

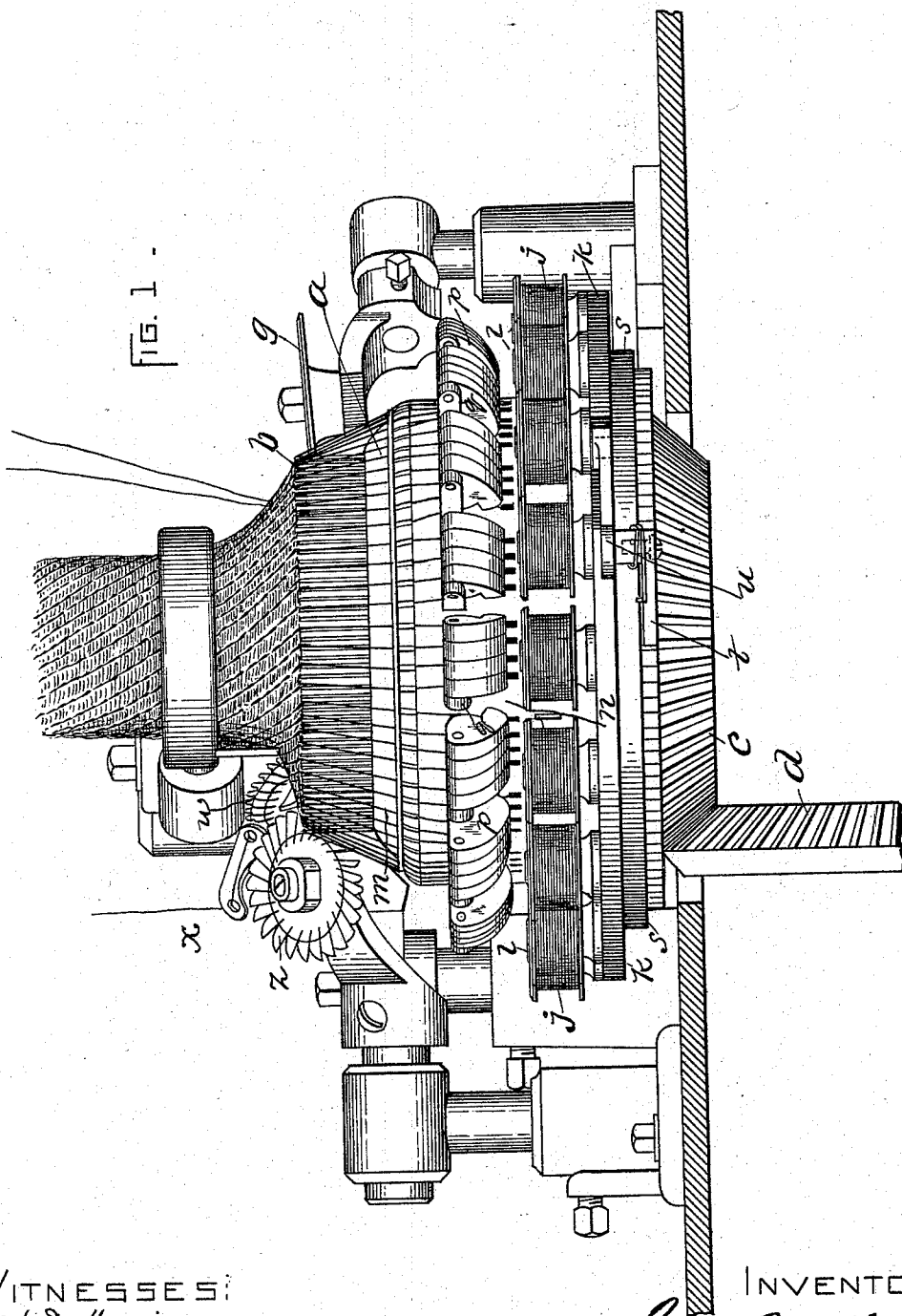
(No Model.)

3 Sheets—Sheet 1.

J. BRADLEY.
WARP KNITTING MACHINE.

No. 527,934.

