

(No Model.)

4 Sheets—Sheet 1.

J. BRADLEY.

CIRCULAR KNITTING MACHINE FOR KNITTING STRIPED FABRICS.

No. 471,415.

Patented Mar. 22, 1892.

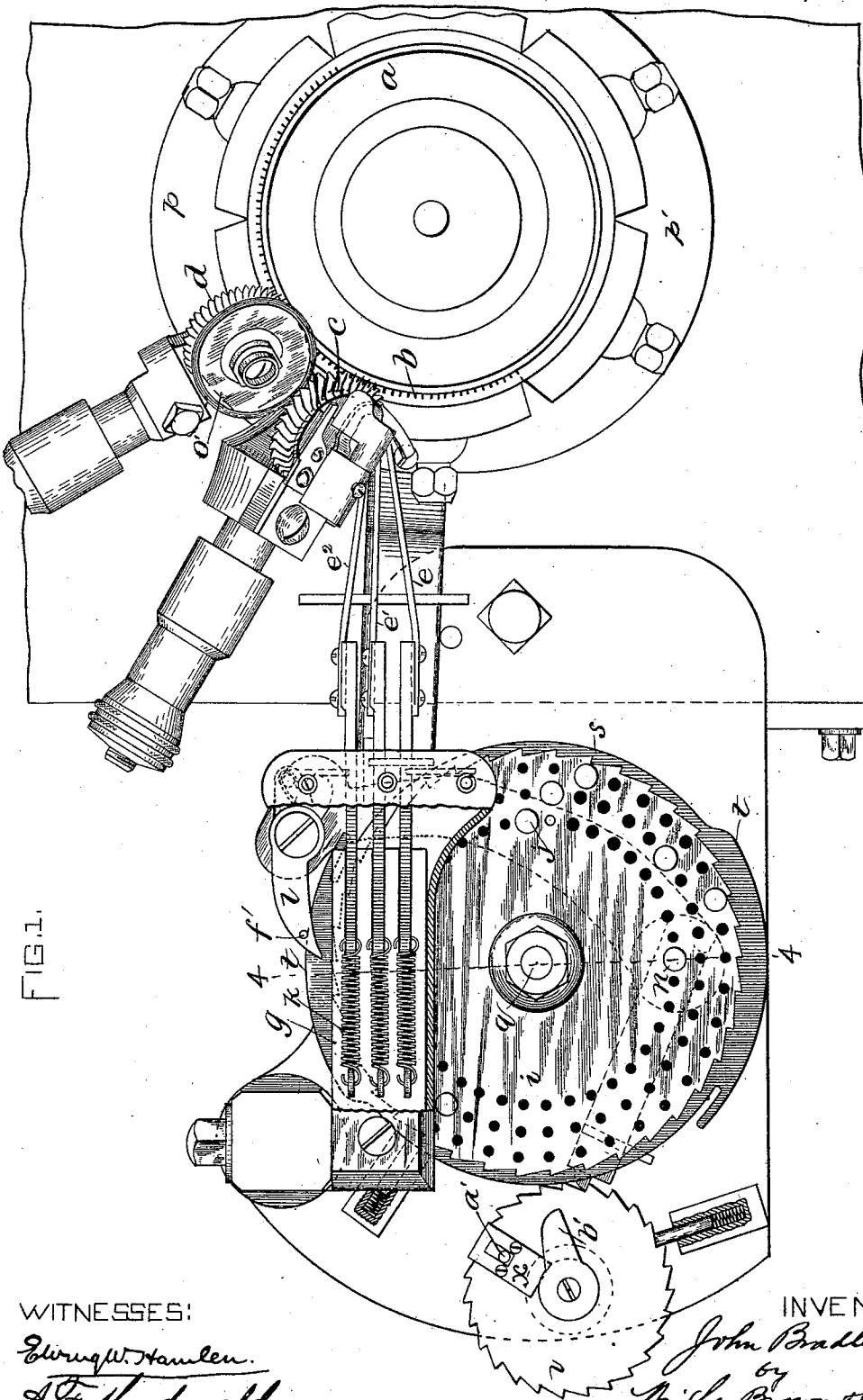


FIG. 1.

WITNESSES:

George W. Hamlen.
A. J. Macdonald.

INVENTOR:

John Bradley.
by
Wright, Brown & Corroley.
Attys.

(No Model.)

