

(No Model.)

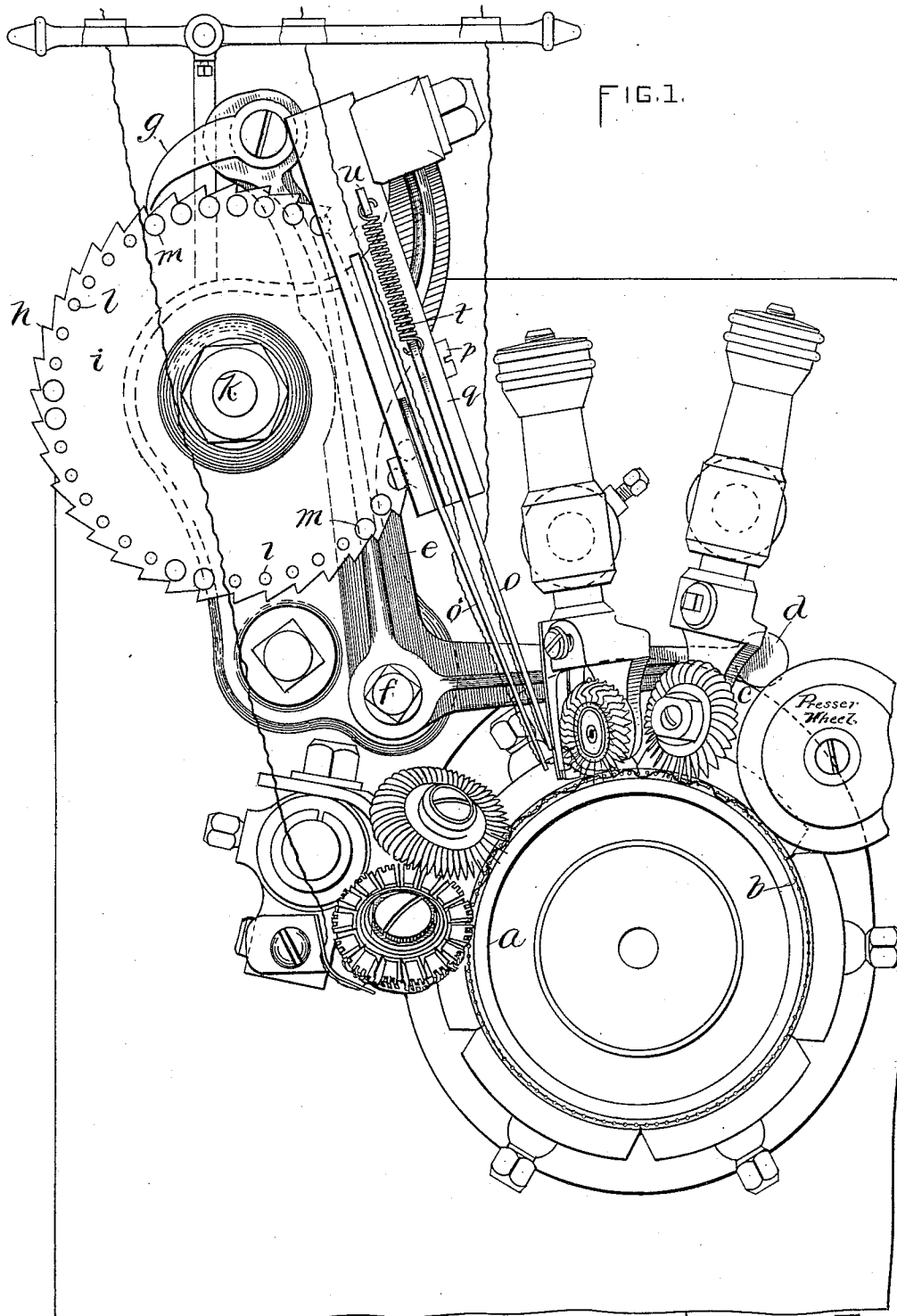
3 Sheets—Sheet 1.

J. BRADLEY.

CIRCULAR KNITTING MACHINE FOR KNITTING CHECKERED FABRICS.

No. 471,416.

Patented Mar. 22, 1892.



WITNESSES:
Henry Marsh.
Edward H. Harker

INVENTOR:
John Bradley.
By *Wight, Brown & Crossley.*
Solicitors.

(No Model.)

3 Sheets—Sheet 2.

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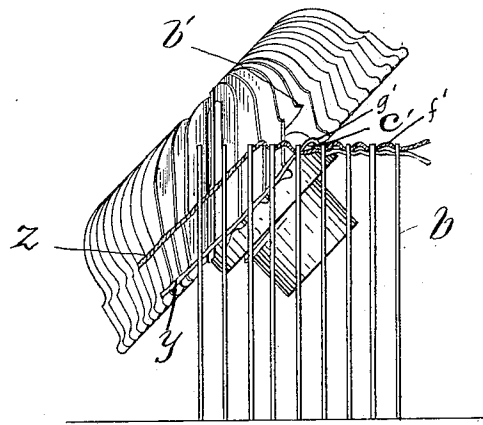


Fig. 2.

