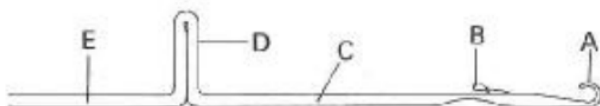
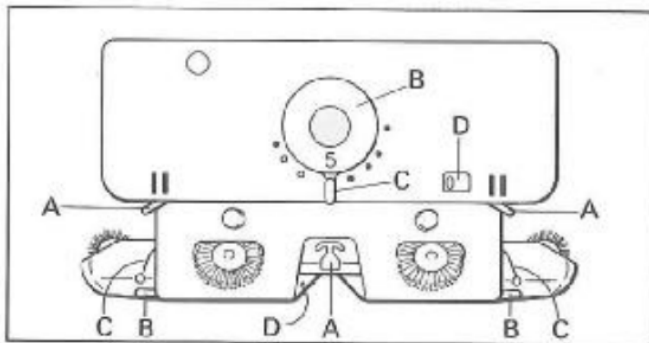
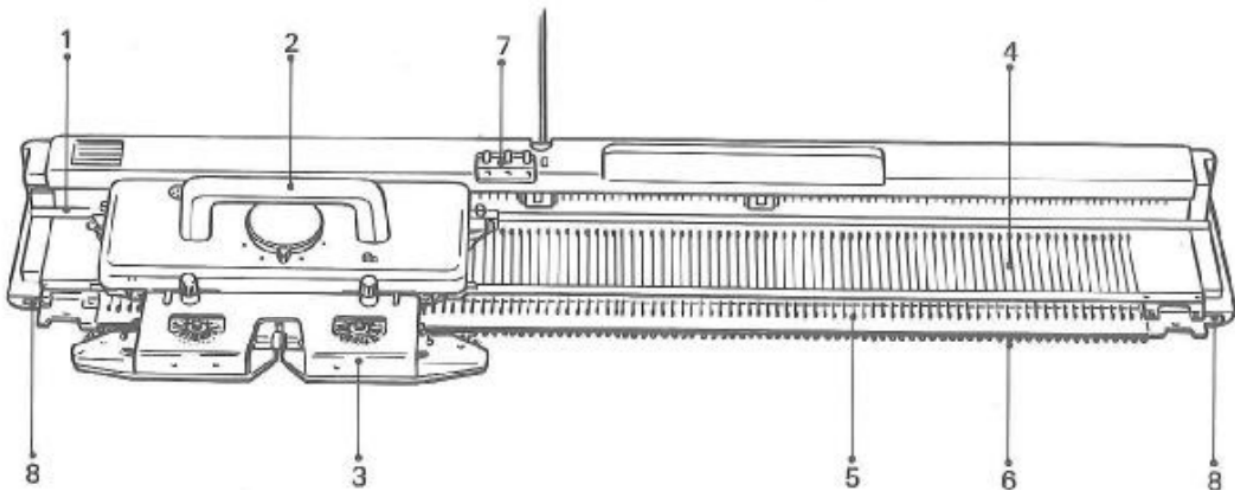


# Basic Skills and Techniques

This page gives an overview and step-by-step instructions for some basic skills and techniques from the knitting machine induction. If you have not completed the induction, do not use this page to try to use the machine, you must have been inducted first.

These methods are all also described in the knitting and operation manuals which you can find in the eTextiles Lab.



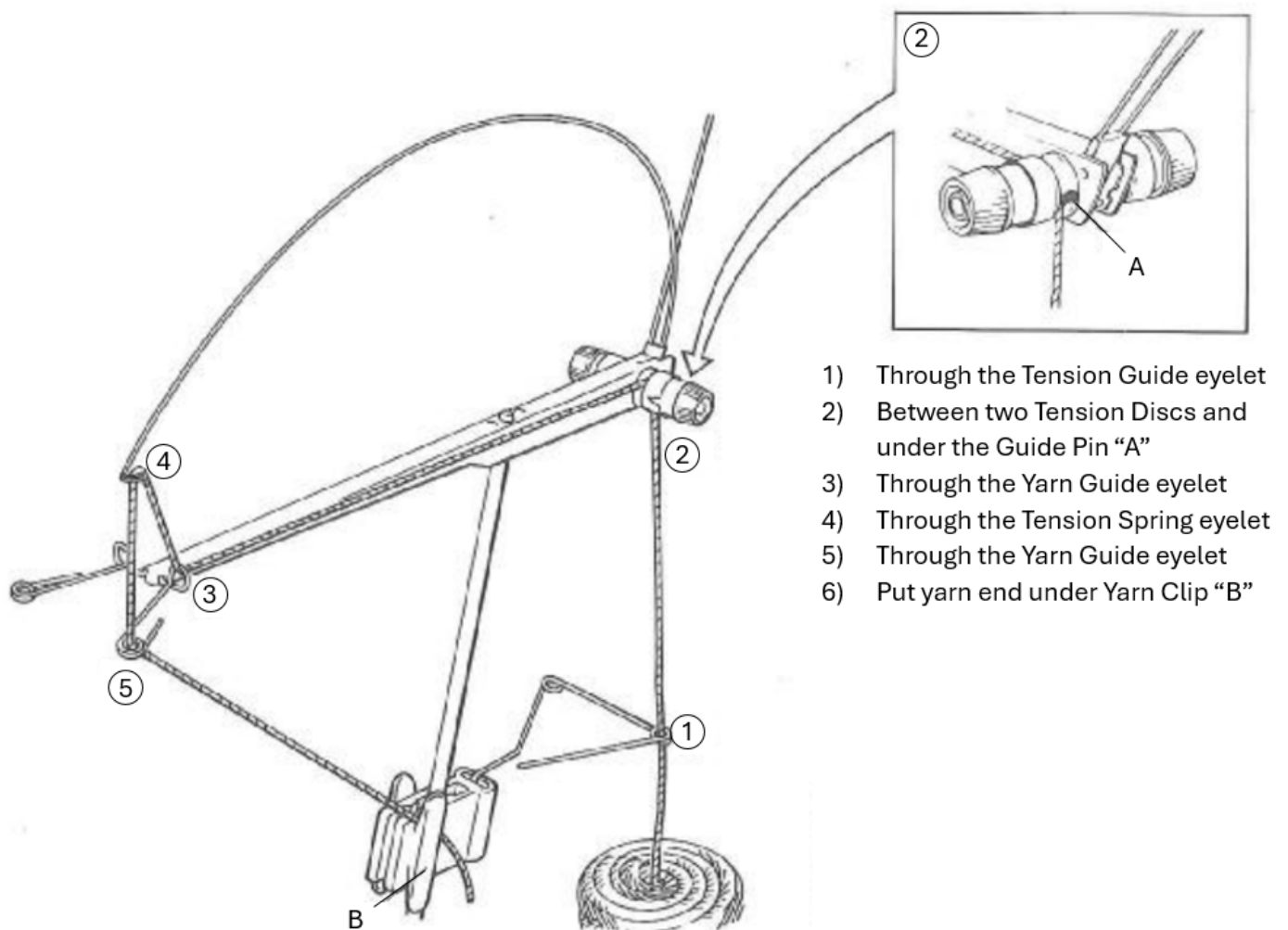
1. Rail
2. Carriage
  - A — Russol Levers
  - B — Stitch Dial
  - C — Cam Lever
  - D — Release Lever
3. Arm
  - A — Yarn Feeder
  - B — Weaving Knobs
  - C — Weaving Yarn Holders
  - D — Yarn Cutter
4. Needle Bed
5. Latch Needle
  - A — hook
  - B — latch
  - C — stem
  - D — butt
  - E — shank
6. Sinker Post
7. Row Counter
8. Yarn Clips

