June 15, 1926. 1,589,290

J. C. KANE

KNITTING MACHINE

Filed April 26, 1923 2 Sheets-Sheet 1

FIG. I.

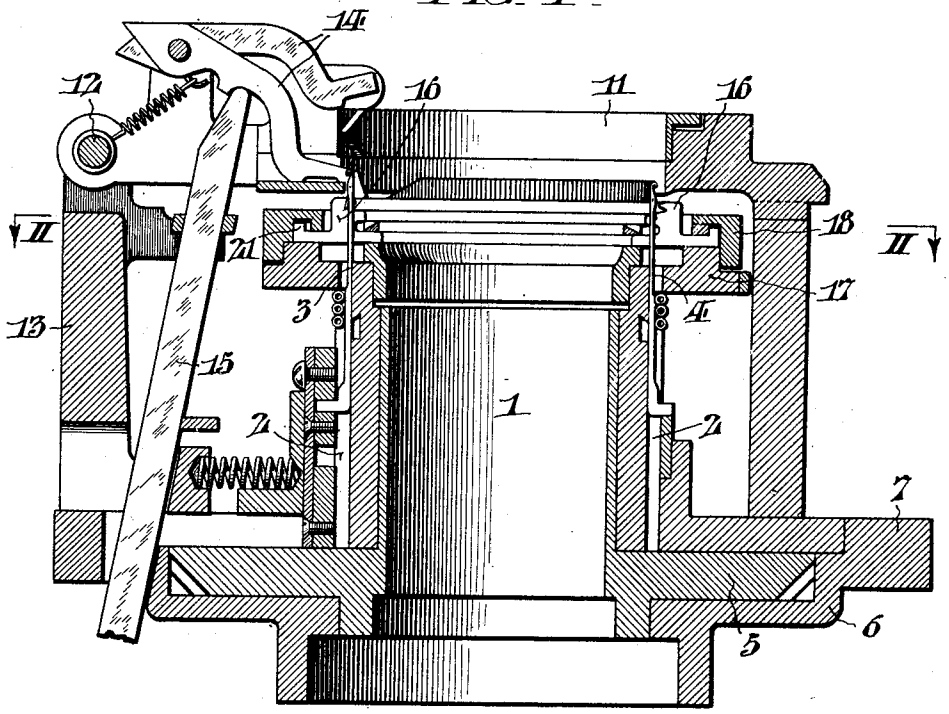
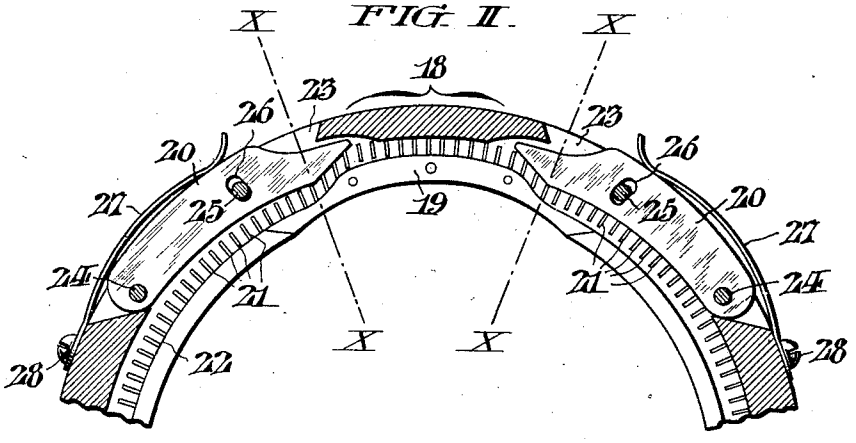


FIG. II.



WITNESSES:
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FIG. III.

