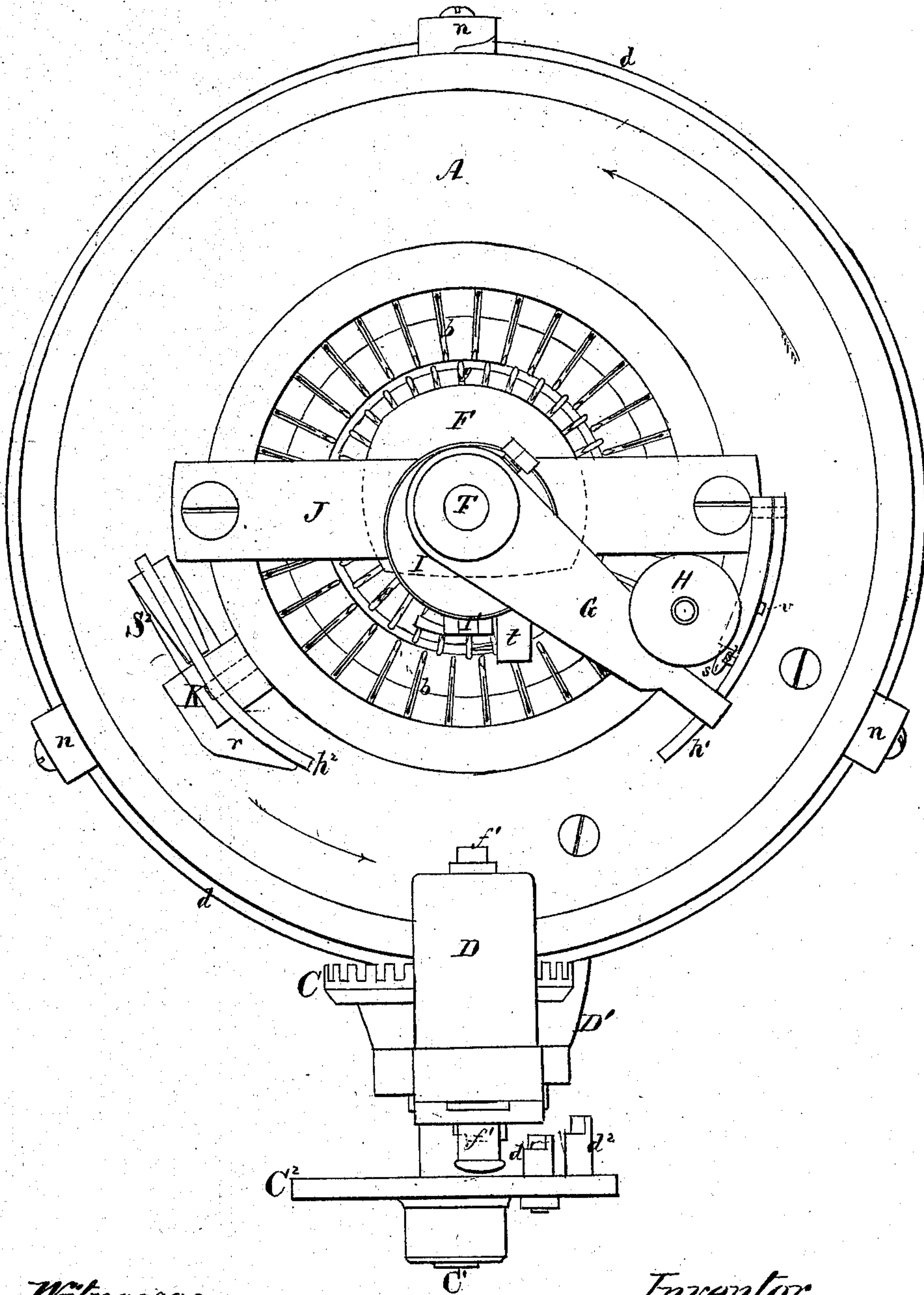


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KNIT FABRIC.

