

J. CHANTRELL.
MACHINERY FOR RIBBED KNITTING.

No. 27,430.

Patented Mar. 13, 1860.

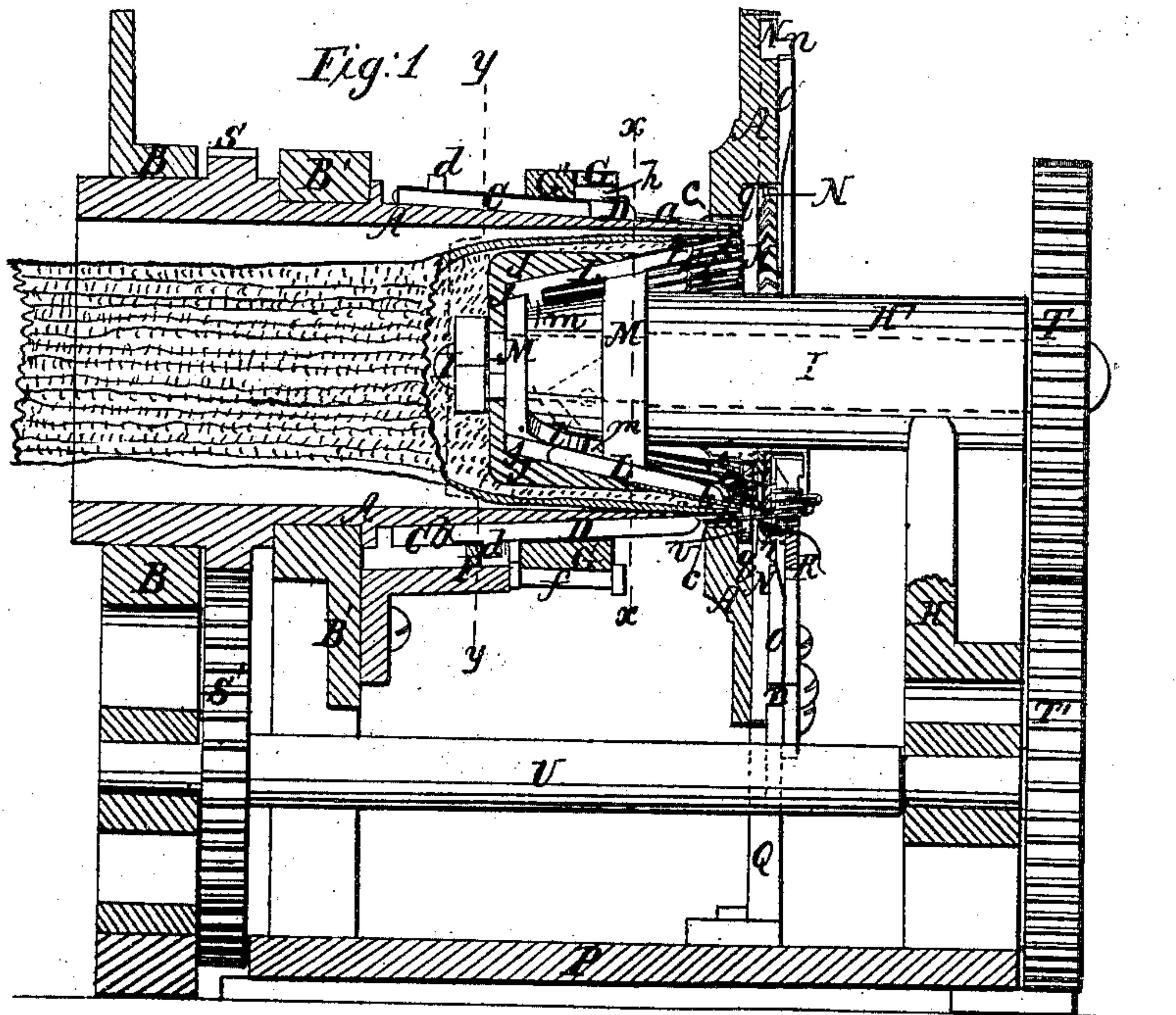


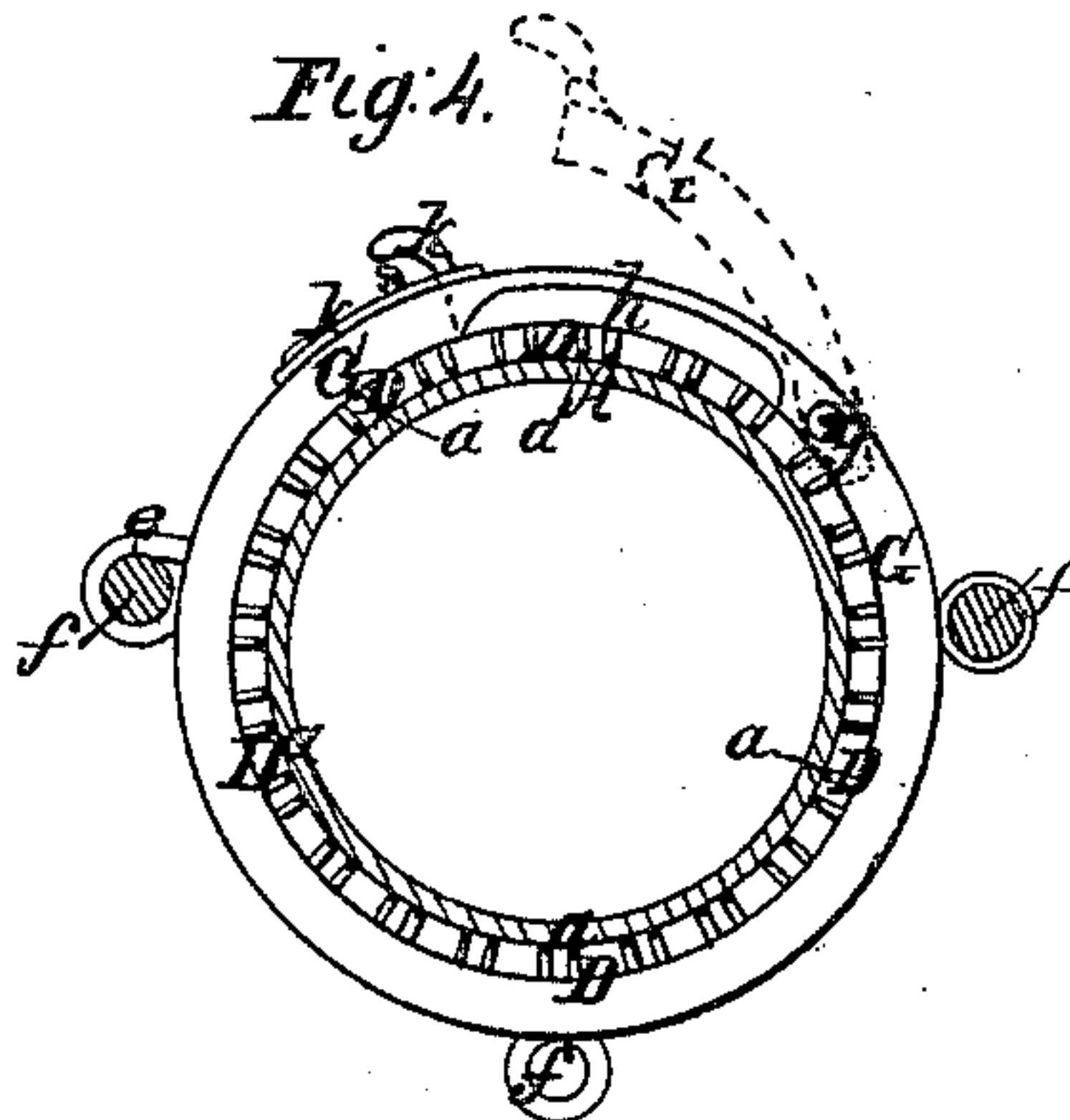
Fig. 5



Witnesses;

