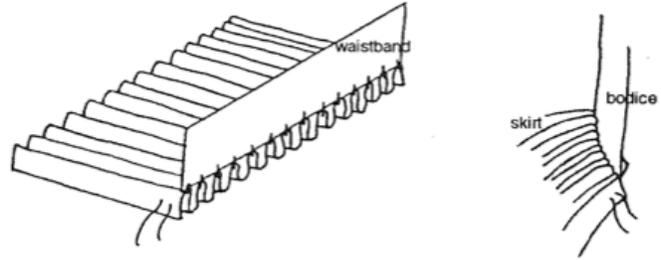


Taming the Cartridge Pleat

Cartridge pleating, or as it was known historically, **gauging**, can be used for many applications. One of the commonest uses is for skirts, which is the model we will be using in this handout.

Skirts can be handled in two different ways. You may choose to keep skirt and bodice as separate pieces, or attach the skirt directly to the bodice. Please note that cartridge pleating cannot be done by machine. If you try to machine stitch the pleats to the band, you will end up with tiny knife pleats, not cartridge pleats.



Instructions

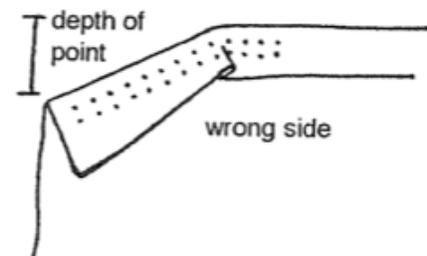
When you are cutting out your garment pieces, you will need to allow extra length to fold over at the edge that will be gauged. Plan ahead. The depth of the fold-over is variable, depending on your fabric; if you are putting in more than two rows of gathering stitches, because your fabric is heavier, you may want to make the fold-over wider. If your fabric is very lightweight, you may need to interface the folded-over part of the skirt. (Iron-on interfacing is not recommended for this.)

Finish the top edge of your skirt if the fabric is ravelly, but use a low-bulk method such as zig-zagging or pinking. It is better not to finish this edge at all; but whatever you do, **DO NOT HEM IT**, because this will make a ridge visible through the skirt. Fold over the top 2+\" once to wrong side, and press the fold. Do not sew this folded over section down; you do not want stitching to show on the outside.

If you are making the skirt and bodice separately, prepare the waistband. It should be a doubled strip of fabric sewn into a tube and turned, with the ends hemmed. Mark where the overlap for closure ends, taking the measurement over smock, stays, petticoats, etc. Mark where the bodice's dropped waistline will cross the bottom of the waistband, if your bodice has one.

If you have lined your skirt, you can just turn over the top as usual, or you can fold the seam allowances of both skirt and lining in $\frac{1}{2}$ \" , and sew them together; do not topstitch. Thereafter treat the layers as one. In this method, you will not need to allow extra for the fold-over.

If you want to attach the skirt directly to the bodice, and your bodice has a point in the front (or back), you will need to allow for this by folding over the top edge of the skirt in the center front (or back) at an angle. Measure the depth of the point beyond the waistline, and use that as a guide for how far down you need to fold this section.



Mid-Victorian and Elizabethan skirts are a little longer in the back than in the front, to accommodate the shape of the hoop or bumroll. In Regency gowns, the waist seam is often higher in the back than in the front. Take this into account as you fold over your top edge. The net result will not be straight across the entire top of the skirt.

Calculate how deep your pleats need to be.

1. To do this, measure the top edge of your skirt, exclusive of the part you are not going to pleat, and the bottom of the waistband or bodice, exclusive of the part that will not have pleats on it. (See below about not putting pleats beneath a dropped waistline.)

2. Make a sample *of the fabric you are going to use*, including any interfacings. Gather it up with two rows of stitching, pull the gathering threads snug, and measure how many pleats there are in an inch. It does not matter for this how deep the pleat is; it's just to get the thickness of the pleat. Count how many pleats there are per inch.
3. Multiply the measure of the WAISTBAND from step 1 by the pleats-per-inch. This will tell you how many pleats you need for the whole skirt.
4. Divide the measure of the TOP OF THE SKIRT from step 1 by this number, to get the depth of the pleat. The depth of the pleat is the same as the length of your stitch.

Example: The waistband is 28" and the skirt is 132" (three 45" panels). The sample gathers up to 8 pleats per inch. $8 \times 28 = 224$, so we need 224 pleats. $132 \text{ divided by } 224 = .59$, so that is the depth of the pleat and the length of the stitch.

