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**5 MIDGAUGE
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PATTERNS**

MACHINE **KNITTERS**

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Sharon Nari
21050 Scheer Dr
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Learn what a
Knitters
Checklist and
how it can
help you knit
on any brand
machine.

by
Sharon
Nani

NOTHING NEW UNDER THE SUN

A Look at the CSM Part III

This is the 3rd article in my series comparing the mechanical features and functions of CSM's (circular sock machines) and Flat Bed Knitting Machines (Passaps, Brothers, Studio, and Artisans). To avoid duplication of the explanation on how I am conducting this comparison, please refer to my two previous articles: *Nothing New Under the Sun, parts I and II, in MKS: issues 100 and 101*. Comparisons of the 'Tension and Weight Systems' were covered in those issues.

When I teach a new student on a flat bed machine, I tell them to always mentally and physically set up their machine in a precise manner. This 'programming procedure' gets them in the habit of checking everything in order, thus giving less chance of forgetting a step. As all knitters of any kind of knitting machine quickly find out, "forgetting one step causes great grief!" I call this "The Knitters Check List". This is kind of like an airplane pilots pre-flight checklist. I include my Passap list at this time as a format that I will follow as I continue with the comparisons.

Passap Knitting Machine Check List (note this format would be used for all knitting machines, just substituting the correct 'term' for your machine. Check the Terminology Comparison Tables for your machine.)

I. Tension System:

Thread each **yarn** properly, making sure that the yarn will flow properly.
Program **Color Changer**.

II. Set up Needle Beds: (always go left to right as if reading the pages of a book)

Is the **Racking Handle** supposed to be down or up for this pattern?

Set up the proper number of **needles** for casting on or beginning the project. Going from left to right, first bring the front bed needles to working position. Then bring the back bed needles to working position in relationship to the front bed needles. Remember to follow needle rule.

Put on the **edge springs**. Make sure that the latch is closed under the edge spring.

Set up the **pushers** if used in the pattern. Again going left to right, first the front bed, then the back bed.

III. Set up the Locks (first the front, then the back)

What **Strippers** are used in this pattern? Stripper rules:

Use Orange Strippers when using needles on both beds (except - see black stripper)

Use Black Strippers when:

1. Using needles on only 1 bed.
2. Tubular or Half Tubular Knitting
3. When knitting a pattern using needles on both beds, but where there are 2 or more adjacent needles in the out of work position.

What is the **N/X Lever** and **Pattern Selector Dial** set to?

What is the **Stitch Size Regulator Dial** set to? (Single bed knitting must be stitch size 5 or larger, double bed knitting is usually between 3-6, depending on the size of the yarn).

Is an **Arrow Key** being used? If so depress it.

Note that part I of the checklist was explained in the previous 2 issues. Now, I continue with the "Needle Bed" Category. Part II on my 'checklist'. For simplicity, I will use auto knitter terms for the CSM in Bold. For the flat bed machines, I will use Passap terms in parenthesis and holding position (Japanese) machine terms in brackets where appropriate. Refer to the "Terminology Table" for all other term comparisons.

The first term in the checklist is 'needle bed' itself. Quite simply, the needle bed is that part of the knitting machine that holds the needles. The CSM's have **cylinders** (front bed) [main bed] that have slots or channels in them where the latch needles are placed. Cylinders came in different sizes dependent upon the brand of CSM's, size of needle, and the size of yarn that was to be used in that cylinder. For example: my auto knitter only came with a cylinder with 60 slots and 12 gauge needles. Although, the manual says that cylinders of 60, 80, 100 and 120 were available, with needle gauges of 12, 18, and 36. My LeGare came with a 54 and a 72 cylinder and 10 and 12 gauge needles. Domestic Flat bed machines come in fine, standard, mid, and bulky needle beds with needle gauges appropriate for its machine - same relationship - different terms! Theory wise, all the cylinders that came with a CSM had to be interchangeable in the same 'cam shell', and therefore, they are roughly the same size in diameter for their respective machine.

