

J. L. BRANSON.
Knitting-Machine.

No. 214,989.

Patented May 6, 1879.

Fig. 1.

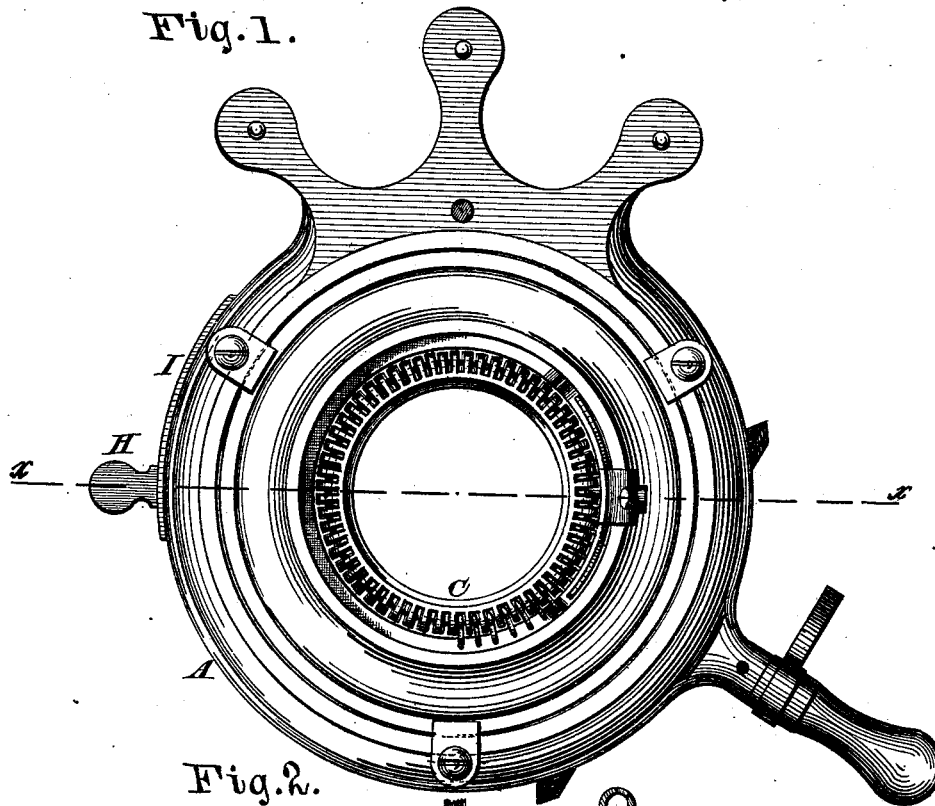
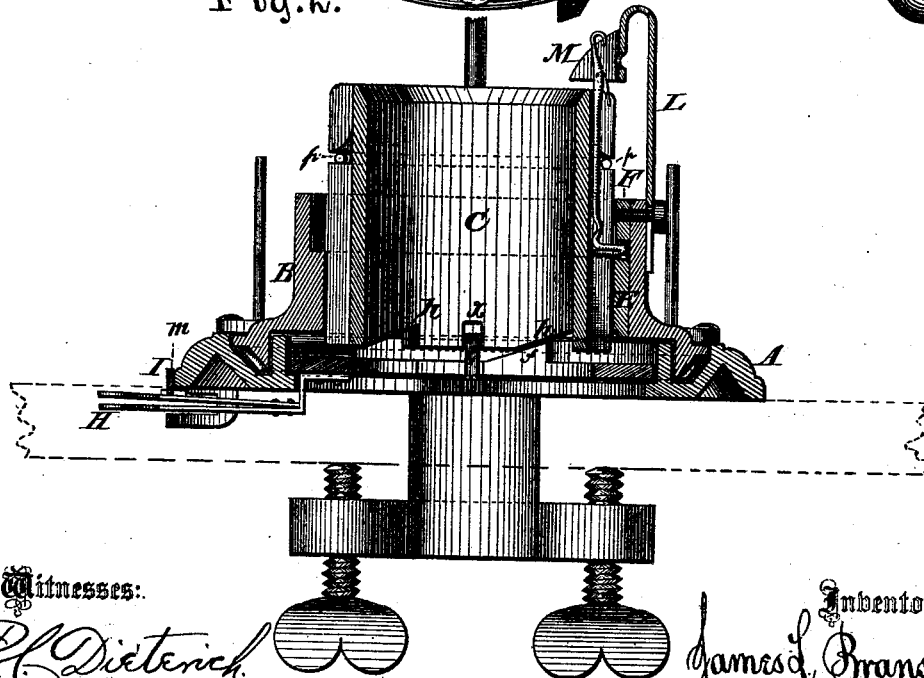


Fig. 2.



Witnesses:

P. L. Dietrich
Frank H. Saffy

Inventor:

James L. Branson
Per *C. H. Watson & Co* Attorneys.

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Fig. 3.

