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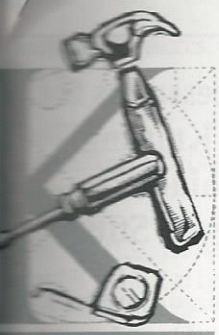

Mechanics of Knitting

Nothing New Under the Sun... A Look at the CSM Part V

by Sharon Nani

In this article Sharon tackles the Terms of the Ribber Attachment

The series of articles on the Circular Sock Machine (CSM) and Flat Bed Knitting Machine mechanical comparisons comes to a conclusion with this issue of MKS. The category of cam shells (locks) [carriages] continues by tackling the terms of the Ribber Attachment. ***(See Table 1 for terms).***

The function of the ribbing attachment with all its components is the same as the cam shell. They each respectively accomplish the task of knitting stitches. Since the ribber needle dial of a CSM sits at the top of the round cylinder, its latch needles operate horizontally between the vertical cylinder needles. Thus the ribber needles are pulling the yarn through the old stitch in the opposite direction as compared to the cylinder needle. ***Refer to figure 1***, which shows the ribber and cylinder with needles set up to knit 1:1 rib. This is like Knit One (cylinder needle) and Purl One (ribber dial needle) in hand knitting.

Let's examine the terms in Table 1 to see how the parts of the **Tappet Plate** (Back Lock) [Ribber Bed Carriage] effect and perform this knitting procedure for these purl stitches. First, the **Ribber Needle Dial** (back bed) [ribber bed] is the flat disc (rectangular bed), which has slots (channels) [slots] on its upper side. These slots hold the ribber needles. On a CSM, the ribber needles are much shorter than the main bed needles. *Refer to MKS issue 102: CSM Part III: **Figure 1** which shows the needle comparisons.* The **Ribber Dial** attaches to the **Cam shell** by placing the guide pins on the bottom of the **Ribber Arm** into the Sockets on the Cam shell. ***See Figure 2**, which shows the arm with guide pins swung over in the 'out of work' position on my Auto Knitter.*

Notice, there are two guide pins, one long and one short, which are at the bottom of the ribber arm. They must fit snugly into the sockets, which join it to the cam shell so that the needles will not be allowed to move out of position as the knitting takes place. The instruction manual even suggested that you might have to 'gently tap' the guide pins down into the sockets, and even remove by gently prying with a screwdriver ***(see figure 3)***. Some oil in the sockets is also useful. My LeGare behaves in this manner. But in my case, I also observed that the longer guide pin had been bent, and therefore would not allow the two pins to be inserted correctly. In addition, I noted that there was a slight burr within the socket that prevented an easy insertion. After these two problems were remedied, by ribber attachment inserted with a gentle tapping. My other CSM did not have this issue and inserted with no tapping. The Passap knitting machines are manufactured with the main and back (ribber) beds already attached, whereas the Japanese/Chinese flat bed machines are joined by adding the "setting plates' into the sides of the main bed, then the brackets of the ribber are inserted into the setting plates to join the two beds. ***See Figure 4.***

