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NARROWING FINGER FOR KNITTING MACHINE

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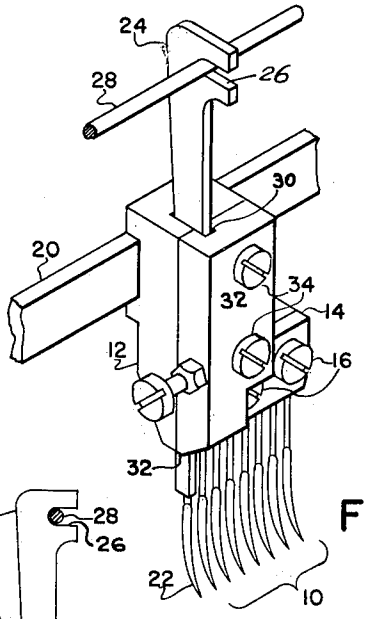


Fig. 1

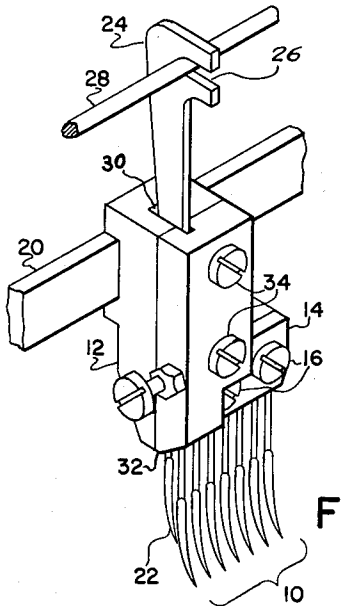


Fig. 2

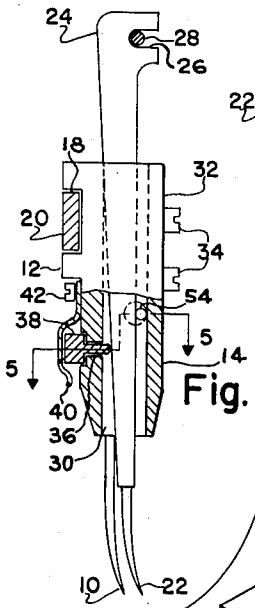


Fig. 4

Fig. 3

Fig. 5

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NARROWING FINGER FOR KNITTING MACHINE

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4 Claims. (Cl. 66—89)

In the knitting of stockings, sweaters and other articles, it is sometimes necessary to narrow the fabric and it is sometimes necessary to widen the fabric. Narrowing the fabric is effected by dropping one, or more needles and presents no problem. But, since widening the fabric is effected by transferring stitches outwardly, the needles from which stitches are transferred are left bare. A succession of such needles produces a diagonal line of holes in the body of the fabric which is referred to as a gore.

The gore thus produced is frequently objectionable because of aesthetic considerations or because it weakens the fabric.

In order to eliminate the gore, it has been proposed to take stitches from a previously completed course and to stretch and hang them on the needles which are left bare by the outward transfer of stitches in a subsequent course. The stitches thus spread cover the holes which would otherwise appear in the body of the fabric.

An example of the manner in which thus spreading and transferring of the stitch can be carried out is disclosed in Patent No. 2,330,681 issued to A. J. Cobert, on September 28, 1943. According to the disclosure of the Cobert patent, each narrowing finger is provided with the usual, main transfer points and with an auxiliary transfer point which is independently movable downwardly, and then laterally of the plane of the main transfer points so that, when the fingers dip the main transfer points into the fabric to pick up the stitches to be transferred outwardly in any given course, the auxiliary transfer point can be lowered, and can be simultaneously pushed out of the line of the main transfer points so as to engage a stitch in a previously completed course. The subsequent upward and lateral movement of the narrowing fingers which serves to transfer the stitches also stretches the stitch picked up from the previous course by the auxiliary transfer point and hangs it on the needle left bare by the outward transfer of the stitch carried by said needle.

In the Cobert patent referred to, the auxiliary transfer point is moved to and fro by positive mechanical means such as cams **96** and **99**, and slots **91** and **92**. A construction of this type is expensive and complicated and will only operate in the presence of a high degree of precision of the parts and of their movement.

It is, therefore, the object of my invention to produce a simplified construction in which the auxiliary transfer point is moved out of line, or into the position in which it can pick up a stitch from a completed course, by means of adjustable yielding pressure and in which the transfer point is moved back into line, or into stitch-releasing position, by the conventional action of the corresponding conventional knitting needle, whereby, positive mechanical means for pushing the transfer point back into line is not needed, and whereby, the construction becomes adaptable to the knitting of various types of fabric and various degrees of tension.

The nature of the invention will be understood from the following specification and the accompanying drawing in which:

Fig. 1 is a perspective view of a narrowing finger provided with an auxiliary transfer point, the same being shown in its lowermost.

Fig. 2 is similar to Fig. 1 but shows the transfer point in its raised, or ineffective position.

Fig. 3 is an exploded view showing details of construction.

Fig. 4 is a partial elevational view showing details of construction.

Fig. 5 is a sectional view on line **5—5** on Fig. 4.

Since the manner in which auxiliary transfer point is used, and, since the necessary conventional parts of a flat knitting machine are shown and described in the above mentioned Cobert patent, it is not necessary in the present application to show or describe these parts. Therefore, the structure and assembly of one narrowing finger provided with an auxiliary transfer point according to my invention will be described.