4 Sheets—Sheet 2.

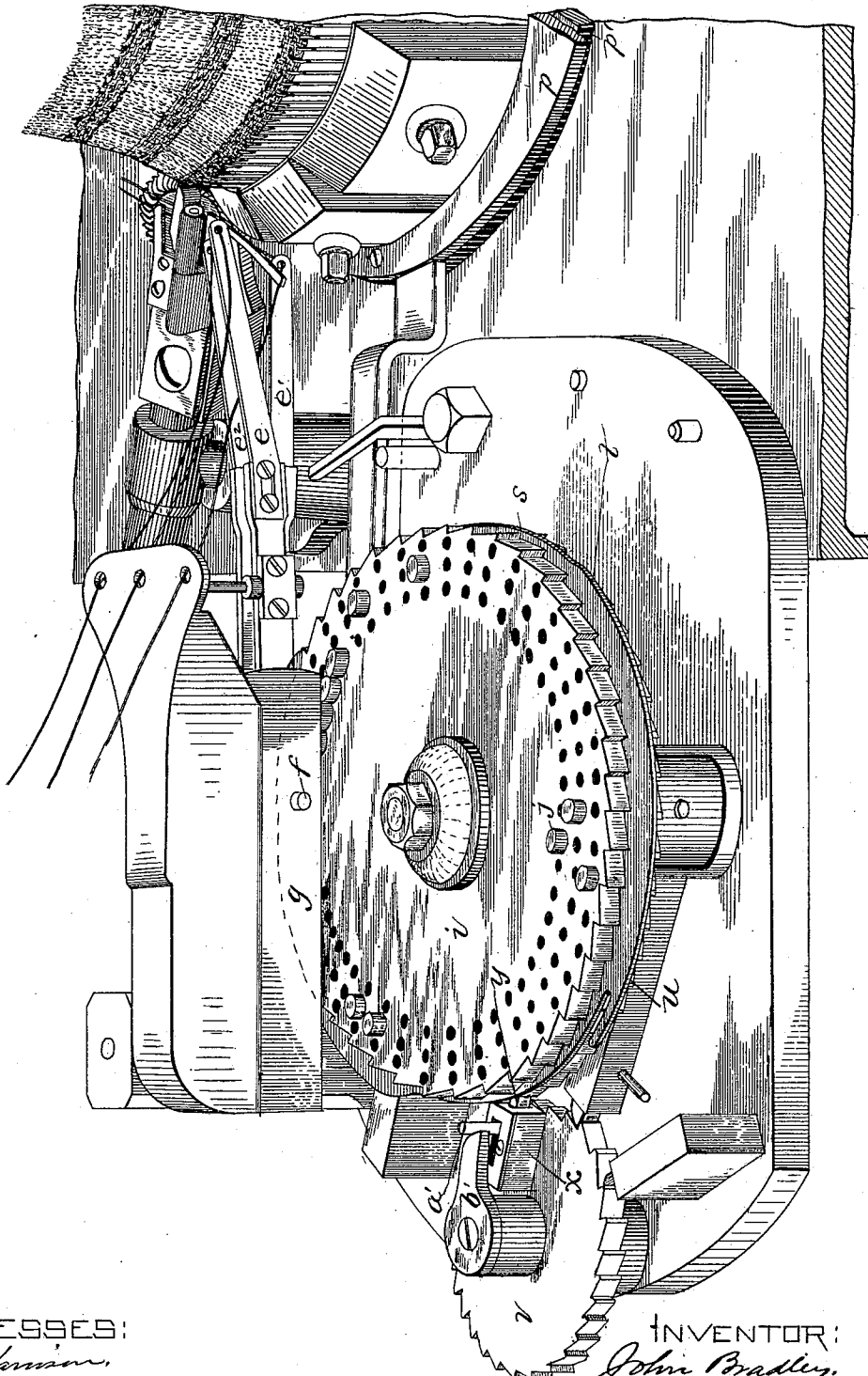
J. BRADLEY.

CIRCULAR KNITTING MACHINE FOR KNITTING STRIPED FABRICS.

No. 471,415.

Patented Mar. 22, 1892.

FIG. 2.



WITNESSES:

A. D. Harrison,

George W. Hawley

INVENTOR:

John Bradley,
by
Wright, Brown & Corroly,
Attys.

(No Model.)