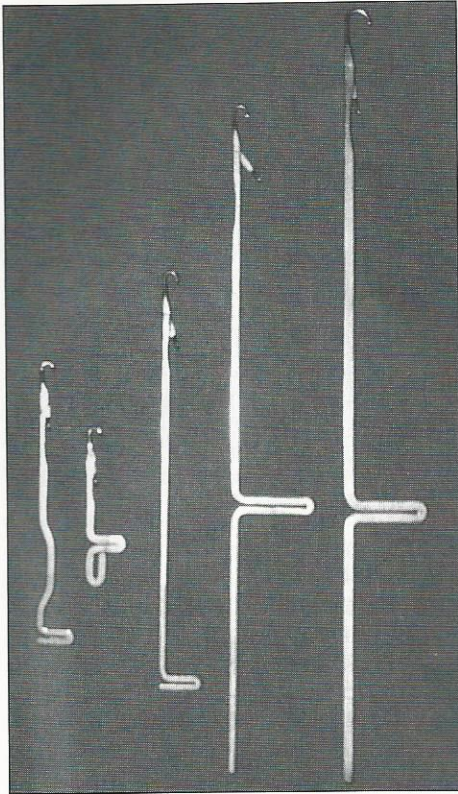


Figure 1: Left to Right - CSM cylinder ndl, CSM ribber ndl, Passap ndl, Brother standard ndl, and Brother Bulky ndl.

Auto Knitter cylinders were listed at 4.5" in diameter. Therefore, the more slots, the closer together the slots had to be and thus finer yarn was used in cylinders with more slots. The Gearhart CSM's had a larger range of cylinders and needle sizes dependent upon the time of manufacture. See Figure 1. It shows a comparison of CSM and Flat Bed latch needles.

The important thing to understand for the CSM's is that all needles must be of the same size to work properly together in their cylinder. Mine were mixed up, and I had to carefully examine and exchange nds until they all matched. Remember these machines are old, and previous sellers may not have been aware of the slight cylinder and needle size differences when they assembled the machine for sale. On this same note, I want to comment that since mechanical precision was not as accurate in the manufacturing time of these machines, if the machine parts were intermixed with other machines, even of the same kind, they might not work or fit well, and therefore, need 'restoring and altering'. So if you are in the market for a CSM, I highly recommend that you do your research. Refer to the footnotes in part I of my series for good sources of information.

See Figure 2: it shows my LeGare 54 cylinder. For photography purposes, I have removed the cylinder from its cam shell. Note that the needles are held in the chan-

nel by means of a **cylinder clasp ring** (brake spring) [sponge bar]. This spring or sponge bar is critically important. Its purpose is to hold the needle down and keep pressure on it as it moves to receive yarn, and to keep it in the proper position for the shaping or patterning function that you are trying to achieve. I will discuss these needle positions more in a future article when I write about fabrication comparisons. See Figure 3: Passap brake spring and front bed and Figure 4: holding position machine sponge bar and ribber bed. Since you cannot visually see the brake spring and sponge bar, which are inside the needle bed, I have placed one on top of the spot where they are positioned for photography purposes. It is also extremely important for the CSM and Passap which have 'springs', that the needles are removed or changed properly so as not to hook and distort your spring because it will not function in that spot if you do. Refer to your manuals for the proper procedure!

Let's take a look at the checklist again and see that the term "Racking Handle" is next on the list. The function of a racking handle is to position the needles of the dial (back) [ribber] bed in relationship to the cylinder (front) [main] bed so that the needles do not crash into each other as they both move forward to receive new yarn to form new stitches. So, now, we have the cue that we have added the element of a 2nd bed of needles. By adding a 2nd bed, we now have the ability to create purl sts on the ribber dial while knit sts are formed on the cylinder or main bed simultaneously. These needles are opposite of each other and must move in perfect unison (or timing) in opposite directions to form knit and purl stitches at the same time. The auto knitter has a **dial adjuster** (racking handle) that comes in contact with the **ribber dial** (back bed) [ribber bed] in such a manner that it can move the 2nd bed of needles to be lined up in the correct position to the needles of the 1st bed. See figure 6 to see this dial adjuster on the inside of a cylinder. Figure 5 shows the CSM Ribber dial with no needles in it. When the ribber dial is placed on the CSM, a lug on the underside presses against the dial adjuster. This pressing of the ribber lug against the dial on the inside of the cylinder allows the two beds to work in unison. The dial adjust screw can be turned to adjust the position of the ribber dial needles so they are exactly in the middle of two cylinder needles. See figure 3 to see the Passap Racking Handle and figure 4 to see the Holding Position Machine Racking Handle.

