere that will sell you off-cuts. Regular nails are mild

If you have no power tools at all, it is possible to make an awl by taking a large needle, breaking off the eye, mounting it into a screw-chuck awl haft and grinding a chisel point into it with wet-n-dry sandpaper on a hard smooth surface. This is a good way to make small awls for fine work but the hardness of sewing needles is not ideal.

steel and don't make good awls.

Regardless of how you make or buy an awl, it should be polished to a mirror finish before use. Rough awls do not slide through leather well and will be more likely to tear out the hole.

Strop

A strop is a device for polishing the edge of a cutting tool. A cord-wainer should always have a strop to hand while working as awls require regular touching up during use. A strop can be made from a piece of smooth level vegetable tanned leather glued to a piece of wood with green polishing compound or autosol metal polish rubbed into the leather. The honing compound sold by Lee Valley tools works the best of any I have tried, but autosol is easier to get, and cheaper. It is good practice to give the awl a few passes on the strop before every job.

Stirrup and Closing Block

The stirrup and closing block are two of the iconic tools of the pre-industrial shoemaker. The stirrup is a strap of leather placed under the foot and over the thigh. By pushing down with the foot the strap can be made tight and therefore used to hold whatever work is placed under it, leaving both hands free for sewing or lasting. The stirrup is sometimes used in conjunction with a 'footing block', a piece of wood that elevates the leg that serves as the shoemaker's work surface.

Stirrups are rarely shown in pictures of medieval shoemakers, but can be seen in the 14th century altarpiece by Arnau Bassa in the basilica of Santa Maria in Manresa and a 16th century altar figure in Marien Church in Delitzsch (see Figure 7 on the next page). Similar devices can be seen in depictions of Roman shoemakers from around the second century used to hold a shoe on a bench-mounted anvil[1].

A stirrup is just a long belt and can be made from two belt blanks or similar strips of leather, sewn together with a lapped seam and with a buckle installed on one end. It is useful to cut a slit in the stirrup 12-15cm long to allow holding of smaller pieces of work or to hold a piece at each end by spreading the split open and working in the space between them. Ensure the slit is cut precisely in the middle of the width of the strap, and punch a 3-4mm hole at each end before cutting the slit to stop the leather tearing. Work out where the best place to have the buckle is before you cut the slit, and cut the slit relative to the buckle.

The stirrup and footing block are mentioned in the *Lystyne Lordys Verament* which is a shoemaker's will set to verse dating from the late 15th century[2].

He bequeythyd to his sone Coke
Hys sterop and hys fotyng-bloke
Wt pyrdowy.

Figure 6: Excerpt from the Manresa Altarpiece depicting the life of St Mark, showing a shoemaker using a stirrup on his right leg. A distinctive medieval style of long-hafted awl can be seen on the table and in the shoemakers hand.





Figure 7: Altar figures of Saints Crispin & Crispinian from the Shoemakers Altar in the Marien Church in Delitzsch. The figure on the right is using a stirrup to hold the shoe on his thigh and is wearing hand leathers.

The closing block is simply a rounded piece of wood the shoemaker puts on his thigh to serve as a surface for the leather being sewn. It serves to slightly elevate the work from the shoemaker's leg, providing clearance for hands, and the hard curved surface holds leather in the right way for the sewing and stitching required to make a shoe.

Thread and Needles or Bristles

The best thread to use for round closed seams in reproduction medieval shoes is single-strand dry spun #10 hemp or linen, tapered at both ends, waxed with hand wax or *code* and plied into a three-ply cord then tipped at both ends with a hog bristle.

Instructions for making such a thread and the code with which to wax it are beyond the scope of this class but both topics are covered on my blog at <http://wherearetheelves.net/making-code/>, <http://wherearetheelves.net/my-first-video-post-breaking-and-tapering-linen-thread/> and <http://wherearetheelves.net/my-second-video-post-attaching-bristles-to-tapered-linen-thread/>.

