

Feb. 14, 1967

R. G. BASSIST
MULTI-SLIDE GUIDE-BAR

3,303,670

Filed May 4, 1964

3 Sheets-Sheet 2

FIG. 4

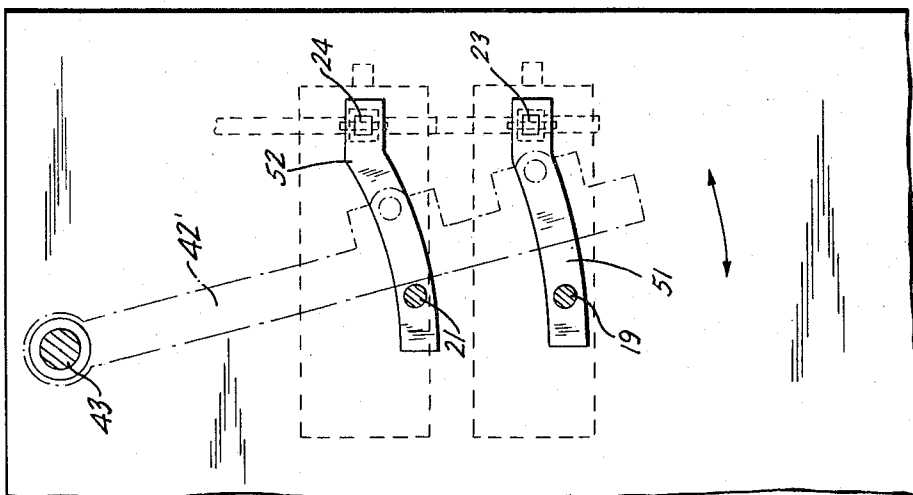


FIG. 3

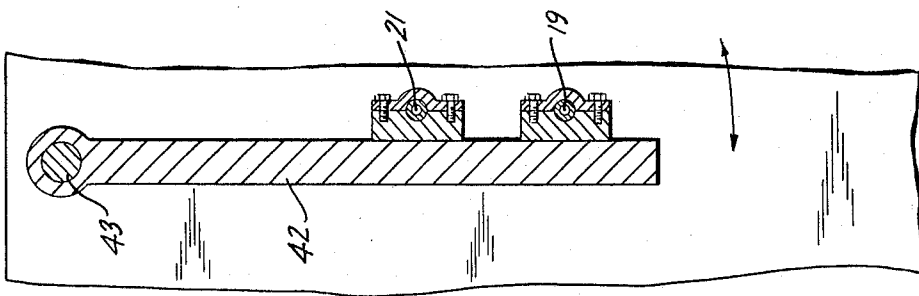
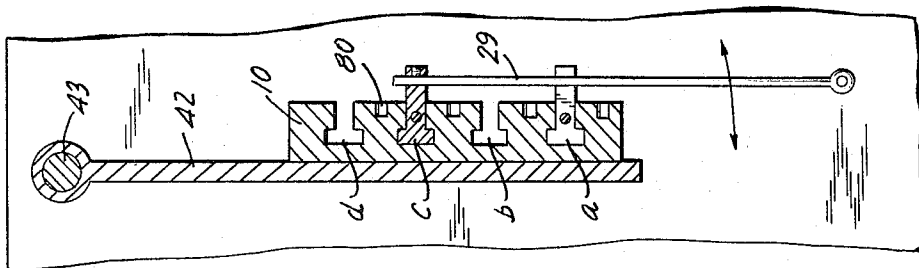


