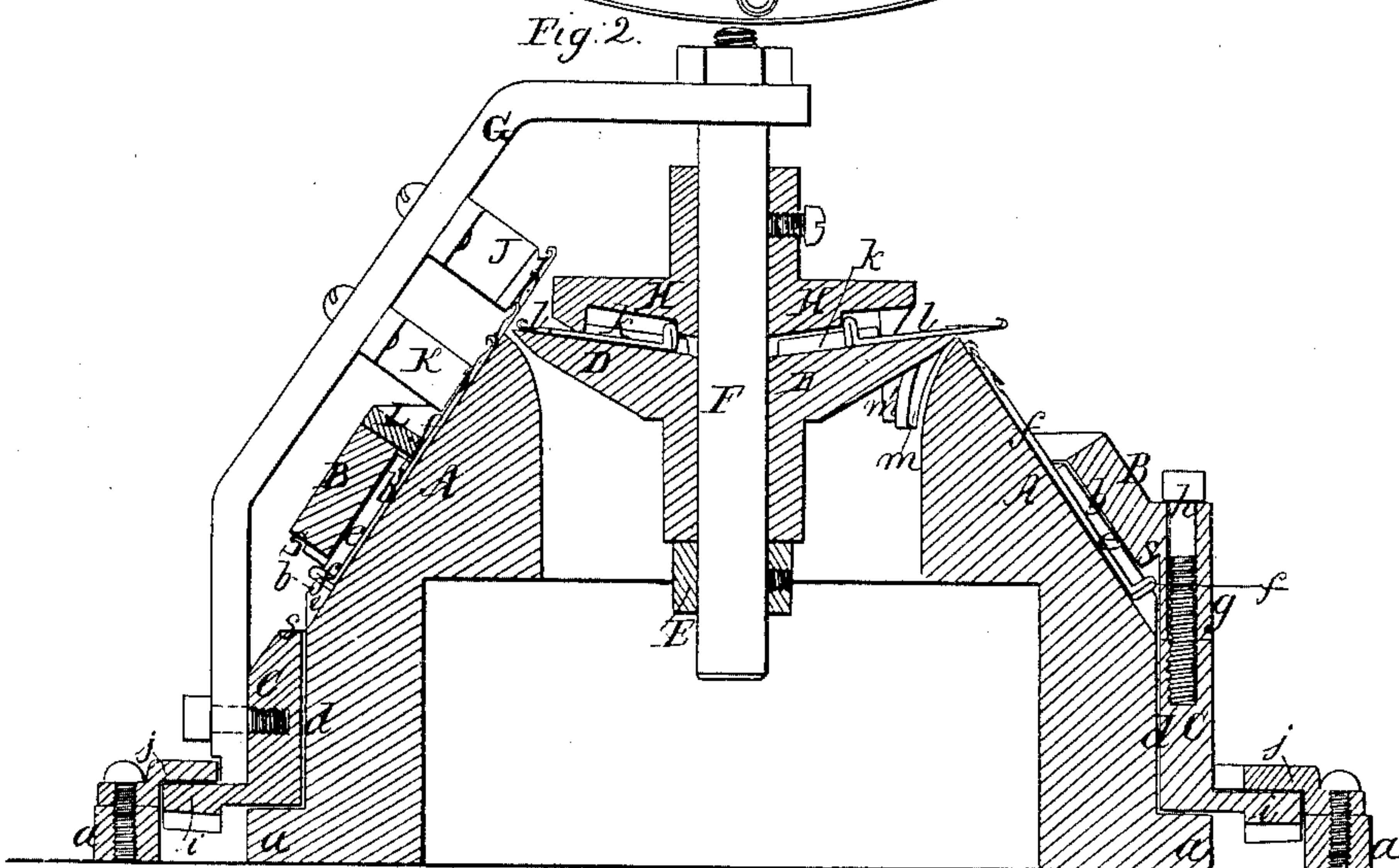
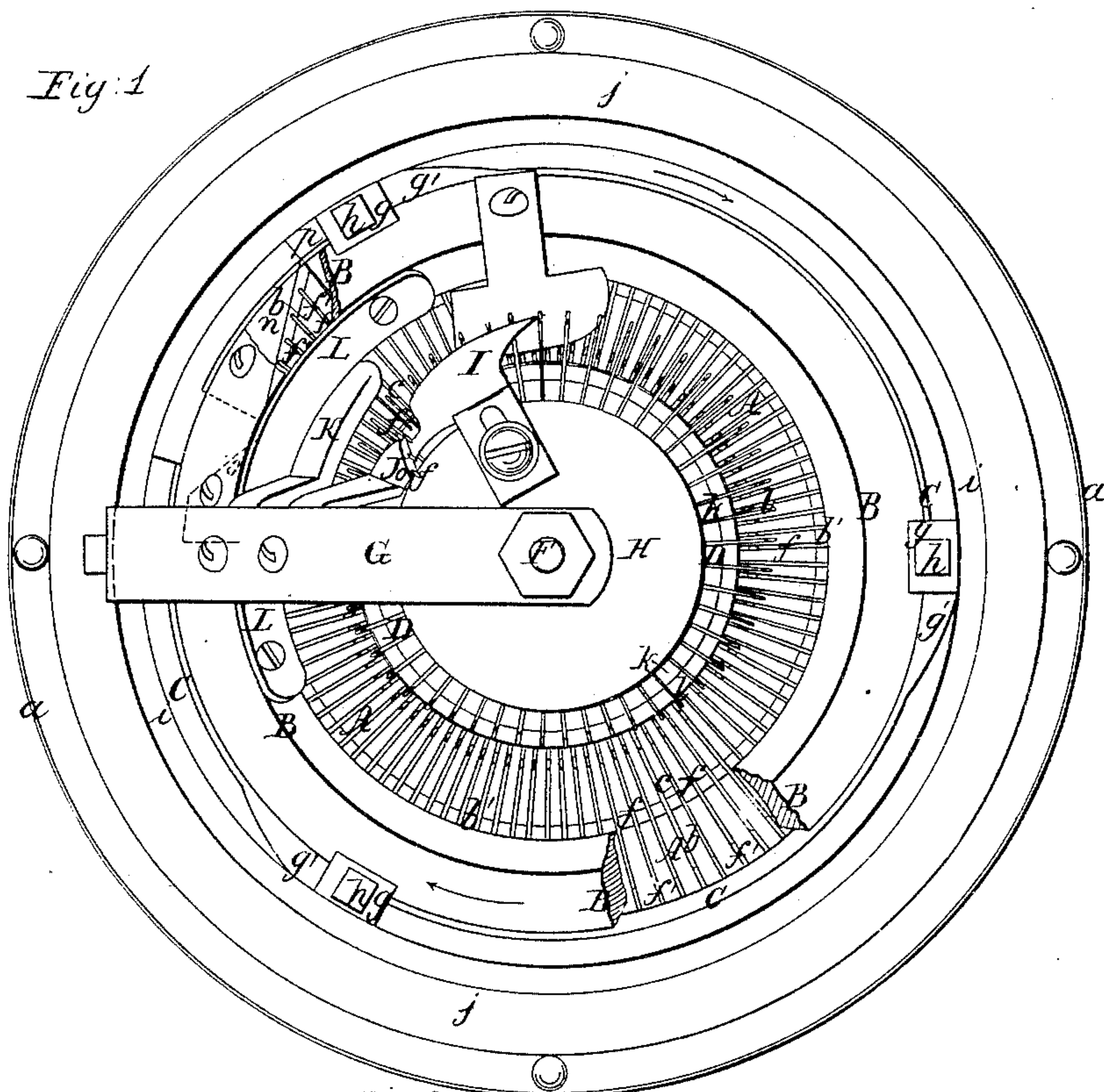


