

2 Sheets—Sheet 1.

WELT OR HEM FORMING DEVICE FOR STRAIGHT KNITTING MACHINES.

Patented Aug. 6, 1889.



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H. R. Mathison

INVENTOR:

ELI TIFFANY,

BY *Franklin Scott*, ATTORNEY.

(No Model.)

2 Sheets—Sheet 2.

E. TIFFANY.

WELT OR HEM FORMING DEVICE FOR STRAIGHT KNITTING MACHINES.

No. 408,272.

Patented Aug. 6, 1889.

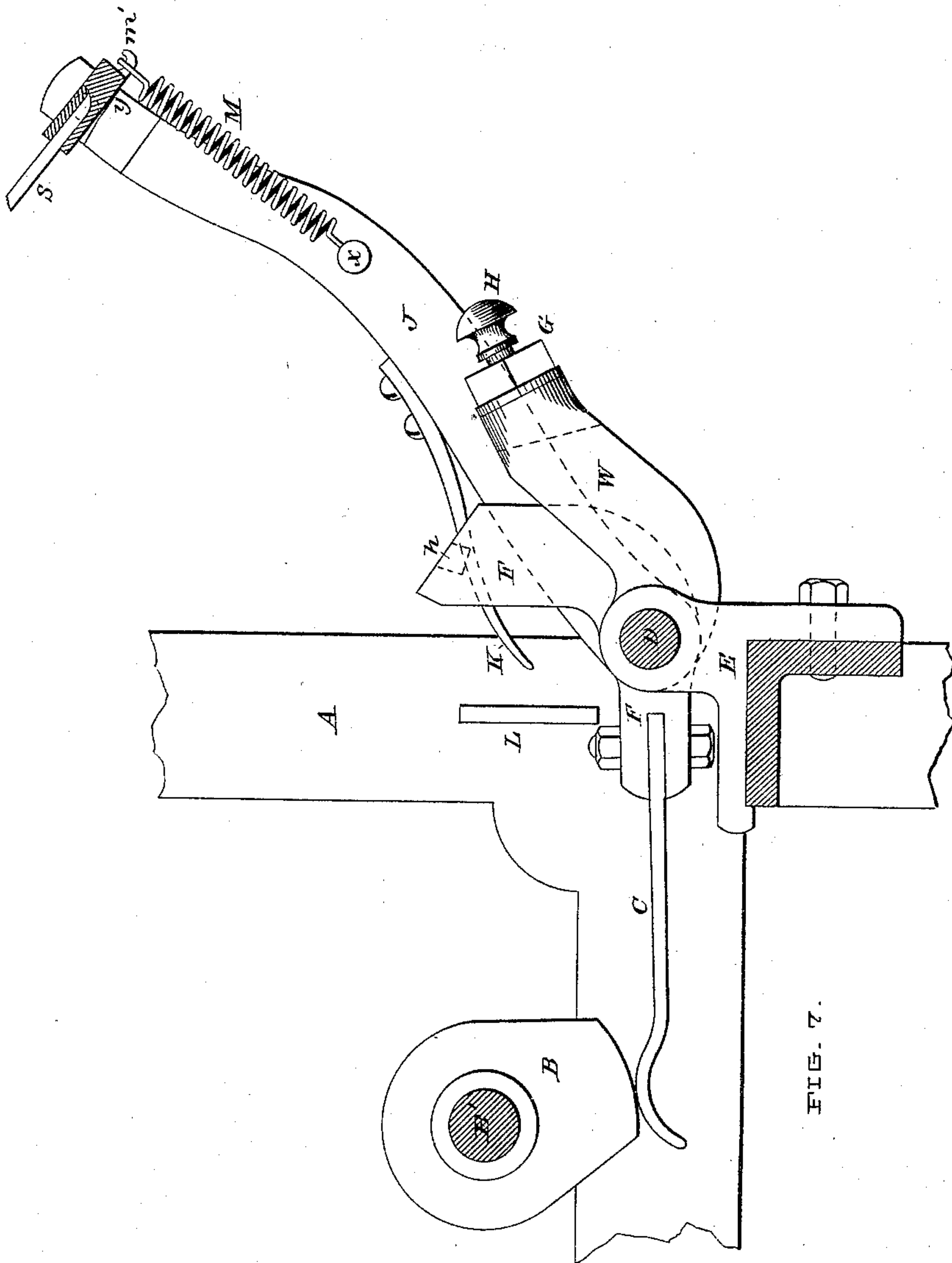


FIG. 7.