FIG. 2



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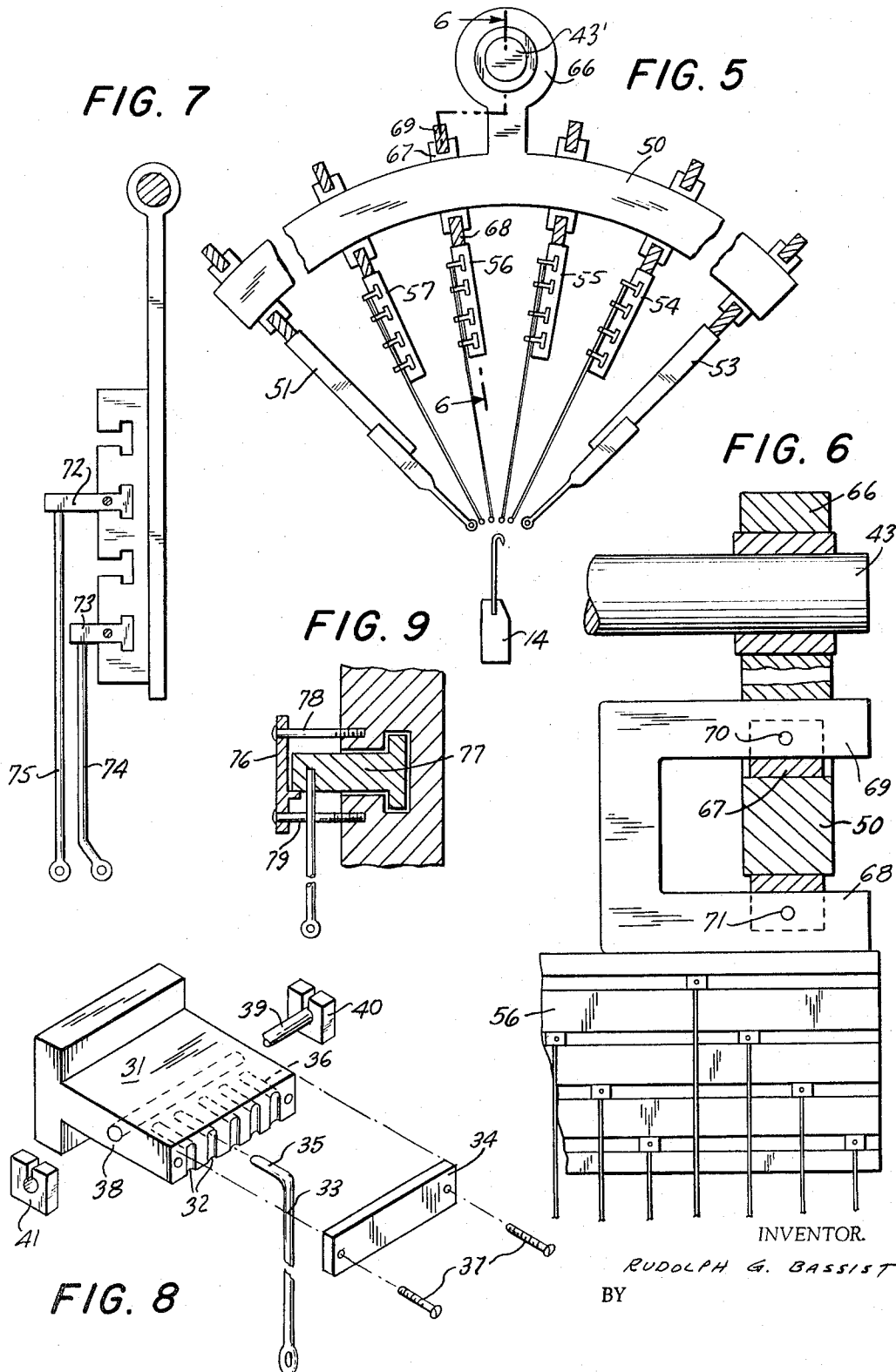
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MULTI-SLIDE GUIDE-BAR
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1 Claim. (Cl. 66—86)

This invention broadly relates to the art of producing ornamental knitted fabrics, knitted laces, and particularly to an improved method and means for producing such fabrics.

As is well known in the art, the usual operation of a knitting machine, whether a warp knitting machine or otherwise, is based on the cooperation of the thread guide elements with corresponding knitting needles. There are usually employed knitting needles supported by and extending from mobile knitting needle bars adapted for reciprocating, substantially vertical movements.