W. B. EVANS.
KNITTING MACHINE.

No. 37,161.

Patented Dec. 16, 1862.



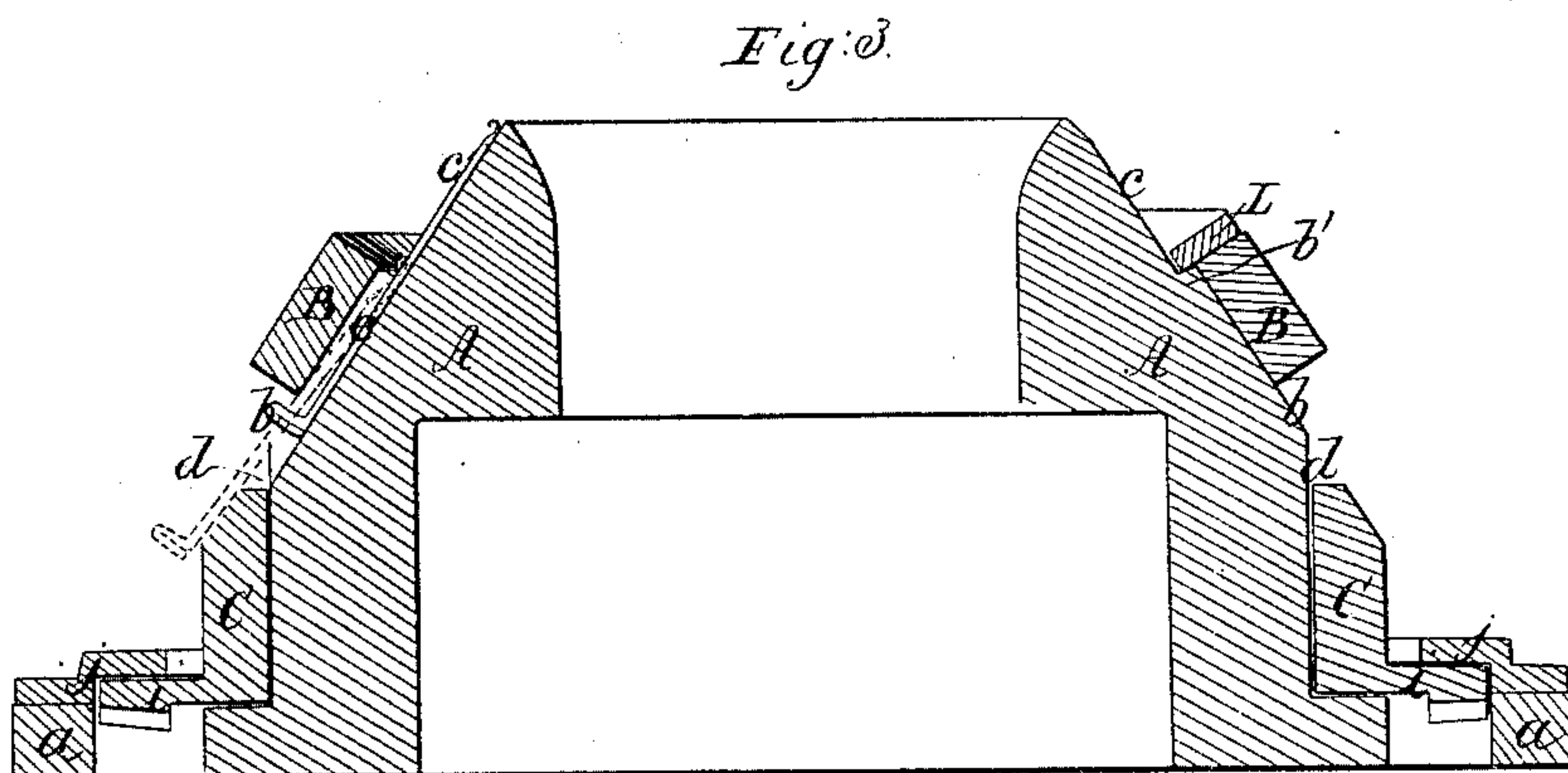