No. 107,749.

Patented Sept. 27, 1870.

Fig. 1.



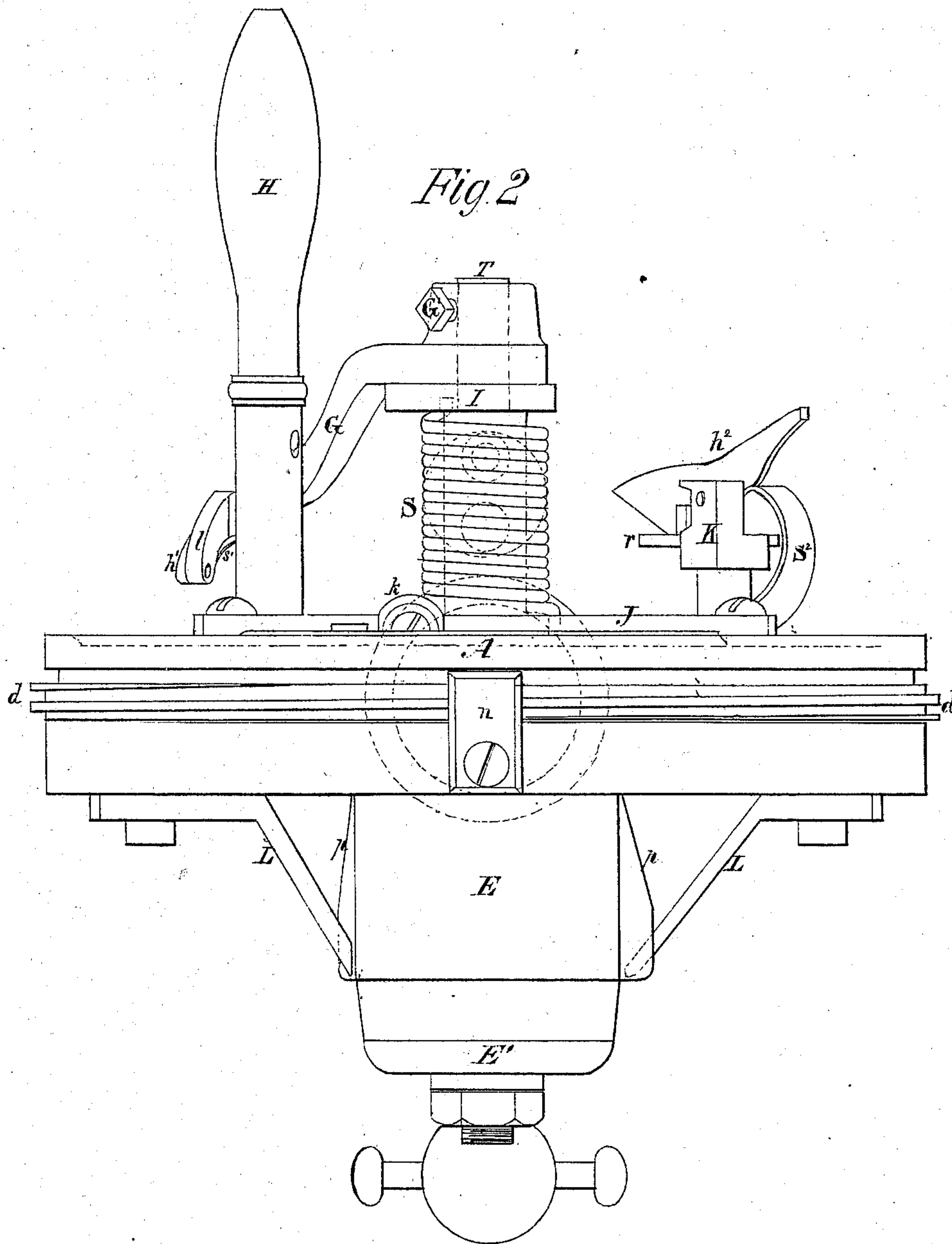
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