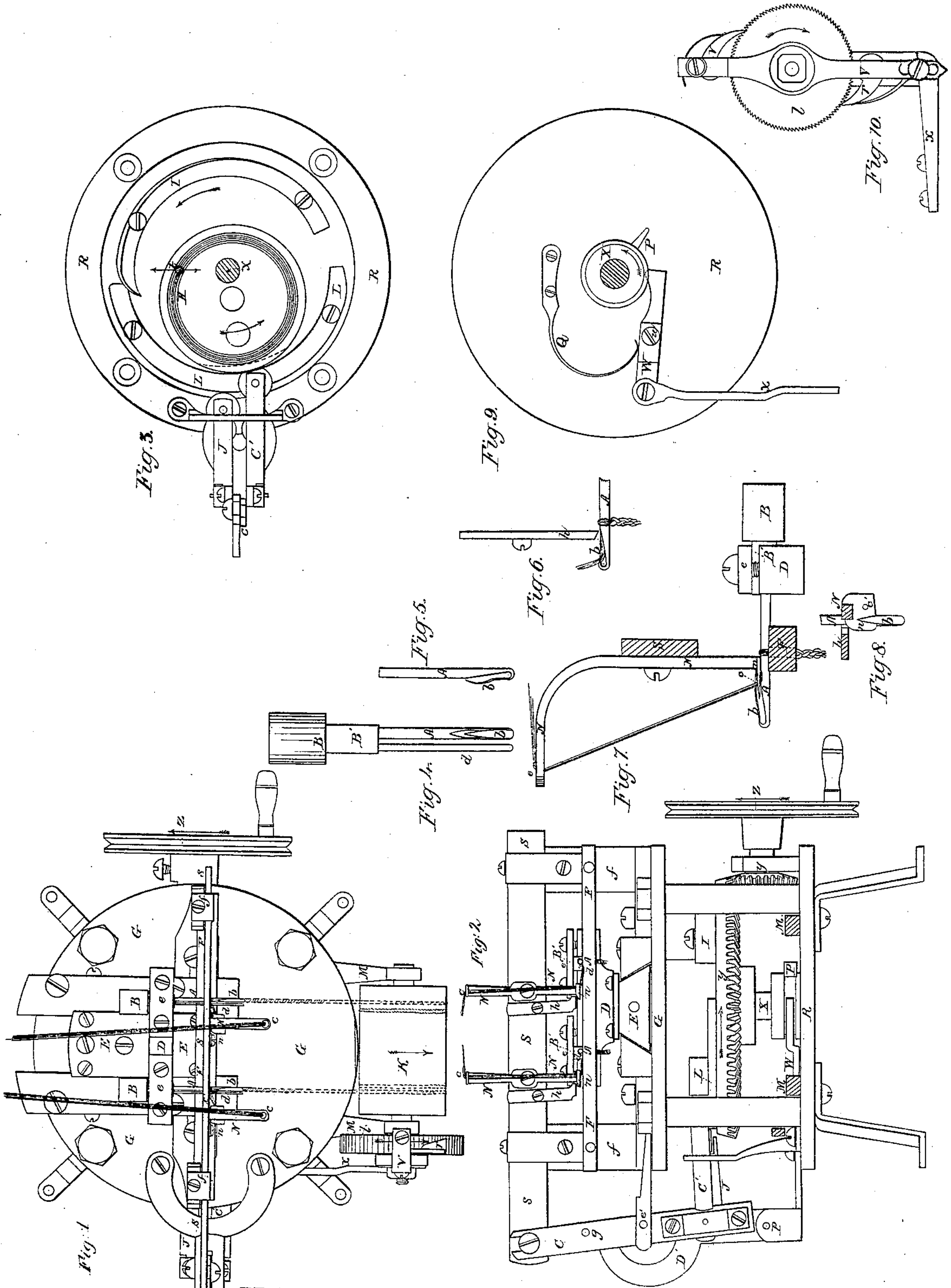
Westcott & Walcott.

Straight Knitting Mach.

No. 48,878. Patented Jul. 18, 1865.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MACHINES FOR KNITTING SHOE-LACINGS, &c.

Specification forming part of Letters Patent No. **48,878**, dated July 18, 1865.

To all whom it may concern:

Be it known that we, NATHANIEL W. WESTCOTT, of Providence, in the county of Providence and State of Rhode Island, and HENRY L. WALCOTT, of Charles River Village, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Machines for Knitting an Improved Article for Lacings, Bindings, &c., of yarn taken directly from the cop; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of our improved machine. Fig. 2 is a front elevation and section of the same. Fig. 3 is a plan of the cams and their connections that operate the knitting instrument. Fig. 4 is a plan, and Fig. 5 is a side view, of the knitting-needle, (double size.) Figs. 6, 7, and 8 are details illustrating the operation of the needle and its auxiliaries in forming the stitch. Fig. 9 is a plan of the cam and its connections that operate the "take-up" that winds the cord or braid as fast as it is knitted. Fig. 10 is a side elevation of the take-up mechanism detached.

Similar letters of reference indicate corresponding parts in all the figures.

Our invention consists in operating a needle with a spring tongue or beard by the aid of certain instrumentalities so as to knit a number of strands of yarn coming direct from the spun cops (and without twisting the same together) into a knotted cord composed of a chain of loops, the same furnishing an improved article for lacings, bindings, and for other purposes.

Heretofore it has been found necessary to spool and twist the required number of strands from several cops into one string before it could be successfully knitted, the difficulty being that the tongue of the needle would separate and enter between some of the strands, if they were not twisted together, by which accident either the tongue or the yarn was broken and the operation of the machine thereby deranged, and our improvement is calculated to guard against this difficulty, and to knit the yarns directly from the cops with great rapidity.