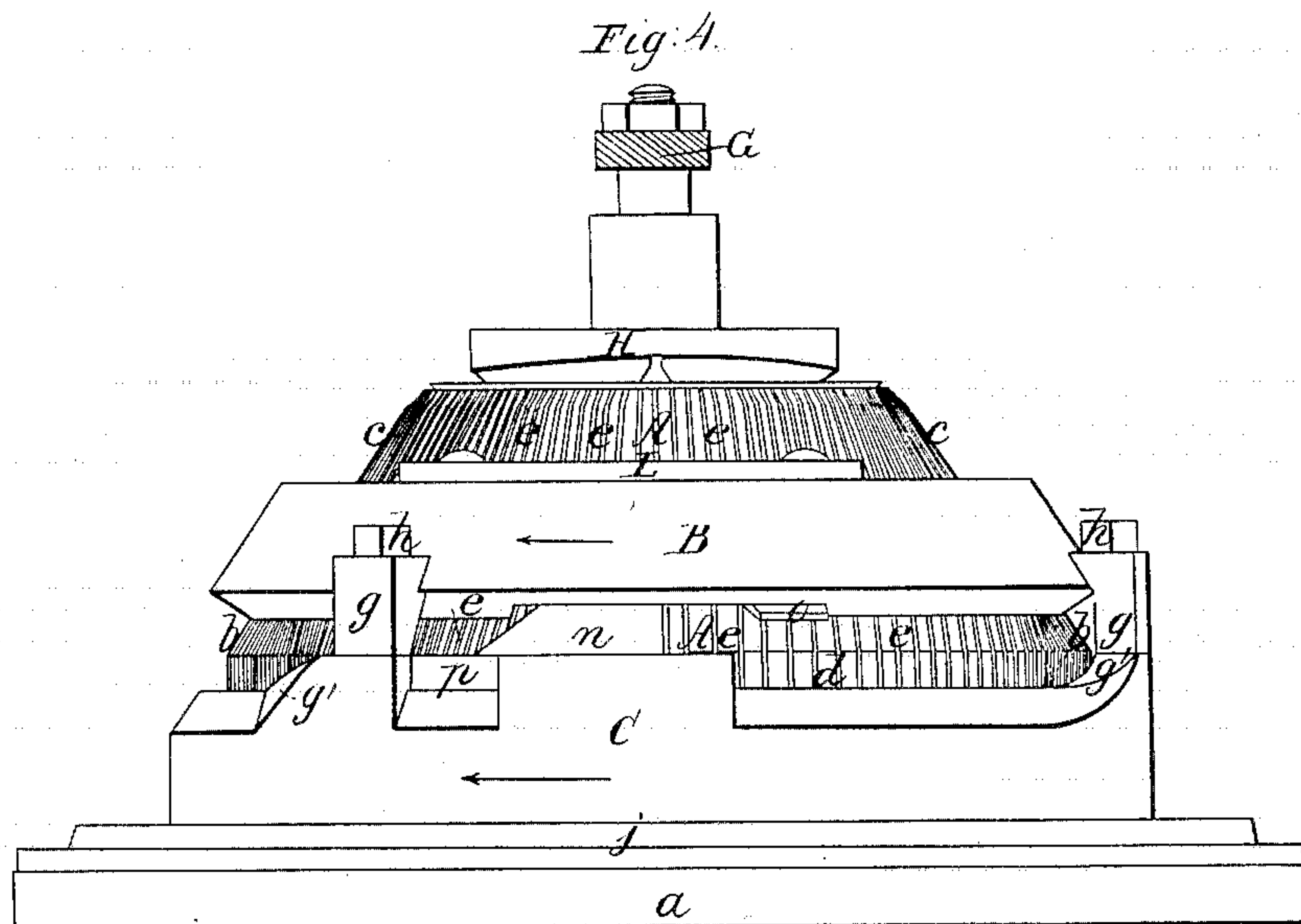
Witnesses;
J. W. Coombs
A. M. H. Gay

