

W. Mansfield.

Sheet 1 of 2 Sheets.

Straight Knitting Mach.

Patented Mar. 22, 1853.

No. 9,620.

Fig. 1.

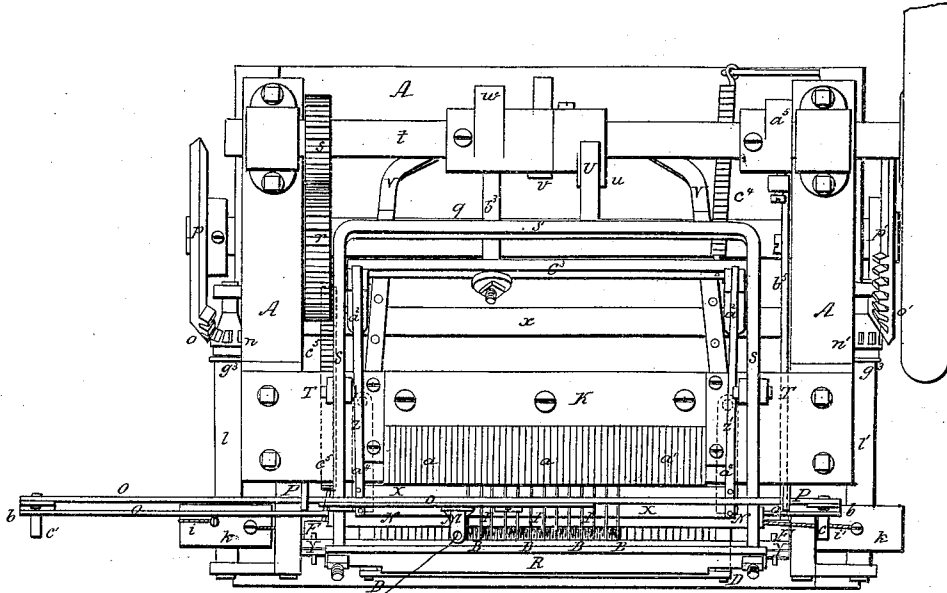
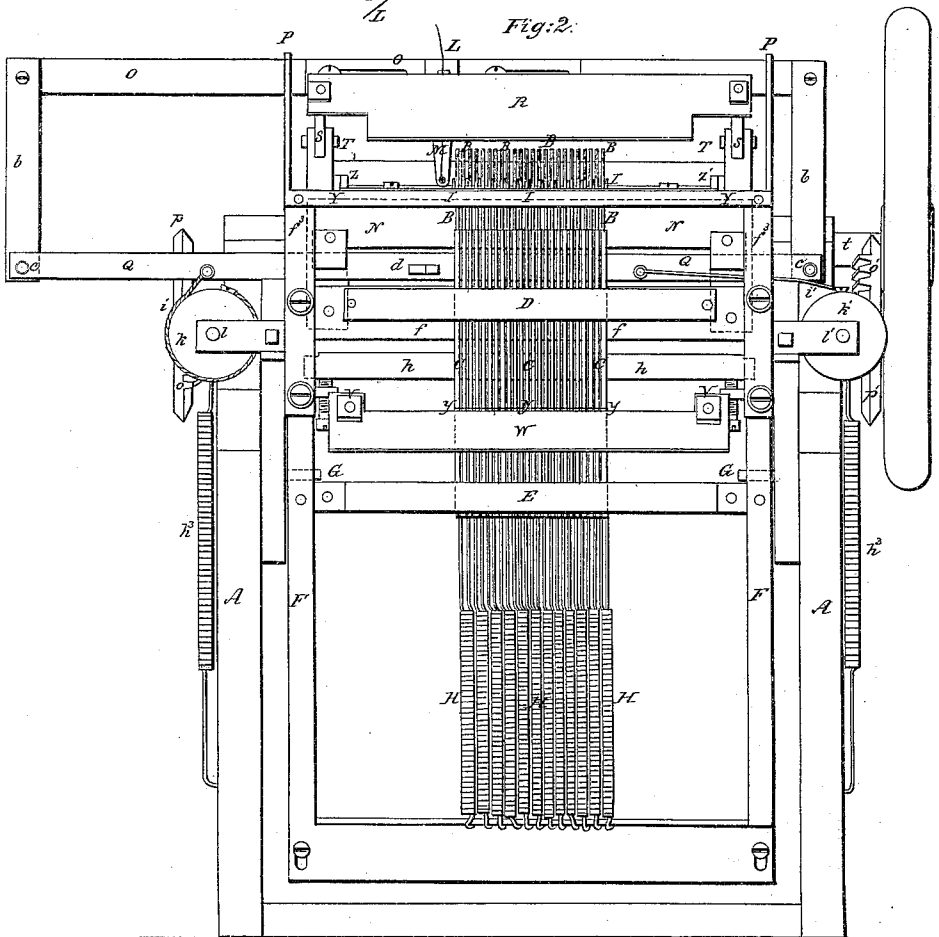