Patented Oct. 23, 1894.



WITNESSES:

A. D. Hamilton
W. H. M^{rs} Lord

INVENTOR:

J. Bradley.
By
Might, Brown & Crossley.
ATTORNEYS.

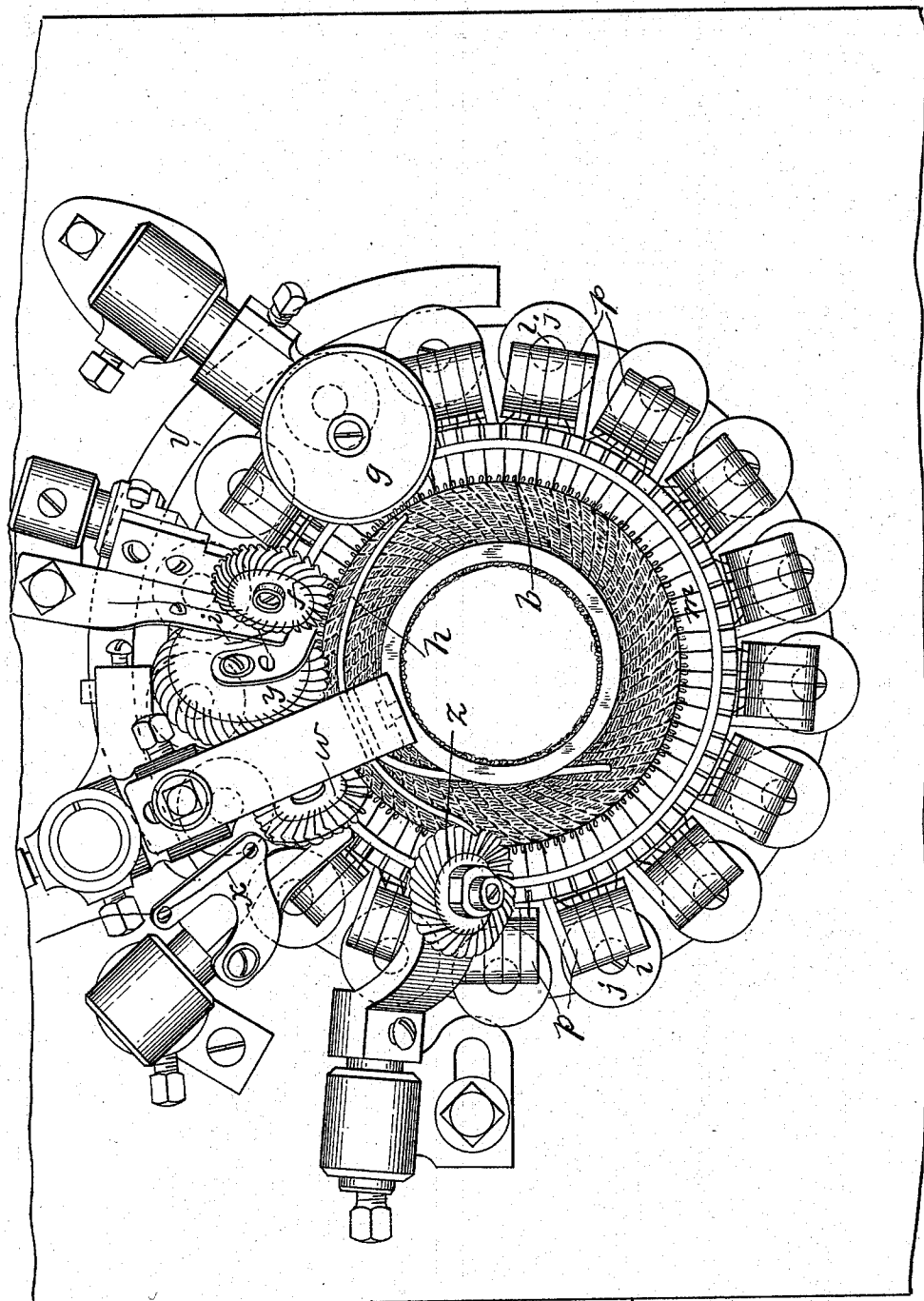
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J. BRADLEY.
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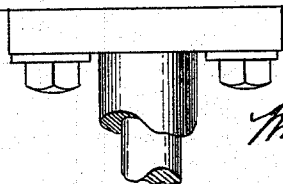
Patented Oct. 23, 1894.



