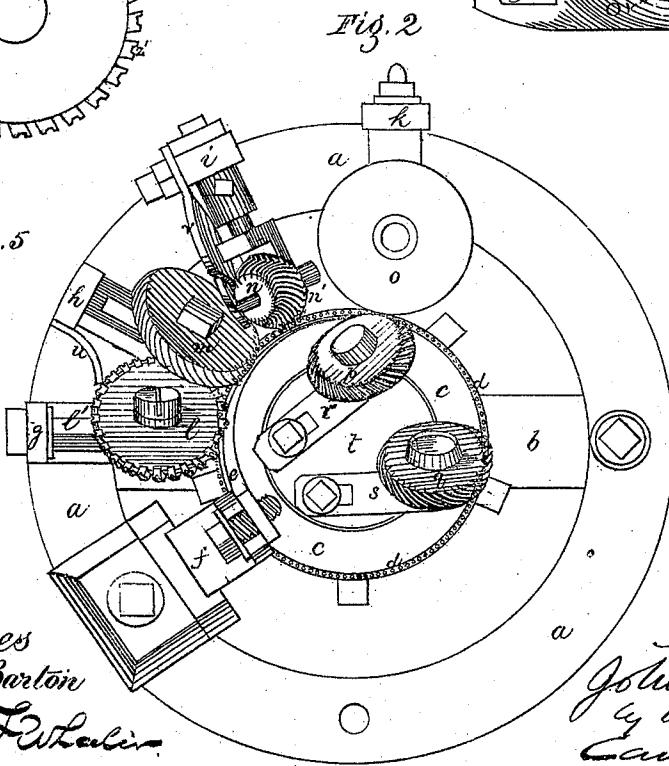
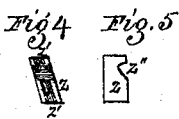
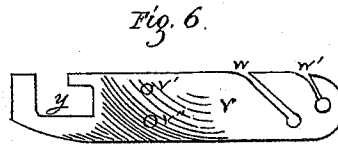
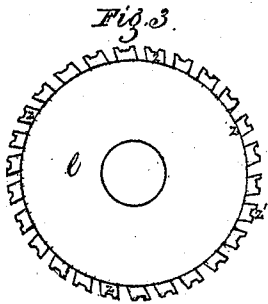
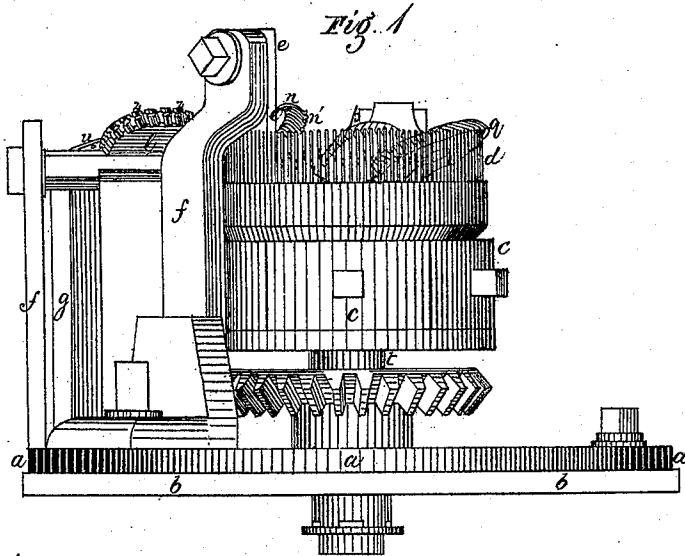


J. BRADLEY.
Improvement in Knitting-Machines.
 No. 131,595. Patented Sep. 24, 1872.



Witnesses
 Saml. H. Barton
 J. E. F. L. L. L.

Inventor
 John Bradley
 by his atty
 Edward D. Wright.