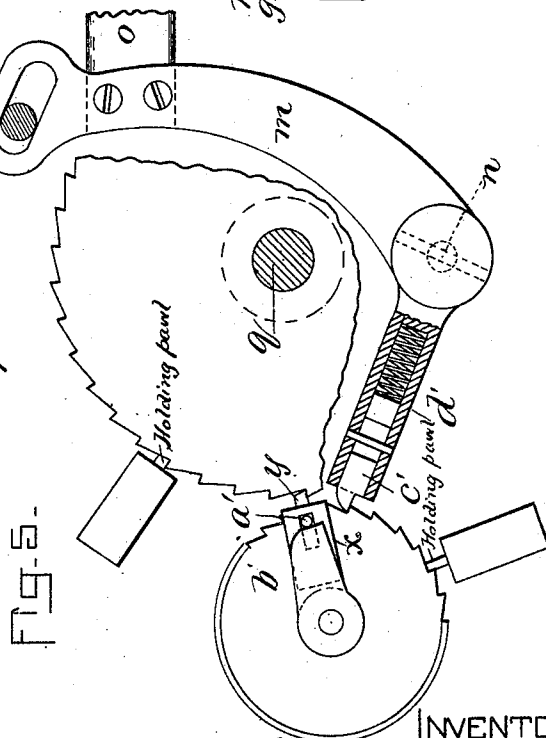
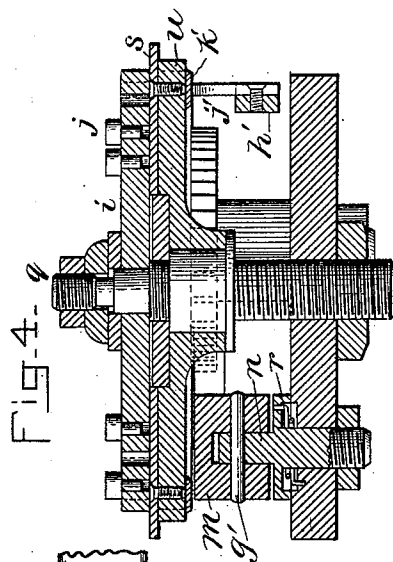
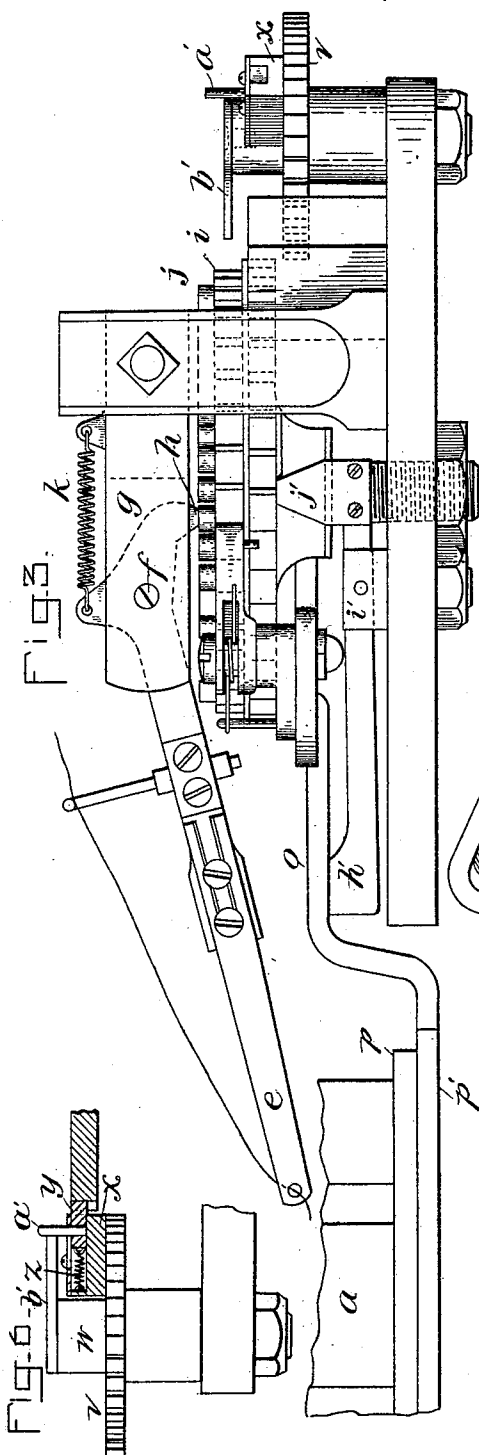
4 Sheets—Sheet 3.

J. BRADLEY.

CIRCULAR KNITTING MACHINE FOR KNITTING STRIPED FABRICS.