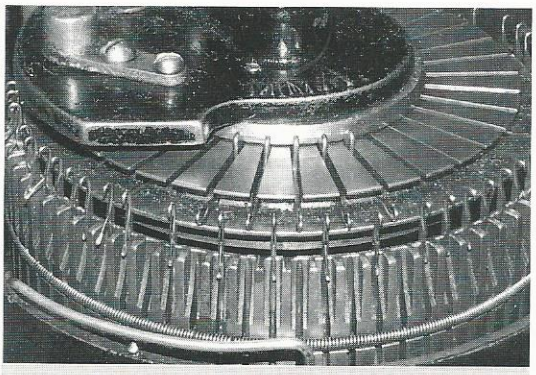

Figure 1: CSM Ribber Dial set up for 1:1 Rib

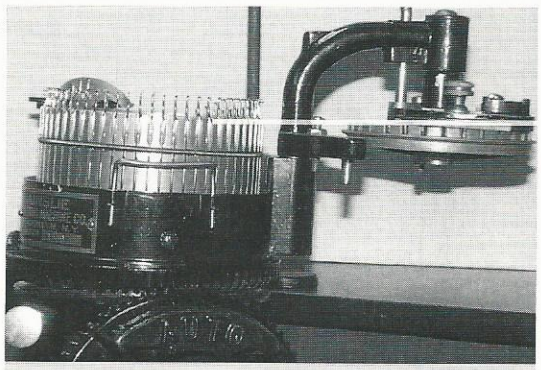

Figure 2: Ribber Dial Out of Work Position

Table 1: Tappet Plate, (locks) [carriages] Terminology for the Ribber Needle Dial (Back bed) [ribber] (taken from Instruction or Parts Manuals from my machines)

Circular Sock Machines: Auto Knitter (Ainslie) Legare 47 Gearhart* since I have not worked on this CSM, I will only list its part as shown in instruction manual where different	Double Bed Machines Passap DM80 Passap E6000 Terms in ( )	Holding Position Machines Brother/Knit King Studio Artisan Terms in [ ]
Ribber Needle Dial	Back Bed	Ribber Bed
Tappet Plate, control cam	Back Lock	Ribber Bed Carriage
Ribber Arm	Manufactured with two bed joined	Setting Plates and Brackets
Height Regulating Screw, adjusting screw	Knob for Lowering Bed	Bracket Levers - Drop Levers
Timing Segment, Timing Screw	See article explanation	See article explanation
Driving Pin, Drive Rod	Connecting Bolt (actually on front lock)	Connecting Pin - Link Pin
Switch Pin (operates switch cam), control cam screw with latch, tappet switch lever	N/X Lever Pattern Selector Dial (which operates cams)	Holding Cam Lever - Hold Levers Cam & Tucking Lever -Side, Tuck/Slip Levers
Ribber Tension Screw	Stitch Dial Cam	Tension Dial Cam --- Stitch Dial
Gearhart has an additional Ribber Cam Nut and pointer	NA	NA