# Contents

1. Threading the machine
2. Casting on
3. Casting off
4. Increases and decreases
5. General advice and debugging

## Threading the machine

To thread the machine, follow the instructions and diagram below.



Note: the threading mechanism in the diagram can only be threaded with 2 different yarns whereas the one on the knitting machine in the e-textiles area can be threaded with 4. This means that there are two paths that the yarn can take on either side of the post as opposed to just one. Try not to cross the yarns over when threading more than one colour on one side, keep one on the inside path and the other on the outside.

## Casting on

Before beginning a piece we must first 'cast on' which creates the first row using a special stitch that stops the piece from unravelling.

There are many cast on methods but the main two (and the ones taught in the induction) are:

1. Weaving cast on: this is the easiest way to cast on but leaves a messy edge and is recommended only for prototyping and sampling, not for a final project.
2. E-wrap cast on: this is slightly more fiddly but leaves a nicer and neater edge.

Whilst knitting the first few rows, there won't be enough material to hang the weights. This means that you must be especially careful that each stitch has fully looped through, and doesn't slip off. Some way to make sure of this are:

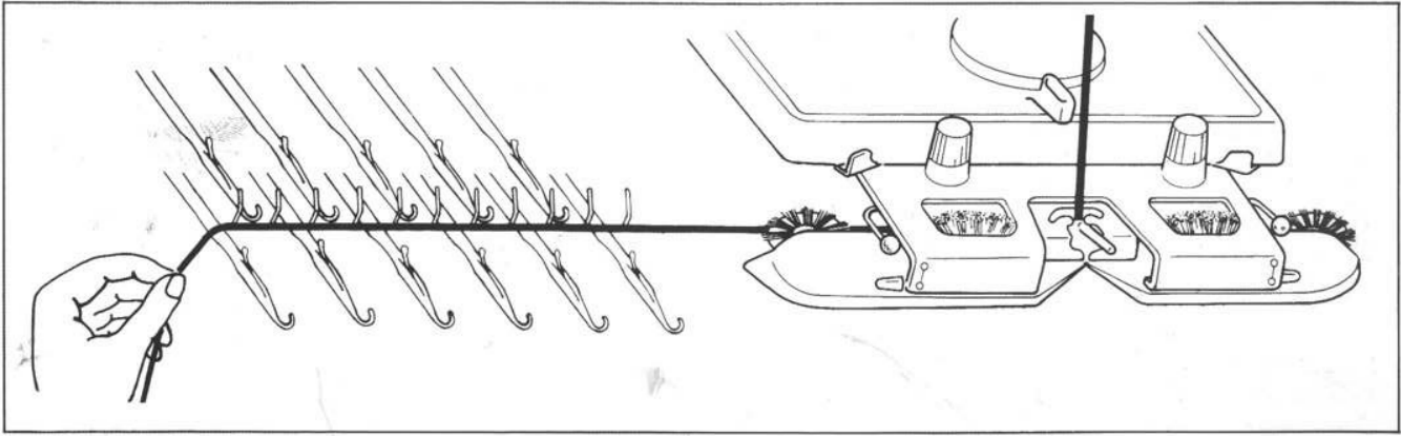
- The brushes **MUST** be down during casting on. These push the yarn down into the needles, reducing the chance of them slipping off.
- After each row, use your hands to pull down slightly on the knitted rows under each stitch, making sure that there is only one loop of yarn on each needle. If there is two, you can manually move the needle to knit the stitch that has not been fully completed.
- If you only have a few rows knit and encounter a large problem, such as a big loop of yarn has formed or multiple stitches have not threaded properly, you can try to fix it but don't be scared to just restart and try again. It is not uncommon to have to cast on multiple times before you get it right as this process, and the first few rows, can be the most delicate part of the whole process. If you are repeatedly having problems with your cast on, check in the [debugging section](#) of this page for some tips.

It is generally easier to start the cast on with the carriage on the side of your dominant hand. If you find this difficult, try the other way around and see what feels best to you.

## Weaving cast on

This is the easiest method on the Silver Reed, though has the downside of leaving a slightly scrappy-looking edge. It's great for quick sampling, though. For a video explanation, [this](#) is a good reference.