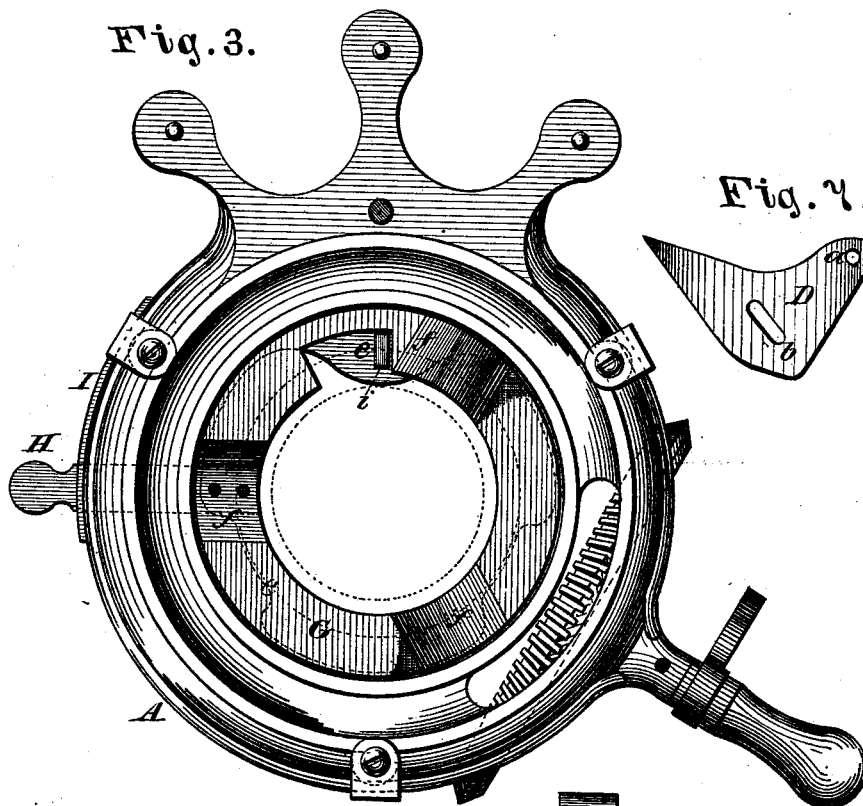


Fig. 4.

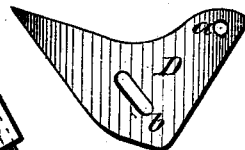


Fig. 4.

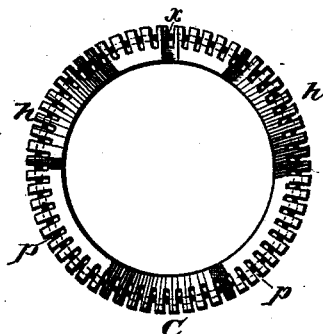


Fig. 5.

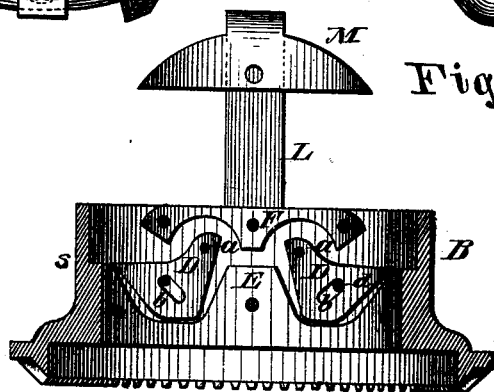
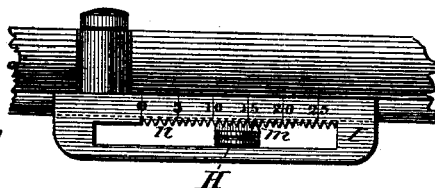


Fig. 6.



Witnesses:

W. H. Dietrich
Frank A. Duffy

Inventor:

James L. Branson
Per *C. H. Watson & Co.* Attorneys.

UNITED STATES PATENT OFFICE.

JAMES L. BRANSON, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. **214,989**, dated May 6, 1879; application filed July 15, 1878.

To all whom it may concern:

Be it known that I, JAMES L. BRANSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention relates to knitting-machines; and it consists in a novel construction of the cams, and also in devices by which the mechanism for raising and lowering the needle-cylinder, to lengthen the stitch or loop, is operated, as will be hereinafter more fully set forth.

In the annexed drawings, to which reference is made, and which fully illustrate my invention, Figure 1 is a plan view of a knitting-machine embodying my invention. Fig. 2 is a vertical section of Fig. 1 on line *x x*. Fig. 3 is a plan view with cam-cylinder removed. Fig. 4 is a bottom view of needle-cylinder. Fig. 5 is a vertical section of cam-cylinder. Figs. 6 and 7 are detailed views.

A represents the bed-frame of the machine. B is the cam-cylinder, rotated by the usual gearing; and C is the needle-cylinder.