WITNESSES:

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FIG. 2.



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54142

(No Model.)

3 Sheets—Sheet 3.

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FIG. 3.

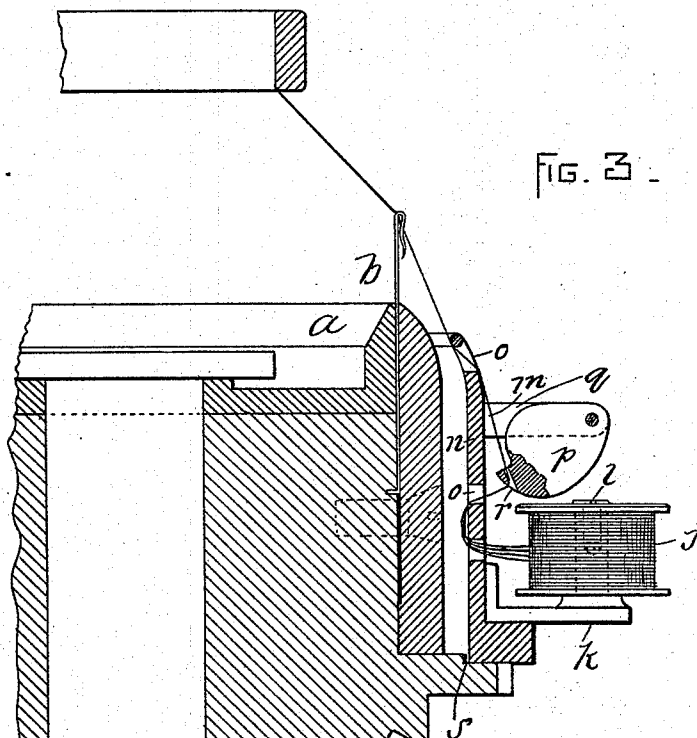
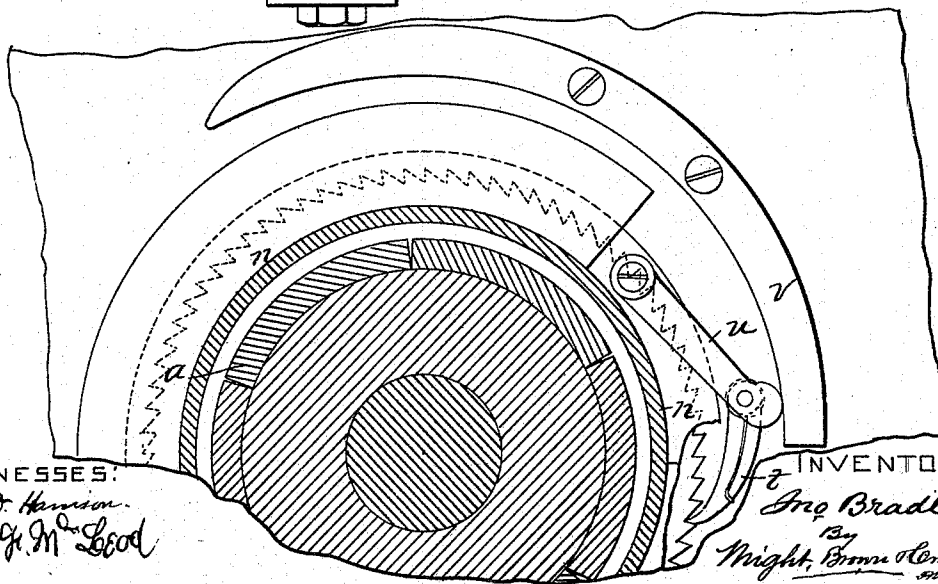


FIG. 4.