In cooperation with the needle of such needle-bars, there are usually employed what are known as guide-bars, to which are removably attached at series of guide elements. All of the fixed guide elements, depending from a guide-bar, are aligned and move simultaneously and are caused to pass around and in the spaces between the needles. All of the guide-bars in a knitting machine are usually actuated by pattern wheels or links and related instrumentalities.

The combined actuating means for the guide-bars are adapted to cause threads carried by the guide elements to move about the vertically reciprocating needles to produce knitted fabrics of predetermined types or patterns, which may include ornamental stitch designs or laces. All of such knitted fabrics, including so-called ground stitch fabrics, with or without ornamental stitch designs, are presently produced by the employment of a substantially large number of guide-bars carrying fixed thread guide elements. Some of such guide-bars, with fixed, uniformly spaced and aligned thread-guiding elements, serve for producing normal or ground stitch knitting fabric, but for effecting ornamental or lace stitch designs in such normal knitted fabric, there is presently required the employment of additional guide-bars, provided with a number of fixedly held, variously spaced, individual thread-guiding elements. The additional guide-bars supporting said ornament-producing thread-guiding elements are axially reciprocated along their longitudinal axes by individually designed and individually operated pattern wheels or links.

Thus, in order to produce knitted fabrics with ornamental stitch designs on present-day types of machines, a large number of specific guide-bars with fixed, especially positioned threadguiding elements are required, in addition to the usual number of guide-bars.

From the foregoing it becomes evident that the heretofore employed methods and devices for producing ornamental stitch designs, in such fabrics, require a rather substantial mechanical equipment, in addition to the machinery for producing knitted lace fabric. Such additional equipment is not only costly in its production but also necessitates the provision of adequate space for its operation.

The present invention contemplates producing ornamental stitch designs in knitted fabrics, by an entirely new, far more economical method, that is, by the use of a greatly reduced number of guide-bars and their required actuating means, wherein some of the formerly employed guide-bars are effectively replaced by what will be known as, "multislide-bars."

These multislide-bars are fixed and only in these multisides are there mobile thread guide elements. These mobile thread guide elements are mounted in these slides

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and connected with a steel rod to each other, which reciprocates axially in its usual way, i.e., in the direction of its longitudinal axis. These slides are individually controlled from pattern wheels, i.e., so as to be selectively movable, relative to and longitudinally of said guide elements adequately spaced in these slides.

By the reduction of the number of guide-bars and their respective actuating means a substantial reduction in space and operational expenditure is effected, and the scope of designing is increased.

The prime object of this invention is an improved method of and improved means for producing ornamental stitch designs in knitted fabrics, at a substantial saving over heretofore employed methods of and means for effecting the same or similar results, with greater efficiency of the mechanical equipment.

The foregoing and still further objects and additional advantages of the present invention, will become more fully apparent from the ensuing description in conjunction with the accompanying drawings, which latter are presented in a purely diagrammatical form to serve for explanatory purposes only, without any intent to restrict this invention to the structures illustrated, and wherein:

FIG. 1 is a fragmental diagrammatic front elevation of a portion of a knitting machine, disclosing in the foreground a fixed guide-bar with four slides with guide elements.

FIG. 2 is a vertical section approximately along lines 2—2 of FIG. 1, of the fixed guide bar supporting four slides and the mobile guide elements.

FIG. 3 is a vertical section taken approximately along lines 3—3 of FIG. 1.

FIG. 4 is a section view taken along lines 4—4 of FIG. 1 illustrating in detail the push rod connection with the pattern wheel.

FIG. 5 is a diagram illustrating the manner in which the multislide bar mechanism is placed in a warp knitting machine in accordance with the present invention.

FIG. 6 is a sectional view taken along line 6—6 in FIG. 5, and showing further details of the supporting of the fixed guide-bar in the warp knitting frame.

FIG. 7 shows modifications of certain parts appearing in FIG. 2.

FIG. 8 is an enlarged perspective view in detail of a mobile guide element.

FIG. 9 is a sectional view illustrating a supporting cover for the mobile guide elements.

