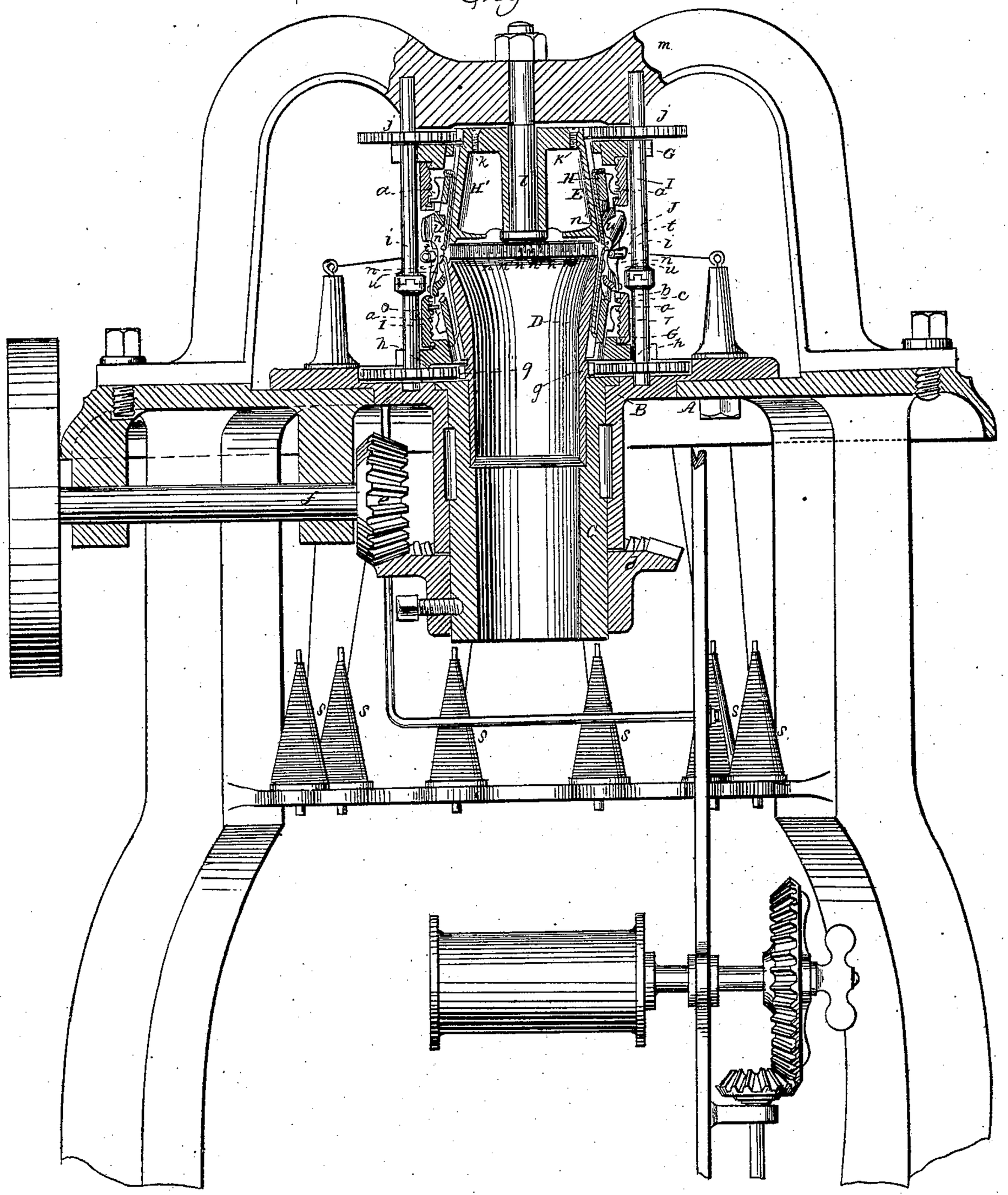
2 Sheets—Sheet 1.

F. GARDNER.

Knitting-Machine.

No. 92,300. Patented July 6, 1869.

Fig. 1.



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By Van Santvoord Brown
his Attys

2 Sheets—Sheet 2.

F. GARDNER.

Knitting-Machine.

No. 92,300. Patented July 6, 1869.

Fig. 2.