No. 471,415.

Patented Mar. 22, 1892.



WITNESSES:
A. S. Harrison,
Ewing W. Hawley

INVENTOR:
John Bradley
by Wright, Brown & Crossley,
Attys.

(No Model.)

4 Sheets—Sheet 4.

J. BRADLEY.

CIRCULAR KNITTING MACHINE FOR KNITTING STRIPED FABRICS.

No. 471,415.

Patented Mar. 22, 1892.

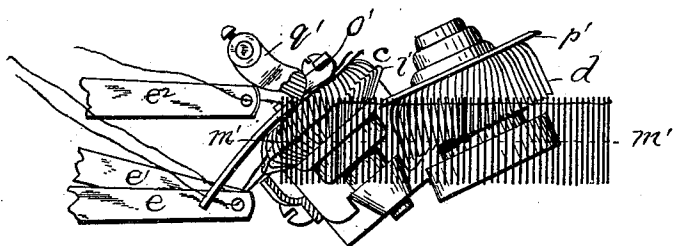


Fig. 7

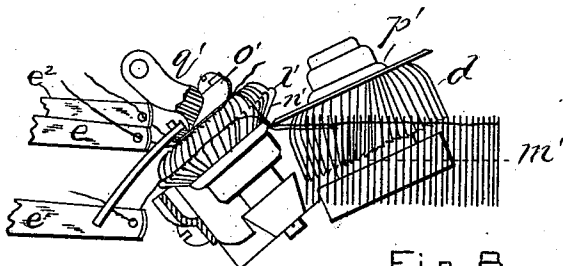


Fig. 8.

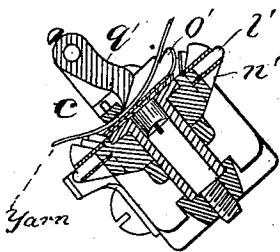


Fig. 9.

WITNESSES

Ewing W. Hansen,
A. F. Maidmald.

INVENTOR

John Bradley,
by
Wight, Brown & Crossley,
attys.

UNITED STATES PATENT OFFICE.

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

CIRCULAR-KNITTING MACHINE FOR KNITTING STRIPED FABRICS.

SPECIFICATION forming part of Letters Patent No. 471,415, dated March 22, 1892.

Application filed September 15, 1890. Serial No. 364,977. (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 Circular-Knitting Machines for Knitting Striped Fabrics, of which the following is a specification.

My invention has for its object the provision of various improvements in means for knitting a striped tubular fabric on circular spring-beard-needle knitting-machines, whereby objections and difficulties now met with are avoided and overcome.

My invention consists of a stitch-wheel the working faces of the blades of which are provided with nibs to engage the yarn and carry it upon the needles under the beards, the edges of the blades being inclined inwardly and downward from the nibs.

My invention also consists of a yarn-holder comprising a pivoted block so arranged that its free end or edge may rest upon the outer face of a plate arranged above the stitch-wheel and so that the end of a yarn thrown out of action may be drawn under the block, between the same and the said plate, and held by the gravity of the block.

My invention also consists of improved means for operating the pattern mechanism whereby the position of the yarn-guides is controlled.

My invention also consists of improved combinations of parts incidental to the foregoing.

The invention will first be described in connection with the annexed drawings and the letters of reference marked thereon, forming a part of this specification, and then be pointed out in the appended claims.

In the drawings, Figure 1 is a top-plan view of a spring-beard-needle knitting-machine head equipped with my improvements. Fig. 2 is a perspective view of the same, but showing only a small portion of the head. Fig. 3 is a rear side elevation of the pattern mechanism and parts of its adjuncts. Fig. 4 is a vertical sectional view taken on the line 4 4 of Fig. 1. Fig. 5 is a sectional plan detail showing particularly a part of the means whereby the pattern mechanism is operated. Fig. 6

is a detail in side elevation and in section on the line 6 6 of Fig. 5, showing particularly the means for operating the pattern-plate. Fig. 7 is a detail view, partly in section, looking 55 from the center of the needle-cylinder, showing the construction and mode of operation of the yarn-guides, stitch-wheel, and yarn-holding and severing devices. Fig. 8 is a view similar to Fig. 7, showing some of the 60 parts in different position. Fig. 9 is a vertical central section through the stitch-wheel and a part of its adjuncts.

The same letters designate the same parts or features, as the case may be, in all of the 65 views.