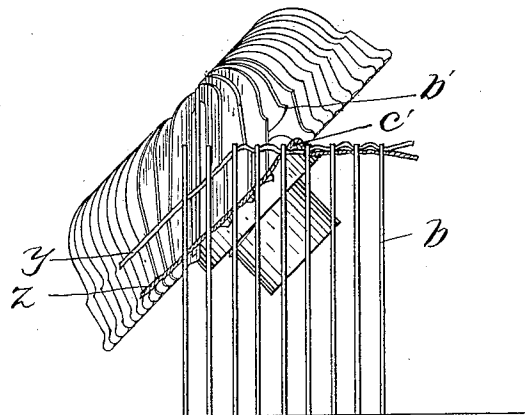


Fig. 3.

WITNESSES.

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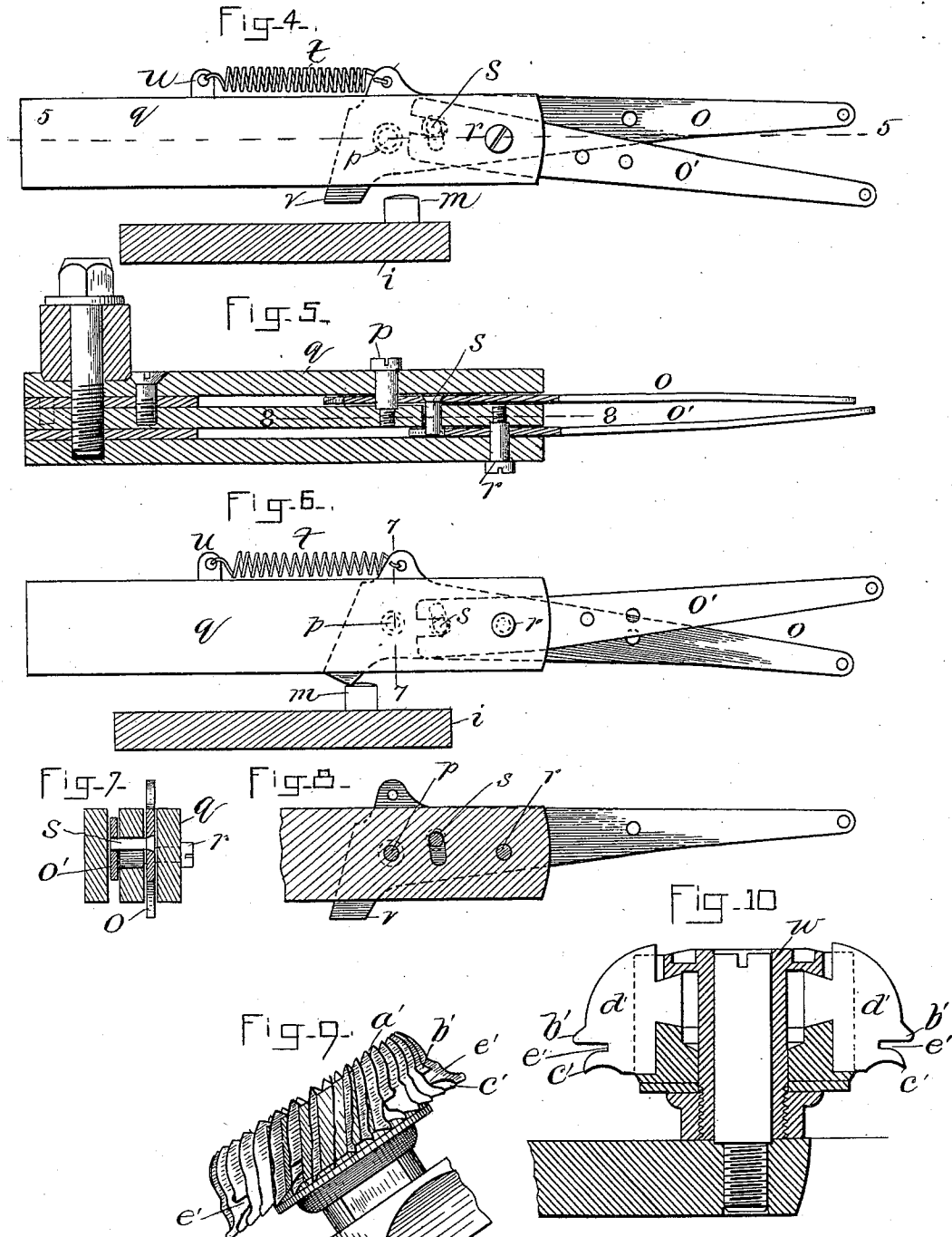
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UNITED STATES PATENT OFFICE.