Fig. 2.



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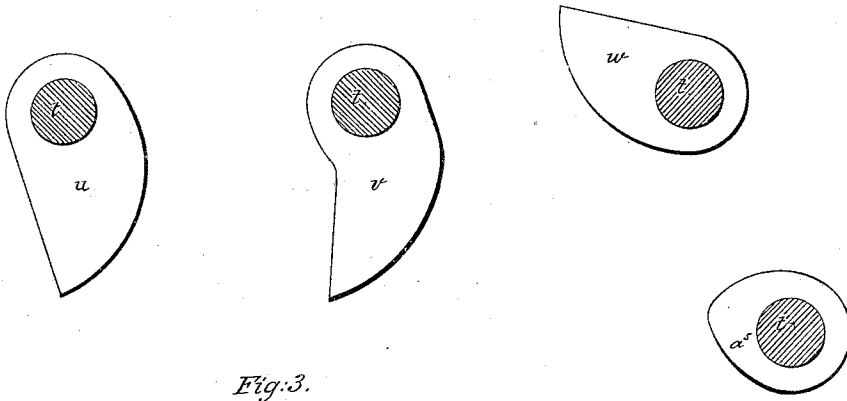
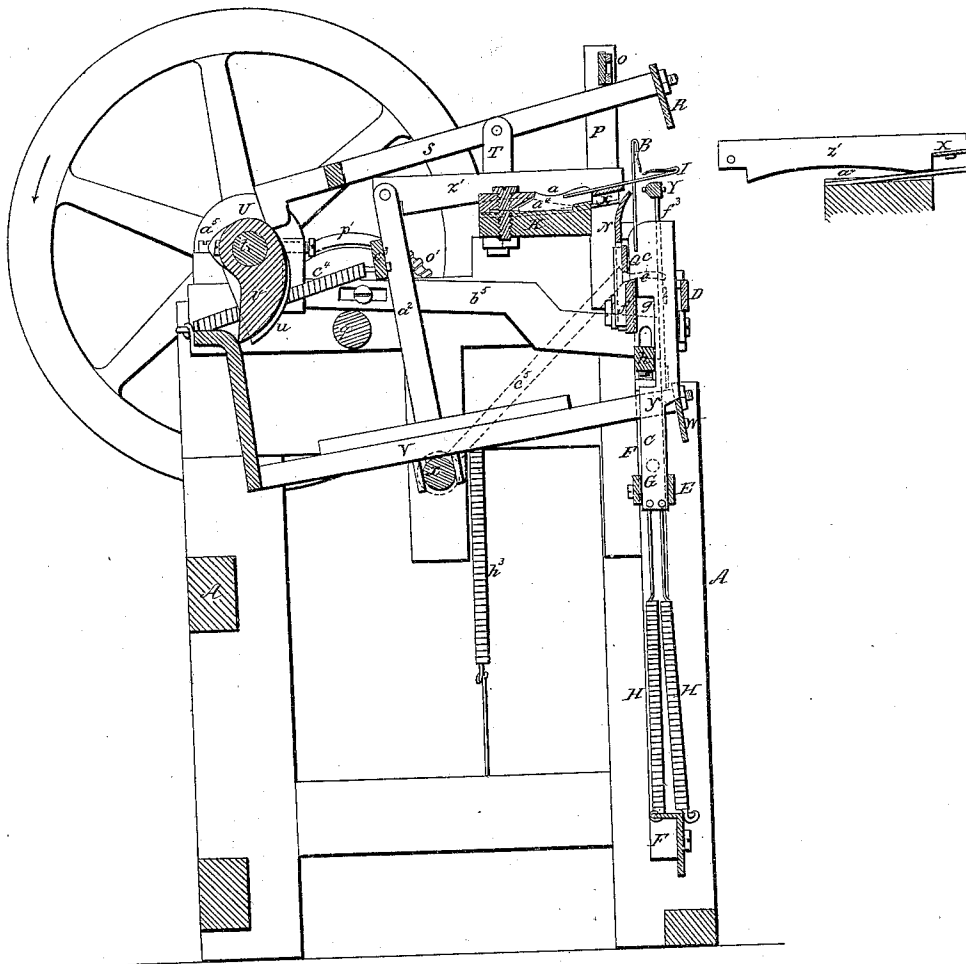