Inventor;
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UNITED STATES PATENT OFFICE.

WILLIAM B. EVANS, OF HOLDERNESS, NEW HAMPSHIRE.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. **37,161**, dated December 16, 1862.

To all whom it may concern:

Be it known that I, WILLIAM B. EVANS, of Holderness, in the county of Grafton and State of New Hampshire, have invented certain new and useful Improvements in Circular-Knitting Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of a machine with my improvements. Fig. 2 is a central vertical section of the same. Fig. 3 is a central vertical section of the needle-plate and needle-operating ring. Fig. 4 is a front view of the principal parts to which my invention relates.

Similar letters of reference indicate corresponding parts in the several figures.

The principal object of my invention is to provide for the easy insertion and removal of the needles of a circular-knitting machine; and to this end it consists, mainly, in a peculiarly-constructed grooved conical needle-plate, and a peculiarly-applied needle-operating ring working in combination with such needle-plate.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

The machine represented in the drawings is for ribbed knitting, and it has my improvements applied in connection with the principal series of needles in a precisely similar manner to that in which they would also be applied to a machine for plain knitting.

A is the principal needle-plate, made with a broad flange, *a*, to constitute a base, with the central portion of its face the form of two frustums of cones, *b* and *c*, and with the portion *d* between the lower and larger cone of cylindrical form. *e e* are the grooves, formed in the said plate for the principal series of needles *f f* to work in. These grooves extend the whole depth of the cones *b* and *c*, terminating in the circular upper edge of the plate and in the cylindrical portion *d*, and, as the bottoms or backs of the said grooves are parallel with the faces of the two cones, the lower portions of which are within the cone *b*, are of the greatest depth. This needle-plate is intended to be stationary.

B is the needle-operating ring, made of a form and size to surround and nearly fit the

upper part of the lower cone, *b*, of the needle-plate. This ring is made with two or more deep lugs, *g g*, through which it is bolted by bolts *h h* to a lower ring, C, which surrounds the cylindrical portion *d* of the needle-plate. This ring C is made with a flange, *i*, which is supported upon the flange *a*, and held down thereon in such a manner as to be allowed to rotate freely by a cap-ring, *j*, and the said flange *i* has teeth all around its under side to enable it to receive rotary motion from a gear on the main shaft of the machine, which is not shown. The said ring C serves to impart motion to all parts of the machine. There is an open space, *s s*, between the said ring and the needle-operating ring B nearly all around the machine, the said space being for the purpose of leaving the lower ends of the needle-grooves *e e* open for the removal and insertion of the needles, and, in order to leave these ends of the grooves open, the ring C only extends up as high as the bottoms of the said grooves.