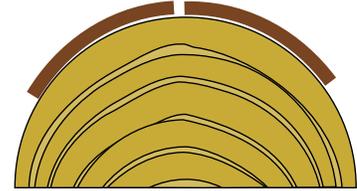
Thread can be difficult to find but Leffler in Melbourne sell it as do Campbell Bosworth in the USA. It is also possible to taper unbonded unwaxed polyester or dacron thread by un-plying it and scraping it with a knife then re-plying and waxing with code then attaching a bristle in the same way that you would with hemp or linen thread.

Bristles can be purchased from Francis Classe (Master Vyncent at Wodegate) who will post them to Australia and New Zealand from San Francisco. I can provide his contact details, or you can contact him through his website: <http://aands.org/raisedheels/>. In lieu of bristles I use fishing line, which aside from being occasionally difficult to split, works very well and is cheap and clean. It is also possible to use blunt needles which have been bent into a smooth curve though owing to the need to pass the thickness of the eye as well as the thickness of the thread, needles will never pass through as small a hole as a pair of bristles will, so the seams will never be quite as tight. Needles are also more demanding to use as they will pierce any thread already in the hole and it is fiddly to get them both in the hole at the same time.

Technique

Like many aspects of reproduction medieval shoemaking, the technique of making a round closing seam is simple to explain but requires a reasonable amount of practice on scrap material to develop

Figure 8: End view of two pieces of leather on a closing block



“And undir the arme the armyngye poyntis muste be made of fyne twyne suche as men make stryngis for crossbowes and they muste be trussid small and poyntid as poyntis. Also they muste be wexid with cordewen coode. And than they woll neythir recche nor breke.”[5]

proficiency and feel for the technique before attempting it on a shoe.

The edges of the pieces to be joined should be cut square - if the edges are at an angle to the face of the leather it will be difficult to draw the seam tight and there will be unsightly bulges in the finished product.

On each piece of leather, mark a line on the grain side, in from the edge a distance approximately equal to half the thickness of the piece. Much more than half the thickness of the leather and the stitches will be too wide, which will cause the work to pucker and deform when they are pulled tight. Much less than half the thickness and the stitches will be weak. The easiest way to mark this line is with a thumbnail, using the index finger as a stop to set the distance. With practice this technique of marking will become second nature and is much faster than picking up a pair of dividers.

You can mark the stitch holes along this line using a pair of dividers or a pricking wheel, but it is good practice to just stitch by eye as you go. Your early work will be messier for it, but as you practice your work will become more even and you will start to naturally set out a stitch length appropriate to the work you are doing, regardless of whether you have a pricking wheel in that pitch. Pricking wheels are a modern invention, extant medieval leather shows the slight variations in stitch length indicative of a craftsman working by eye and at speed.[Cite, Goubitz]

Awl Technique

Using an awl well is half feeling and half technique. The awl should be held with the thumb and forefinger around the ferrule and the main body of the haft held between the middle two fingers. Avoid putting the butt of the awl haft into the centre of the palm of your hand. There are nerves in there that will get bruised and make using the awl painful. You should hold the awl in a way that allows you to free up your thumb, index and middle fingers to manipulate the thread while holding the awl with your ring and little finger without putting the awl down. The feeling comes from being able to sense the passage of the awl through the leather, when you are having to lean on it too hard and it needs sharpening, and when it is deep enough into the leather to start bringing the point back up and out. These things are difficult to explain, but will come with practice.

Stabbing your awl point into some tallow, beeswax, or even better some glycerine soap between each stitch will lubricate the blade as it passes through the leather and make the work much easier.

Figure 9: Result of awl inserted at too shallow an angle. Too little leather is left in the body of the stitch (highlighted) to give the seam strength.

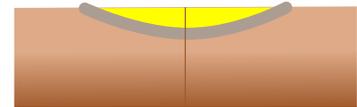


Figure 10: Result of awl inserted at too steep an angle. Stitch shows on outside of work.