WITNESSES:

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UNITED STATES PATENT OFFICE.

ELI TIFFANY, OF BENNINGTON, VERMONT.

WELT OR HEM FORMING DEVICE FOR STRAIGHT-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 408,272, dated August 6, 1889.

Application filed January 12, 1889. Serial No. 296,148. (No model.)

To all whom it may concern:

Be it known that I, ELI TIFFANY, of the town of Bennington, in the county of Bennington and State of Vermont, have invented certain Improvements in Welt or Hem Forming Devices for Straight-Knitting Machines, of which the following description, in connection with the accompanying two sheets of drawings, constitutes a specification.

10 This invention has for its object to provide knit shirt cuffs and borders and drawers-bottoms with a deeper welt or hem than it has been practicable to do hitherto on the ordinary straight-rib-knitting frames where two
15 sets of needles are employed.

In machines for knitting ribbed work for cuffs upon two sets of needles working across each other in the ordinary way welts have been made by arresting the knitting upon the
20 lower or front set of needles and continuing the knitting upon the upper or back set for a limited number of courses, usually five or six, and then casting off the fabric or last course of stitches on the upper set of needles onto
25 the front needles, and then continuing the knitting. Thus a welt is formed the depth or breadth of which has hitherto been limited by the distance measured from the stitch on the upper needles to the row of stitches on the
30 front set of needles, the completed welt being half such distance in depth. One obstacle to prevent the formation of deeper welts on existing machines is the fact that knitting can proceed properly on the upper needles only
35 so long as there is a proper degree of tension on the fabric below, and when the take-up or other tension device has drawn the front course of stitches down onto the front knocking-over bar the tension of the take-up ceases,
40 and if the knitting on the upper needles is carried beyond this point there are no means for holding or keeping the fabric taut, so that as a result imperfect and defective work beyond that point is produced.

45 The object of this invention is to provide means below the upper and behind the front needles for continuing the tension or drag on the fabric produced on the upper needles for any desired time or distance, so as to secure
50 a welt or hem of from one to any greater number of inches in depth.

In the drawings I have shown my invention

as applied to an ordinary straight-rib-knitting frame such as used for knitting flat ribs for cuffs and drawers-bottoms of the general
55 character patented to Eli Tiffany by United States Letters Patent No. 28,133, dated May 1, 1860.

Figure 1 of the drawings is a vertical transverse section taken through the middle part
60 of a section of needles. Fig. 2 is a front elevation of so much of Fig. 1 as illustrates my improvement. Fig. 3 is a transverse section through the needle-bars, and shows the retired position of the vibrating finger-bar. Fig. 65
4 is a transverse section of the finger-bar. Fig. 5 is a modification of the same. Fig. 6 is a plan view of the top side of one end of the finger-bar. Fig. 7 shows the finger-bar thrown
70 back out of action.

The upper needle-bar is seen at Q' and its needles at Q, and the front bar at O' and its needles at O. The cast-off plate for the upper set of needles is seen at R, and the knocking-over plate for the front needles is shown
75 at P. These several parts of the machine are the same as those in common use, and their operations being well understood by knitters I do not here describe their functions.

The leading feature of my improvement
80 consists of the finger-bar N, provided with the series of tension-fingers S, the projecting ends of which are pointed or serrated, as at *u u*, Figs. 4 and 5, in such a way as to take onto the surface of the knit fabric just beneath
85 the upper needles, as seen in Fig. 1. The serrated ends of fingers S are designed to engage the fabric at the point named and press the same firmly against the under inclined surface of the cast-off plate R. As the under
90 side of plate R is inclined downwardly and to the rear, when the points of fingers S commence to bear against the cloth further pressure applied from behind causes such points to slide down against the plate R, and such
95 movement carries the cloth with the points, thus drawing the cloth taut below the upper needles.

The fingers S are set in a bar N, as shown in Fig. 6, and the ends of bar N are fitted
100 with journals *v v*, upon which it oscillates or rocks. As many fingers S are provided as are necessary to secure even and uniform tension of the cloth below the needles to the extent

of a finger-blade between each successive pair of needles, if so many are necessary.