In Figs. 4 and 5 of the drawings, A is the needle, having a spring-tongue, *b*, at its extremity, and *d* is a looping-pin, arranged parallel to the shank of the said needle, both being confined in the metal block B. This block is formed with a square neck, B′, by which it is confined beneath the cap *e*, and held firmly in the needle-bar D on the slide E, which reciprocates horizontally on the upper plate, G, of the machine, as indicated by the arrow, by motion communicated to the stud *t* thereon from the groove-cam H formed on the upper face of the cylindrical portion H′, forming part of and set eccentrically on the revolving toothed disk, as seen in Fig. 3, as it revolves. One or more needles may be confined and operate in the same needle-bar. In the drawings two are represented, both operating simultaneously by the same mechanism.

A rest-bar, F, Fig. 7, extends directly beneath the said needle at right angles thereto, and is supported at both ends by the upright stands *f f*, as shown in Fig. 2, and there is an opening in the said bar, directly under the needles, through which the knitted cord is drawn from the needle by the take-up mechanism.

The chain of loops composing the knitted cord is formed by thrusting successive loops through preceding ones, which are cast successively upon the needle, and the office of the looping-pin *d* is to double the yarn to form such loops in the manner which will presently be explained.

In connection with the spring-tongue needle A a shear or guard, *n*, Figs. 7 and 8, is used, which has a movement across and directly above the shank of needle, for the purpose of doubling the yarn over the looping-pin and carrying it beneath the tongue of the needle to cast on the new loop, and to lift the point of the tongue while it is passing over the said loop. This shear is a thin metal blade formed, as shown, on the end of the rod N, which is secured to the sliding bar S, sliding in bearings formed at the top of the stands *f f*, by motion

transmitted through the lever C, pivoted at e', and the connection C′ from the revolving cam I, Figs. 2 and 3. In the upper end of the rod N there is an eye or yarn-guide, c c, and another, c', through the shear n, through which the yarn (represented in red lines in the several figures) passes from the cops to the needle.

Besides the shear n, above described, a depressor, h, Fig. 6, is used connection with the spring-tongue b of the needle, for the purpose of depressing the point of the tongue beneath the surface of the shank after it has passed over the newly-formed loop, so that the loop already on the needle may pass over the tongue and be cast off in the manner shown, and to this end the said depressor is secured beside the rod N on the sliding bar S, which, by a further sliding movement to that required for placing the shear n in position, and after that instrument has performed its function, places the depressor over the tongue of the needle, which, by its receding movement, is drawn under the depressor in the act of casting off the stitch or loop, as shown in Fig. 6, following which action the sliding bar carries both the depressor and shear past the end of the needle and looping-pin preparatory to doubling the yarn over the latter to form another loop by motion transmitted through the levers C and D′, pivoted at g and p, and the connection J from the revolving cam L, Figs. 2 and 3.

At each operation of the machine to form and cast off a loop or link of the chain the take-up mechanism acts to draw the additional loop or link from the needle, and thereby determine the length of the loop and the compactness of the chain. This take-up consists of a roller, K, Figs. 1 and 10, turning in bearings formed in the stands M, attached to the lower plate, R, of the machine and operated by the ratchet l and pawls r r on the lever V by motion transmitted through the connection x and lever W, pivoted at u, from the cam P and spring Q, Fig. 9.

The several operating-cams H, I, L, and P, above described, are secured on the upright shaft X, having a bearing at each end in the plates G and R, and are revolved (in the direction indicated by the arrows) by means of the bevel-gears y by power applied to the driving-wheel Z.

With the several parts constructed and arranged as described in the position shown in Fig. 1, and with the yarn (shown in red lines) passing through the guides c and c' and under the looping-pin, the needle advances through the loop already formed until the shear n may pass by the point of the tongue clearly, which movement next follows, thus carrying and doubling the yarn over the looping-pin d (from left to right) and placing the shear n over the needle, which next retreats, and when the point of the tongue meets the shear it strikes and slides over the upper surface thereof in the manner shown in Figs. 7 and 8, thereby separating its point from and carrying it over the loose yarn beneath it, which is to form the loop, after which the shear slides aside and the depressor h is placed over the needle, which immediately depresses the point of the tongue upon the loose yarn and permits the loop on the shank of the retreating needle to pass over the tongue to the end of the needle and then cast off by the action of the take-up roller K, which next follows, drawing the loop down over the end of the needle and the chain or cord through the hole in the rest-bar. The shear and depressor then retreat and move past the end of the needle, carrying the yarn beneath the looping-pin, which being done the needle again advances, preparatory to forming the next loop, in the manner before described.

We are aware that a similar needle with a spring-tongue has been used before, and it is not therefore claimed.

What we claim, and desire to secure by Letters Patent, is—

1. The combination of the needle-bar D, carrying one or more needles, with the rest-bar F, constructed, arranged, and operating substantially as described.

2. The looping-pin d, or its equivalent, in combination with the needle A, and operating substantially as and for the purpose described.

3. The shear or guard n, or its equivalent, operating substantially as and for the purpose described.

4. The depressor h, or its equivalent, in combination with the needle A, operating substantially as described, for the purpose specified.

5. The mode of operation described, by which the point of the needle-tongue is first positively raised and carried over the loose yarns which are to form the succeeding loop by the interposition of a suitable instrument and afterward immediately depressed to the requisite extent to permit the loop already formed to be cast off, substantially as described.

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