JOHN BRADLEY, OF NORTH CHELMSFORD, ASSIGNOR TO THE BYFIELD MANUFACTURING COMPANY, OF CHELMSFORD, MASSACHUSETTS.

CIRCULAR-KNITTING MACHINE FOR KNITTING CHECKERED FABRICS.

SPECIFICATION forming part of Letters Patent No. 471,416, dated March 22, 1892.

Application filed September 15, 1890. Serial No. 364,978. (No model.)

To all whom it may concern:

Be it known that I, JOHN BRADLEY, of North Chelmsford, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Circular-Knitting Machines for Knitting Checkered Fabrics, of which the following is a specification.

My invention has reference to knitting-machines designed to knit figured fabrics by employing yarns of different colors, which are knit in a predetermined order or pattern, it being the purpose of my improvements to provide a simple and efficient "checking mechanism" whereby a fabric having a checkered figure may be produced.

My invention consists of a stitch or loop wheel of novel construction whereby two yarns laid thereon in particular positions may be fed to the needles in the same positions upon any desired number of needles and be changed in position on any other desired number of needles.

My invention also consists of improved means for operating or controlling the operation of yarn-guides designed to feed yarns of different colors to the needles.

The invention will first be described in connection the accompanying drawings, forming a part of this specification, and then be pointed out in the appended claims.

In the said drawings, Figure 1 is a top plan view of a knitting-machine equipped with my improvements. Fig. 2 is a diagram showing the operation of the improved stitch-wheel in placing the yarns upon the needles. Fig. 3 is a view similar to Fig. 2, but showing the yarns upon the needles in a changed position. Fig. 4 is a detailed sectional view of the yarn-guides and a portion of the pattern-disk for operating upon the same. Fig. 5 is a sectional view of Fig. 4, taken on the line 4 4 of the latter figure. Fig. 6 is a view similar to Fig. 4, but with the yarn-guides in a changed position. Fig. 7 is a sectional detail taken on the line 7 7 of Fig. 6. Fig. 8 is a sectional view taken on the line 8 8 of Fig. 5. Fig. 9 is a side view of my improved stitch-wheel. Fig.

10 is a vertical central sectional view of the same.

The same letters of reference designate the same parts or features, as the case may be, wherever they occur.

In the drawings, *a* designates the needle head or cylinder, and *b* the spring-beard needles, of a circular-knitting machine, the head being adapted to be rotated and being provided with a cam *c*, arranged to engage a bowl or roller *d* on one end of an angular lever *e*, fulcrumed at *f* upon the bed of the machine and provided at its other end with a pawl *g*, which engages the teeth *h* of a pattern disk or plate *i*, adapted to be rotated on a stud *k*, also secured to the bed of the machine. With this construction and arrangement of parts the pattern-disk may be rotated to the extent of one tooth on the periphery thereof at each rotation of the knitting-head, as will be well understood by those skilled in the art without further description.

Springs (not shown) are provided for moving the lever *e* so as to keep the bowl *d* in contact with the cam *c* and so as to keep the pawl *g* in engagement with the ratchet-teeth *h* of the pattern-disk *i*.

The pattern-disk *i* is provided in its upper face with holes *l*, in which pins or lugs *m* may be inserted in any desired order, so as to engage the heel *v* of a yarn-guide *o*, pivoted at *p*, near its heel, in a slot formed in a bracket *q*, supported on a stationary part of the machine.

o' designates another yarn-guide, pivoted at *r*, forward of its heel, to the bracket *q* and loosely connected at its rear end, as at *s*, with the yarn-guide *o* at a point forward of that at which the said yarn-guide *o* is pivoted upon bracket or support *q*.

t designates a spring attached at one end to the yarn-guide *o* at a point above its pivot-pin *p*, the other end of said spring being connected to a lug *u* on the bracket *q*, this arrangement being for the purpose of holding the heel *v* of the yarn-guide *o* down upon the face of the pattern-disk *i* or upon the face of a lug or pin *m* in the pattern-plate *i*. With

this construction and arrangement of parts it will be seen that when the heel *v* is upon the face of the pattern-disk the feeding of the yarn-guide *o* will be above that of the guide *o'*, and when a pin or lug *m* passes under the heel *v* it will lower the forward or feeding end of yarn-guide *o* and raise the feeding end of guide *o'* correspondingly. In other words, the forward or feeding ends of the yarn-guides will change position as the heel *v* may ride upon the face of the disk or plate *i* or rest upon a pin or lug *m*.

