J. VICKERSTAFF.

KNITTING MACHINE.

No. 19,740. Patented Mar. 23, 1858.

Fig. 1.

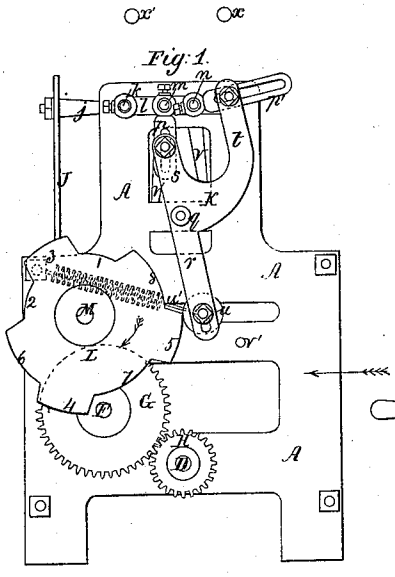


Fig. 2.

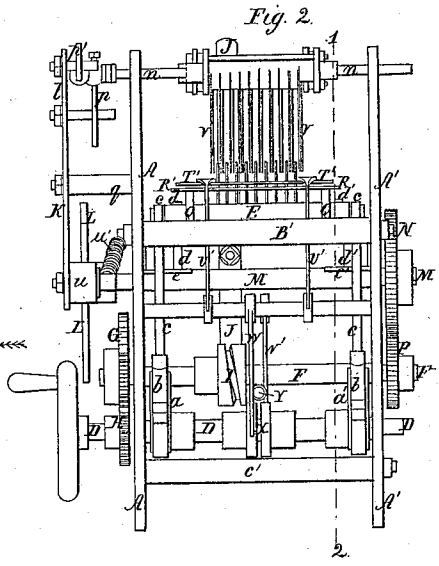


Fig. 3.

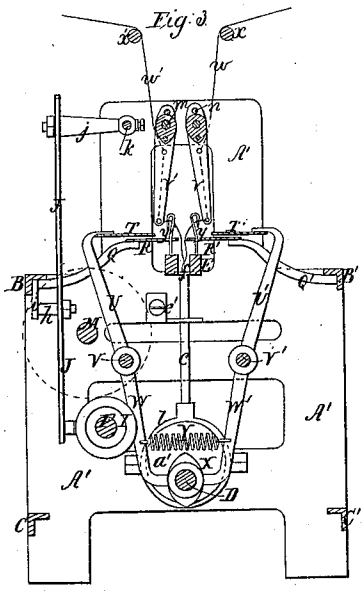


Fig. 4.

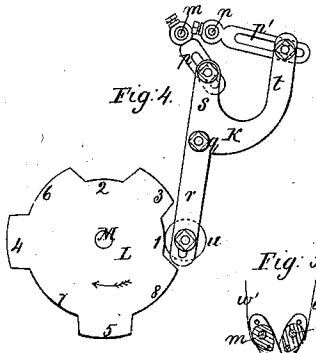
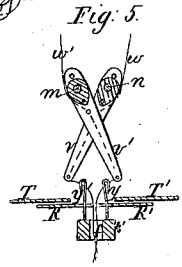


Fig. 5.



UNITED STATES PATENT OFFICE.

JOSEPH VICKERSTAFF, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MARTIN LANDENBERBER, OF SAME PLACE.

KNITTING-MACHINE.

Specification of Letters Patent No. 19,740, dated March 23, 1858.

To all whom it may concern:

Be it known that I, JOSEPH VICKERSTAFF, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Knitting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to an improvement in knitting machines having the ordinary reciprocating hooked needles and pressure bars, and my improvement consists in the employment of two sets of thread guides actuated by a cam wheel and levers, fully described hereafter, in such a manner that their respective threads may be knitted first by one, and then by another set of needles, for the purpose of producing an ornamental knitted fabric, both sides of which shall present a plain, uninterrupted surface of loops, free from the loose, unknitted threads common to other ornamental knitted fabrics, as described in the patent granted to my assignee, Martin Landenberger, on the sixteenth day of June, 1857.