In the drawings, *a* designates the needle-cylinder or head; *b*, the spring-beard needles; *c*, the stitch-wheel; *d*, the dividing-wheel, and *e* 70 *e'* *e*² the yarn-guides. The push-back, presser-landing, and knocking-over wheel necessary to accomplish knitting in conjunction with the other devices shown and mentioned have, for the sake of clearness, been omitted from the drawings. 75

The yarn-guides are pivoted upon a pin *f* in a comb-bracket *g*, and each guide is provided with a heel *h*, adapted to rest upon a pattern-disk *i* and be acted upon and raised by a pin or projection *j*, a spring *k*, attached 80 at one end to the yarn-guide above its pivotal point and at the other end to a stationary part of the machine, acting with a tendency to hold the heel *h* down upon the disk *i* and to raise the forward end of the yarn-guide, as 85 will be readily understood without further description.

The pattern-disk *i* is provided on its periphery with ratchet-teeth, which are engaged by a pawl *l*, adjustably connected with one 90 end of a lever *m*, connected with a pivot pin or stud *n* and provided with an arm *o*, arranged so that its free end may be engaged by either cam *p* or *p'* on the head *a* and be operated thereby to actuate the pawl *l* to move 95 the pattern-disk *i* to the extent of one of the ratchet-teeth at each revolution of the needle-head, it being understood that said disk is adapted to be rotated on the stud *q*. A spring *r*, connected at one end to the pivot-stud *n* 100 and at the other with a stationary part of the machine, is arranged to operate with a tend-

ency holding the free end of arm *o* in contact with cam *p* or *p'*.

When the heel *h* of a yarn-guide is engaged by a pin or projection *j*, arranged in a hole 5 formed in the face of the pattern-disk, as is common, the forward end of the guide will be lowered into action, and when the heel *h* rides on the face of the disk the yarn-guide will be raised out of action, so that with the con- 10 struction and arrangement of parts as thus far described a striped fabric may be knit in any desired pattern within the capacity of the pattern-disk.

It is desirable at times to knit a web of con- 15 siderable length of a single color and to render the pawl *l* inoperative in order that it may not be necessary to greatly increase the size of the pattern-disk *i*, and to accomplish this end I provide a disk *s*, having projecting 20 cams *t* formed on its periphery, which disk *s* is secured to the upper face of a ratchet-wheel *u*, adapted to turn on stud *q* below pattern-disk *i* and independently of the latter.

v designates a ratchet-wheel adapted to be 25 rotated upon a fixed stud *w* and provided on its upper face with a box *x*, in which is arranged a dog *y*, so as to be moved longitudinally in the box in a line radially with respect to the ratchet-wheel *v*. A spring *z* en- 30 gages the dog *y* and operates with a tendency to draw the latter inward within the circle of the ratchet-wheel *v*.

a' designates a pin connected with the dog *y* and extending up through a slot formed in 35 the box *x* in position to engage the outer end of a cam-finger *b'*, fixed upon the stud *w*, and move the dog *y* outward into engagement with a ratchet-tooth of the ratchet-wheel *u*, so that if the ratchet-wheel *v* should be further moved 40 the dog *y* would effect the movement of the said ratchet-wheel *u* to the extent of one tooth, when the pin *a'* would slip off the cam-finger *b'*, and the dog *y* would be drawn inward again by the action of the spring *z*.

45 In Fig. 1 the dog *y* is represented as drawn in by spring *z*, while in Figs. 2, 5, and 6 the pin *a'* is shown as having engaged the cam-finger *b'* and moved the dog out into engagement with one of the ratchet-teeth of pattern- 50 disk *i*.

The ratchet-wheel *v* is adapted to be rotated by means of a spring-pressed pawl or dog *c'* on the end of arm *d'* of lever *m*, as will be best understood by reference to Figs. 1 55 and 5.

The pawl *l* is provided with a downwardly-projecting pin *f'*, which extends into close proximity with or it may ride upon the periphery of the disk *s* and be engaged by the 60 cams *t*, and when so engaged (see Fig. 1) the pawl will be held out of engagement with the teeth of the disk *i*, and the latter will be moved only by the action of dog *y*, which will actuate the said ratchet-wheel *u* to the extent 65 of one of its teeth at each rotation of the ratchet-wheel *v*, and this will continue until the pin *f'* rides over and off the cam *t*, when

the pawl *l* will actuate disk *i*, as before explained.

