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DROP STITCH MECHANISM FOR FULL FASHIONED KNITTING MACHINES

APPLICATION FILED DEC. 3, 1915.

1,246,797. Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

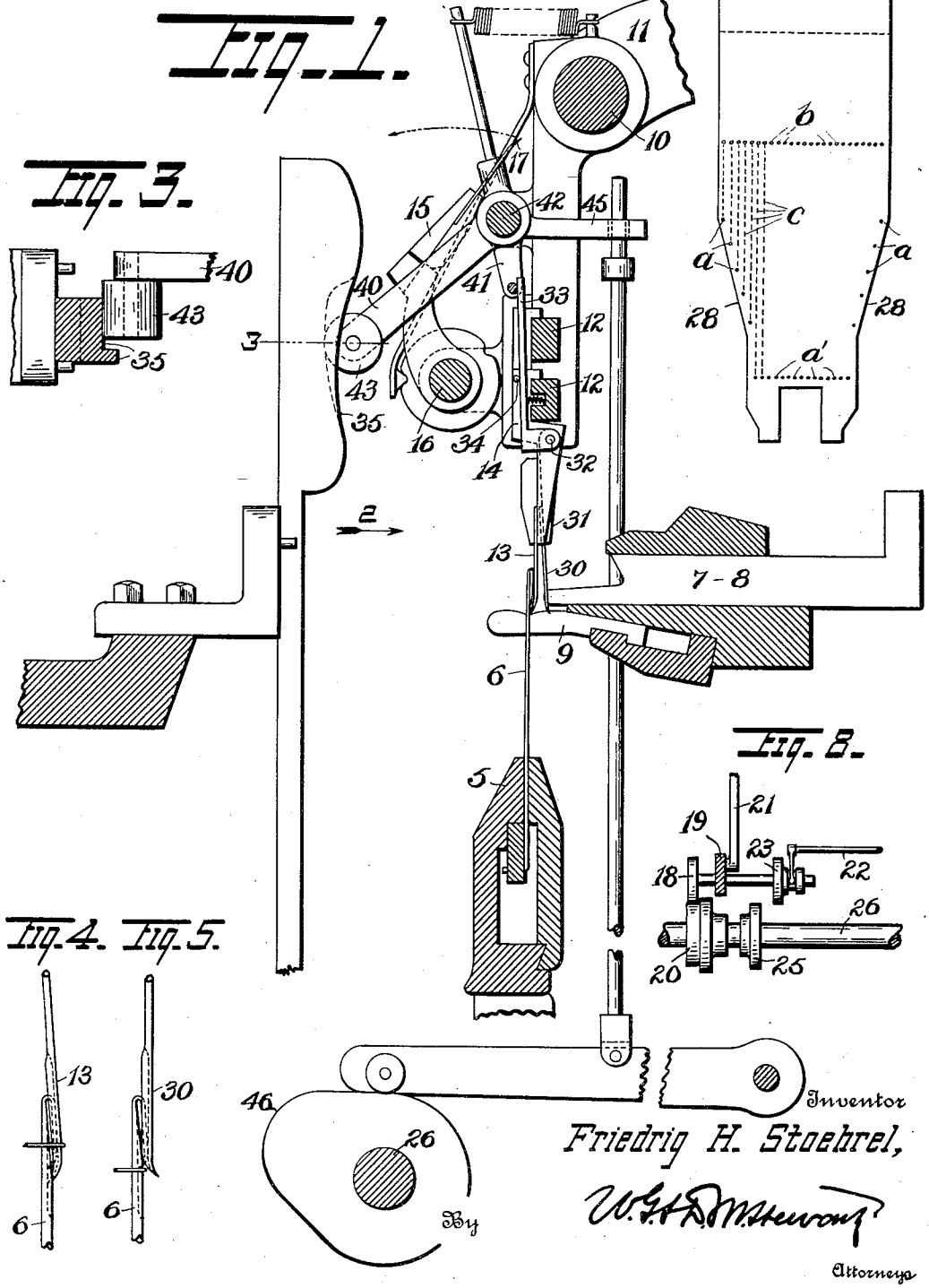


Fig. 3.

Fig. 6.

Fig. 8.

Fig. 4. Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 2.