Before you can clearly understand

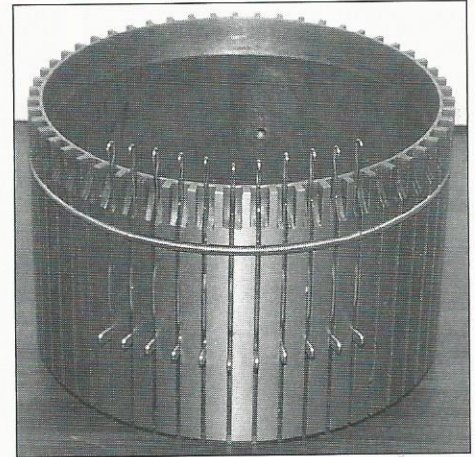


Figure 2: CSM Cylinder with Cylinder Clasp Ring holding nds.

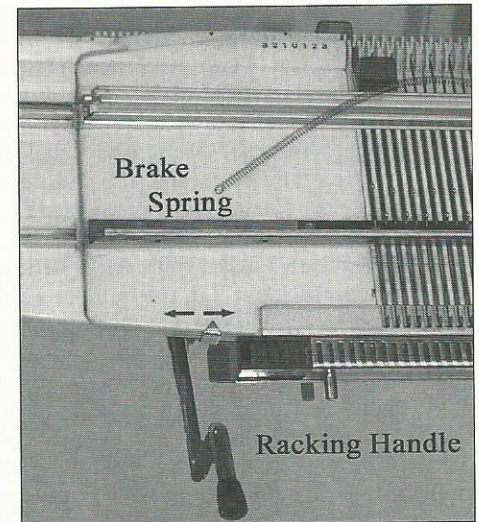


Figure 3: Passap Front Bed, Brake Spring, and Racking Handle in the "Up Position".