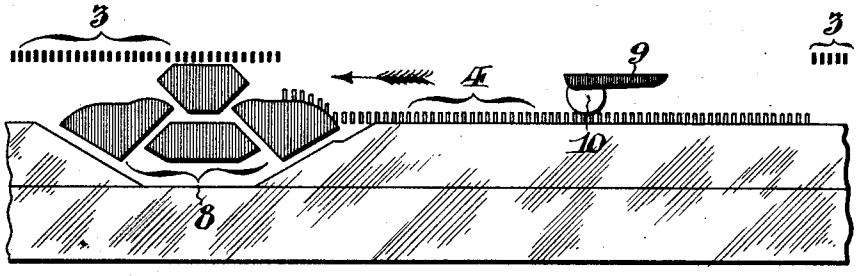
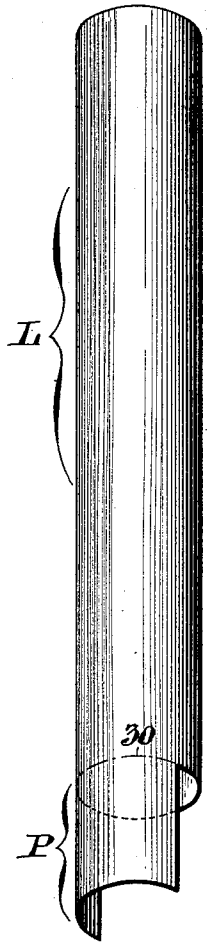


FIG. IV.



WITNESSES:
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Patented June 15, 1926. 1,589,290

UNITED STATES PATENT OFFICE.

JESSE C. KANE, OF EASTON, PENNSYLVANIA, ASSIGNOR TO CHIPMAN KNITTING MILLS, OF EASTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

KNITTING MACHINE.

Application filed April 26, 1923. Serial No. 634,655.

My invention relates to knitting machines, more specifically circular or rotary knitting machines, and, while generally directed toward facilitating casting of the loops from the needles incidentally to the formation of the fabric its primary object is to enable production of flat prolongations with perfect selvage edges in continuation of tubular stocking blanks. With knitting machines ordinarily available, the above desideratum is extremely difficult of attainment, the selvages produced by them being, at best, ragged and imperfect, and therefore difficult to loop in transferring the blanks to other machines for addition of the stocking feet. Such faulty production of the selvages I have found due to tendency of the main or tubular portions of the blanks held by the idle needles, to restrain proper casting of the fabric loops during the knitting of the flat prolongations upon the remaining needles through oscillation of the needle cylinder.

How the difficulty just mentioned may be overcome, and other subsidiary objects and their attendant advantages attained, will be readily undesrtood from the detailed description which follows of a typical embodiment of my invention, while the appended claim clearly defines the scope of said invention in so far as present knowledge permits.

Referring to the drawings, Fig. I is an illustration in sectional elevation of the knitting head of a circular machine convenient to the purpose of my invention.

Fig. II is a partial horizontal plan section through the web holder ring taken as indicated by the arrows II—II in Fig. I.

Fig. III is a partial development showing, more or less diagrammatically, the actuating cams for the knitting needles; and

Fig. IV is a conventional view in perspective of the stocking blank produced in accordance with my invention.

Attention is first directed to Fig. I wherein I have indicated the cylinder of the knitting machine at 1, it having the usual longitudinal peripheral grooves 2 for guiding vertical reciprocation of the needles which are herein shown as being of the ordinary latch type, and comprising a long butt series 3 and a short butt series 4, these being represented conventionally by heavy and light lines respectively in Fig. III. The cylinder 1, it will be observed, is mounted upon a bevel gear 5, said gear being supported in the recessed portion 6 of the bed plate 7 so that the cylinder 1 may be either rotated or oscillated by any suitable mechanism, (not shown) such as ordinarily provided for this purpose.

The cams which actuate the needles (Fig. III) include the usual stitch forming group indicated comprehensively by the numeral 8, and a switch cam 9 designed to be swung about a horizontal pivot 10 to raise and lower the long butt needles 3 in controlling their activity in a manner well understood. Any approved known means may be provided for governing the movements of the switch cam 9 in timed relation to other submechanisms of the machine. It is to be especially observed that the machine is devoid of pickers so that an unfashioned, parallel side edged fabric is produced with only the short butt needles 3 active during oscillatory phases of knitting.

Referring again to Fig. I, the needle cylinder 1 is shown as overhung by a needle latch guard ring 11 which is pivoted, to permit of its being retracted when desired, at 12 to an upstanding post 13 bolted or otherwise secured, to the bed plate 7. This latch guard ring 11 carries a series of pivotal feeds 14 whereby different yarns may be directed to the needles when one is interchanged with another through the medium of individual pattern controlled thrust bars such as indicated at 15.