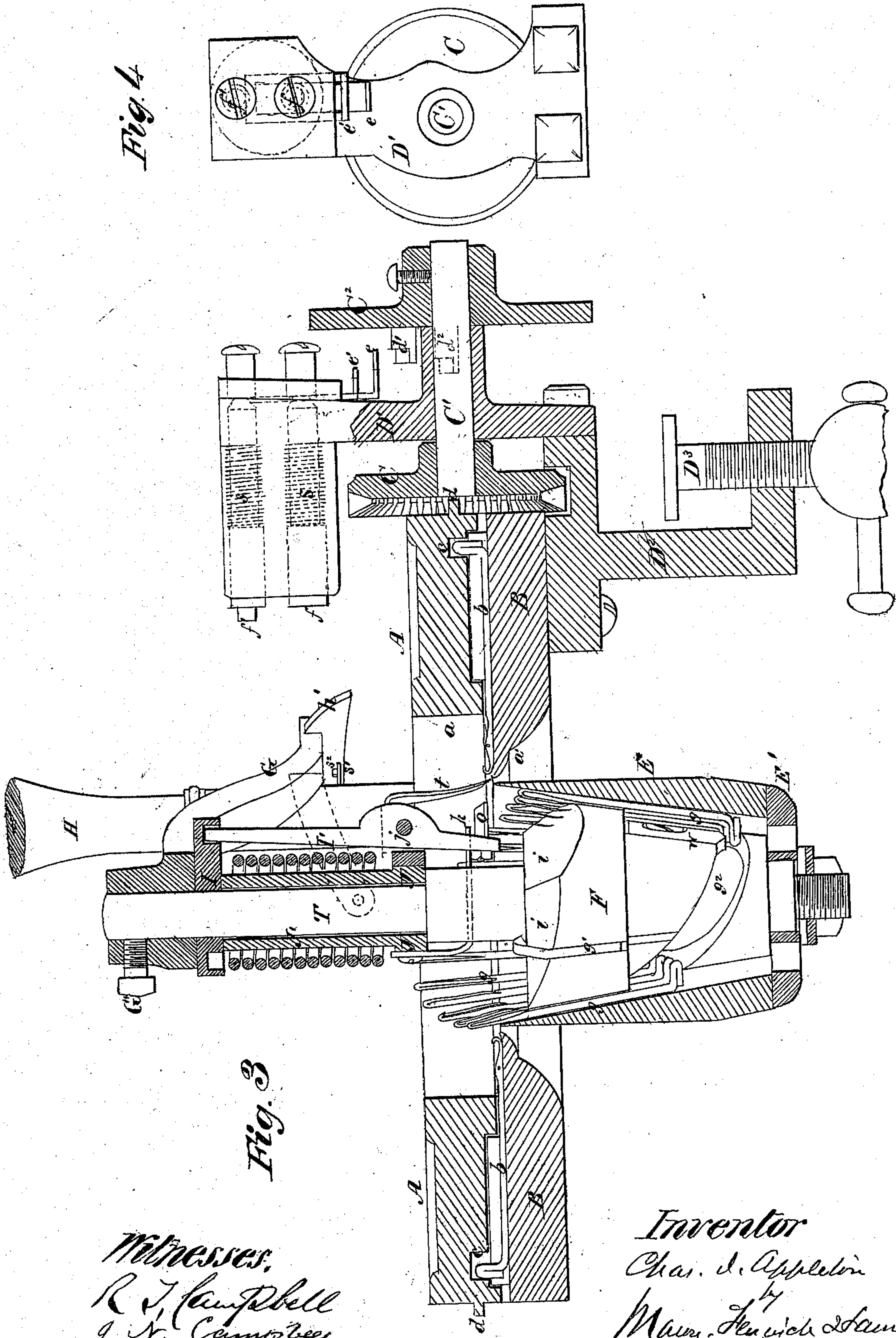
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UNITED STATES PATENT OFFICE.