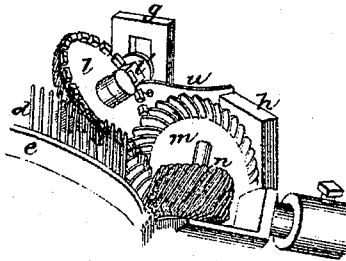
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Fig. 7.



Witnesses.
C. F. Brown
James L. Norris

Inventor
J. Bradley
by *Geo. E. Brown*
Associate Atty.

UNITED STATES PATENT OFFICE.

JOHN BRADLEY, OF LOWELL, ASSIGNOR TO GEORGE W. COPELAND, OF
MALDEN, MASSACHUSETTS.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 131,595, dated September 24, 1872.

To all whom it may concern:

Be it known that I, JOHN BRADLEY, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Knitting-Machines, of which the following is a specification:

Figure 1 of the accompanying drawing is a front view; Fig. 2 is a top view; and Figs. 3, 4, 5, 6, and 7 are parts in detail of my improved knitting-machine.

The present invention relates to certain new and useful improvements in knitting-machines whereby the production of mixed hosiery or mixed cloth, or other mixed articles or fabrics, is secured in a rapid, economical, and effective manner. My improvements consist mainly in a filling-wheel of a knitting-machine, constructed and arranged as will be hereinafter more fully described, so as to receive from a guide the filling-thread, yarn, &c., and convey it between the needles, which are at the same time divided by the operation, so that the thread or yarn, &c., is brought over the front of one needle and behind the other, alternately.

In the drawing, *a* represents the rim of an ordinary spring-needle knitting-machine, provided with a cross-bar, *b*, in which revolves a circular head, *c*, supplied with bearded leaded needles *d*, and extending partly around the interior of which is a curved push-back, *e*, connected with a standard, *f*, attached to the rim *a*, to which are also attached standards or guards *g*, *h*, *i*, and *k*, to which are connected, respectively, a filling-wheel, *l*, a clearing-wheel, *m*, a loop-wheel, *n*, and a presser-wheel, *o*, partly surrounding the exterior, and engaging with the needles *d*. On the inside of the circle of needles is a landing-wheel, *p*, and a knocking-over wheel, *q*, affixed to suitable brackets or standards *r* and *s* connected with an axle, *t*, of the head *c*. Attached to the standard or guard *h*, or otherwise suitably connected with the machine, is a bent guide, *u*, provided with proper holes for the insertion of the thread or yarn, &c., that is conveyed to and by the filling-wheel *l*. Connected with the guard or standard *i*, or otherwise attached to the machine, is a double-slit guide, *v*, formed, as shown in Fig. 6, with holes *v'* for the insertion of the separate different-colored thread or yarn, &c., and with slots *w w'* at one end for

the conveyance of the threads, &c., to the loop-wheel *n*, which is formed with oblique curved teeth *n'*, with projecting nibs that carry the thread or yarn under the beards of the needles *d*. The outer end of the double guide *v* is formed with a double slot, *y*, or otherwise suitably constructed to be readily attached and adjusted to the position that it is required to sustain in connection with the loop-wheel *n*. The filling-wheel *l* is arranged at an angle with the rim *a* on an adjustable bar, *l'*, connected with the standard or guard *g*, and is formed of a solid piece of iron, or other suitable metal, with teeth *z* arranged obliquely on its outer periphery, and having on their face a vertical groove or notch, *z'*, and a horizontal groove or notch, *z''*, as shown in Figs. 3, 4, and 5, which represent, respectively, a top view of the filling-wheel *l*, and a front and side view of the teeth *z*.

The arrangement of the teeth *z* obliquely across the periphery of the wheel *l* admits of the thread or yarn being inserted between the dividing needles without the aid of other appliances, which it would be impossible to do if the teeth were arranged perpendicularly. By the arrangement of the filling-wheel *l* in a sloping position the thread or yarn, &c., is carried behind every alternate needle—that is, in front of one and behind the other—without subjecting the needles to the great pressure and consequent injury to which they are necessarily liable by the ordinary arrangement of machines for knitting mixed work; or by that process in which one needle is bent out and the other in by separate wheels while the thread, &c., is conducted between the divided needles by a tubular guide.