This is not an exact science. You may find that you have to rip out and do it over. There is always a certain amount of variability in the sewing process.

Make marks to guide the gathering stitches, using a ruler and an appropriate fabric marker. The first row should be not more than 1/4" from the fold, and the second row 1/4 to 1/2" from the first row, depending on the weight of the fabric. The marks should be made on the inside of the skirt (on folded over area).

When you come to a seam, try to make sure that it falls toward the bottom of a pleat; it's nicer if the seam doesn't show at the top of the pleat. Don't worry if that means one pleat isn't the same size as all the others; it won't show on the outside.

Alternative methods of marking:

Face the top of the skirt with a two-inch strip of 1/8-inch gingham, and use the squares to guide your stitches.

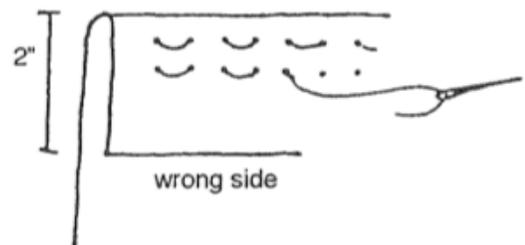
If your skirt is a regular plaid or check, use the pattern in the fabric to guide your stitches.

Tiger Tape is a removable, repositionable adhesive tape with regular marks on it. Use the 9 lines-per-inch type.

If you are confident of your ability, you can eyeball the gathering stitches!

Put the gathering stitches in the skirt **BY HAND**, using a strong thread of a **MATCHING** color (such as buttonhole twist or carpet thread) and a running stitch through both layers.

Start and end the stitching on the wrong side; if your fabric is loosely woven, instead of tying a knot, tie the thread through both holes of a small button. This will prevent the knot popping through the fabric. The button is not a period method, but is sometimes helpful. Stitch very evenly; it is important to have the two rows of stitches march exactly together. When you start the second row, attach the thread again to the same button. If your gown has a dropped waistline, and the skirt is separate, start at the place where your bodice's waistline crosses below the skirt's waistline, as you do not want to have cartridge pleats under the point of the bodice -- it is very uncomfortable.



If you are adept with a needle, you can thread two needles and put in two rows at once. This takes a little practice, but saves a lot of time!

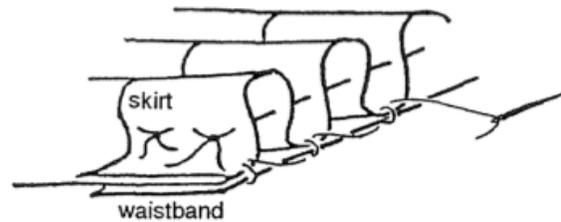
Mark the quarters and eighths on both the waistband/bodice and the skirt.

Pull up the gathering threads to reduce pleated area of skirt to waist measurement. Do not trim or tie off gathering threads yet. Lay the skirt on the waistband (or bodice) right sides together, and match the quarter and eighth marks you made earlier, pinning them together. Adjust pleats so they are evenly distributed along the band excluding the waistband overlap and area under the bodice point. Pin waistband/bodice to the skirt at intervals; you don't need to pin it to death. Tie off gathering stitches temporarily with a slip knot.

At this point, you will be able to see if your pleats are the right depth. If they are too large, there will not be enough pleats to fill the space on the waist comfortably. If they are too small, they will be crowded. You may have to rip out the gathering and do it over; it happens.

Sew the skirt to the waistband or bodice using a doubled thread or a heavy thread in a matching color. Wax your thread and iron it between two paper towels before you start stitching. This will smooth and strengthen the thread.

Stitch **BY HAND**, at least two stitches through each pleat, catching both the top of the pleat and the edge of the band. The stitch will bite in about 1/16th of an inch on both pieces. Take a second stitch in the same pleat, then move on to the next pleat. The stitches will have a saw-tooth appearance, alternating a vertical stitch and a diagonal one. This is the make-or-break point for making your pleats even; keep your diagonal stitches a consistent length as you move from one pleat to the next. Also stitch the waistband to the part of the skirt that is not pleated, whipping them together. A thimble is helpful here, especially with heavy fabric. **DO NOT REMOVE THE GATHERING THREADS; THEY ARE PERMANENT.**



