

KNITTING:—PROCESSES AND MACHINERY.

A STUDY OF KNITTING

With a Description of Knitting Processes and of the Construction and Operation of the Prominent Knitting Machines.

(Continued from page 34.)

Mock Rib Stitch. Again, derivations of a foundation stitch may be used for regular work, as, for example, the so-called "mock rib" stitch. As its name indicates, it is used in place of a regular rib stitch, because it can be knitted on the same machine as the plain knit stitch, whereas the rib stitch can only be knit on a rib machine. This, of course, saves the additional outlay for rib machines and consequently is more economical in production. The mock rib stitch is more frequently practiced with machines using spring beard needles than with machines using latch needles.

Spring Beard Needles, or simply spring needles, differ materially from latch needles in their form of construction, which necessitates a different method of operation in knitting and a different type of machine for this purpose, although the same styles of stitches and the same kinds of fabrics are made equally as well with both needles. The principal point of difference in construction between the two needles is the hook, by which the yarn is held and the stitch made; in the latch needle, the hook is short and open and is closed by a separate piece, the latch, whereas, in the spring beard needle, the hook is long and its prolongation, the spring beard, serves the same purpose as the latch, in the latch needle, closing the hook when its point is pressed into the recess in the shank provided for this purpose. Another difference between the two needles is the method in which they are fastened in the needle cylinder. The end of the latch needle, the butt, fits into a slot cut into the cylinder, in which it can move up and down or in and out, accordingly as it is placed, vertical or horizontal, while the end of the spring beard needle is embedded in a small block of lead alloy, the blocks, holding a set of these needles, being clamped in the cylinder to form a circular row, and consequently the needle is immovable as to the cylinder, *i. e.*, can move only as the cylinder moves. "Trick" needles, a form of the spring beard needle, when used in place of the former, are also fastened immovably in the cylinder, by means of a projection, called the trick (see Fig. 5) at the lower end, which is clamped fast between plates, and these needles work the same as the ordinary spring beard needle.

The method of forming the stitches with the two needles differs chiefly in the following respects: (1) With the latch needle, the needles themselves take up the yarn from the carrier, and by their own movement, up and down or in and out, form the stitches from it and cast them off when completed; with the spring beard needle, the yarn must be laid in the hook of the needle by a special device, the burr wheel, and all the different operations of making the stitch and casting it off must be performed by other devices, the

needles themselves remaining stationary in the cylinder, which revolves with them, and perform no operation except holding the yarn during the formation of the stitches. (2) With the latch needle, the yarn of the last formed stitch closes the hook, while the new stitch is being made, by pressing up the latch as the needle moves downward or inward; with the spring beard needle, the yarn itself has nothing to do with closing the hook, this being done by a slotted wheel, placed at the outer edge of the needle cylinder, which presses the spring beard inwardly so that its point (5 in Fig. 4) enters the slot (4 in Fig. 4) in the stem of the needle. (3) In knitting with the latch needle, the yarn practically remains stationary and the needles move, up or down or in and out, in making the stitches; whereas in knitting with the spring beard needle, the needles remain stationary, while the yarn is moved up and down by the burr wheels, etc., to make the stitches.

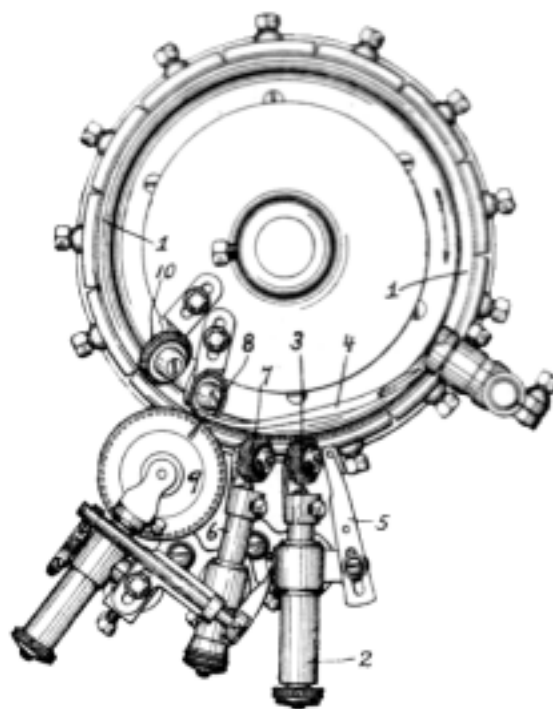


FIG. 17.

In short, the two needles may be distinguished thus: the latch needle does all the work of knitting itself, the other parts of the machine being merely accessories, whereas the spring beard needle is an accessory in the operations of making the stitch, the actual work being done by other parts of the machine, the burr wheels, etc. The difference in the two types of needles can be plainly seen in comparing Figs. 1 and 4, the latter showing the form of the spring beard and how the slot is formed in the stem of the spring beard needle to receive its point.

As the method of making the stitches on a spring beard needle is so widely different from that of the

latch needle, and as the various burr wheels, etc., of the spring beard needle knitting machine have such an important part to perform in making the stitch, the formation of a stitch can best be explained by a brief description of the machine and its operation. Fig. 17 shows a perspective view of the principal parts of a spring beard knitting machine.