CHARLES J. APPLETON, OF COHOES, NEW YORK, ASSIGNOR TO HIMSELF,
EARL L. STIMSON, AND S. EDWARD STIMSON, OF SAME PLACE.

IMPROVEMENT IN KNIT FABRICS.

Specification forming part of Letters Patent No. 107,749, dated September 27, 1870.

To all whom it may concern:

Be it known that I, CHARLES J. APPLETON, of Cohoes, in the county of Albany and State of New York, have invented a Mode of Finishing the Ends of Tubular Knit Fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1, Plate 1, is a top view of a machine which is adapted for producing welts on tubular knit fabrics. Fig. 2, Plate 2, is a view of one side of the machine. Fig. 3, Plate 3, is a section taken diametrically through the machine. Fig. 4, Plate 3, is an end elevation of the bearing for the tripping devices and the toothed wheel. Fig. 5, Plate 4, is a top view of the machine, portions of which are broken away to expose the two sets of needles and the yarn-guide. Fig. 6, Plate 4, is a view of a portion of the fabric as it would hang from the machine while knitting plain work, showing the plain loops and the rib and rib-loops.

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

The object of this invention is to produce seamless or tubular knit fabrics with welts or finished ends.

The following is a description of one practical form of knitting-machine which is adapted for producing my improved commodity.

A and B are two circular plates, having circular passages *a a'* centrally through them, in which are exposed the operating ends of the two sets of knitting-needles *b* and *g*, and also the upper end of a conical cam, F, and its cup E.

The plate A is allowed to rotate freely, which motion may be given to it by a handle, H, rising perpendicularly from it, or by any other suitable means.

The plate B is stationary, and has secured to it a clamping device, D² D³, by means of which the machine can be fixed to the edge of a table, or to other established object.

By means of three fingers, *n n n*, which are fastened to the plate B, and constructed with lips that are received into an annular groove made into the circumference of the plate A, this latter plate is confined in place upon the plate B.

The upper surface of the plate B is channeled radially to receive and guide the upper set of needles, *b*, which may be of the latch or bearded kind; and the bottom side of the plate B has a groove, *c*, formed into it, of the shape indicated in dotted lines, Fig. 5, for receiving the butts of the needles *b*, and giving the required movements to these needles toward and from the center of the machine.

The ribbing-needles *g*, which move up and down between the needles *b*, are arranged in channels formed into the inner side of a cup, E, which cup is suspended in the center of the machine, so that its upper circular edge is nearly on a level with the inner edge of the plate B, as shown in Fig. 3.

Within the cup E is an inverted cone, F, having a cam or oblique groove, *g*², made into its tapering surface, for receiving the butts or shanks of the needles *g*, and giving vertical motion to the needles.

W is an adjustable section of the cone F, for increasing or diminishing the throw of the needles *g*; and *g*¹ is a gate or plug, for allowing the removal of these needles from, or their insertion into, their places.

The needles *g* are of the bearded kind, and receive up-and-down motion from the oblique groove *g*² by the rotation of the cone F with the plate A.

The cup E, which is applied loosely to the lower end of the shaft T of the cone F by means of a nut and washers and a loose plate, E', is prevented from rotating with said cone by means of the downwardly-converging arms L L, which are secured to the plate B, and which receive against their lower ends the lugs or ears *p p*, on the exterior of the said cup.

The shaft T rises vertically through a bridge, J, which latter is fixed to the plate A and extended diametrically across the opening through the same, and it also rises through a tube, J', which is perpendicular to said bridge.

Above the tube J' is a circular plate, I, having a groove in its bottom side, which, when the plate is applied fast to the shaft T, is eccentric to the axis thereof, and will therefore operate on the upper end of a lever, I', as a cam, when the shaft T is turned independently of the plate A, as will be hereinafter explained.