Fig. 3.



UNITED STATES PATENT OFFICE.

WILLIAM MANSFIELD, OF DRACUT, MASSACHUSETTS.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 9,626, dated March 22, 1853.

To all whom it may concern:

Be it known that I, WILLIAM MANSFIELD, of Dracut, in the county of Middlesex and State of Massachusetts, have invented a new or Improved Machine for Knitting Ribbed Knit Fabrics; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof.

In the said drawings, Figure 1 denotes a top view of my said machine. Fig. 2 is a front elevation of it. Fig. 3 is a vertical and central cross-section.

By means of the said machine I perform the operation of knitting a piece of goods by means of a single thread or yarn taken from a bobbin and two sets or series of hooked needles.

The main or principal feature of novelty in my invention consists in the manner of operating one set of needles with respect to the other set.

Having thus premised, I shall proceed to particularly explain the construction of my said machine.

In the said drawings, A denotes the frame of it, which shall be properly constructed to sustain the operative parts and allow of their requisite movements.

B B B, &c., is a set of hooked needles arranged in an upright position or thereabout, as seen in Figs. 2 and 3. Each of the said needles projects from one of a set of slides C C C, each of which takes the form as seen in Figs. 2 and 3. These slides play lengthwise through suitable sustaining and guiding bars D E, that extend horizontally across and are fastened to a frame F, that is made movable on pivots or journals G G.

To each of the slides C there is a spring H for the purpose of drawing said slide (and of course its needles) downward at a proper time.

Another set of needles I I I are arranged horizontally or thereabout, as seen in Figs. 1, 2, and 3, and work across the first set. In the drawings they are in number with respect to that of the first set such as are sufficient to produce what is usually termed by stocking-weavers the "two and one ribbed work"—that is to say, when the rib on one side is double the width of that on the other side.

There may, however, be an equal number of needles in each set, so as to produce ribs of the same width on both sides of the cloth. In this machine the upper needles are stationary ones, they being fixed into leaden or metallic sockets *a a*, &c., that are firmly secured within a frame or holding-bar K. The barbs or points of the stationary needles are severally arranged with respect to those of the movable needles or those of the other set, as seen in the drawings.

The yarn L is to be led to the yarn-guide M from a bobbin conveniently situated and made to operate so as to deliver it as fast as it may be woven. The cloth as woven hangs from the two sets of needles (there being a set of stitches on each set of needles) and over the top and against the rear side of a horizontal plate or bar N, that is attached to the movable or rocking frame F.