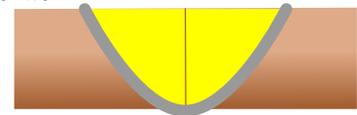


Table 1: Too narrow a stitch. This will be weak and prone to tearing out.

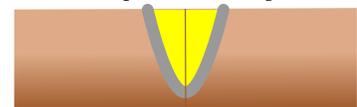


Figure 11: Too wide a stitch. This will cause the work to buckle and deform when the stitch is pulled tight.

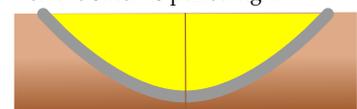


Figure 12: Correct depth and width of stitch. Just deep enough to not show on the outside of the work and wide enough to have body in the stitch.

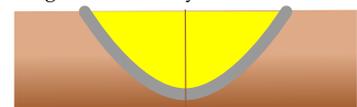


Figure 13: Stitch cross-section to scale through 3mm thick leather.



Making the Seam

To begin the seam, take the two pieces of leather to be joined, with the guide lines marked on them with a thumbnail and place them over your closing block and under your stirrup. Arrange them so that the adjacent edges are lying along the centre of the closing block. Take your awl in hand, and your waxed thread with a bristle or needle on each end.

Place your awl point on the marked line, just in from the end of the leather on whichever side you are holding the awl, and pierce a hole through the top side of the leather, out the edge, then in the edge and out the top side of the facing piece. Thread one bristle through this hole and pull approximately one third of the thread through. Match the ends of the thread up in your off hand (the one not holding the awl) and, holding them both in your off hand, press the thumb of your awl hand over the stitch and pull the threads through together so you have an even length on each side of the stitch. Rearrange the thread so you have an end in each hand and they aren't crossing over on top of the work.

Take your awl and pierce a hole in the same manner as the first, around one leather-thickness in front of the first hole. Make sure the blade of the awl is flat and parallel to the leather, not angled or edge-up, or the hole will tear out. Angle the awl down until you feel it emerge from the edge of the first piece of leather then angle it up gently (*never* lever an awl blade!) and push it through the second piece until the tip just emerges. Resist the urge to rock the awl back and forth. It will go through the leather more easily that way but it will tear a larger hole that will not close up as well over the threads. If the tip is sharp enough it should just slide through the leather. If it isn't sharp enough, give it a few passes on your strop.

Take the bristle in your off hand and feed about half its length through the hole you have made, repeat with the bristle in your awl hand, then take the tip of each bristle and draw them past each other through the hole. Once you have drawn enough thread through the hole to be able to grasp the thread, take up a loop in each hand and pull the stitch tight.

Repeat for each stitch until you have a seam.

Order is important when you build a stitch. Every stitch should be laid up in exactly the same way, or the seam will show variation. To keep the stitches all the same you need to make sure that the threads always cross in the same way - left thread in front and right thread behind, or vice-versa - so the threads of adjacent stitches always lie in the same relationship to each other. This applies to all stitching, including round seams, and is most important in stitching stabbed

Tip: If you are working with particularly hard or stiff leather you can dampen the edge and the awl will pierce the leather much more easily but you need to be careful because if you get it too wet, or pull the stitches too tight, the seam will gap when the leather dries.

Figure 14: Consistently laid up stitches, left thread always behind right thread, resulting in a straight seam.



Figure 15: Inconsistently laid up stitches, left thread is sometimes behind and sometimes in front of the right thread, making the stitches lie unevenly.



through the leather grain-flesh.

Finishing the Seam

Depending on where the seam is on the shoe, you may not need to finish it. For closing seams that will be caught up in the sole seam I always start at the top-line of the shoe and work towards the lasting margin, that way the ends of the seam will be held securely in the sole seam and won't need tying off. For seams that are attaching a strap or the like you will need to stitch backwards for a couple of stitches or tie off the ends with a square (reef) knot but beware that knots can dig painfully into the wearer's foot. It is perfectly possible to stitch backwards, even on a fine seam, but it takes practice and care and a good fine awl. You want the back stitches to go between the existing ones; if you try and awl through the same holes again you'll just cut the thread.