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Chas. M. Good

INVENTOR:

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UNITED STATES PATENT OFFICE.

JOHN BRADLEY, OF NORTH CHELMSFORD, MASSACHUSETTS.

WARP-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,934, dated October 23, 1894.

Application filed January 13, 1894. Serial No. 496,709. (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 new and useful Improvements in Warp-Knitting Machines, of which the following is a specification.

This invention has relation particularly to knitting machines of the kind adapted to produce warp and warp-and-weft fabrics—that is, fabrics in which, in addition to containing in its structure regular loops formed from a particular thread or threads, also embraces other threads which run through the loops longitudinally of the web, and in most cases an additional thread or threads which run circumferentially of the web, and transversely of the warp threads, and are interlocked with the other threads of the fabric. The thread mentioned as moving transversely of the warp threads is commonly termed the “weft” or “filling” thread.

It is the object of this invention to provide such improvements in machines of the kind mentioned as will produce diagonal effects in the knit-cloth, and also result in a fabric of superior quality in other respects.

To these ends the invention consists of a warp knitting machine so constructed as that the warp guides may be intermittently moved to lay the threads controlled thereby first between certain needles and then between adjacent needles, thus being made to run diagonally through the web, producing diagonal effects in the goods, and in combining with the foregoing a weft thread or threads running diagonally of the warp threads and interlocked with the same and the regular looping thread or threads, all as I will now proceed to describe and claim.

Reference is to be had to the annexed drawings and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be wherever they occur.

Of the drawings—Figure 1 is a side elevation of a circular spring-beard needle knitting machine embodying the invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical sectional view of certain parts, intended

to show the relationship of the warp threads to the needles and one form of means for guiding the same and maintaining them under tension. Fig. 4 is a horizontal sectional view designed to show one form of means whereby the warp guides and carrier may be shogged or moved so as to lead the warps in the fabric in diagonal order.

In the drawings—*a* designates a head provided with a circular series of needles *b*, the said head being provided in its lower part with bevel gear-teeth *c*, which are engaged by a rotary bevel gear *d*, whereby the said head is rotated. The head is further equipped with a yarn guide *e*, a stitch-wheel *f*, a presser-wheel *g*, a landing and a knocking-over wheel, (not seen, being covered by the fabric knit) a push-back *h*, and such other devices, of well-known structure and arrangement as to make the machine capable of producing regular-loop knitting from the thread or yarn *i*.

j designates a series of warp-carrying spools arranged at regular intervals, around the head and each supported on a bracket *k* provided with a pin *l* extending through the hole in the spool so that the latter may be rotated as the warp threads *m* are drawn off. The brackets *k* are attached to a ring or cylinder *n* through which at certain points are formed holes *o* which serve as guides for the warp threads led therethrough, and thence to the needles.

p designates a gravity warp tension block pivoted at its outer point upon an arm or extension *q* of the ring *n* and provided at its inner point with a guide eye *r* through which the warp yarn *m* passes. The gravity of the block serves to keep the warp under the necessary tension, as will be most clearly understood by an inspection of Fig. 3.

The warp-carrying ring *n* is shogged or moved circumferentially the distance between one, two, or more needles, generally depending upon the number of warp yarns used after each row of regular knitting in order that the warps may extend diagonally in the goods and that diagonal effects may be produced. Various means may be employed to accomplish this. An efficient construction is shown

in the drawings, wherein the ring *n* is shown as mounted so as to turn on a ledge *s* projecting horizontally from near the base of the head, and extending around the same.