In order to enable others skilled in the art to make and use my invention, I will now describe its construction and operation.

On reference to the drawing which forms a part of this specification Figure 1 is an end view of a knitting machine with my improvements. Fig. 2 a side view looking in the direction of the arrow, (Fig. 1.) Fig. 3 a transverse section on the line 1, 2, (Fig. 2.) Fig. 4 a detached view of the device for transposing the threads, and illustrating the same in a different position to that exhibited in Fig. 1. Fig. 5 a detached view illustrating one of the positions assumed by the thread guides during the movement of the machine.

Similar letters refer to similar parts throughout the several views.

The framework is composed of the two standards A and A′, connected together by the upper bars B and B′, and the lower bars C and C′.

D is the main driving shaft turning, in the opposite frames A and A′, and on this shaft are two eccentrics *a* and *a′* each being embraced by a strap *b* on the end of each of the rods *c c*. The upper end of one of these rods is jointed to one end of the needle bar E and the other rod to the opposite end of the bar, as seen in Fig. 2.

The needle bar is guided during its reciprocating movement by the rods *d* and *d′*, attached to the brackets *e* and *e′*, one of which is secured to the inside of each of the opposite standards A and A′. A longitudinal opening *f* (Fig. 5) is formed in the needle bar for the passage of the knitted fabric.

F is a shaft turning in the opposite standards and furnished with a cogwheel G which gears into and is driven by another cogwheel H on the main shaft D. On this shaft F is a scroll cam I, into the groove of which fits a pin projecting from the end of the lower arm of the lever J, which has its fulcrum on a pin *h* projecting from a bracket *i* attached to the bar B of the framework. From the end of the upper arm of the lever J projects a bracket *j*, the end of which embraces and is connected to the rod *k*, which is arranged to slide in the opposite standards of the machine. One end of the rod *k* is attached to a bar *l*, to which the two rods *m* and *n* are so connected as to be capable of turning freely within the bar but to have no other motion independent of the same. On the end of the rod *m* is secured a slotted arm *p*, and on the end of the rod, *n*, another slotted arm *p′*.

K is a lever hung to a pin *q*, which projects from and is attached to the standard A of the framework. This lever has one lower arm *r* and two upper arms *s* and *t*. On the end of the lower arm is secured a pin, on which is a roller *u* which bears against the cam wheel L hereafter alluded to. A spiral spring *u′* one end of which is attached to the pin on the arm *r*, and the other end to the standard A causes the roller *u* to bear against the projections and recesses of the said cam wheel as the latter revolves. A pin on the end of the upper arm *s* of the lever K fits into the slot of the arm *p*, and a similar pin on the arm *t* of the same lever fits into the slot of the arm *p′*.

The cam wheel L is secured to one end of the shaft M, which turns in the opposite standards, the other end of the shaft being furnished with a cogwheel N, which gears into and is driven by another cogwheel P on the shaft F.

On each of the rods *m* and *n* are secured a series of arms *v* and *v′*, which I term thread

guides. A series of threads w (Fig. 3) pass from bobbins over the bars x, through the holes near the upper ends of the thread guides v, and downward through the holes at the lower ends of the same, where they are operated upon by the needles. Another series of threads w' pass from bobbins over the bars x', and through holes in the thread guides v' in a precisely similar manner. To a bracket Q on the bar B of the framework is secured a plate R, a similar plate R′ being attached to a bracket Q′ on the opposite bar B′. Each of these plates has a series of holes through each of which operates one of the opposite series of needles y and y' on the needle bar E. Above the plates R and R′, but free from contact with the same, are the pressure plates T and T′, the former being attached to the levers U, and the latter to the levers U′. The lever U is secured to the rod V, the ends of which turn in the two standards A and A′ of the framework, and the lever U′ is secured to the rod V′, the ends of which also turn in the standards of the framework. To the rod V is secured a lever W, and to the rod V′ the lever W′, the ends of both levers being bent inward toward each other, so that the double cam X, on the driving shaft D can operate upon them simultaneously, moving them outward, and consequently moving the pressure plates T and T′ toward each other as the cam revolves, the inward movement of the levers W and W′, and outward movement of the pressure plates T and T′ being effected by the spiral spring Y.