The fragmental illustration in FIG. 1, discloses a fixed guide-bar 10, for supporting mobile guide elements in four slots *a*, *b*, *c*, and *d*. It is presumed that either in front or rear, or both in front and the rear of bar 10, are disposed additional guide-bars of the conventional kind.

Beneath all of the guide-bars, including guide-bar 10, there is arranged a needle bar, in the usual manner, as indicated at 12, and which supports exchangeable needles and needle holders 13, from which needles 14 extend upwardly.

The improved multi slide guide-bars and the common type of guide-bars with fixedly held guide elements, are designed to be operated by means of pattern wheels or pattern links, indicated at 15, 16, 17, and 18. As is known, these pattern wheels are driven continuously by the drive shaft (not shown) of the knitting machine. Guide-bar 10, illustrated in the drawings, is intended to provide additional, entirely new and different functions, from guide-bars equipped with fixed guide elements.

The guide-bar 10 is fixed and supports the mobile guide elements within the slots *a*, *b*, *c*, and *d*. The mobile guide elements are placed in each of these slots and are held therein in a predetermined manner by means of steel rods, 19, 20, 21, and 22. Steel rods, 19, 20, 21, and 22 are

respectively connected to more rigid steel shafts, 19', 20', 21', and 22', which are in turn respectively connected in a well known manner to the pattern wheels, 15, 16, 17, and 18, and push rods, 23, 24, 25 and 26.

All the push rods are pressed by a spring against the pattern wheels in a well known manner.

The placing of the different mobile-guide elements is in accordance with the design, and this method is known to those skilled in the art as "nesting."

The mobile guide elements hold guide needles, 27, 28, 29 and 30. It is also a feature of this invention to make the guide needles 27, 28, 29 and 30 of different lengths, to enable the guide needles, to reach from the different slots in the knitting area to engage knitting needles 14. This knitting procedure is well known to those skilled in the art and will therefore not be further explained.

In FIG. 8, is an enlarged view of a mobile guide element generally designated as 31. The latter demonstrates that many guide needles 33 can be placed in groove 32, according to the design requirements. Guide needle 33, has a 90° bend 35, the latter fitting exactly in holes 36. A cover 34, and screws 37, keep the guide needles 33 secured within grooves 32.

Guide element 31 is attached to a steel rod 39 and secured in place with clamps 40 and 41.

In FIG. 1, for the sake of simplicity, the features of the present invention are described in connection with a single guide-bar, although it will be understood, as hereinbefore pointed out, that more than one guide-bar will be employed.

Mounted in proximity to the needles 14, is the fixed guide-bar 10, which carries a plurality of downwardly projecting mobile guide needles, 27, 28, 29, and 30, which are adapted to move in a forward-and-backward direction within the spaces between the needles.

This component of movement of the guide needles, is under the control of the main shaft (not shown), and in turn by the swing shaft 43.

In this figure, I have illustratively shown swing-shaft 43, which transmits a rocking movement in the direction of the arrows shown in FIGS. 2-4, to hanger elements 42, which carry the fixed guide-bar 10 and support the rigid steel shafts 19', 20', 21' and 22'.

Merely by way of example, I have chosen to illustrate the present invention as it may be applied to a so-called warp-knitting machine. Some of the parts of such a machine are shown in operative relationship in FIG. 5. In this figure, I have shown a multiplicity of guide-bars of the present invention, 54, 55, 56, and 57, mixed with guide-bars 51 and 53 of the conventional type.

In general, it will be understood that those skilled in the art may make changes to produce certain designs. Also, the number of bars is not limited. The articulation is transmitted by a swing shaft 43' and a swing arm 50, which provides support for the guide-bars 51-57. The periphery of the pattern wheel is provided with a predetermined series of raised and depressed portions (see FIG. 1), 58, 59, 60, and 61, and the ends of the guide-bars are provided with followers 62, 63, 64, and 65 (see FIG. 1) which are constantly pressed against the periphery of the pattern wheels, or links, in a yieldable manner, by means of springs. Accordingly, certain longitudinal movements are imparted to the guide-bars in a predetermined sequence and of predetermined magnitudes, as the followers are pushed to the left or right under the actions of the pattern wheels and the springs, in a well-known fashion, per se, although the present invention makes it possible to provide a far greater number of variations.