Provided for the purpose of cooperating with the needles in forming the fabric stitches, are web holders 16 which are supported for longitudinal reciprocation relative to the needles in a radially grooved dial ring 17 secured to the top of the needle cylinder 1. The dial ring 17 just referred to, is surmounted by a cap ring 18 which carries the cams for actuating the web holders 16. The construction of the cap ring 18 will perhaps be best understood from Fig. II from which it will be noted that the same has an attached center retracting cam 19 which is flanked at each side by a projecting cam 20, these cams cooperating by engaging the web holder butts 21 to shift the web holders 16 laterally at the region of stitch formation from the normal course determined by the concentric groove 22 which comprehends the greater portion of the ring 18.

The projecting cams 20 are accommodated in cut-outs 23 of the ring 18, and at one of their ends are pivoted about fixed studs 24, while their opposite ends are movable under guidance of additional studs 25 which pass through limiting slots 26 in said cams. Leaf springs 27 are provided for a purpose which will presently be explained to urge the cams 20 inward, said springs being secured at the periphery of the ring 18 by screws 28.

The operation of my invention will perhaps be better understood in connection with the conventional representation of the stocking blank of Fig. IV which it is designed to produce. The leg portion "L" is of course knit with all the needles in action and proceeds until the course 30 is reached when the motion of the machine is changed from that of rotation to oscillation which may be effected in any of the well known ways. At the time of this change, the switch cam 9 is swung downwardly and so maintained until all the long butt needles 3 have been raised to the idle or inactive level, said needles holding the course of stitches last drawn by them. Succeeding oscillations of the cylinder 1 with all the short butt needles 4 concurrently active, will obviously determine knitting of a flat, parallel sided, selvage edged prolongation "P" as in integral continuation of the tubular leg portion "L" of the stocking blank. Although important in connection with rotary knitting, the special features, hereinbefore described as incorporated with the projecting cams 20 for the web holders 16, are doubly important while the selvaged tabs are being knit. It will at once be apparent that under the action of the springs 27, the projecting cams 20 aforesaid are urged against the butts 21 of the web holders 16 so that the possibility of lost play of the web holders 16 at the regions of stitch formation indicated at "X" in Fig. II is absolutely precluded. It necessarily follows therefore, that the yarn holders are at all times projected to the maximum extent in opposition to any inherent tension of the loops, as well as, what is of still greater importance, in opposition to the restraining tendency of the main portion of the blank held by the needles 3 against forward progression of the fabric which is to constitute the prolongation "P", or, in other words, the free casting of the loops incidental to its formation, especially the loops of the selvages and those immediately contiguous. In absence of the provision whose function has just been explained, the fabric simply accumulates or "backs up" upon the needles, it being often punctured by the needles as they rise to take new thread. As a result, tuck stitches, drop stitches, or even fractures invariably appear along the selvage edges of the prolongations P. Such contingencies are entirely obviated by my invention, the selvages produced being absolutely perfect and characterized by uniformity in the stitches or loops constituting them, and furthermore capable of being readily transferred for addition of stocking feet to the blanks.

Having thus described my invention, I claim:

In a knitting machine, the combination of a needle cylinder capable of being rotated to produce tubular stocking blanks and oscillated to knit flat selvaged prolongations in continuity of said blanks upon a selected group of the needles, web holders cooperating with the needles in forming the fabric stitches, projecting cams for the web holders, having movement limiting slots therein, said projecting cams being pivoted at one of their ends with the limiting slots concentric therewith and having their other ends engaging the web holders at the stitch casting points, leaf springs tending to swing the cams about their pivots and urging them forward to avoid loose play of the web holders whereby said web holders are projected to the maximum extent and the positive casting of the loops from the needles active during oscillatory knitting thereby assured in opposition to restraint imposed by detention of the main portion of the blank upon the idle needles.

In testimony whereof, I have hereunto signed my name at Easton, Pennsylvania, this 19th day of April 1923.

JESSE C. KANE.