Operation: On turning the driving shaft D, the following movements will take place: First, a vertical reciprocating motion of the needle bar E and its needles, imparted by the eccentrics on the driving shaft D. Second, the horizontal motion of the pressure plates T and T′, imparted by the cam X on the driving shaft. Third, a longitudinal, reciprocating motion, imparted to the rods m and n and their thread guides v and v' by the action of the scroll cam I upon the lever J. Fourth, the continuous vibrating movement of the thread guides caused by the action of the cam L on the lever K, and by the action of the latter on the arms p and p' of the rods m and n. Fifth, the transposing movement of the thread guides caused by the peculiar form of the cam L, acting in conjunction with the above mentioned lever K and arms p and p'. The fourth and fifth movements combined, form the especial novelty of my invention.

It should be understood, that the needles used in the above described machine, are the usual elastic hook-needles employed in other knitting machines, that the movement of the pressure bars against the elastic hooks of the needles, the longitudinal, reciprocating motion of the thread guides, and the continuous, vibrating movement of the same, are all common to other knitting machines, and are necessary to the formation of the loops of the fabric. The manner of accomplishing this is too well known to those engaged in the art to require further description.

It will be observed, that the edge of the cam wheel L, against which the roller u on the lever K bears, is of a peculiar form; portions of its edge being nearer to the center of rotation than others. Thus the tops of the projections marked 4 and 5 are farthest from the center; those marked 3, 6, 7, and 8 nearer to that center; and those marked 1 and 2 still nearer.

Supposing the cam wheel to be turning in the direction of the arrow (Fig. 1); as that portion of its edge containing the alternate projections and recesses marked 4, 7, 5 and 8, bears against the roller u on the lever K, a vibratory motion must be imparted to the latter, and communicated to the thread guides, by the action of the arms s and t of the lever K upon the slotted arms p and p' of the rods m and n. This vibratory motion, however, is merely that which is absolutely necessary for the formation of the loops, and, during its continuance, the needles y are knitting with the threads w a fabric independent of that knitted by the needles y' with the series of threads w'. As the camwheel continues to revolve, however, the wheel on the end of the lever K is drawn by the spiral spring u' into the recess 1, which causes the lever, and with it the thread guides to assume another position, the guides crossing each other as seen in Fig. 5. As the portion of the camwheel having the alternate recesses and projections marked 1, 3, 2 and 6 act upon the lever, the vibrating movement of the thread guides necessary to form the loops is continued, but with the thread guides crossing each other as seen in Fig. 5, so that the needles y, which were previously employed in knitting the threads w, are now knitting the w', and the needles y', which were previously knitting the threads w', are now employed on the threads w. Thus, as the camwheel revolves, not only is the vibratory movement, which in conjunction with the movement of the pressure bar and needles is necessary for forming the loop of the fabric, imparted to the thread guides, but also the latter are transposed at intervals, so that the needles may operate, first on one series of threads and then on the other alternately. If the opposite series of threads be of different colors, there will be produced an ornamental, knitted fabric, composed of two separate thicknesses, interlocked at intervals during the process of knitting, both sides of the said fabric presenting a plain, uninterrupted surface of loops, free from the loose, unknitted threads common to

other ornamental, knitted fabrics, as described in the patent granted to Martin Landenberger as my assignee on the sixteenth day of June, 1857.

It will be easily seen that fabrics may be produced of the most elaborate patterns by varying the colors of the opposite series of threads and by frequent or irregular transposition of the thread guides.

I claim and desire to secure by Letters Patent—

Imparting to two sets of thread guides the continuous, vibratory movement, combined with the transposing movement, herein described, by means of the cam wheel L, acting in conjunction with the lever K and arms p and p' or equivalent devices, for the purpose specified.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

JOSEPH VICKERSTAFF.

Witnesses:
HENRY HOWSON,
C. WEILER.