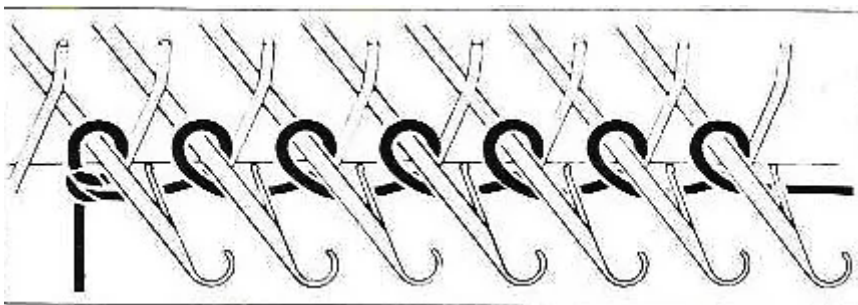
1. Pull the needles you wish to knit with into D position (all the way forward).
2. With no yarn in the carriage and the ravel levers set to II, run the carriage across the needles to move them into B position. End with the carriage on the side of your dominant hand.
3. Pull every other needle forward into D position.
4. With the machine and carriage threaded, hold the end of the yarn in your non-dominant hand and lay it across the top of the needles.
5. Knit a row. Make sure that as you run the carriage across the needles you are not pulling on the end of the yarn but just holding it and allowing the carriage to pull it in as it knits.
6. Knit a second row to complete the cast on.



## E-wrap cast on

This is a cast on technique common to all knitting machines, and is the "official" method that will give you a neat edge. There is a detailed guide [here](#) as well as the instructions below.

1. Pull the needles you wish to knit with into D position.
2. With the machine threaded (but the yarn not through the carriage) and the carriage on the side of your dominant hand, create a slip knot in the yarn and loop it around the first needle on the opposite side to the carriage. Wrap the end of the yarn around the nearest clamp post.
3. Starting with the needle furthest from the carriage, hold the end of the yarn in your non-dominant hand and use your dominant hand to wrap the yarn under and around the needle. If you are right-handed, this will be the same motion as drawing a lowercase e (hence the name e-wrap), see the picture below.
4. Use your non-dominant hand to push the stitch up to the sinker posts.
5. When wrapping the next stitch, use your non-dominant hand to hold the previous stitch to make sure that the wrap is not too tight.
6. Continue this, wrapping each needle individually until you reach the last one.
7. Run the yarn under the carriage and through the gate.
8. Knit a row.

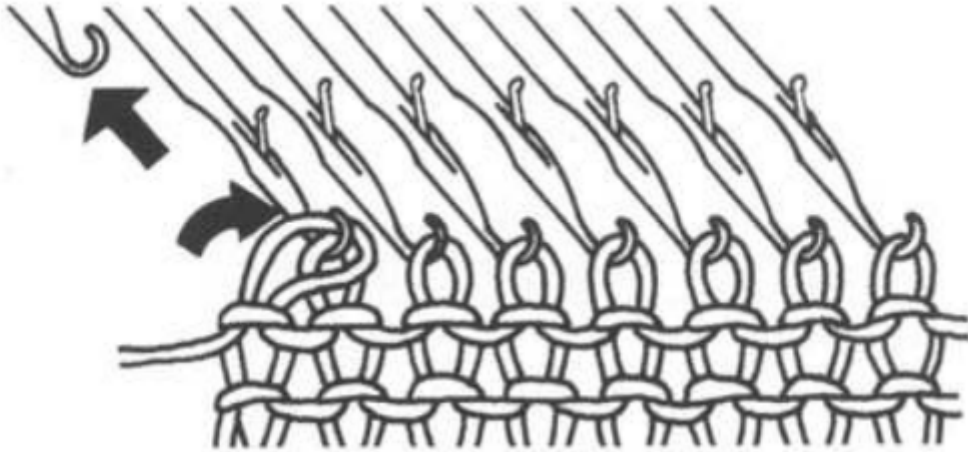


Note: You want to make sure that the stitches are not too tight which can happen as there is tension on the yarn from the threading mechanism. If you are finding this difficult, pull a long length of yarn through then use the white yarn clip to hold it whilst you cast on. This will eliminate the tension and stop the yarn from tugging.

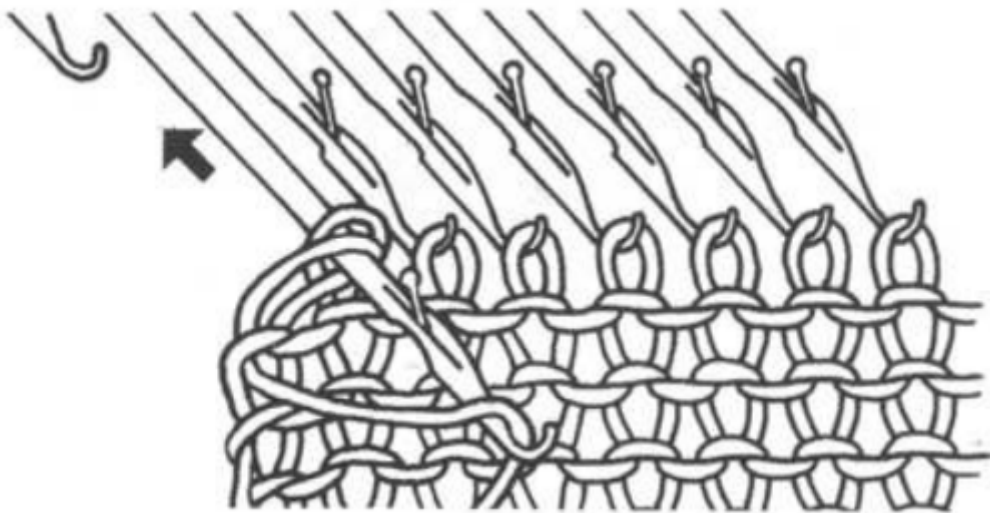
# Casting off

After a piece has been completed, we need to cast off to stop it from unravelling.