The yarn-guides just mentioned are designed to feed two yarns continuously to the needles, so that one shall be placed above the other upon the stems of the needles by means of the loop-wheel *w*. As is well known to knitting artisans, the uppermost yarn of two yarns placed upon the stems of the needle will be buried by the lower yarn, so that the lower yarn will form the face of a fabric, while the upper yarn will form the back or appear prominently on the wrong side. By placing the two yarns *y z* in the form of loops upon the needles *b*, so that the former, which may be supposed to be a white yarn, shall be below the latter, which may be supposed to be a red yarn, in the form of loops, as shown in Fig. 2, and knitting several rounds or courses, and then changing the positions of the yarn-guides, so that yarns shall change position, as shown in Fig. 3, a white stripe will first be formed on the right side of the fabric produced by reason of the fact that the white yarn will appear most prominently in the courses where it was placed lowest on the stems of the needles, and a red stripe will subsequently appear above the white upon the right side or face of the fabric for the same reason.

My improved loop or stitch wheel, next to be described, is designed to change the positions of the yarns at particular points upon the stems of the needles without changing the position of the yarn-guides—that is to say, while the yarn-guides may be positioned so as to place the yarns upon the needles, as represented in Fig. 3, the loop-wheel *w* will operate upon, say, three needles to place the yarn thereon as fed thereto and then change or shift the position of the yarn upon the fourth needle without a change of position of the yarn-guides, so that if the yarn-guides did not change position, but fed the yarns to the loop-wheel in the same positions throughout a tube or length of fabric, longitudinal stripes would be formed therein by reason of the change in position effected by the loop-wheel alone. If now a change is effected in the positions of the yarn-guides, both by the loop-wheel independently of the yarn-guides, whereby longitudinal stripes will be formed, and the yarn-guides are arranged to change position at regular intervals, whereby horizontal stripes

will be produced, a checked fabric will result.

The stitch or loop wheel *w* is provided with wings or blades *a'*, fixed in the periphery obliquely to its axis of rotation, and is arranged in a well-known way with respect to the needles, so as to engage the yarns and introduce them under the beards of the needles in the form of loops.

Each of the working faces of the blades *a'* is provided with two nibs *b' c'*, so that if two yarns should be fed to the wheel, as before explained, one in position above the nib *b'* and the other above the nib *c'*, they would be carried under the nibs of the needles and formed in loops in the same order and so that the lower loop would appear upon the face of the fabric, while the upper loop would form the back or wrong side of the goods—in other words, the upper loop would be buried by the lower one, as before described. The blades *d'*, arranged at desired intervals in the periphery of the wheel, are also provided with two nibs *b' c'* and with a deep notch *e'*, formed between the nibs, so that the lower of the two yarns engaged by the wings of the wheel will fall into the said notch.

Referring now to Fig. 2, we may suppose that the white yarn *y* is fed to the loop-wheel above the nibs *c'* and that the red yarn *z* is fed to the wheel above the nib *b'*. The blade *a'*, acting upon the yarns so placed upon them, will form the same into loops under the beards of the needles, as represented at *f'*. When, however, a blade *d'* is engaged by the needles and operates to form the yarns into loops thereon, the nib *c'*, below the notch *e'*, will operate to carry the loop thereon above or draw it through the loop which has slipped over the nib *b'*, as represented at *g'*, and thus carry the lower yarn *y* above the yarn *z*, and at the points where it is operated upon by the wings *d'* bring the yarn *z* below the yarn *y* and bury the latter so that the former shall appear prominently upon the face or right side of the goods at this point. In this way a checked fabric may be readily produced from two yarns, as before explained, and as will be fully understood by knitting artisans without further description or illustration.

It is obvious that changes may be made in the form and arrangement of parts comprising my invention without departing from the nature or spirit thereof.

Having thus described my invention and explained a way in which the same may be constructed and used, I declare that what I claim is—

1. The combination of the rotary pattern-plate provided with pattern pins or lugs, the yarn-guide *o*, provided with a heel adapted to be engaged by said pins or projections, a support having a slot in which said yarn-guide is pivoted near its heel, a spring for

holding the heel down upon the pattern plate
or pin, and a yarn-guide o' , pivoted at a point
 r forward of its rear end to a slotted support
and loosely connected at its rear end with
5 the yarn-guide o at a point forward of that
at which said yarn-guide o is pivoted upon
its support, both yarn-guides being arranged
to operate in said slots, substantially as de-
scribed.

10 2. A loop or stitch wheel provided with pe-
ripheral blades, each having two nibs $b'c'$,

certain of said blades being provided with
notches between said nibs, as set forth.

In testimony whereof I have signed my
name to this specification, in the presence of 15
two subscribing witnesses, this 5th day of Sep-
tember, A. D. 1890.

JOHN BRADLEY.

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.