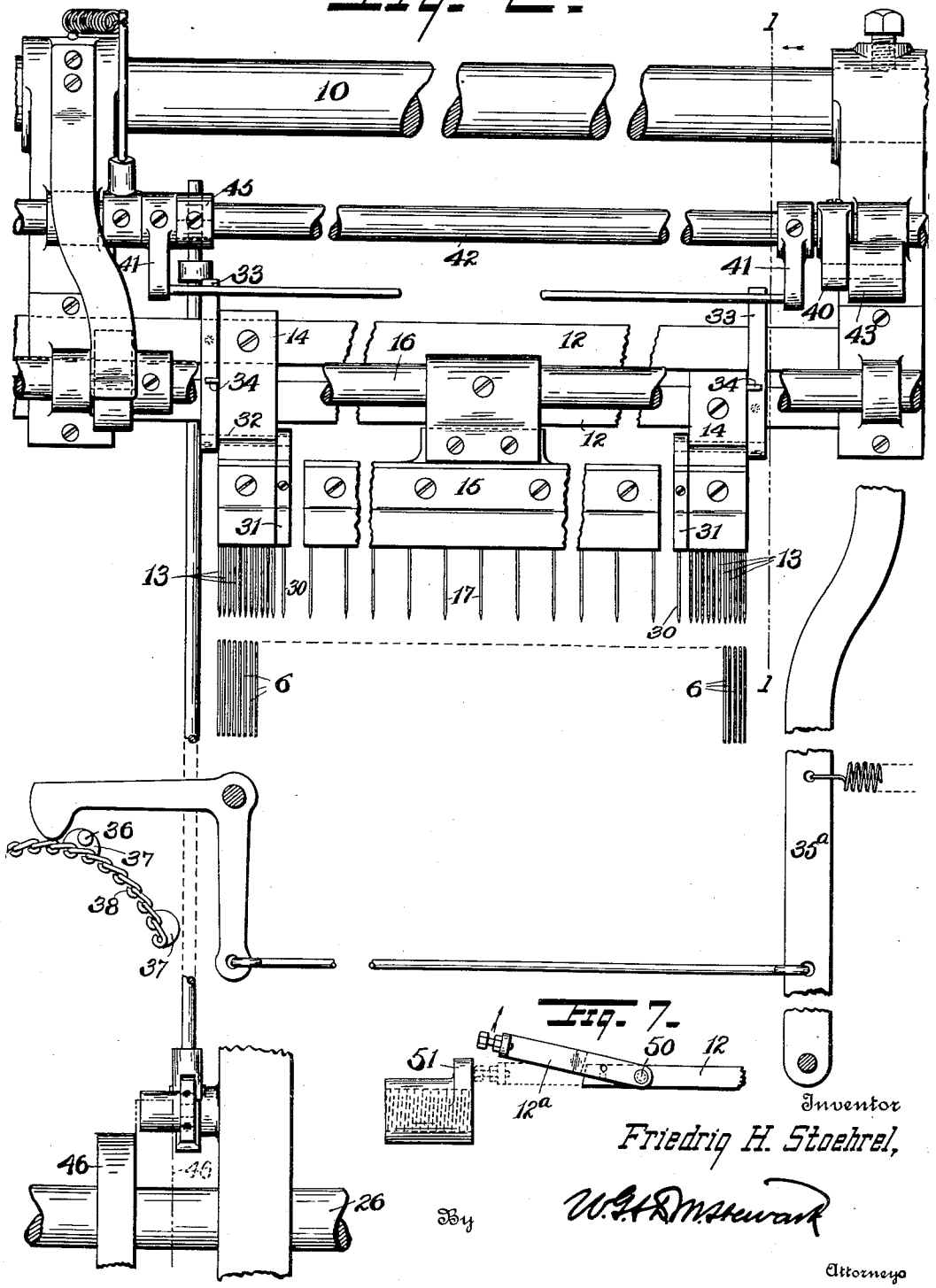


Fig. 7.

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UNITED STATES PATENT OFFICE.

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DROP-STITCH MECHANISM FOR FULL-FASHIONED KNITTING-MACHINES.

1,246,797. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed December 3, 1915. Serial No. 64,812.

To all whom it may concern:

Be it known that FRIEDRIG H. STOEHREL, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, has invented certain new and useful Improvements in Drop-Stitch Mechanism for Full-Fashioned Knitting-Machines, of which the following is a specification.

My invention relates to straight knitting machines having narrowing mechanism as commonly employed for the production of full-fashioned hosiery; and it consists in the application thereto of improved drop-stitch mechanism as fully described in connection with the accompanying drawings, and the novel features of which are specifically pointed out in the claims.