The object of the cam-plate I is to move the presser or closer *o* away from the beards of needles *g*, when it is desired to allow loops to

remain thereon during the knitting of plain loops by the needles *b*.

The lever *I'* is pivoted, at *j*, to ears on one side of the bridge *J*, and to the lower end of this lever the beard-closer *o* is adjustably attached, so as to close the beards of needles *g*, when the latter co-operate with needles *b* in producing ribbed work.

Above the cam-plate *I*, and rigidly secured to the shaft *T*, is an arm, *G*, which extends outward and downward, so that its outer end will be received by either one of two catches, *h*¹ *h*², and also will be arrested by a dog, *f*, when the latter is released from its catch *e*, as will be hereinafter explained.

The hooked catch *h*¹ is pivoted to an arm, *l*, which is secured to the handle *H*, and this catch is held up against a stud, *v*, on said arm by a spring, *S*¹, in position for receiving and holding the end of arm *G*, as shown in Figs. 1 and 3.

The hooked catch *h*² is constructed with a backward extension, beneath which is a spring, *S*², that presses the hooked nose of the catch down upon a horizontal rest, *r*, which latter is applied to a post, *K*, to which the catch *h*² is pivoted.

The two catches *h*¹ *h*² are arranged at such a distance apart, relatively to the highest part of the oblique groove *g*² and to the yarn-guide *k*, (through which the yarn is fed to the needles,) that when the arm *G* is held by the catch *h*², as in Fig. 5, both sets of needles will operate and produce ribbed work, and that when said arm *G* is held by catch *h*¹ the needles *g* will be thrown out of operation, and needles *b* will produce plain knitting.

The helical spring *S*, which is coiled around the tube *J'*, is connected at one end to cam *I* and at the other end to bridge *J*, and is intended to move the arm *G* to catch *h*¹, when released from the catch *h*², as will be hereinafter explained.

The yarn-guide *k* is arranged over the needles *b* *g*, in proper position to distribute yarn to them, and it is secured to the bridge *J* and receives yarn from the handle *H*, through which it is passed from the cop or spool.

The finger *t*, which also depends from the bridge *J*, is intended to hold the work down as the needles *g* rise, and prevent dropping of the loops while knitting ribbed work.

A screw-thread, *d*, of one or more turns, is formed around the circumference of the plate *A*, and engages with the teeth of a spur-wheel, *C*.

The wheel *C* is keyed on a horizontal shaft, *C*¹, which passes through and has its bearings in a standard, *D*¹, rising from the clamp-jaw *D*², as shown in Fig. 3.

On the outer end of shaft *C*¹ a disk, *C*², is keyed, having two tripping-pins, *d*¹ *d*², fixed to its inner face at proper distances apart, one of which pins, *d*², is intended to act upon a sliding catch, *e*, and the other is intended to act upon a similar catch, *e*, at every revolution of the shaft *C*¹.

A head, *D*, extends inward from the upper end of the standard *D*¹ and overhangs the plate *A*, and receives through it two springs, *f* *f'*, arranged one over the other, as shown in Fig. 3.

The dogs are both acted on by springs *s* *s*, inclosed within the head *D*, one of which springs will move the dog *f'* inwardly when released from its catch *e'* far enough to operate on the tail of catch *h*² and release the arm *G* therefrom, so as to allow spring *S* to move this arm to the catch *h*¹. The other spring *s* will operate on the dog *f* when it is released from its catch *e*, and throw out this dog far enough to arrest the arm *G* and deliver its end to the catch *h*² as the plate *A* is moved around. Thus it will be seen that the adjustments are automatic.