The yarn-guide M is attached to a horizontal slide-bar O, that slides freely and longitudinally through two stationary standards P P. From the ends of the bar O two arms *b b* extend downward and have pins *c c*, projecting respectively from them and through corresponding holes made through a sliding slur-cock bar Q, that is made to slide longitudinally back and forth with the bar O, and is supported by the frame F. A small slur-cock or triangular cam *d*, fixed on the front side of the bar Q, moves with said bar, and is for the purpose of successively throwing or moving forward the slides of the needles B B, so as to throw their shoulders *e* off the sustaining-bar *f*, and thereby set the slides free, so as to enable their springs to draw them downward until other shoulders *g* of them rest on another bar *h*.

The yarn-guide and the slur-cock are to be moved simultaneously either in one direction or the other by means of any suitable mechanism. That which I employ may be thus described:

To the slur-cock bar Q two cords or bands *i i'* are attached and wound around pulleys or wheels *k k'*, situated as seen in Figs. 1 and 2 and respectively fastened on the ends of two horizontal shafts *l l'*. There is a beveled pinion *n n'* on each of the shafts *l l'*, which pinion engages with an arc *o* or *o'* of beveled cogs placed on the side of a wheel *p* or *p'*, the said two wheels *p p'* being fixed on the re-

spective extremities of a long horizontal shaft q , the whole being arranged as seen in the drawings. The shaft q is connected by gears r s with the main driving-shaft t , so that when the said driving-shaft is put in revolution the shaft q will also be rotated. The arcs of teeth o o' on the wheels p p' are arranged so as to give the necessary movements and intervals of rest to the slur-cock and the yarn-guide.

There are three cams u v w fixed on the main shaft t . The first of them—viz., the cam w —actuates the presser of the stationary needles, the said presser being seen at R. It is placed directly over the barbs of the needles and affixed to a tilting frame S, that rocks in bearings at T T, and has a projection U extended down from it toward and against the cam. The spring of the needles, after the presser has performed its office on them, will generally elevate the presser sufficiently above them. Should this not be the case, such elevation may be effected by a spring properly applied. The middle or next cam v serves to elevate the movable needles from their lowest to their highest positions. It actuates a tilting frame V, that rocks on a shaft x and has a bar W fixed on its front end, which bar in rising upward passes under the shoulders y of the slides of the movable needles and elevates them. The weight of the bar W or a spring may be employed to depress the bar before the needles fall down when the slur-cock is brought against their slides. The third or last cam w operates the slide or plate bar X, that is placed directly underneath and against the stationary needles, and is for the purpose of moving the work forward, so as to cast the stitches over the loops on the said needles and entirely off them (the needles.) The said slide X is made to rest on and is pressed upward or against the needles by springs, which are situated in the frame and respectively underneath the two bars z z' , to which the slide is attached, the same being represented by dotted lines at a^1 a^1 in Figs. 1 and 3. The bars z z' are respectively jointed at their rear ends to arms a^2 a^2 , that extend upward from the rocker-shaft x . A projection b^3 extends back from a bar c^3 , that is fastened to the arms a^2 a^2 , the said projection being made to bear against the cam w . The back movement of the bar X is effected by the contraction of a spring c^4 , one end of the said spring being attached to the frame or a projection therefrom, while its other end is connected to the cross-bar c^3 .

Directly in front of the movable needles and attached to the frame F by springs f^3 f^3 is a pressure-bar Y, whose office is to close the barbs of the needles or press the hooks against the shanks of the needles when the said needles descend. The upper part of the frame F is moved backward by the upward movement of the bar that raises the movable needles. A wire or friction brake or strap g^3 is placed on each shaft l l' and borne down

against it by a spring h^3 , the object of the said friction-brake being to prevent improper movement of the shaft to which it is applied.