5 Ratchet teeth are formed in the periphery of the said ledge and a spring-pressed pawl *t* pivoted upon the outer end of an arm *u*, which arm is in turn pivoted at its inner end upon the offset base of the said ring *n*. The arm,
10 *u*, has a spiral spring arranged around its pivot with one end connected to the arm and the other to the base of the ring, *n*, so that normally the said arm, *u*, will be pressed outward. The spring is not shown, being hidden
15 beneath the pivotal point of the arm.

v designates the segment of a ring secured to the base of the machine eccentrically with the needle head and in the path with the outer end of the arm *u* so that as the head is
20 revolved, the said segment *v* acting upon the said arm as a cam will move it inward and set the ring *n* backward a predetermined distance depending upon the position of the segment *v*, as will clearly appear from what is
25 portrayed in Fig. 4.

w designates a filling wheel of suitable construction, which is so arranged as to lay a filling or weft yarn *x* into the needles, placing it in front of certain of the same, and
30 carrying it over behind others.

y is a wheel co-operating with the filling wheel and acting to carry the weft yarn down on the stems of the needles so that the regular knitting yarn can be carried under the
35 beards of the needles by the stitch wheel above the weft or filling yarn.

z designates a bladed or winged wheel constructed and arranged to act on the warps and carry them over the tops of the needles
40 to place, after the warp guides have been shogged, as before described.

The filling wheel is of the usual function in machines where a filling thread is introduced, as before described, and the wheel, *y*,
45 co-operating with the filling wheel has also a mode of operation similar to that of clearing wheels, and like that of wheels for the same purpose which are used in connection with filling wheels for carrying a yarn laid into
50 the needles by the filling wheels down around their stems or shanks. The bladed wheel, *z*, acts somewhat in the nature of a common knocking over wheel; that is to say, it acts upon the warp threads at the top of the needles so as to, as it were, knock them over the
55 tops of the needles against which the warp threads also press after the warp guides have been "shogged."

In operation knitting will be performed in
60 the usual way by the stitch wheel acting upon its yarn from its yarn guide, and by the common devices acting in connection therewith and the filling wheel will lay its yarn into the needles in a well known way, which filling
65 or weft yarn will be depressed by the wheel

y, as hereinbefore described. The warps *m* from their guides will pass into the web between the needles and be interlocked with the other yarns. As the outer end of the lever *u* passes the segment *v*, the yarn guide
70 will be set back the distance between the two warps at the needles, and so set the warps back and secure the running of the same into the web in diagonal direction, as may be clearly understood by viewing Fig. 2. As
75 the warps arrive at the wheel *z* they will be acted upon by the same, as before explained, and properly positioned with respect to the needles.

It will be observed that by varying the
80 colors of the different yarns, a variety of colored patterns may be produced, and that varying effects may be obtained by shogging the warp-guides first in one and then in the
85 opposite direction.

The cloth produced by the invention, particularly when the regular, the weft, and the warp yarns are employed is of superior texture for many purposes, such as cloakings,
90 overcoatings, &c.

Various changes may be made in the form and arrangement of the mechanism without departing from the nature or spirit of the invention.

Having thus explained the nature of the
95 invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, it is declared that what is claimed is—
100

1. The art of knitting warp fabrics which consists in forming the ground fabric in the usual way, interlocking the warp threads with the ground fabric and shifting the warp threads laterally after each round of knitting
105 to the extent of one or more rows of loops, as set forth.

2. A warp-knitting machine comprising in its construction needles and co-operating knitting mechanism for producing a ground
110 fabric, movable warp-guides for guiding the warps into the fabric, and means for shifting the warp-guides after each course of knitting to the extent of the distance between two or more needles, as set forth.
115

3. A warp-knitting machine comprising in its construction needles and co-operating knitting mechanism including a filling wheel to lay in a weft thread, for producing a ground
120 fabric, movable warp guides for guiding the warps into the fabric, and means for shifting the warp guides after each course of knitting to the extent of the distance between two or more needles, as set forth.

4. A warp-knitting machine comprising in
125 its construction needles and co-operating knitting mechanism for producing a ground fabric, movable warp-guides for guiding the warps into the fabric, means for shifting the warp guides after each course of knitting to
130

the extent of the distance between two or
more needles, and a winged or bladed wheel
is adapted to act upon the warp threads and
carry them over the tops of the needles to
5 proper place, as set forth.

In testimony whereof I have signed my
name to this specification, in the presence of

two subscribing witnesses, this 2d day of
January, A. D. 1894.

JOHN BRADLEY.

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.