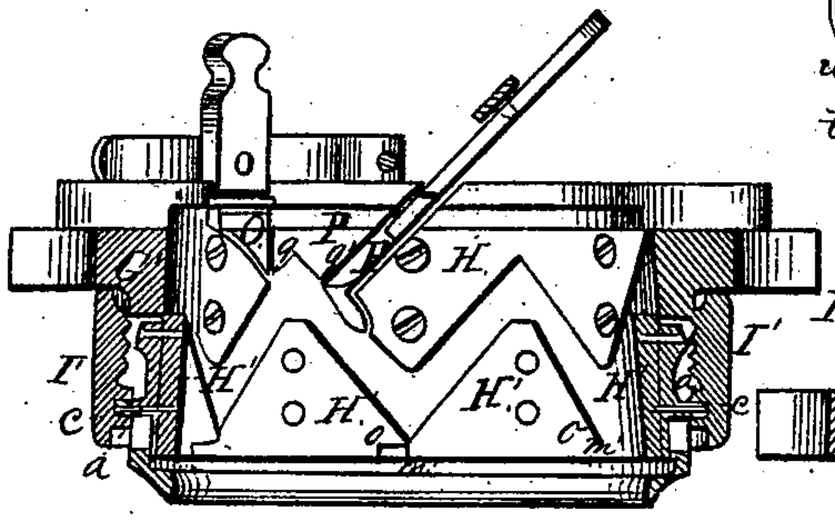


Fig. 3.

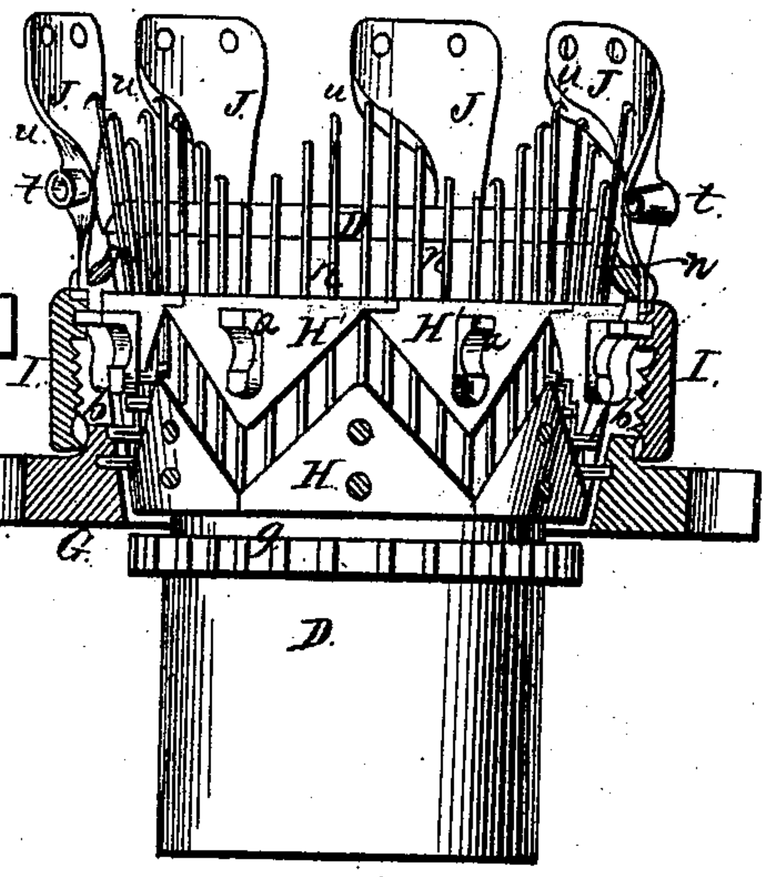


Fig. 4.