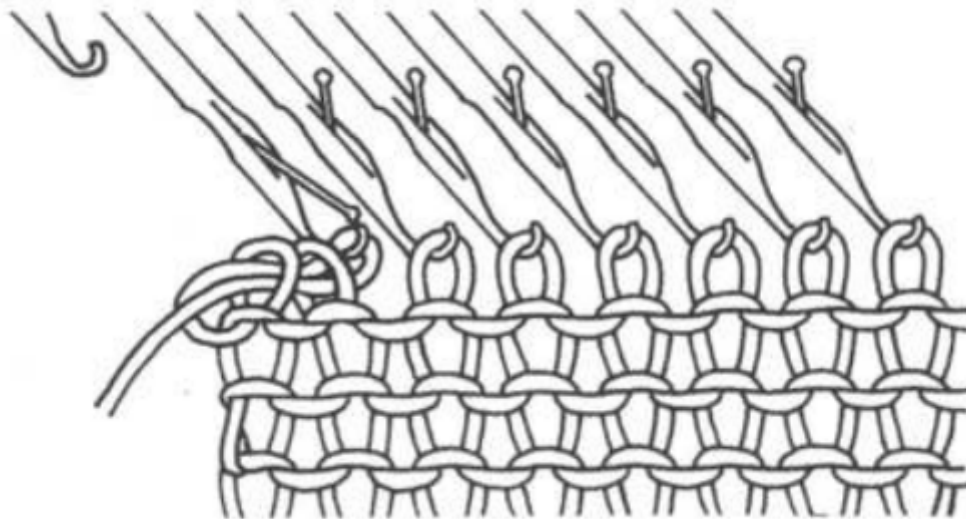
1. Remove the yarn from the carriage and measure a length approximately 4x the width of your project then cut.
2. On the side of the carriage, use the transfer tool to pick up the outermost stitch and move it one needle inwards (either moving behind or in front of the sinker posts).



3. Push the needle now holding two stitches into D position, making sure both loops are behind the latch.
4. Loop the working yarn over the needle, ensuring that it is laying in the needle hook (one way to help with this is to loop it over then hold the end out parallel with the needle).



5. Using your hand, manually push the needle back into B position, looping the working yarn through the two stitches.



6. Repeat steps 2-5 for every needle until you have only one stitch left.
7. Pull on the last loop so that the end of the yarn is brought through, leaving no more loops and a secure piece.

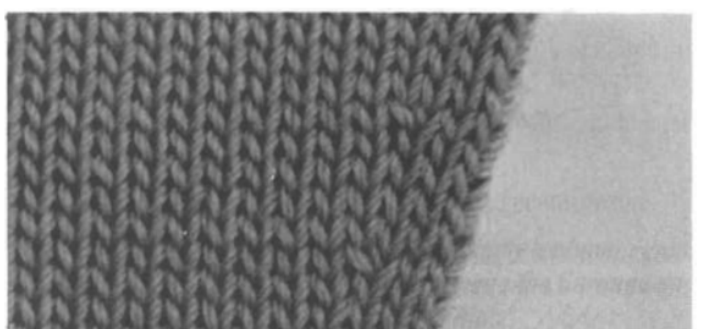
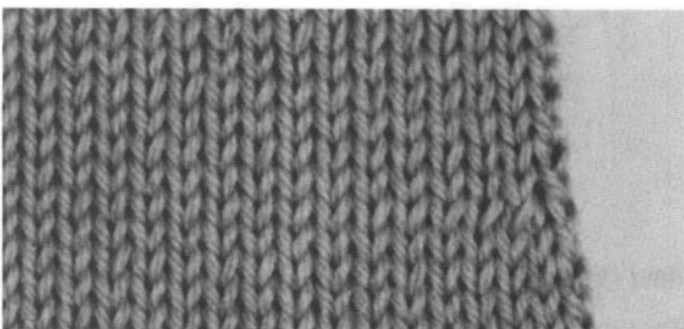
Note: when completing step 2 (moving the stitch inwards), you can either pass it behind or in front of the sinker posts. Passing it behind is more fiddly (it's very easy to drop stitches whilst doing it) but leaves a neater, more even edge. The first couple of times you cast off, go in front of the posts and when you feel more comfortable with that, try going behind. If passing behind the sinker posts, once casting off is done, pull the piece off of each post carefully to finish.

## Increases and Decreases

In order to knit a piece that isn't the same width the whole way, we have to be able to increase or decrease the number of needles we are working with. There are two ways to do each of these which are used for increasing different numbers of stitches and leave slightly different edges.

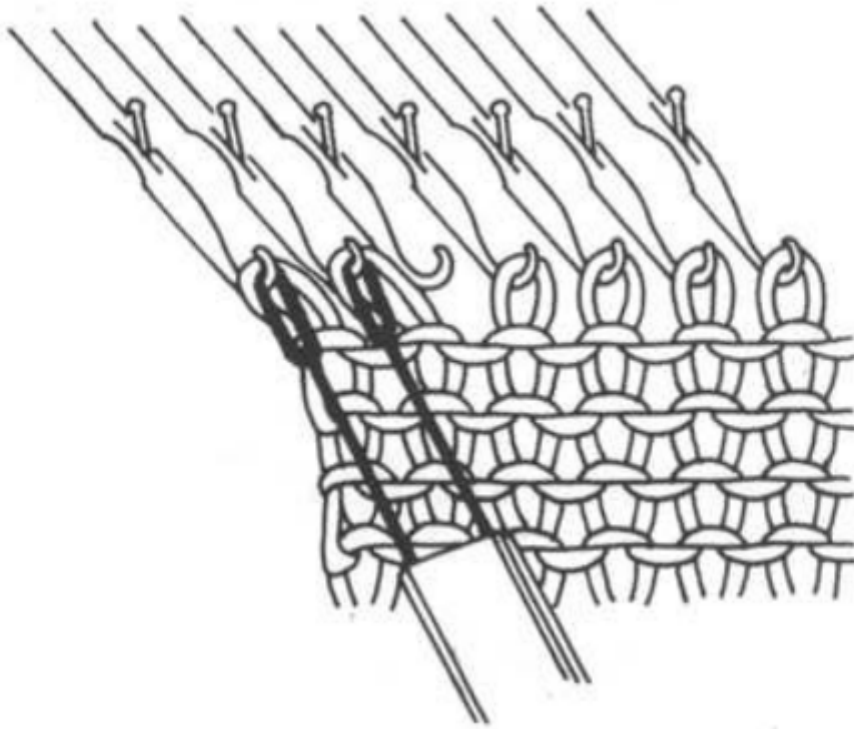
### Fully Fashioned

This method is used for increasing/decreasing 1 needle and can be performed at either side of the piece. This will leave a smooth edge (as seen below) as the outer stitch does not change.