The operation of my improvements is as follows: Power being communicated to the head *c*, the needles *d* and the various wheels *l m n o p q* operating in connection with them are rotated, and the thread or yarn, which is inserted in the guide *u*, is conveyed to the filling-wheel *l*, in the horizontal groove or notch *z''* of which it is held, and fed along to the needles *d*, one of which falls between the teeth *z*, while another is pushed forward; or they are divided alternately, so that the thread or yarn passes in front of one needle and behind the other, and is deposited between the nee-

dles d , which, as they are revolved, carry it along to the clearing-wheel m , which carries the thread, &c., to the bottom of the needles, as usual, so as to allow the loop-wheel n to perform its function, which is to take from the double-slit guide v the different-colored threads or yarns that are inserted separately in the holes $v' v''$ and slots $w w'$, and deposit them, by means of the nibs of the teeth n' , under the beards of the needles d , the separate threads or yarns becoming mixed into one strand in the operation. The work is then carried further around to the presser-wheel o , which presses in the beards of the needles d , and is then landed by the usual operation of the landing-wheel p , and is thence carried forward to the finishing-wheel g , which knocks over the stitch and finishes one course of the fabric.

In making mixed work the loop-wheel n is composed of an odd number of teeth, n' , and the head c provided with an even number of needles, d .

By the above description, reference being had to the drawing, it will readily be seen that the filling-wheel l not only conveys the thread or yarn, &c., to the needles, but at the same time gently divides the latter without the assistance of any other appliances, and in such a manner as not to force the needles apart so as to break them, as is often done by the ordinary methods employed in placing the filling-thread, especially by that process in which a tubular guide and two wheels are used, in which case the needles are often broken by their forcible separation, necessitated by the introduction of the tubular guide between them, and the broken needles are liable to come in contact with the tubular guide and damage the machine, and occasion much expense and loss of time in its repair; and moreover, by constructing the filling-wheel of one piece of iron or other suitable metal, its teeth are not liable to get bent or otherwise disordered.

The ordinary method of making mixed hosiery, &c., is by using threads or yarn already twisted, which, owing to the hard unyielding nature of the combined threads and the knots and lumps in the same, is apt to break a great

number of needles, thus delaying the operation and causing much expense in repairing the damage to the work and machine.

By the use of the double thread-guide it will be observed that the separate threads, being mixed on the machine, have no tendency to break or otherwise damage the machine, which can therefore be operated without delay, and produce much more work in a given time, and insure the manufacture of mixed fabrics more even and perfect in appearance and make than by the ordinary methods, and at a greatly reduced expense.

I have employed several methods of placing the filling-thread on the needles, but in all my experience with my own experiments and with my knowledge of the inventions of others, I am convinced that the arrangement hereinabove described and shown by the drawing is, on many accounts, more satisfactory in its operation than any method now known to me for knitting mixed fabrics, &c.

Having thus described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. In a knitting-machine a filling-wheel, l , provided with oblique teeth z having vertical and horizontal notches or grooves $z' z''$, and operating so as to divide the needles d , and deposit the thread or yarn, &c., in front of one needle and behind the other, substantially as specified.

2. A knitting-machine provided with a filling-wheel, l , bent guide u , loop-wheel n , and double-guide v , constructed and arranged as herein described, and operating in connection with a clearing-wheel m , presser-wheel o , needles d , landing-wheel p , and knocking-over wheel g , and the other usual devices of a knitting-machine, so as to produce any mixed fabrics, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BRADLEY.

Witnesses:

CARROLL D. WRIGHT,
SAML. M. BARTON.