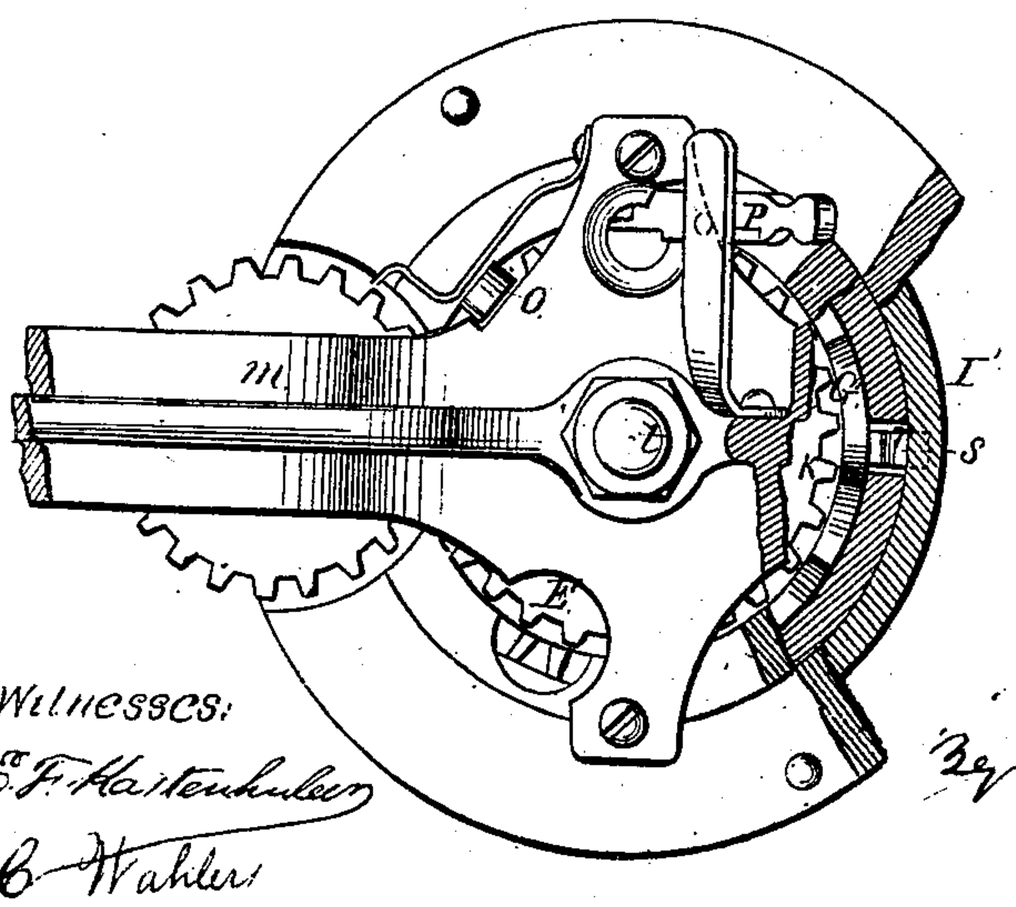
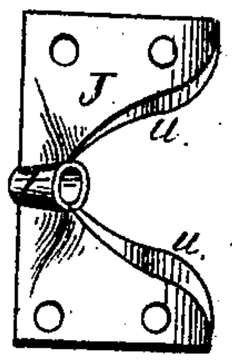


Fig. 5.



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FREDERICK GARDNER, OF HAMILTON, CANADA.

Letters Patent No. 92,300, *dated July* 6, 1869.

IMPROVEMENT IN KNITTING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, FREDERICK GARDNER, of Hamilton, in the county of Wentworth, Province of Ontario, Dominion of Canada, have invented a new and useful Improvement in Knitting-Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 represents a vertical central section of this invention.

Figure 2 is a vertical section of one of the cam-cases, detached.

Figure 3 is a sectional side elevation of one of the needle-carriers and its cams.

Figure 4 is a sectional plan of the upper cylinder.

Figure 5 is a detached elevation of one of the latch-openers.

Similar letters indicate corresponding parts.

This invention consists in the employment of adjusting-rings, in combination with movable cams, in the cam-cases, and with the needles, in such a manner, that by turning said rings in or out, the throw of the needles can be regulated according to the nature of the work to be produced; also, in the employment of two gates, of peculiar construction, in combination with one of the cam-cases and its needles, in such a manner, that by adjusting said gates, the needles can be thrown in or out of action, as the nature of the work may require; further, in the employment of combined latch-openers and yarn-guides, of peculiar construction, in combination with the revolving needle-carriers, in such a manner, that by the action of said latch-openers, the latches of the needles in both cylinders will be thrown open, and yarn delivered to their hooks, without fail, and thereby insure the correct operation of the knitting-mechanism.

A represents the table or bed-plate, on which the hollow cylinder B is supported.

This cylinder forms the bearing for the cylindrical sleeve C, to which is attached the take-up gear, at its lower end, and the under or plain-knitting cylinder or needle-carrier D, at its upper end. This needle-carrier, which, when used alone, serves for knitting a plain web, is hollow and tapered, and it is grooved on its external surface, to receive the needles *n*.

The needles which I use in my machine, are latch-needles, and their hook-shaped tails project into the cam-case G, which surrounds the needle-carrier, as clearly shown in figs. 1 and 3 of the drawing.

In the interior of this cam-case is placed a series of V-shaped cams H H′, in such a position that a zig-zag groove is formed between their edges, to receive and guide the tails of the needles.

The cams H are firmly secured in the cam-case, while the cams H′ are placed loosely therein; and from the outer surfaces of these loose cams, project lugs *a*, through slots *b*, in the cam-case, and into a circular groove, *c*, in the adjusting-ring I.