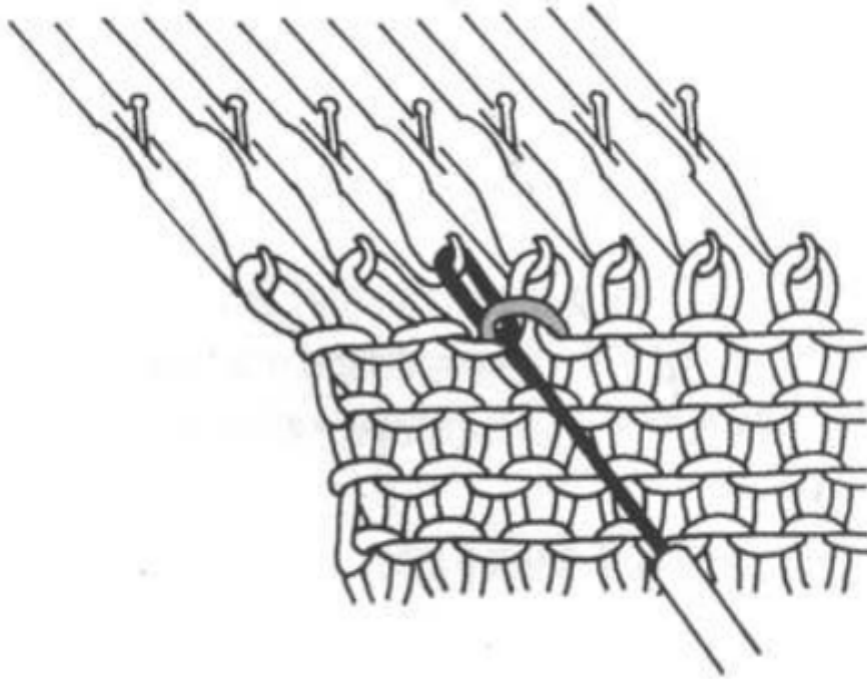


## Fully fashioned increase

1. Use the transfer tool to pick up the outer two stitches on the side that you want to increase.
2. Move these stitches one needle outwards, leaving the third needle from the edge empty.



3. Use the transfer tool to pick up the horizontal 'bar'/loop from one of the stitches adjacent to the empty needle and hook that on to fill the gap (This step stops small holes from forming due to the empty needle, however it can be quite fiddly so if you are just prototyping/sampling and want to be fast, you can skip it).



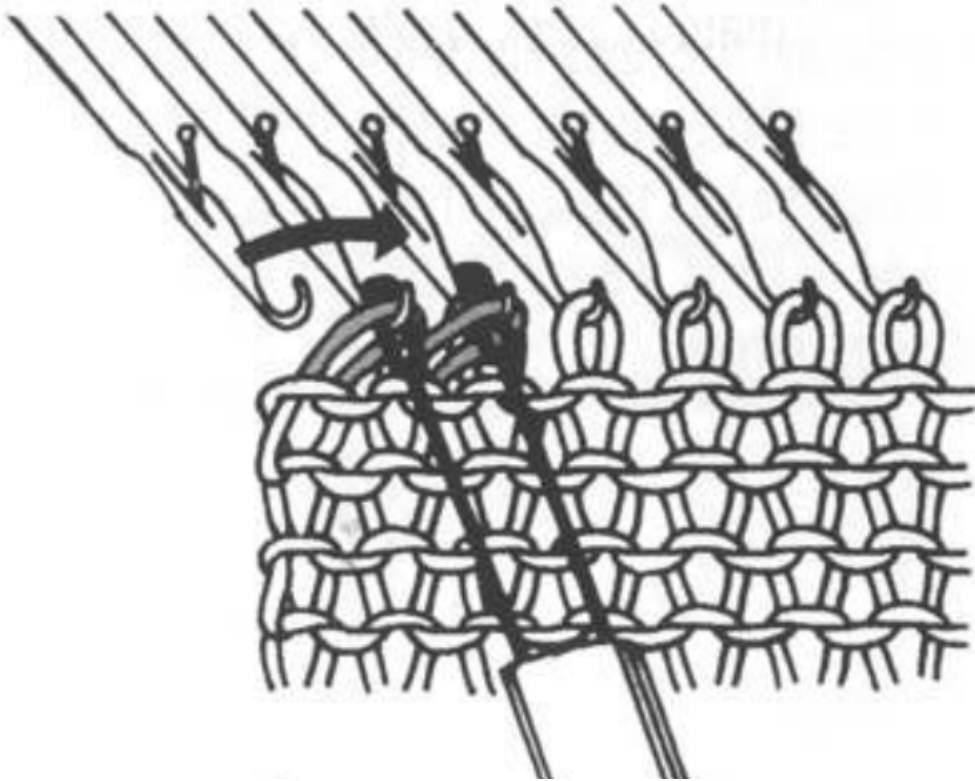
4. Continue knitting.

## Fully fashioned decrease

1. Use the transfer tool to pick up the outer two stitches on the side that you want to decrease.



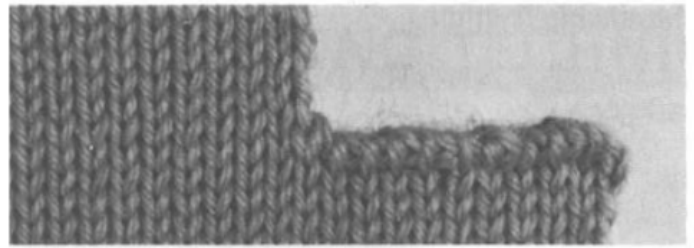
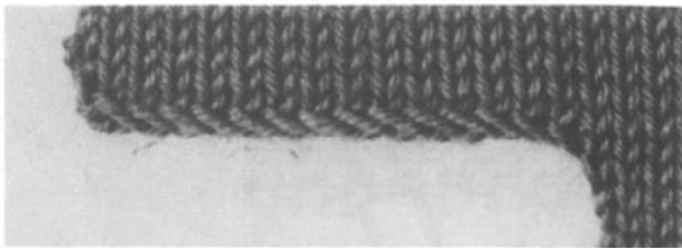
2. Move these stitches one needle inwards, leaving the outermost needle empty.