J. W. Coombs
P. S. Spencer

Fig. 4



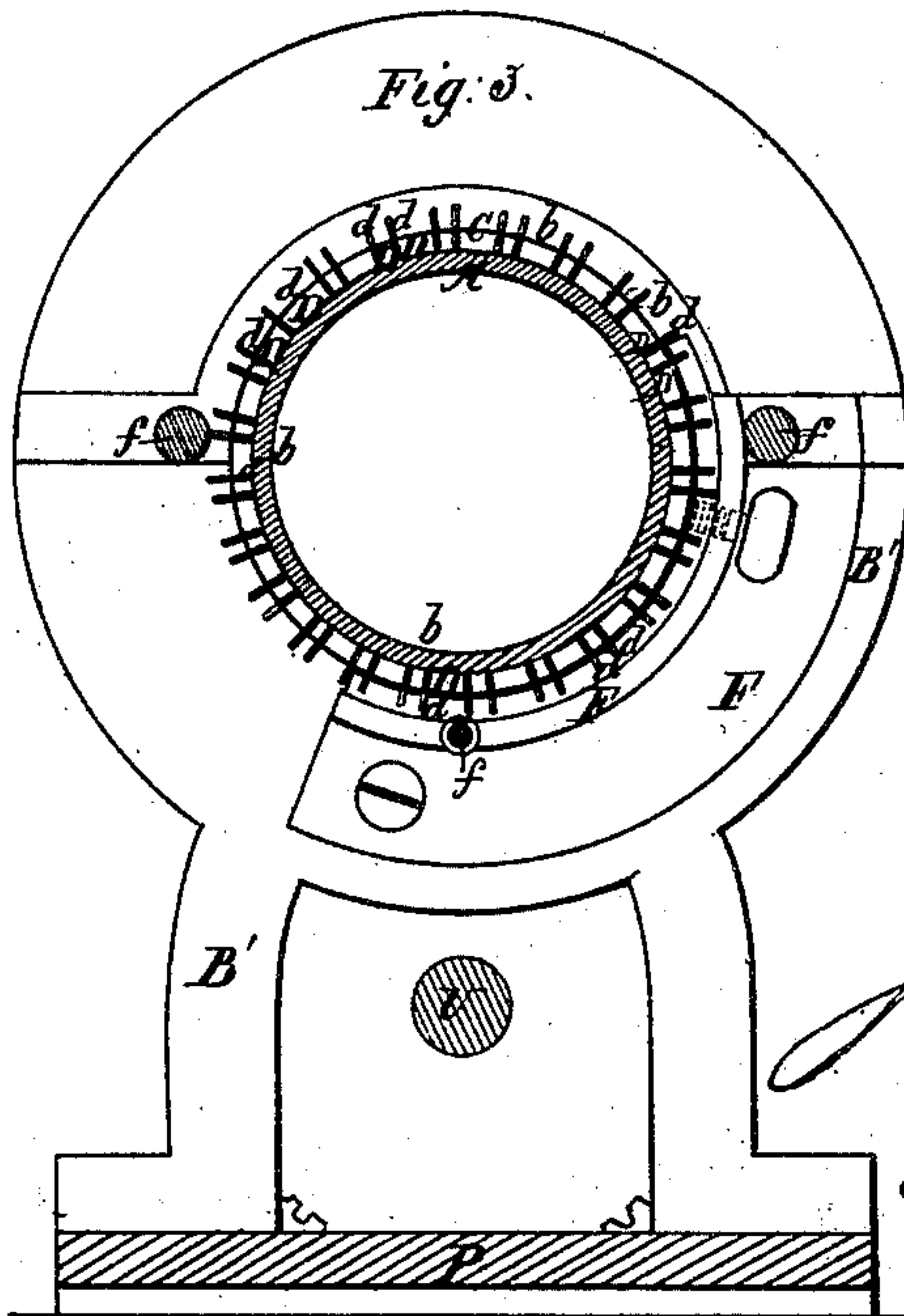
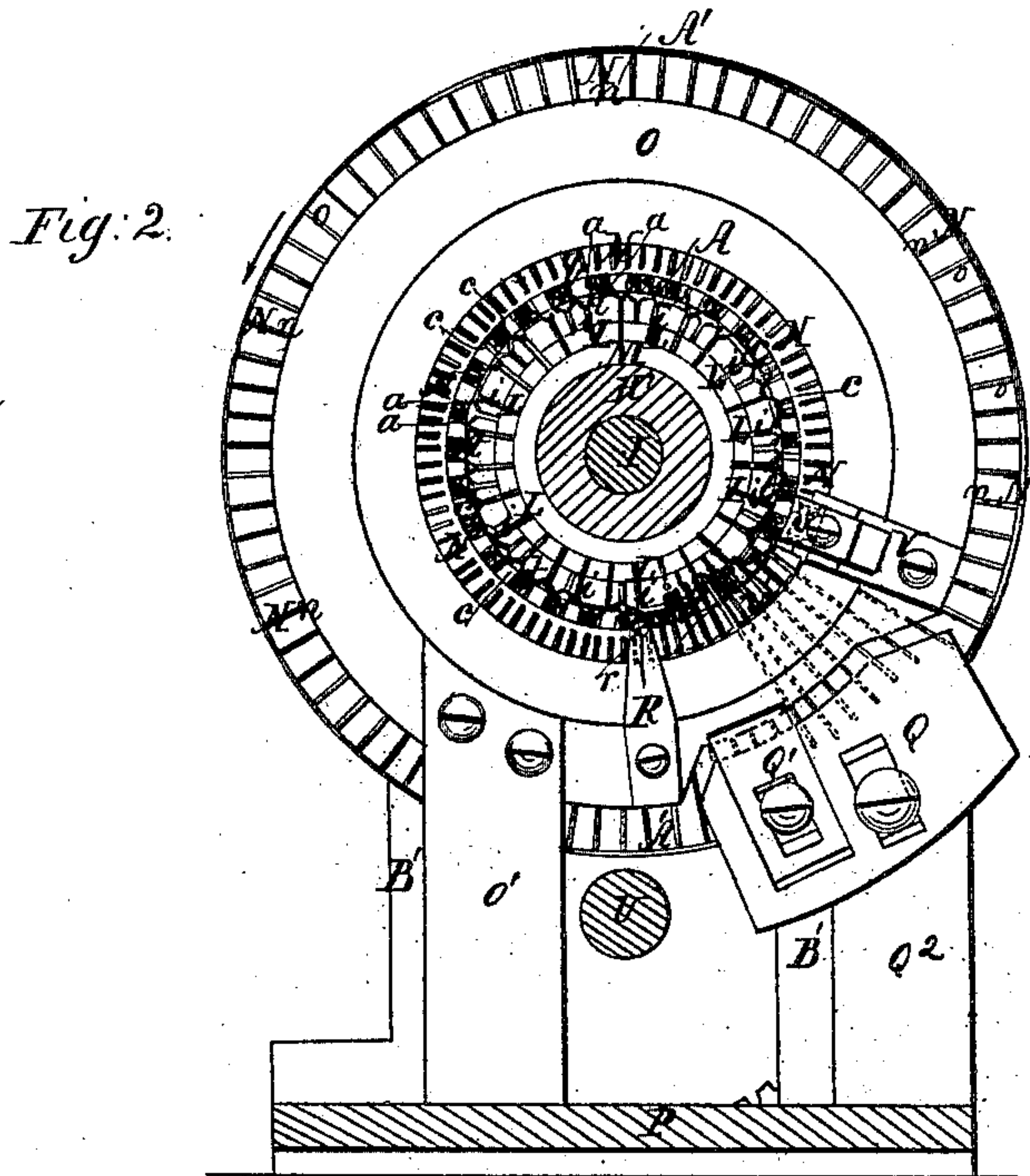
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Spanwell
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1870