The lever *m* is pivoted upon the stud *n* by 70 means of a pin *g'*, so as to have a slight rocking motion thereon, in order that the free end of arm *o* may be raised or lowered to engage either cam *p* or *p'* in order to shift the time of operating said arm and lever *m* to change 75 the points at which the yarns are thrown out of and brought into use in the web. This movement of arm *o* is accomplished by a lever *h'*, fulcrumed upon a stud *l'*, the forward end of said lever extending under the arm *o* 80 and the rearward end being provided with a toe-piece *j'*, extending under ratchet-disk *u*, which is provided with a cam-segment *k'*, adapted to act on the toe-piece *j'* and actuate lever *h'* to raise arm *o* or allow the same to 85 fall.

The stitch-wheel *c* is provided with blades to be engaged by the needles, and by means of notches, which form nibs *l'* thereon, en- 90 gage the yarn and carry the same in the form of loops under the beards of the needles. The edges of the blades below the nibs *l'* are beveled or inclined inwardly and down- 95 wardly, so that the portion of the wheel between the nibs *l'* and the upper ends of the blades which operates upon the yarn is quite narrow.

By beveling the blades, as described, the wheel can be arranged at a much lower point below the tops of the needles than could be 100 done were this provision not made, since if the blades below the ribs projected they would come into contact with the needle cylinder or head, and if this did not occur the blades would be sunk so deep between the needles 105 as to make the wheel inoperative. This construction enables me to introduce the yarn to the needles and form the same in loops thereon before the yarn is carried under the needle-beards and to bring the yarn into action 110 without allowing the end to engage the beards of the needles and accidentally press off stitches, which it is liable to do in the use of the stitch-wheel as commonly constructed. By an inspection of Fig. 7 it will be seen that 115 the yarn from the yarn-guide *e'*, which may be supposed to have been just brought into action, has been engaged by the stitch-wheel and will be introduced to the needles the space of five or six needles forward of the 120 line where the yarn will be carried under the beards, which may be supposed to extend down to the horizontal line *m' m'*. The inclined portion *n'* of the stitch-wheel blades engages the stems of the needles and serves to steady 125 the wheel in its movements.

In Fig. 8 the yarn carried by yarn-guide *e* is represented as thrown out of action and as having been engaged by a blade of the stitch-wheel and carried over upon a plate *o'* in 130 close contact with the outer end or face of the stitch-wheel and into contact with the sharp-edged periphery of the disk *p'* on the outer end of the dividing-wheel *d* and cut or

severed. As the yarn is thrown out of action and carried over upon plate *o'* it is drawn under a pivoted block *q'*, slightly raising the same, and when the yarn is severed the block
5 by its gravity falls upon the end and holds it sufficiently secure to prevent its accidental displacement. The so-called "gravity-holder"

I deem an important feature of my invention.

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

Having thus explained the nature of my improvements and described ways of constructing and using the same, I declare that
15 what I claim is—

1. A stitch-wheel for knitting-machines, provided with blades having notches forming nibs to engage the yarn, the portion of the
20 blades between the nibs and the top being quite narrow and the edges of the blades below the nibs being inclined inward and downward, as set forth.

2. The combination, with the needles, yarn-
25 guides, and means for operating the latter, of a stitch-wheel, a plate above the outer or upper face or end of the said wheel, and a pivoted block adapted to bear by its own gravity upon said plate, as set forth.

30 3. The combination, with the needles, yarn-

guides, and means for operating the latter, of a stitch-wheel, a plate above the outer or upper face or end of the said wheel, and a pivoted block adapted to bear by its own gravity upon said plate, and a dividing-wheel provided on
35 its upper end with a cutting-disk *p'*, as set forth.

4. The combination, with the needle-cylinder provided with a cam, the needles, and a plurality of yarn-guides, of a rotary pattern-
40 disk provided with ratchet-teeth, a ratchet-wheel *u* below said pattern-disk, a cam-plate *s*, secured to the ratchet-wheel *u*, a ratchet-wheel *v* at one side of the ratchet-wheel *u*, a spring-actuated dog *y*, provided with a pin *a'*
45 on the ratchet-wheel *v*, a stationary cam-finger *b'* above the pin *a'*, lever *m*, provided with arm *o*, actuated by the cam of the needle-cylinder, arm *d*, connected with lever *m* and provided with a dog or pawl to engage
50 ratchet-wheel *v*, and pawl *l*, provided with pin *f'* and connected with lever *m*, as set forth.

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

JOHN BRADLEY:

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.