The needle bar 12 and the knitting needles 14 are located beneath and directly along the central axis of the guide-bars and swing arm arrangement of FIG. 5, so that all the guide needles can pass between the knitting needles for the lapping motion to produce knitted fabrics in a well-known fashion.

It makes no difference whether the type of knitting needles is a "Latch Needle," or a "Spring Board Needle," or any other kind.

But, whatever the nature or mode of operation of the warp-knitting machine may be, it will embody, of course, a mechanism adapted to perform a knitting operation upon yarn supplied to it.

In FIG. 6 is shown in greater detail, the construction of one of the guide-bars designated by the reference numerals 54, 55, 56 and 57 in FIG. 5.

The swing shaft 43' is journaled within a bearing 66, and multi-slide guide bar 56 is mounted around swing arm 50 so that guide bar 56 is rocked by the rocking motion of swing arm 50. To prevent guide bar 56 from receiving horizontal movement from the pattern wheel of conventional guide bars such as 51, yoke 69 is fixed in place with respect to bracket 67 by means of conventional screws (not shown) placed within holes 70 and 71.

FIG. 7 shows a modification of the structure shown in FIG. 2, wherein mobile guide elements 72 and 73 extend at different lengths from the guide bar 10' to enable guide elements 72 and 73 to pass one another without interference. Guide needles 74 and 75, which extend respectively from slide elements 73 and 72, are formed in the manner shown in FIG. 7 to make such passage possible.

FIG. 9 illustrates a suitable supporting cover 76 placed over a guide element 77, which is held in place by means of screws 78 and 79. In FIG. 1 screw holes 80 are shown which receive screws such as 78 for the placement of a supporting cover such as 76 over the guide elements.

FIG. 2, illustrates the multi slide guide-bar 10, with slots a, b, c and d, and guide needle 29, screw-hole 80, and the supporting bracket 42.

FIG. 3 illustrates the manner in which bracket 42 carries the stronger rigid steel shafts 21' and 19'.

FIG. 4, illustrates the connection of the swinging rigid steel shafts 19' and 21' to the stationary sliding pushrods 23 and 24, by means of swinging plates 51 and 52, which are fastened to pushrods 23 and 24, so that swinging pushrods 23 and 24 can slide on plates 51 and 52.

In general, it will be understood that the details herein described and illustrated, may be modified by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claim. It is therefore, intended that these details be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, and illustrated its use, what I claim as new, and desire to secure by Letters of Patent, is:

In a knitting machine of the type comprising a needle bar having a plurality of upwardly projecting needles:

a guide bar cooperating with said needle bar, said guide bar having a plurality of substantially parallel elongated slots formed in its face, each of said slots being spaced a distance from said needle bar different from the spacing of every other slot from said needle bar, at least one mobile guide element associated with each slot, each of said guide elements having a head slidably located within its respective slot and a portion extending from the head to a point outwardly of its respective slot, the length of said extending portions varying with the distance of their associated slots from said needle bar, the guide element associated with the slot closest to said needle bar having the shortest extending portion and the guide element associated with the slot farthest from said needle bar having the longest extending portion,

means for independently moving each of said mobile guide elements with respect to said slots along paths parallel to the longitudinal axis of said guide bar, said means including a separate pattern wheel allocated to each of said guide elements, a follower responsive to each pattern wheel, and a push rod op-

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eratively connected between each of said followers and a different one of said guide elements, and at least one guide needle extending from each mobile guide element toward said needle bar, said guide needles being mounted near the free ends of said extending portions so that the guide needles mounted on the guide elements farther from said needle bar are spaced farther from said guide bar than the guide needles mounted on guide elements closer to said needle bar, whereby said guide needles mounted on different mo-

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bile guide elements may be moved past one another without interference from one another.

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