The particular purpose of my invention is to provide for satisfactorily producing vertical drop-stitch stripes in the fashioned articles; and to this end I provide for automatically forming series of properly spaced drop-stitch openings adjacent the narrowed or selvage edges of the fabric as indicated at *a a* Figure 6, in connection with a crosswise series *a' a'* at the most reduced portion of the leg fabric indicated in said figure; each of said drop-stitch openings being located in vertical alinement with a transverse series of lace or transferred-loop openings *b b* in the wider upper portion; the latter openings being adapted to form terminals for vertical stripes *c c* extending from the drop-stitch opening; and the horizontal series of drop-stitch openings *a' a'* serving as guide openings for properly attaching the finished leg fabric to the needles of the footer machine.

The drawings indicate only such portions of the general straight knitting machine construction as are needed to make clear the application of my invention thereto.

Fig. 1 is a cross-sectional view, showing the narrowing and drop-stitch mechanisms, mainly on the line 1—1 of Fig. 2, in coöperative relation to certain portions of the knitting machine structure.

Fig. 2 is a corresponding elevation looking in the direction of the arrow 2 Fig. 1, the drop-stitch cam being broken away, and the lace or loop-transfer bar shown in lowered position.

Fig. 3 is a cross-sectional plan view on the line 3—3 of Fig. 1.

Fig. 4 shows a narrowing point in beard-closing position; and Fig. 5 shows my specially applied drop-stitch point in similar position.

Fig. 6 is a diagrammatic view indicating the product of my invention.

Fig. 7 shows the folding end provided on the narrowing bars.

Fig. 8 indicates the lace-point cam mechanism for operating the lace-point bar.

The knitting bar 5 with its needles 6, and the sinkers and dividers and knock-over bits 7, 8, 9, are mounted and operated as usual; as is also the narrowing mechanism carried by the shaft 10 on swinging arms 11, and which comprises the narrowing bars 12, 12 each provided with a series of longitudinally movable narrowing points 13 rigidly fixed to a carrier bracket 14.

In connection with this narrowing mechanism is carried a lace-point bar 15, which is mounted upon a shaft 16 so as to be readily swung up into inoperative position as indicated in Fig. 1, or down into operative position as indicated in Fig. 2; the spaced lace points 17 fixed to said bar being adapted to serve as loop-transfer points, for determined needle-engaged loops, similarly to the narrowing points 13 indicated in Fig. 4, so as to form the series of lace or transferred-loop openings *b*, *b* as heretofore.

In order to provide for employing these lace points 17 to also form the transverse series of drop-stitch openings *a' a'* shown at the bottom of the leg fabric (Fig. 6), I arrange for temporarily throwing the closed-together points 13 of the reversely adjusted narrowing bars 12, 12, out of the way of the lace point bar 15, so that the latter may be freely swung into service at the reduced lower portion of the fabric; and I also arrange that the movement of the lace point bar be changed so as to produce drop-stitch openings *a' a'* instead of transferred-loop openings as *b b*. The first of these changes I preferably provide for by simply forming each of the narrowing bars 12 with a movable end portion 12^a (Fig. 7), hinged at 50 as shown so as to swing out of contact with the usual narrowing-screw device indicated at 51 and thus permit of the bar being temporarily moved longitudinally to get the narrowing points out of the way of the lowered lace-point bar without changing the position of said device 51. The

requisite change in the movement of the lace-point bar to produce the drop-stitch openings *a' a'* involves merely the dropping of the loops which in the previous operation (forming openings *b b*) were transferred to adjacent needles; and this is readily provided for, as indicated in Fig. 8, by an additional cam 25 on the movable cam shaft 26. The figure shows the cam shaft moved to the right so as to cause the roller 18, of lever 19, to bear on the usual narrowing cam 20, which latter operates the narrowing head through connecting arm 21, in well known manner. When the special holes *a'* are to be made, an additional roller 23 on lever 19 is moved as by means of slide rod 22, into engagement with special cam 25, which latter operates the lace point bar to drop off the stitches instead of transferring them.