The bar N is journaled in the upper parts of two vertical arms J, (only one is shown in the drawings,) which are fixed on the rock-shaft D. Beneath the journal *v* of bar N is a ledge *y*, against which the back edge of bar N strikes when the fingers S leave the cloth on the back-stroke, being drawn down or rocked into the position shown in Fig. 3 by the retractile force of spring M, which connects hook *m'* with pin *x* of the arm J. Thus in action bar N has a rocking or tilting motion while the fingers S are in contact with the cloth.

The rock-shaft D is journaled at each end in suitable bearings connected with the frame, and also in a central bearing or bracket E, located somewhere about the middle of the frame. Between the cheeks *k' k'* of bracket E the coupling W is rigidly fixed on shaft D, and under it the rocking elbow F is loosely pivoted on shaft D, so that the same can turn therein. The upturned arm of elbow F is fitted to play between the cheeks *f' f'* of coupling W, and the spring-actuated bolt H is fitted in the top of coupling W, so as to play up and down, the lower end locking into a socket *h* in the top of elbow F. When the bolt H is locked in position, as in Fig. 1, elbow F and the rock-shaft D, with its main appendages, become practically a rigid structure adapted to oscillate in the bearings A' at each end of shaft D. The coupling F W permits the finger-bar N to be thrown back, as in Fig. 7, for any purpose.

The horizontal arm *f''* of elbow F carries a spring-lever C, which is adapted to bear against cam B on the main shaft of the machine. The rotation of this cam effects the oscillation of the rock-shaft D and imparts the appropriate reciprocating motion to the finger-bar N.

The upright arms J are one or both fitted with a spring K, which in action bears against the lug L of the main frame to throw the finger-bar back after cam B has passed the tappet-bearing *c'* of the spring-lever C.

A spring is preferably employed for lever C to obviate breakage and soften the impact of the finger-points against plate P.

In practice, when the knitting of the cuff or other article has progressed to the desired length to commence the welt, the further knitting on the front needles is arrested by appropriate mechanism such as is now commonly used for that purpose. The further knitting proceeds on the upper set of needles until enough stitches have been cast off to allow the tension-fingers S to come up be-

tween the needles and press the cloth against the cast-off plate R. From this point onward the knitting progresses in the usual way; but after the yarn has been laid for each course, as needles Q move back the finger-bar N advances and the finger-points *u* engage the cloth and gently force it down below the needles against the plate R, and thus maintain a proper tension of the same during the formation of one row of stitches and the casting off or shedding from the needles of the last previously-formed rows.

By the means aforesaid I am enabled to knit a welt F'' of indefinite length.

I therefore claim as my invention—

1. The combination, with the two series of needles of a flat-rib-knitting machine, of a longitudinal finger-bar provided with a series of fingers which alternate with the needles of one of the said series, a back-stop in proximity to the other series of needles, and means for vibrating the said finger-bar and carrying the ends of the said fingers against the back-stop, substantially as described, and for the purposes set forth.

2. The combination, with the front and rear needles of a flat-rib-knitting machine, of an inclined back-stop in proximity to the rear set of needles, a series of fingers alternating with the front needles, a finger-bar carrying said fingers, bearings for said bar, in which it is permitted to have a movement about its own longitudinal axis, and means for oscillating said bearings, substantially as described, and for the purposes set forth.

3. The combination, with the vertical and horizontal needles of a flat-rib-knitting machine, of a back-stop beneath the horizontal needles, a series of fingers or blades arranged in a horizontal plane, a finger-bar to which said fingers or blades are secured, pivoted supports in bearings on which said bar is mounted, with capacity for movement about its longitudinal axis, and means for vibrating said supports, substantially as described, and for the purposes set forth.

4. The combination of rock-shaft D, elbow-coupling F C W, and spring-actuated bolt H, and arms J J, carrying the finger-bar N and fingers S, with the inclined back-stop R, substantially as described, and for the purposes set forth.

In testimony whereof I have hereto subscribed my name this 27th day of December, A. D. 1888.

ELI TIFFANY.

In presence of—

FRANKLIN SCOTT,
J. M. A. CLOWARD.