Things That Will Go Wrong While Learning

It is a rare beginner who can make a good round closed seam on their first attempt, it took me several attempts to make something structurally sound and many more practice pieces to make something neat and tidy.

Most errors will result in the leather on one or both sides of the stitch 'blowing out' and tearing. Common causes of blowout are:

- Pushing the awl too far through the hole so the fat part of the blade tears the leather.
- Levering the awl to try and get the second half of the stitch.
- Pulling the stitch too tight.
- Not catching enough leather in the 'holdfast' of the stitch.
- Pulling the threads tight up, rather than sideways.

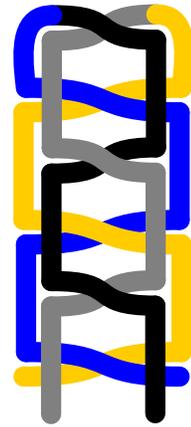
The other common errors are to put the awl in at too steep an angle so it comes out the other side of the leather rather than the edge so the stitch shows, to stab a finger with the awl and bleed on the work, and to pull the bristle off the end of the thread.

I have done all of these things, more than once, while learning, but persevere! I rarely do any of them now.

Glossary

Closing block A small rounded block of wood placed on the thigh used as a support for sewing.

Figure 16: Back-stitches, blue and yellow, going under main stitches, black and grey, offset by half a stitch so as not to re-use the holes of the main seam and risk cutting the thread. This is tricky to do, particularly in thin or firm leather, but with practice it is quite achievable even with 2mm stitches.



Cobbler A shoe repairer. In medieval London cobblers were forbidden from working with new leather.

Code Medieval term for what modern cordwainers call hand wax. A sticky resin/wax or resin/pitch mixture used to coat threads to protect them from moisture, hold the bristle on the end, and lock the stitches.

Cordwainer The formal term for a shoemaker. A worker in 'cordovan' leather, which in medieval times was probably a brightly dyed alum-tawed goat from Cordoba in Spain.

Ferrule The metal ring around the end of an awl haft to stop the haft splitting when driven onto the blade.

Footing block A block placed under the stirrup foot to raise the working leg to a more comfortable height and allow easier tensioning of the stirrup.

Flesh side The rough "in" side of leather. This was the inside of the animal when it was alive.

Grain side The smooth "out" side of leather. This was the dermis layer of the animal's skin when it was alive, just under the base of the hair follicles.

Haft The handle of an awl.

Hand leathers Leather coverings for the palm of the hand to protect it from the thread when pulling stitches tight. Not generally required for smaller seams.

Souter/Sowter A shoemaker. See the Lystyne Lordys Verament

Pyrdow, pyrdow, pydowy,
wows se bone
Trenket sowterly

Stirrup A strap placed under the foot and over the thigh. Used to clamp work to leave the hands free.

Thumb stall A leather tube worn on the thumb of the awl hand to protect it from the thread when pulling stitches tight in combination with the awl haft.

Trenket The round knife which is the emblematic tool of the shoemaker; the collective noun for shoemakers.

References

- [1] I. Marc Carlson. Shoemaker pictures.
- [2] I. Marc Carlson. Lystyne lordys verament (with suggested translations). <http://www.personal.utulsa.edu/~marc-carlson/shoe/RESEARCH/DOCS/testament.htm>, 2001.
- [3] Olaf Goubitz, Carol Van Driel-Murray, and Willy Groenman-Van Waateringe. *Stepping Through Time: Archaeological Footwear from Prehistoric Times Until 1800*. Stichting Promotie Archeologie, 1 edition, 2001.
- [4] Francis Grew, Margrethe de Neergaard, and Susan Mitford (illustrations). *Shoes and Pattens*. Number 2 in Medieval Finds from Excavations in London. Boydell Press, London, 2 edition, 2002.
- [5] Brian Price. How a man shall be armed for his ease when he shall fight on foot. <http://www.chronique.com/Library/Armour/armyd1.htm>.

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