The needles are set into the cylinder so as to form a circular row, the spring beards of the needles opening outward, this cylinder and the needles having a positive motion in the direction of the arrow, but are otherwise immovable. The operations of knitting are performed by the various burr wheels; etc., shown, acting in connection with the presser wheel, the burr wheels pushing the yarn onto and between the needles and otherwise manipulating it until the stitches are formed, when they are cast off by other devices. The spring beards are pressed in and held closed by the cogs on the presser wheel while the yarn is being pushed up over them, and are then released by meeting the recesses between the cogs. Other attachments, such as the sinker burr and the holding down wheel, serve to keep the stitches and the finished fabric in their proper positions during the revolutions of the needle cylinder.

Referring to the illustration, 1 indicates the needles, which are secured in the needle cylinder, said cylinder being positively rotated in the direction of the arrow. Situated without the needle cylinder, on the frame stand is the feed burr stand 2, on the inner end of which the feed burr 3 is journaled on a pin, said burr being set at such an angle that the thin plates or teeth composing the burr will pass separately in between the spaces of the needles as they come around. Owing to the way in which the burrs are built and the angle at which they are set in the machine, the movement of the teeth, while in the spaces between the needles, will be downward and hence any yarn with which they come in contact will be pushed downwardly also. The needles themselves cause the rotation of the burrs. As shown in the illustration, a push back 4 is used to press the web down in front of the feed burr 3, although in many instances a wheel is used for that purpose.

Situated just to the right of the feed burr is the thread guide 5 through which the yarn is fed by means of the feed burr to the needles. The teeth of the feed burr, by entering into the spaces of the needles, carry the yarn in with them, and thus produce enough slack yarn to properly make a stitch without straining the yarn. Located next to the feed burr stand is the dividing wheel stand 6, carrying at its end the dividing burr wheel 7, which is placed at a corresponding angle to that of the feed burr 3. It is used to even the loops formed by the feed burr 3.

The burr 8, known as the landing burr, is located within the needle cylinder and is inclined at such an angle that the movement of its teeth, when in the spaces of the needles, is upwardly and thus it serves to move the loops upwardly over the spring beards of the needles, said beards being pressed inwardly at the

same time by a presser wheel 9, located on the outside of the needle cylinder, in order to allow the loops to pass over them.

The presser wheel plays a very important part in making different kinds of stitches, since by making grooves in its circumference, according to some pattern, certain loops are prevented from being cast off, because certain beards are not pressed in and consequently the loops on those needles which are not pressed in, when actuated by the landing burr, go up again into the hooks of their needles.

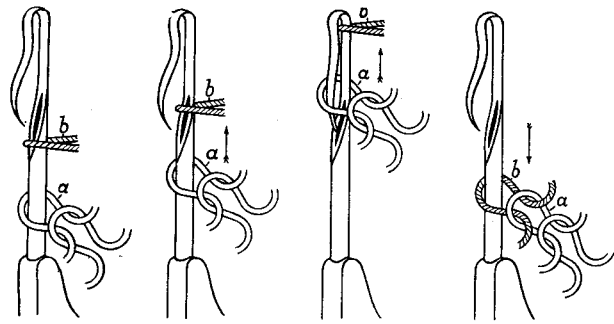


FIG. 18.

FIG. 19.

FIG. 20.

FIG. 21.

Figures 18, 19, 20 and 21 show the position of the yarn on a needle at various stages of the stitch, the burr wheels, presser wheel, etc., being omitted for clearness. The stitch is made in the following manner:

As the needle cylinder revolves, the needle meets the feed carrying the yarn and the first burr wheel, which lays a loop of yarn onto the needle and presses it down below the point of the spring beard, as shown at *b* in Fig. 18, so that it can go up into the hook of the needle in the next movement. At the same time, the cloth wheel, or other similar device, presses down the web of the already knit fabric, so that the last formed loop, resting on the needle, is pressed down below the loop of yarn newly laid on, as shown at *a*, Fig. 18. The cylinder continues to revolve and the needle meets the second burr wheel, which pushes loop *b* up, until it enters the lower part of the hook, loop *a* also being pushed up with it, as shown in Fig. 19. Just before loop *a* reaches the slot in the stem of the needle, the spring beard engages with the presser wheel and its point is pushed into the slot of the needle and held there, while the next attachment, the landing burr, acting in conjunction with the presser wheel, pushes loop *a* over the spring beard and loop *b* up into the hook of the needle, where it is held by the closed spring beard, as shown in Fig. 20. Loop *a* is finally pushed entirely over the spring beard by the burr wheel and is cast off, over loop *b* and consequently engaged with it, loop *b* reaching the top of the hook. At this moment, the needle reaches the sinker burr, which follows the burr wheel, when loops *a* and *b* are both pressed down by it to the position shown in Fig. 21, loop *a* now being a completed stitch and loop *b* taking its place on the needle, consequently

loop *b* in Fig. 21 corresponding to loop *a* in Fig. 18 for the next stitch. In the illustrations, loop *b* is represented shaded, for clearness, and the small arrows indicate the direction the loops travel.

The needle is now ready to receive yarn again and make another stitch, the completed stitch and the last formed loop being pressed down in position by the cloth wheel. When the needle comes round again to the feed carrier, another loop is laid on it and the operations just described are repeated, a continuation of the same forming the knitted fabric. These operations form what is known as the plain stitch, which has been previously referred to and described. Other stitches can be made with these needles by varying the method of forming them, or by other and different attachments to the machine.

(To be continued.)