The forming of the series of drop-stitch openings *a a* along the narrowed edges 28 of the fashioned fabric, is effected by means of a special drop-stitch point 30, located adjacent each series of narrowing points 13 and automatically movable into and out of alinement with the latter. This point, as shown, is secured to a holder 31, which is fixed to a pivot shaft 32 mounted in the carrier arms 14, and is swung into and out of alinement with the narrowing points 13 by means acting upon the point operating lever 33 on said shaft 32. A stop 34 serves to positively limit this movement in one direction and swinging movement is imparted to the point 30 by a cam 35, which is suitably moved to operative position at determined times; as indicated in Fig. 1 by a pin 36 on certain of the narrowing buttons 37 of pattern chain 38. This adjustably fixed cam 38 may thus be arranged to operate during the vertical movement of the narrowing mechanism when desired, so as to rock the bell-crank arms 40, 41 on the suitably mounted shaft 42, by contact of the roller 43 with said cam, so as to swing the point 30 into alinement with the narrowing points while the latter are descending to disengage the loops from the end knitting needles preliminary to narrowing; though at other times the point 30 will descend in the inoperative position indicated in Fig. 1. As shown in Fig. 5 however the point 30 is adapted to close the beard of the needle on which it acts without engaging the loop thereon, so that the latter will be merely dropped from its needle by subsequent downward movement of the latter instead of being transferred to another needle as are the loops upon the narrowing points 13, Fig. 4.

Owing to the fact that the sinkers and dividers are apt to interfere with the free transverse movement of this drop-stitch point 30 if the latter is allowed to remain in the safely inoperative position indicated in Fig. 1, I have found it to be practically important that means be provided for positioning said point 30 approximately in alinement with the narrowing points during each transverse movement of the narrowing bars 10, so as to certainly avoid contact with any of said parts during such movements; and to this end I provide, as shown, an additional fixed arm 45 on said shaft 42, arranged to be operated at proper times by a special cam 46 on the cam shaft.

It will be seen that my invention provides for mechanically forming vertical drop-stitch stripes at all portions of the leg of a full-fashioned stocking and with absolute uniformity. The specific construction shown may obviously be readily modified without departing from the spirit of the invention.

What I claim is:

1. In a narrowing mechanism for knitting machines, a series of narrowing points, a drop-stitch point movable jointly with said narrowing points and also independently thereof to position it in or out of alinement therewith, and means for effecting such joint and independent movements.

2. In a narrowing mechanism for knitting machines, a longitudinally movable narrowing bar having a carrier bracket, a series of narrowing points rigidly fixed to said bracket, a drop-stitch point movably attached thereto, and means for moving said bar and adjusting said drop-stitch point relative to said narrowing points.

3. In a narrowing mechanism for knitting machines, the combination with narrowing points of a coöperating drop-stitch point, means for throwing the latter into and out of operative position, and means for changing the inoperative position thereof preliminary to the transverse movement of the points.

4. In a straight knitting machine, the combination with narrowing mechanism of means for forming a transverse series of transferred-loop openings, and means for forming a narrowed-edge series of drop-stitch openings located respectively in vertical alinement with openings of said transverse series.

5. In a narrowing mechanism for knitting machines, a series of narrowing points, a drop-stitch point movable jointly with said narrowing points and also independently thereof to position it in or out of alinement therewith, and pattern controlled means for effecting such joint and independent movements.

6. In a straight knitting machine, the combination with narrowing mechanism of means for forming an upper transverse series of transferred-loop openings, a lower transverse series of drop-stitch openings, and a narrowed-edge series of drop-stitch openings, each of both of said series of drop-

stitch openings being located in vertical alinement with one of said transferred-loop openings.

7. In a straight knitting machine, a narrowing bar carrying fixed narrowing points and a coöperating pivotally movable drop-stitch point, and means for positioning said drop-stitch point in or out of alinement with the fixed narrowing points.

8. In a straight knitting machine, a narrowing bar carrying fixed narrowing points and a coöperating pivotally movable drop-stitch point, means for positioning said drop-stitch point in or out of alinement with the narrowing points during vertical movement of the latter, and means for changing its position preliminary to transverse movement of said narrowing points.

9. In a straight knitting machine comprising a transverse series of transfer points and means for operating the same; a transversely movable narrowing bar carrying a series of narrowing points and a drop-stitch point, the latter being adjustable into and out of transverse alinement with said series of narrowing points; means for moving said narrowing bar to bring said drop-stitch point into vertical alinement with said transfer points successively; and means for adjusting said drop-stitch point into alinement with the narrowing points when in such successive positions.

10. In a straight knitting machine, a knitting mechanism comprising a series of knitting needles; a loop transfer mechanism comprising a series of loop transfer points operative on certain of said knitting needles; a narrowing mechanism comprising a series of narrowing points, and a drop-stitch point adjustable into and out of alinement with the narrowing points; and means for adjusting said drop-stitch point into operative position for said certain needles only.

In testimony whereof I affix my signature.

FRIEDRIG H. STOEHREL.