As will be seen from Fig. 3 each narrowing finger includes a number of main, or conventional transfer points **10** the upper ends of which are clamped between opposite plates **12** and **14** which are secured together by screws or the like **16**. The plate **12** is provided with a horizontal recess **18** for engaging a bar **20** which is moved up and down by a cam, not shown. When the bar **20** is lowered, the main transfer points **10** engage stitches in the course being currently knit and, when the bar **20** is moved up, the stitches engaged by the points **10** are lifted above the fabric. Subsequent movement of the narrowing finger laterally outwardly brings the points **10** into registration with the needles on to which the raised stitches are to be transferred. This is the conventional widening operation and it need not be described in greater detail.

In order to provide for picking up a stitch from a previously completed course and for stretching it and placing it on the needle in a subsequent course which was left bare by the outward transfer of a stitch therefrom, I provide each narrowing finger with an auxiliary transfer point **22** which is provided with an elongated shank **24** the upper end of which is provided with a recess **26** adapted to engage a bar **28** which is also moved up and down by a cam, not shown. The shank **24** of the auxiliary transfer point **22** is adapted to slide freely in a slot **30** formed in the abutting faces of plates **12** and **32**. The depth and width of slot **30**, is greater than the width and thickness of the shank **24** of the auxiliary transfer point.

The front wall of plate **12** is provided with an opening **36** which leads to slot **30** and in which is loosely placed a plug **38**. A flat spring **40** is secured to plate **12** by screws **42** which engage tapped holes **44**. The function of spring **40** is to press against plug **38** so as to force the reduced end of the plug into slot **30** and against the shank **24** of the auxiliary transfer point. This results in continuously, yieldably biasing the auxiliary transfer point out of the plane of the main points, or to the offset position in Fig. 4. In this connection it is pointed out that in Figs. 1 and 2 transfer point **22** is shown in line with the main point **10** but that is because Figs. 1 and 2 are intended to show only the vertical movement of the point **22** while its lateral movement is shown in Fig. 4. With auxiliary transfer point **22** thus constantly pushed rearwardly the width of one course, or the length of one stitch, it follows that the main narrowing points **10** will engage the stitches to be transferred laterally outwardly and auxiliary transfer point **22** will engage a stitch in the previously completed course. During the knitting operation, the knitting needles move upwardly, then forwardly in which position they engage corresponding transfer

points, if the transfer points are in use, and then the needles and the transfer points move downwardly, substantially simultaneously. According to my invention, because transfer point **22** is moved out of line by the yielding pressure of spring **40**, the pressure of the corresponding knitting needle, which is exerted against the transfer point during the forward and downward motion of said needle, is sufficient to push the transfer point back in line, so that the stitches carried by the main points **10** will be placed on the needles onto which they are to be transferred and the stitch carried by the auxiliary point **22** will be stretched and placed on the needle left bare by the lateral transfer of a stitch therefrom. Thus, the stitch carried by auxiliary transfer point **22** is stretched diagonally and hung over two needles in two successive courses so as to cover the space which would otherwise remain and produce a gore.

The structure thus far described is satisfactory for most purposes, but, to provide for adjustment and control of the position of auxiliary point **22** relative to the main points **10**. In the embodiment illustrated I provide a tapped side hole **50** which leads into slot **30** and I thread a screw **52**, having an eccentric arm **54** at its inner end, into hole **50** so that eccentric arm **54** lies in slot **30** transversely of the path of lateral movement of the shank **24** of auxiliary point **22**. The screw **54** is locked in adjusted position by nut **56**.

By turning screw **52** on its axis, eccentric arm **54** is moved, to the left or to the right, as viewed in Figs. 4 and 5, and thus provides a positive stop which limits the extent to which auxiliary point **22** can be moved rearwardly of the plane of the main transfer points **10**. For standard fabrics, and for different, but relatively coarse fabrics, screw **52** may not be needed and can either be omitted or it can be turned to an extreme position where its effect on the position of auxiliary point **22** will be

negligible or non-existent. For finer fabrics, in which the stitches are very small and the courses are narrower, the adjustment provided by rotating screw **52** to, and locking it in, the desired position may be very desirable if not indispensible.

What I claim is:

1. A narrowing finger including a body, a number of main transfer points fixedly carried by said body, there being a vertical slot formed in said body, an auxiliary transfer point freely slidable in said slot, there being an opening in a face of said body leading to said slot, a plug freely movable in said opening into and out of engagement with the shank of said auxiliary transfer point, and a spring carried by said face of said body for normally biasing said plug into engagement with the shank of said auxiliary transfer point to move the latter out of alignment with said main transfer points.

2. The structure recited in claim 1, there being a second opening in another face of said body also leading to said slot, and means passing through said second opening and engageable with the shank of said auxiliary transfer point for limiting the movement of said transfer point in response to the biasing action of said spring.

3. The structure recited in claim 2 in which said means engages the side of the shank of the auxiliary transfer point which is opposite to that which is engaged by said plug.

4. The structure recited in claim 2 in which said means includes a rotary member which is rotatably mounted in said second opening and an eccentric arm carried by the inner end of said rotary member for controllably limiting the movement of said transfer point.

References Cited in the file of this patent

UNITED STATES PATENTS

2,330,681 Cobert ..... Sept. 28, 1943