The operation of the machine is as follows: The machine is secured to a bench or table, and the operator sits in front of it. The movable arm *G* is held in position by the catch *h*², as shown in Fig. 5, and the plate *A* with its attachments is turned by the handle *H* from left to right, as indicated by the arrows in Figs. 1 and 5, thus knitting one-and-one ribbed work, as shown at 4 4, Fig. 6, Plate 4. With each revolution of the plate *A* the worm or thread *d* moves the spur-wheel *C*, and when a sufficient number of courses of one-and-one ribbing has been made, (regulated by the number of teeth of wheel *C*), the outer pin, *d*², on plate *C*² trips the catch *e'* and releases the dog *f'*, which is pushed by its spring *s* toward the center of the machine, and by its depressing the tail of catch *h*² the arm *G* is released and is thrown around by spring *S* to the catch *h*¹. The arm *G* being attached to the shaft *T* of the cam-cone *F*, in which the rib-needles *g* work, the cone itself is carried around sufficiently to take the needles *g* out of the way of the yarn as it is fed into the machine, and yet the needles *g* retain their loops 1 1, Fig. 6; for by the action of the eccentric or cam-plate *I* and the lever *I'*, the presser *o* (which, in making ribbed knitting, presses the beards of the rib-needles) is moved away from the rib-needles, and the loops 1 1 last formed on them are retained on them. The horizontal needles *b* continue to work and produce plain knitting 2 2, Fig. 6, for any desired number of revolutions. The tail of the catch *h*² returns the dog *f'* to its original position in the same revolution during which this dog was released, and this dog is again held by its catch *e'*. When the given number of plain courses 2 3 has been made the inner pin, *d*, on the plate *C*², pushes down the slide-catch *e*, and the dog *f* is released and thrown toward the center of the machine far enough to engage with the arm *G*. During the next revolution the dog *f* depresses the catch *h*¹ and arrests the arm *G* until the catch *h*² is moved around and takes this arm, when the beveled edge of the table *r* pushes back the dog *f* to its original position, where it is retained by its spring-catch *e*. The several parts of the machine are now in

their original positions, and produce the one-and-one ribbed loops 4 4, which are at first thrown over the plain loops 2 2 just made, and the welt is complete.

It will be seen from the above description that the annular welt is produced by two changes, to wit: from ribbing to plain knitting, and back again from plain to rib knitting.

When a sufficient length of ribbing is made the needles *g* are drawn down from between the needles *b* in such manner that, when the former needles rise, they will be beyond the place where the yarn is fed to the horizontal needles. Consequently, while these ribbing-needles retain the loops last formed on them, they do not form other loops. After the required number of courses of plain loops has been knit by the horizontal needles, acting alone, the ribbing-needles are again adjusted into operation to produce ribbed work, when the first course knit will receive into it the binding-loops 1 1 1, which were for a time kept out of the way. The retained loops, overlapping the courses of plain loops, will round out the plain work and produce a thickened place or welt. This operation can be continued indefinitely.

In order to separate the cuffs or ribbed work and leave each cuff or piece with a welted or finished end, the fabric must be cut across through that course of ribbed loops which was

the last course completed before the ribbing-needles were drawn out of the way for the purpose of knitting plain work.

The fabric cut in this manner will not ravel, for the reason that ribbed work made on two sets of needles will ravel only from the last loop made toward its predecessors, and will not ravel from a former loop toward the last made.

The making of welts on flat or straight frames has been long practiced, and is effected by depressing the straight needle-bar which carries the ribbing-needles; but I believe that I am the first to have ever produced tubular seamless work with welted or finished ends.

I do not claim under this application any of the contrivances herein described for producing the seamless welted fabric, as such claim I have made in an application for Letters Patent marked "Case A," and filed on the 13th day of May, 1870.

Having described my invention, and shown one practical form of machine for carrying it into effect, what I claim as new, and desire to secure by Letters Patent, is—

Welted, seamless, tubular knit fabrics, as a new article of manufacture.

CHARLES JAMES APPLETON.

Witnesses:

E. W. FULLER,
JAMES CRAMER.