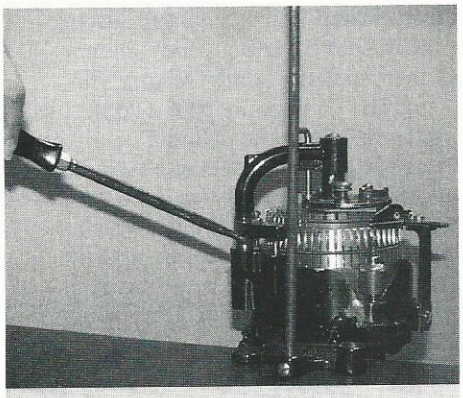

Figure 3: Prying Ribber Dial out of Socket

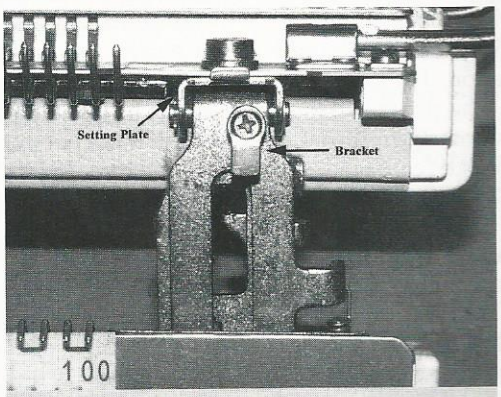

Figure 4: Joining Ribber to Main Bed

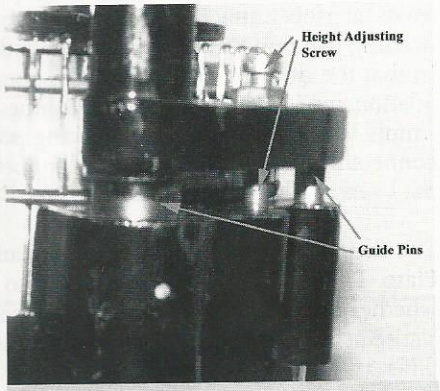

Figure 5: Height Regulating Screw

The next term in Table 1 is "**height regulating screw**". This screw is on the ribber arm between the two guide pins. It is a very good, common sense approach to allow you to set up the correct height for the ribber needles to knit with the cylinder needles. ***See Figure 5***. By screwing the screw in or out, the length of the screw sets the distance that the guide pins can be inserted into the sockets. The correct height may have to be adjusted according to the size of yarn being used. For example, my LeGare manual recommends: "HEIGHT OF THE DIAL - The height of the ribbing attachment for knitting ordinary yarn ought to be between 1/8 and 3/16 inch, measuring from the top of the needle cylinder to the bottom of the grooves in the dial; to knit thick yarn, the height ought to be between 3/16 and 3/4 inch."[1] This is a very important setting because there is a small space between the outside of the ribber disc and the inside of the cylinder. Enough room must be created between these two parts to allow the knitting to move downward inside the cylinder as the stitches are being formed.

This same relationship exits on the flat bed machines. There is a knob for lowering the Passap front bed, but this is usually just done for rehanging stitches. Since the beds for the models of Passap imported into the United States were manufactured as one unit, this setting was done internally. But there were Single bed Passaps manufactured for other countries. If ribbers were attached to these models, attention would have to be made to this setting. The Japanese/Chinese flat bed machines can regulate this height by the use of the bracket/drop levers. The Brother ribber instruction manual suggests that the ribber bed be dropped to the 2nd position down (2 mm) for knitting thicker yarn.

The relationship of the ribber needles to the cylinder needles must also be adjusted correctly in the horizontal position. This was discussed in MKS issue 102: CSM Part III. Refer to this article for the detailed description of the **Adjuster Dial, Lever and Screw**, (racking handle). This was part of the "needle bed category".

The final factor that effects the relationship of the two sets of needles working properly with each other is the timing; both the corresponding ribber and cylinder needle must be brought forward to receive new yarn at a precise time in relationship to each other. I made reference to this fact in the previous articles of this series. If the timing is not just right, the yarn cannot get into the hooks of the needle, and the stitches will drop. This setting is done at the time of manu-

facture, and all the manuals suggest that you leave this setting alone. But as we all know, any setting can come out of adjustment. Also, in the case of CSM's, often the original ribber that was made to go with the cam shell is not the one you own. Therefore, the adjustment may not be correct. It is wise to at least know that there is a **Timing Segment and Screw on the Tappet Plate** to make this adjustment. Refer to your manuals for more information if needed on this part. These would be internal settings on the flat bed machines regulated in the lock (carriage) cams. *Refer to* **Figure 6** *which shows a picture of the ribber dial with these labeled. There are no ribber nds inserted into the slots.*

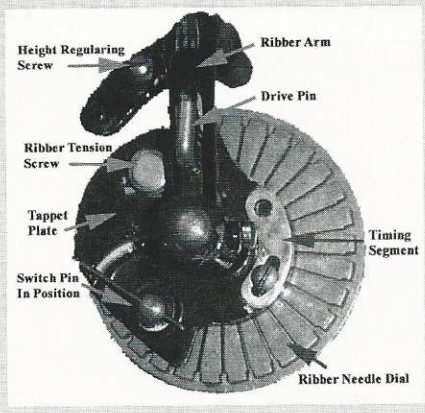

Figure 6: Parts of the Ribber Attachment

The remainder of the parts listed in Table 1 have to do with knitting of the rib stitches. First, the **Driving Pin**, (Connecting Bolt) [Connecting Pin] is simply the part that connects the **Tappet Plate** to the **Cylinder** so that the two parts will work in unison. If, for example, you wished to leave the ribber attached only when working on the cylinder needles, just remove the driving pin and turn the switch pin so that the ribber needles are not in operation. The same relationship is true for flat bed machines. The ribber bed is simply lifted into the proper working position. Then the connecting bolt or pin joins the front bed lock [carriage] to the back bed lock [ribber carriage].