In my machine the two sets of needles cross each other while working, and when crossed the yarn is laid on the stationary needles and in the angle made between them and the other set. In order to explain the operation of the machine, we will suppose that the movable needles are all elevated to their highest positions and between the stationary needles and so that the barbs of the movable needles shall rise a short distance above the stationary needles, or so as to cause all the shoulders e to be thrown upon the bar f . As the shoulders y , y , &c., of the slides of the needles are made to stand at an obtuse angle to the front edge of the part of the slide below them the upward bearing of the bar W against them will cause the slides not only to move upward but to be pressed backward, so as to throw their shoulders on the sustaining-bar f when they rise above it. We will also suppose that on each set of needles there is a row or stitches of the work or fabric; also, that the yarn-guide is to pass across the rows and lay the yarn in the angle between the two rows and close up to the vertex of the angle. This being the situation of things, the slur-cock is next moved across the machine. In doing this it will throw the needle-slides successively forward, so as to enable their springs to successively depress them and the needles. It will also throw the barbs of the needles against the presser-bar Y, which will close them down against their respective shanks. When the needles descend, their barbs or hooks pass over and hook upon the yarn, and soon after the points of the hooks pass below the yarn. Such points are closed down by the presser to the extent that will enable them to pass through the stitches on their respective shanks. In descending, the needles not only form their loops and drag them through their stitches, but it will be seen also that as they descend a short distance below the stationary needles they form loops of yarn on them and back of the points of their hooks. Next the upper presser R or that of the stationary needles is brought down upon their barbs (so as to close them down) and the slide X moved forward so as to move the back stitches or those on the stationary needles over the barbs and needles, and thereby cause the loops within the hooks to be drawn through the stitches in order to form new stitches. Before, however, the back stitches can reach the presser R it is elevated or thrown up above them, and this by the springing or recoil of the needles or barbs when the extreme point of the cam u passes beyond the projection U. Next the slide X is caused to suddenly retreat back to its rear-most position. Next the work is moved entirely back on the stationary needles, this taking place by reason of the upward pressure of the lifter-bar W against the lower

shoulders of the needle-slides. As the bar W is situated in front of the turning pivots G G of the frame F, it will be seen that the upward pressure of the bar will cause the upper part of the frame to tilt or move back so as to move the work back on the stationary needles. Next the bar W rises upward sufficiently to elevate all the movable needles up to their highest positions and cause the shoulders *e e*, &c., of their slides to rest on the bar *f*. The yarn-guide next moves in an opposite direction and lays the yarn in the angle of the two rows of needles, and the operation of forming the stitches again goes on. When the work is pressed forward by the slide X, the upper part of the frame F is moved forward by a cam *a*⁵, which acts against a slide-arm *b*⁵, that is jointed to the frame. The back movement of the frame is effected by a spring *c*⁵. From the above description it will be seen that by the peculiar movement or successive depression of the movable needles loops are not only formed on them but they form loops on the stationary needles, such effect taking place by their conjoint action. The loops are formed on both sets of needles by the conjoint action of the two sets in separating apart after the yarn

has been laid between them. Thus by such an operation I am not obliged to make use of sinkers and their operating machinery, such as are in use in other hosiery-loom. In this way I very much simplify the mechanism of the loom for producing ribbed work. By dropping or moving the needles of each set successively while the yarn is passing through the angle of their decussation we are enabled to take up the yarn as fast as wanted without such a strain being produced on it as would be liable to prevent the proper working of it.

What, therefore, I claim as my invention, is—

The above-described improvement in forming the loops in knitting ribbed fabrics—viz., by the combination of two sets of needles made to operate together, substantially as hereinbefore set forth—the same enabling me to gain important advantages in the construction and operation of the loom.

In testimony whereof I have hereto set my signature this 17th day of March, A. D. 1852.

WILLIAM MANSFIELD.

Witnesses:

JOHN T. K. ADAMS,
JOEL ADAMS.