This ring is provided with an interial screw-thread, and it screws on the cam-case G, so that by turning the ring I, the cams H′ can be raised or lowered, and the zigzag groove between the cams H H′ can be made closer or wider, whereby the throw of the needles is regulated, as will be hereinafter more fully explained.

A revolving motion is imparted to the needle-carrier D, by a bevel-wheel, *d*, which is secured to the sleeve C, and gears into a pinion, *e*, mounted on the driving-shaft *f*; and as the needle-carrier revolves, the tails of the needles slide upon the inclined edges of the cams H, and on reaching the apex of one of these cams, they are carried along in a horizontal direction, until they strike the inclined surface of the adjoining cams H′, when they pass down thereon to the apex of said cam, &c., and by these means a rising and falling motion is imparted to said needles. The amount of this motion is increased, if the cams H′ are moved toward the cams H, and decreased if the cams H′ are moved away from the cams H, because each needle, on reaching the apex of one of the cams, is carried along in a horizontal direction, and, consequently, strikes the adjoining cam on a level with said apex; and if the cams H′ are moved toward the cams H, the needles, on leaving the cams H, will come in contact with the adjoining cams H′, at a point closer to the starting-point of said cams, and the same on leaving the cams H′, they will come in contact with the cams H, closer to their starting-points, than they will if the cams H′ are moved away from the cams H, and, consequently, the throw of the needles can be changed, simply by turning the adjusting-ring I, as previously stated.

The needle-carrier D is provided, on its outer surface, with cogs *g*, which gear into pinions *h*, mounted on the bottom ends of upright shafts *i*, on the upper ends of which are secured pinions *j*, which gear into cogs *k*, on the outer surface of the upper needle-carrier E.

This needle-carrier is constructed similar to the lower needle-carrier D, being composed of a hollow truncated cone, grooved on its outer surface, to receive the needles *n′*; and it has its bearing on a stud, *l*, which is secured in a bridge, *m*, fastened to the table A, as shown in fig. 1 of the drawing.

To the under side of this bridge is secured the cam-case G′, which surrounds the needle-carrier E, and which is provided with stationary cams H, and movable cams H′, the same as the cam-case G of the lower needle-carrier D.

An adjusting-ring, I′, serves to adjust the movable cams H′ of the cam-case G′; and these cams are fitted together by tongues *m′*, and grooves *o*, so that the same can be moved apart, without opening a space at their starting-points, in which the tails of the needles would be liable to catch.

In the needle-case G′, is made a circular groove, *p*,

which communicates with the zigzag groove between the cams H H′, through channels *g g′*; and these channels are opened or closed by gates O P, best seen in fig. 2.

If these gates are pushed down, the tails of the needles, on arriving at the channel *g′*, are caused to slide up into the circular groove *p*, and they are retained in this groove until the gates are again raised, when the tails of the needles, on arriving at gate O, are caused to slide down again through the channel *g*. By these means the needles in the upper needle-carrier can be thrown out of operation at pleasure.

The needles can be introduced into the grooves of the upper carrier E, through an aperture, *r*, which is opened and closed by a slide, *s*. (See fig. 4.)

To the outer surfaces of the cam-cases G G′, are secured the latch-openers J, a detached elevation of one of which is shown in fig. 5.

They are provided with eyes *t*, through which the yarn passes from the spools S; and the curved edges of the wings *u* of said latch-openers, serve to throw open the latches of the needles, as the same are carried past them, by the revolving motion of the needle-carriers, and by the rising and falling motion imparted to the needles by the cams H H′.

By the action of the latch-openers, a positive motion is given to the latches, and the correct action of the knitting-mechanism is insured.

By the combined action of the needles in the two needle-carriers, an elastic fabric can be knitted, of one or more colors, and if desired, the upper needles can be thrown out of action, and in that case, a plain web will be produced by the lower set of needles.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the cam-cases G or G′, and the stationary cams H, of the movable cams H′, provided with lugs *a*, and the screw-ring I or I′, provided with the groove *c*, all constructed and operating substantially as described.

2. The grooved gates O P, constructed as described, and operating in connection with the zigzag grooves, and the groove *p*, substantially as and for the purpose set forth.

3. The latch-opener J, constructed with a single eye, *t*, and two wings, *u u*, and arranged in relation to the upper and lower carriers D E, substantially as and for the purpose described.

This specification signed by me, this 20th day of November, 1868.

FREDERICK GARDNER.

Witnesses:
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E. F. KASTENHUBER.