The **Switch Pin** operates the **Switch Cam** under the **Tappet Plate**. This cam is the 'traffic director' to tell the needle whether it is suppose to knit a stitch (be in operation) or slip a stitch (be out of operation). The 'in and out' of operation is different for each brand of CSM so refer to your manual to see the settings for your CSM. For example, the Switch Pin is set to "IN' on my Auto Knitter for the nds to be in work and "OUT" for them to be out of work or slipping. The reverse is true for my LeGare CSM. The setting is used in making the selvedge (beginning tubular cast on) for a CSM. The first round is knit with the Auto Knitter Switch Pin "IN". Therefore, both the ribber and cylinder needles knit a stitch (N/N) [N/N]. The next three rounds are knit with the Switch Pin "Out". (CX/CX) [appropriate 'Part' buttons engaged]. Then finally the Switch Pin is set back to 'In" (N/N) [N/N] for the remainder of the ribbing. This procedure locks the stitches in such a way that they will not unravel.

The length of the rib stitch is set by the Ribber Tension Screw (Stitch Dial Cam) [Tension Dial Cam]. The farther down the screw is screwed, the bigger the rib stitch. Often this screw operates a lever that shows markings of the stitch size.

This brings us to the last item in the table which pertains to the Gearhart CSM. Apparently, since there are so many cylinder sizes that can be used with the ribber attachment, there is a lever to set up the relationship of the cylinder size. Example: 60, 80, 100, etc. Since I do not have a Gearhart, I cannot give any more information on this part. But, I again refer all people who are interested in CSM's to get more valuable information from Bonnie Smola, editor of "Sock Machine Knitting News Letter", and all the helpful CSMer's on the sock-machine knit list.[iii]

In closing this series, I do want to make a few additional comments. First, a "mechanical first aid guide" caution. In the last two articles of this series, I discussed how the needles are directed into the position to knit by the cams in both the cylinder and tappet plate. By seeing how this movement works, it is extremely important on any knitting machine - a CSM or Flat Bed - NOT TO BACK UP while you are in the process of knitting in a forward motion. If you do, you will probably jam the back of the latch needle in a cam. Then you will most assuredly damage the needle, the cam, or the cylinder slot (probably all three parts) in the process of fixing the problem.

Second, the kinds of stitch structures that can be formed on flat bed machines were discussed under the Basic Stitch Construction series: MKS issues 85 & 86. CSM's are not automated machines. Therefore, any stitch construction must be manually set up. The CSM's only have two needle positions - not putting the needle in the cylinder or ribber disc ("out of work") and putting the needle in ("working"). Then in turn, the working needles can stay in working (knit), or be brought all the way upward (hold), which in this case is a slip stitch because the yarn goes behind the needle. Taking this information and what you learned in issues 85 & 86; that there are three kinds of stitch structures: knit, slip, and tuck. Be inventive and see what kind of stitches can be accomplished on the CSM. Remember, mechanically, we know that CSM's can knit and slip. Types of knit stitches are: stockinet, ribs, lace, and cables. Fairisle and intarsia are types of slip. A variety of 'hand manipulated' stitches may be tried. Just remember to stay within the limitations of the yarn and machine, and NEVER force the issue to the point of damaging your equipment. Footnote 2 sources have wonderful patterns and stitch instructions - and they are not just sock patterns.

Finally, I hope that through this series of articles, everyone can see that fiber enthusiasts are kindred spirits, whether they are weaving, hand knitting, spinning, crocheting, or knitting on a CSM or a flat bed machine. And there is truly "Nothing New Under the Sun". What can be new, exciting, and rewarding is the creativity and interpretation of what we do with our particular craft.

La Compaignie Legare Limetee. *Manuel Du Tricoteur*. 1200 Rue Amerst Montreal, P.Q. (no year found) Superior Appliance & Pattern Co.

[iii] Smola, Bonnie. Sock Machine Knitting News Letter. 304 Scott Hollow Rd, Monona, Iowa 52159. email: smolas@netins.
CSM knitters are extremely helpful on the sock-machine list: (no charge) Subscribe to the sock-machine knit list by sending email to "Socks-Subscribe@topica.com. This is part of http:// www.topica.com There is a wonderful picture museum and maintenance tips by Ralph Kanko, "The Cranky Knitter" at http://www.victiques.com