3. Push the empty needle back to A position.
4. Continue knitting.

## E-wrap increase/cast off decrease

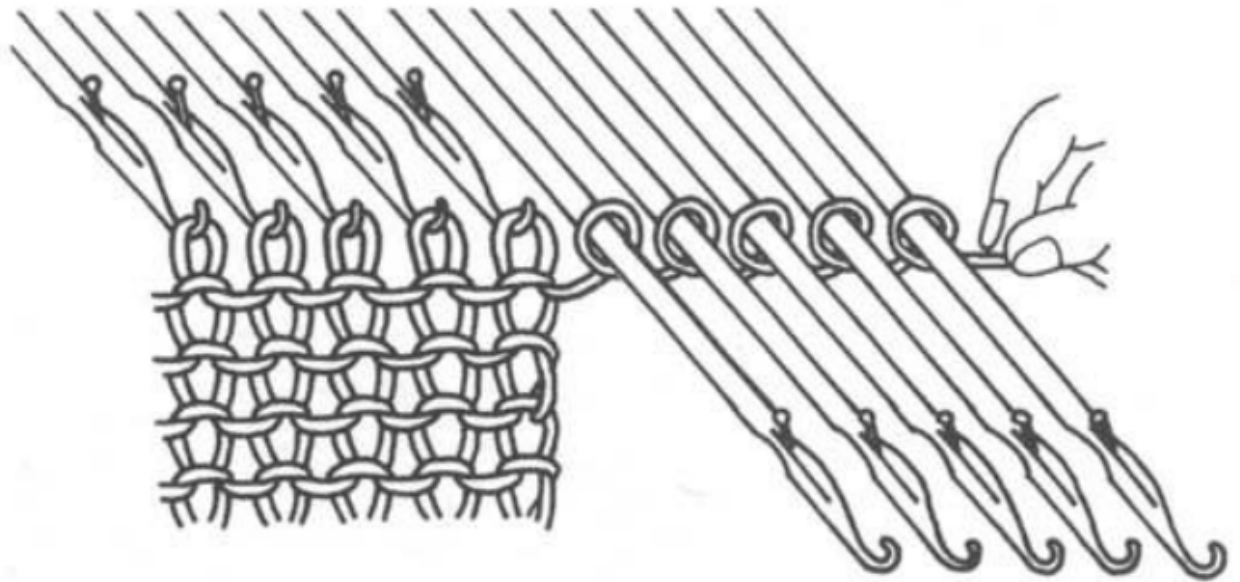
These methods are used for increasing/decreasing by a larger number of stitches and can only be performed on the side closest to the carriage. These will both leave a right-angle like shape (as seen below) as the outer stitch is changing.



## E-wrap increase

This is essentially the same as the e-wrap cast on so make sure you are comfortable with that before trying this.

1. On the side closest to the carriage, pull the number of needles you want to increase into D position.
2. Using the same method as the e-wrap cast on, wrap the yarn under then over each needle in turn.



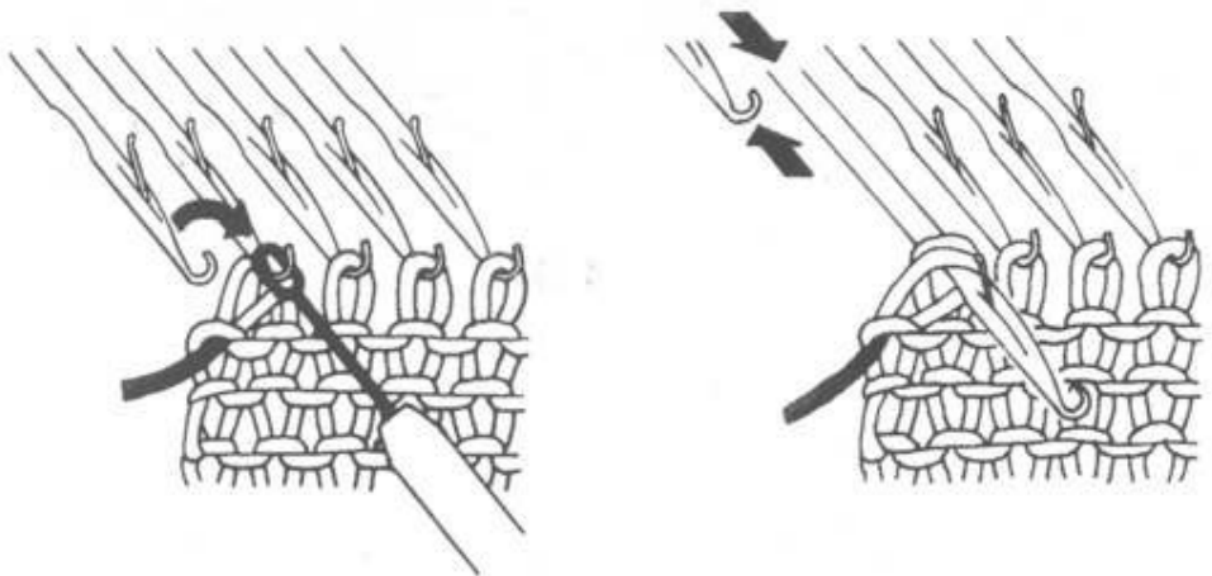
3. Make sure the working yarn is back through the carriage, then continue knitting.

Note: when using this method, treat the new needles as you would a proper cast on, checking each stitch and pulling them down after every row.

## Cast off decrease

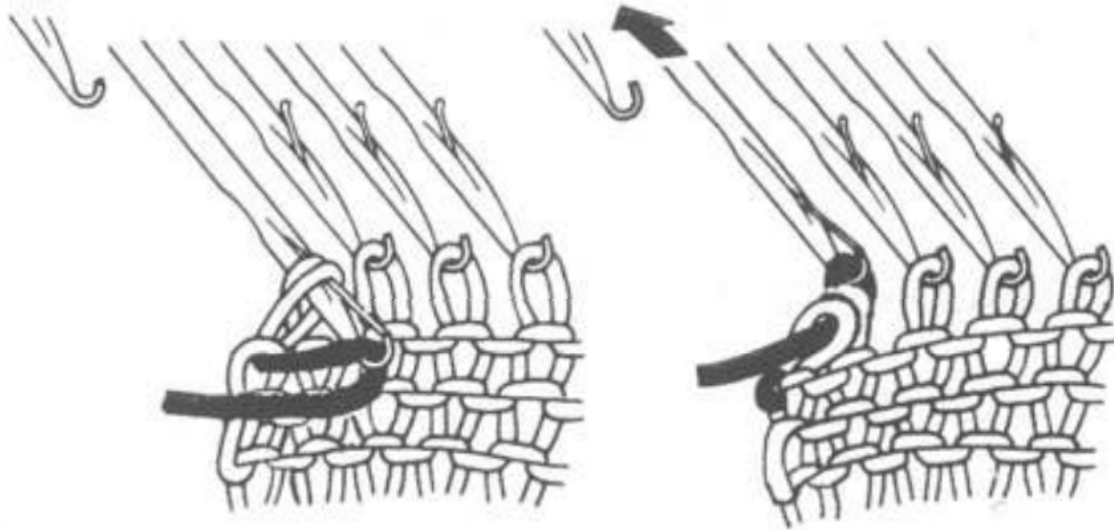
This is essentially the same as casting off so make sure you are comfortable with that before trying this.