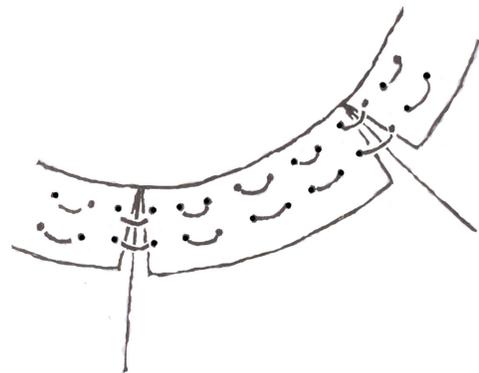
When the stitching is all done, lay the skirt out flat in a single layer so that the waistband or bodice forms a standing circle in the middle. Untie the temporary knot in the gathering thread, and release tension on the threads so that the pleats spread at slight angles to each other, allowing them all to lie flat, in a sunray pattern. If this is not done, the threads, which are all the same length, will force the gathered part of the skirt to be a cylinder, not a cone or disk. Tie the final knot in the gathering threads securely, passing them first through another button if you need to. You may trim off the excess thread if you will never need to alter the skirt; otherwise, wind the excess thread up neatly and tack it to the inside of the skirt. That way, should you need to let out or take in the skirt, you are ready to go. Note: The gathering threads should be tied to each other at both ends; a knot in the end of the thread will be likely to slip through the fabric eventually.

You will sooner or later encounter instructions for gauging that require you to secure both the top and the bottom of each pleat. This is not historically accurate, and causes the pleats to hang much more stiffly and less attractively. Don't go there.

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Cartridge Pleating a Gored Skirt

Yes, it is possible! The only difference in the procedure is that when you are marking your gathering stitches, the marks in the outer row(s) may be a tiny bit farther apart than those in the first row. You may need to release the seam in the folded over area. You may need to fiddle with the placement of the marks a little, but don't worry; if the pleats are not all exactly the same size, it will not be noticeable.



Partially Cartridge-Pleated Skirts

Regency and mid-Victorian skirts were often gauged for only a few inches at the center back, and the rest of the skirt was either gathered or knife-pleated. This presents a challenge where you switch from one sort of pleats to the other, because in the gauging, the top of the fabric is folded down, and in the knife-pleats, it points up, and is enclosed in the waistband.

The best way to arrange this is to make sure a seam falls at both edges of the gauged area. Cut the center-back panel(s) a few inches longer than the others, to provide the fold-over, and don't stitch the seam in the seam allowance. Put in the gathering stitches as above in the gauged area, then do the knife-pleats. Sew the knife-pleated areas into the waistband first, whip the band closed over them, sew the center back part of the band closed at the bottom, and then draw up the gathering threads in the gauged area. Stitch the gauging to the waistband as above, but be sure to catch both folds of the waistband with your needle.

If you cannot arrange the panels this way, you will need to cut the top of the panel with a step-shaped outlet for the gauging, and snip the seam allowance to the stitching line where the pleats switch from knife to cartridge. Take a couple of supporting stitches across the bottom of the snip to strengthen the spot.

If your fabric is thin, and your knife pleats are not overlapping a lot, you can use a third method. Do your gauging, and pin your knife pleats, then fold the top of the knife-pleated portion to the inside. Whip the folded edge of the knife pleats to the finished waistband, catching all thicknesses of the fabric. The knife-pleated part will have a raw edge on the inside just like the gauged part.

Padded Pleats

You may wish to pad your pleats, depending on the characteristics of your fabric and the amount of yardage you want to put into the pleated area. The procedure is the same, except that before you start putting in the running stitches, you will place a strip of padding fabric under the fold-over at the edge to be pleated. Make the strip a little bit wider than the fold-over; this will make less of a "break" at the edge of the fold-over, making the skirt hang more nicely. What you use to pad the fold-over will depend on how fat you want the pleats to be. Flannel makes a good padding for a light-weight fabric, and if you want more, you can use Polar Fleece.

With padded pleats, your running stitches will need to be a little longer, as there are fewer pleats per inch. Make a sample first!

When you are stitching the skirt to the bodice or waistband, don't worry about catching the padding in the stitch; the running stitches will keep it in position.

I have a Cartridge Pleating board on Pinterest if you would like to see more images of cartridge-pleated garments from many periods:

<https://www.pinterest.com/staffordcastle/cartridge-pleating/>