D is the plate which carries the rib-needles, having its upper surface slightly concave and provided with radial grooves *k k* for the rib-needles *l l* to work in. This plate rests on a collar, E, which is secured to a shaft, F, which is carried by a bent standard, G, which is bolted firmly to the ring C. The shaft F is concentric with the two needle-plates A D, the latter being bored out centrally to fit easily upon it; and it has firmly secured to it the cam H, for producing the longitudinal sliding movement of the needles. The said shaft and cam rotate with the rings C and B, but the needle-plate D is prevented from rotating with them by means of a stop-piece, *m*, secured to the under side of the said plate, and coming in contact with a stop, *m'*, secured to the interior of the needle-plate.

The cam H has secured to it the latch-opener I, for opening the latches of the rib-needles *l l*, those, as well as the needles *f f*, in the machine represented being what are called "latch-needles."

The latch-opener J, belonging to the needles *f f*, is attached to the standard G, and so is the guard K, for holding the said needles steady while the latches are opened.

I have only described the upper needle-ring and its appendages and the latch-openers to prevent confusion of parts in the drawings.

The ring C has its interior cut out in proper form and position, and is fitted with suitable plates, *n o*, to constitute cams for acting upon the projecting butts *f' f'* of the needles, to give the needles the necessary upward and downward motion, and the part of the ring which contains these cams has secured to its upper edge a plate, L, which laps over the shoulder *b'*, formed between the cones *b* and *c*, and which almost fits against the face of the cone *c*, the said plate also extending some distance in front and rear of the cams. The object of the said plate is to confine the said needles in their proper positions within the grooves during the operation of the cams upon them. While in any position but under this plate, or opposite to one of the lugs *g g*, any of the needles *f f* can be taken from the machine by simply taking hold of the projecting butt *f'* and pulling it outward as far as permitted by the ring B and then drawing it downward through the open lower end of its respective groove *e* and over the edge of the needle-operating ring C in the manner shown in Fig. 3 in red outline, and all of the grooves not in either of the positions above specified may have needles inserted in them by passing such needles upward over the edge of the ring C and under the ring B.

The provision thus afforded for taking out and replacing the needles by leaving an open space between the needle-operating ring and its supporting-ring C opposite to the lower or outer ends of the grooves *e e*, thereby leaving the said grooves open at those ends and making the face of the needle-plate in the form of two cones, *b c*, the lower of which increases in size by a positive step, *b'*, enables the needles to be removed and replaced much quicker than in most other circular-knitting machines which use needles having an independent longitudinal movement, and the necessity of drawing a key to permit the removal and replacement of the needles is obviated. The needles are prevented from slipping out of the machine, for if they are loose enough to slide down the grooves *e e* by their

own weight they will be stopped by coming in contact with the top of the ring C.

On that side of each lug *g* which faces in the direction of the revolution of the rings B C, such direction being indicated by arrows in Figs. 1 and 4, there is provided on the ring C an inclined surface, *g'*, the object of which is to cause any of the needles which may have dropped down on the said ring to be raised up by the cam-like action of the said inclined surface high enough for their butts *f'* to clear the said lugs in their revolution, and so be prevented from being broken off in passing the said lugs.

In order that the butts of the needles may always be at the proper height for the cam *n*, which raises them, to operate upon them when the said cam arrives at them, there is fitted to the ring C, between the cam *n* and the nearest inclined surface *g'*, a piece of iron or steel, *p*, the upper surface of which unites with the top of *g'* and forms a continuous surface from thence to the bottom of the said cam, and so supports the needles till the action of the cam is commenced.

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

1. The combination of the needle-plate A, having its face composed of two conical surfaces, *b c*, and cylindrical surface *d* and needle-grooves *e e*, opening into the said cylindrical surface, and the two rings B C, having between them an open space, *s s*, opposite to the openings of the grooves in said cylindrical surface, substantially as and for the purpose herein specified.

2. The plate L, applied in combination with the said needle-plate and the ring B, substantially as and for the purpose herein specified.

3. The inclined surfaces *g' g'*, provided on the ring C, substantially as and for the purpose herein specified.

WM. B. EVANS.

Witnesses:

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A. L. SMITH.