1. On the side of the carriage, pick up the outermost stitch and move it one needle inwards.
2. Push the needle now holding two stitches into D position, making sure both loops are behind the latch.



3. Loop the working yarn over the needle, ensuring that it is laying in the needle hook (one way to help with this is to loop it over then hold the end out parallel with the needle).

4. Manually push the needle back into B position, looping the working yarn through the two stitches.



5. Continue this for each needle that you want to decrease, pushing each empty needle back into A position.

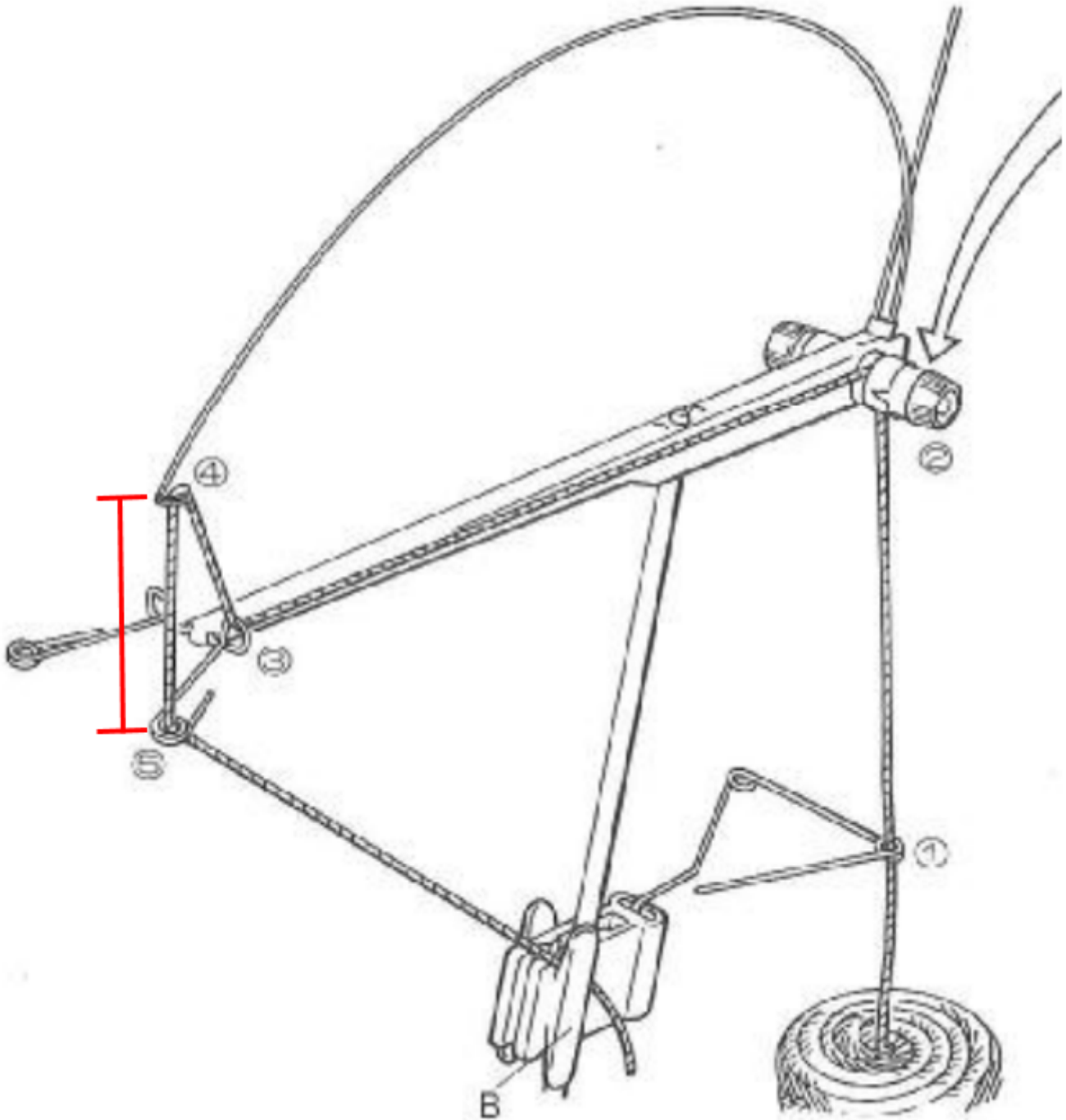
Note: like for casting off, you can either pass the loop behind or in front of the sinker posts. If passing behind, knit a few rows, then pull the cast off stitch off of the sinker posts before continuing. To make sure you don't drop any stitches in the process, push a few of the needles on the side of the decrease into D position first.

## General Advice and Debugging

Like with coding, sometimes there is a problem with your knitting and you can't immediately see why. Here is a small list of things to check when you are having issues.