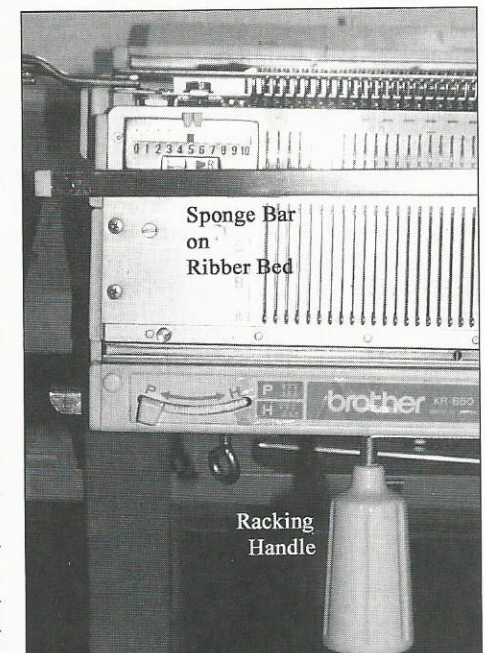


Figure 4: Ribber Bed, Sponge Bar and Racking Handle for Holding Position Machine

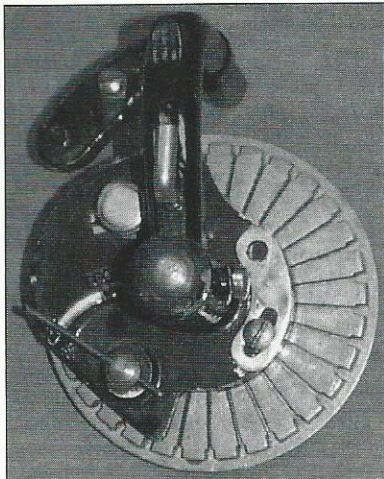


Figure 5: CSM Ribber Dial

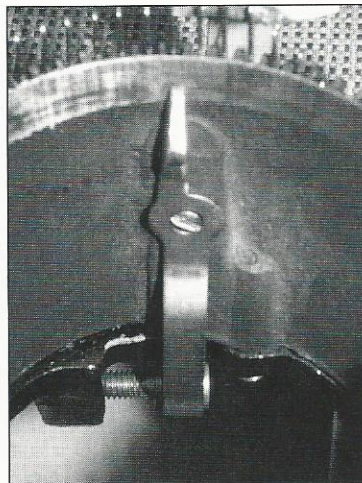


Figure 6: CSM Dial Adjuster

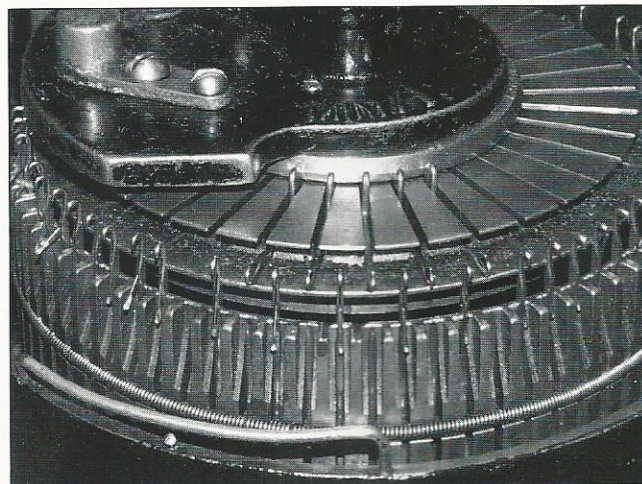


Figure 7: CSM set-up for 1:1 Rib

how the ribber needles are set up to work with the cylinder needles, I must take a step back and explain some differences between CSM **ribber dials** and flat bed ribbers. Let's look at the CSM ribber dials first. There are corresponding ribber dials to co ordinate with each different size of cylinder. Since the needles from the two different beds must never try to get yarn at the same time and thus crash into each other, the CSM dials have half the number of needle slots in them to match their corresponding cylinder. Ex. A 60 nd cylinder would have a matching 30 nd ribber dial. Therefore, if one wanted to knit a "knit one purl one sequence", you would have a ribber needle in every slot of the ribber dial. (30 nds) And you would remove every other needle in the cylinder. (leaving 30 nds). The dial adjuster would be set that the dial needle would be exactly across from the empty spot in the cylinder at the time both nds are ready to receive yarn from the yarn carrier. You would follow the instructions in your manual to do this procedure. *See figure 7* to see this relationship.

There are two major differences between CSM ribber dials and flat bed (back) [ribber] beds. First on CSM's, if you wish a nd to knit a stitch, you place it in the cylinder and dial (working position). If you do not want a stitch in that spot, you must remove the needle from the cylinder and dial (out of work position). With flat bed machines, the nds are always left in the needle beds; they are just put in working or out of work position. Refer to manuals.

The other difference is that the flat bed ribber beds have approximately the same number of needles as their corresponding 1st bed. Therefore, the racking handle has 2 major ways that it can position the 2 sets of needles in relationship to each other. If one wanted to perform the knit one purl one procedure described for the CSM, the passap racking handle would be set to the "up position" [full pitch]. Then every other alternate needle on each bed would be brought into working position. The other positioning is so that every needle on both beds can be used, but they must still bypass each other so as not to crash. In this case, the racking handle is set to (down) [half pitch]. In this case the nds are still spaced so that they fit half way in between each other.

The LeGare, which came with the 54 and 72 cylinder, only had a 36 ribber dial. Therefore, it would use this half pitch relationship to knit a knit 2 purl 1 rib, with all the nds in the 72 cylinder and 36 in the dial. The whole principle in all cases is that needles on opposite beds can not be in the same position at the same time and receive yarn at the same time! If you remember this, you will not break needles because they crash heads! The dial adjuster (racking handle) is the part of the needle bed that is used to set up this needle bed relationship.

The final two items in part two of the checklist are Passap terms only. The (edge springs) are a special 'safety' part on the passap needle bed that places a holder on the edge needles that are being used. Their main function is to keep the latch of the edge needles in the closed position so that the edge sts can not drop out of the hooks of the needles as the locks reverse directions to knit the next row. The (pushers) are a 'secondary' group of needles. On the Passap, the needles only have two positions: working and out of work as previously explained. Therefore, pushers are used to tell the individual needles how to automatically pattern and shape.

This completes the needle bed category. In the next issue, I will discuss the cam shell (locks) [carriages].

I also want to take the opportunity in this issue, to let you know that my husband David takes all the illustration pictures. He is not only 'the mechanic', who keeps all my machines running, he is the 'photographer' for all my articles, books, training programs and patterns.

Table 1: Needle Bed Terminology (taken from Instruction or Parts Manuals from my machines)

Circular Sock Machines: Auto Knitter (Ainslie), Gearhart & Legare 47	Double Bed Machines Passap DM80 Passap E6000	Holding Position Machines Brother/Knit King Studio
Cylinder	Front Bed	Main Bed
Cylinder Clasp Ring, – Cylinder Spring Band	Brake Spring	Sponge Bar
Ribber Dial	Back Bed	Ribber Bed
Adjuster Dial and Adjuster Lever and Screw, Cylinder-Dial Adjuster and Screw, Cylinder Pin	Racking Handle	Racking Handle