The cams are specially designed for what is termed a "reciprocating-cylinder knitting-machine," and are so constructed that each cam forms not only the stitch and lifting cam, but also automatically closes the gap out of which the needles pass when the stitch is formed, and prevents the needles dropping under the cam when the movement of the machine is reversed. Heretofore this gap has been closed by tumblers or switch-cams; but in my present invention the one cam performs all the different functions of stitch-cam, lifting-cam, and switch-cam or tumbler.

D D represent the stitch-cams, which are pivoted at their upper ends at *a a*, and vibrate at their lower ends, the movement being limited by a slot, *b*, in each cam, in which projects a pin, *d*, firmly attached to the cam-cylinder. This pin determines the upward movement of the cam, being far enough to form the proper

angle for the needles to pass down the cams in forming the loops, and to open a sufficient space for the passage of the needles out between the stitch-cam and the lower cam, E, that forces them upward. As soon as all the needles have passed out from under the stitch-cam, it drops down of its own gravity, and closes the gap out of which the needles have passed and bridges the opening, so that the needles cannot possibly pass down under the cam again, but must pass up over it and free the latches of the needles preparatory to forming new loops in passing down under the stitch-cam on the opposite side, which performs the same functions in its turn.

The upper cam, F, projects downward between the two operating-cams D D (just described) far enough to bring the needles below the pivoting-points *a a*, so as to force them back against the pins against which they vibrate. My pivoted or swinging cams D D perform the threefold function of switch-cams or tumblers, elevating-cams, and depressing or loop cams.

For lengthening or shortening the stitch, I use a ring or annulus, G, resting upon lugs *e* on the bed-plate, and provided with inclines *f*. These inclines correspond with inclines *h* in the lower end of the needle-cylinder, and the cylinder rests on said ring. By turning the ring the cylinder is raised or lowered perpendicularly, the cylinder being prevented from turning by a stud, *i*, on one of the lugs *e*, projecting into a slot, *x*, in the cylinder; but to these devices I lay no claim herein.

A lever or arm, H, is attached to the ring G on one side, and extends outward past the outer edge of the bed-plate through a slotted piece, I, attached to the bed-plate. This arm H is formed of two pieces, one of which rests on the lower edge of the slotted piece I. The other, having a projection, *m*, springs up against the upper edge of the slot, the projection engaging notches *n*, and thereby holding the arm firmly, and thus preventing the ring G from moving and changing the length of the stitch during the operation of the machine. This ring also serves in the same capacity as the ring shown in the Letters Patent granted me May 22, 1877.

The needle-cylinder resting upon the upper

edge of the ring, and the inclines extending outward to the inner edge of the bed-plate, it is obvious that needle-cylinders of different diameters can be used resting upon the same ring and be actuated by it perpendicularly, as described.

In the operation of the machine, after the first round of loops are cast on in the ordinary way, a continuous tubular web can be made by revolving the cam-cylinder by means of the crank and gear-wheel in either direction.

In knitting the heel or toe of socks or other hosiery, the needles in the back half of the needle-cylinder are raised up until their heels are brought against the coil-spring band *p* in the cylinder, which is as far as they will rise. They are then entirely above the cam-cylinder and clear of the cams which operate them, and they remain motionless while the cam-cylinder is being revolved. The cam-cylinder is now revolved until all the needles down and in operation have formed their loops and have passed out from under the stitch-cam and are at rest on the ledge *s* of the cam-cylinder. The operator then ceases to revolve the cylinder in that direction; lifts up the needles down and in operation next the first of the lifted-up needles in the back half of the needle-cylinder, and then revolves the cylinder in the opposite direction in the same manner and with the same result; continues to revolve the cylinder back and forth, each time lifting up a needle on the side where the last stitches were formed, and next those already lifted up and out of operation, until only ten are left down and in operation. Then the operator pushes down one needle into operation of those lifted up on

the opposite side from those last forming stitches, at each backward and forward motion of the cam-cylinder, until all are pushed down to the back half first lifted up. Then all remaining needles are pushed down together, and the cylinder is revolved round and round, as at first in knitting tubular web.

In knitting all manner of flat web, or the heel and toe of hose, the take-up spring *L*, attached to the yarn-guide *M*, is used to draw up the yarn drawn through the cam-cylinder far enough to cause the needles to pass out on the opposite side.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the swinging cams *D* *D*, pivoted at their upper ends and provided with slots *b*, through which the pins *d* project, and the stationary cams or guides *E* *F*, all constructed and arranged as described, whereby the swinging cams are caused to act separately as stitch-cam, lifting-cam, and switch-cam or tumbler, substantially as herein set forth.

2. The combination of the ring *G*, having inclines *f*, the split or double handle or lever *H*, with projection *m*, and the slotted plate *I*, with notches *n*, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JAMES L. BRANSON.

Witnesses:

R. C. CHEESMAN,

I. W. GEPHART.