### 1. Tension

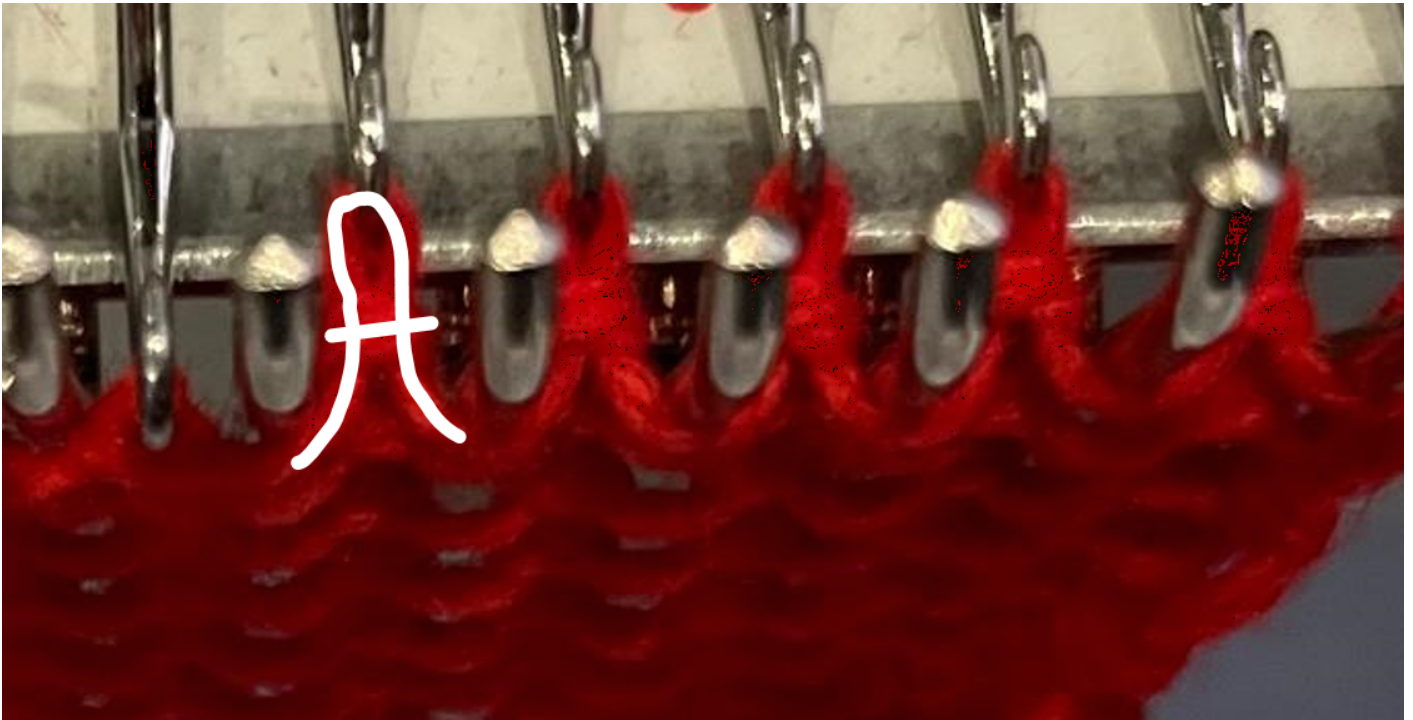
Tension is very important when knitting and is the cause of a lot of problems that can occur. It is controlled both by the dial on the carriage and the threading mechanism. Check that the carriage dial is not set too high or too low (generally we want it to be set at around 6) and that the gap between points 4 and 5 on the picture below is around 10-20cm.



Make sure that the yarn has an easy and clean path from the reel to the needles, that there is nothing getting caught and that the reels are placed directly under the yarn feeder.

## 2. Loops on the needles

In order to properly knit the next row, each stitch from the previous row must have been fully looped through. When looking down on each stitch, it should form an 'A' shape (see picture below).



If the stitch is missing the horizontal bar, then the stitch has not been properly looped meaning that there will be two loops of yarn over the needle. One of these is the stitch from the previous row, which will be tighter and further back on the needle, and the other is the new stitch, which will be looser and further forwards. To remedy this, do the following step:

1. Using your hand, push the needle into D position.
2. Slowly push it away from you making sure that the new stitch goes over the latch and into the hook and the old stitch stays behind the latch.
3. Fully push it back, looping the new stitch through the old one.

### 3. Weights

The weights should ideally be within the 5-20cm range below the needle bed and placed right at the edge of the piece. To add additional weight, you can pull down gently on the weights as you slide the carriage across.

### 4. Carriage settings

Are you using the right stitch? Are the russel levers in the correct position? Is there yarn in the carriage?

## Casting on

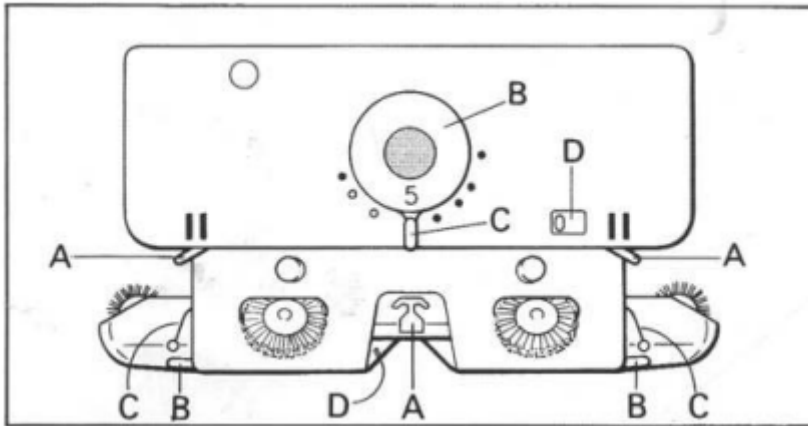
For casting on specifically, here are a few things to check:

- Make sure that the brushes are DOWN.
- If you are doing an e-wrap cast on, make sure that your loops are not too tight.
- Check that the tension on the carriage is not too high or low. For a cast on, it is recommended for the tension dial to be set at around 6.

- Check that the needles aren't bent. This can cause problems generally but especially with the cast on. If this is the case, inform a technician and, if possible, move down the bed and work with a different section of needles.

## Stuck Carriage

The carriage sometimes requires a fair amount of force but it is gets properly stuck, don't try to force it! This can bend or damage the needles. If this happens, there is a release switch is on the bottom right of the carriage (shown below as **D**) that will lift it up and allowing it to be moved to the side.



After resolving whatever tangle you found yourself in, check the above debugging points to try to prevent it from happening again.

happy knitting! :)

Revision #7

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