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UNITED STATES PATENT OFFICE.

JOHN CHANTRELL, OF BRISTOL, CONNECTICUT.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 27,430, dated March 13, 1860.

To all whom it may concern:

Be it known that I, JOHN CHANTRELL, of Bristol, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machinery for Ribbed Knitting; 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 a part of this specification, in which—

Figure 1 exhibits a central section of a circular-knitting machine with my invention applied. Fig. 2 is a front view with one of the standards removed to expose the needles and sinkers. Fig. 3 is a transverse section taken in the plane indicated by the line *x x* in Fig. 1. Fig. 4 is a transverse section in the plane indicated by the line *y y* in Fig. 1. Fig. 5 is a perspective view of one of the sinkers.

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

My invention consists in a certain novel mode of applying and arranging a series of sinkers to operate in combination with two series of needles for the production of ribbed knitting.

It also consists in a series of elastic plates so applied in combination with the ribbing-needles and in relation to the needle-plate which contains the principal series of needles as to support the rib-loops of the last course of knitting against the action of the ribbing-needles as they draw the new stitches tight, but as to yield readily to allow any knots or inequalities in the yarn in the finished portion of the knitting to pass between themselves and the principal needle-plate.

My improvements are applicable either to circular or straight knitting machines.

I will first describe their application to a circular machine as illustrated in the drawings, after which but little explanation will be required to enable them to be adapted to a straight machine.

A represents a hollow shaft having an internal diameter sufficient to enable the work to pass through it, arranged horizontally in bearings in two standards B B', erected on a bed-plate P and furnished at its front end with a broad flange A', in rear of which, for a considerable portion of its length, its exterior is turned to a slightly taper form, diminishing in size toward the flange A'. On the

larger rear part of the taper portion there is fitted and firmly secured a metal band C, which has cut in it a number of grooves *b b*, running lengthwise of the shaft, to receive the straight sliders or jacks D D, to which the principal circular series of needles are attached, and opposite to every one of these grooves there is an opening *c* in the flange A' of the shaft large enough for a needle to pass through.

The needles *a a* have a slight inclination to the axis of the shaft A, corresponding with the taper of the exterior of the said shaft, as shown in Fig. 1. The said needles are represented of the bearded form common to the older knitting-machines, their beards being on the sides most distant from the axis of the shaft A.

The needle sliders or jacks D D are each furnished with a projection *d*, which, as the said needles revolve with the shaft A, work in a stationary cam F, that is bolted to the standard B for the purpose of producing the necessary longitudinal movement of the needles *a a*. The said needles are confined within the grooves *b b* of the band C of the shaft A by a ring G, which is fitted loosely to the exterior of the said band C, but which is prevented from rotating with the said band and with the needles by its being furnished externally with two stop-pins *e*, which come in contact with one of three fixed horizontal studs *f f f*, which are secured to the cap of the bearing of the standard B'. The said ring G is also prevented moving lengthwise of the needles by entering grooves in the studs *f f f*.

To provide for the removal of the needles *a a* from the machine, a portion G' (see Figs. 1 and 4) of the band G, equal to about one-sixth of its circumference and half its width, is made in a separate piece and hinged, as shown at *g* in Fig. 4, so that it can be swung open, as illustrated by the dotted outline in that figure. The corresponding portion of the ring which makes the other half of its width has cut in its exterior a cavity *h*, Figs. 1 and 4, the depth of which is equal, or nearly so, to the depth of the needle-jacks D D. When the portion G' of the ring is thrown open, as shown by the dotted outline in Fig. 4, the needles can be severally taken out when the shaft A is turned to bring them opposite to the cavity *h*; but when the said portion G'

is closed and secured by the fastening *k*, provided for the purpose, it, by fitting close to the band *C* of the shaft, confines them as well in that as in any other portion of the ring.

H is a standard erected upon the bed-plate *P* some distance in front of the flanged front end of the shaft *A* and carrying a long tube-like bearing *H'*, in which is fitted the shaft *I*, to which is secured the needle-ring *J*, which carries the circular series of ribbing-needles *i i*, the said bearing *H'* entering some distance into the shaft *A*, but having its exterior small enough to leave plenty of room between it and the needles *a a*. The needle-ring *J* is of cup-like form, having a conical exterior, in which is provided a series of grooves *j j*, one for each ribbing-needle *i*, the sides of said grooves running parallel with planes passing directly through the axis of the shafts *A* and *I*, and the bottoms of the said grooves having such a degree of obliquity to the said axis that the ribbed needles *i i* and the principal needles *a a* are at an angle of about twenty degrees to each other, or as nearly parallel with each other as is practicable, it being necessary for both series to pass so close to the same line in their operation that they must be arranged at a considerable angle to each other.

The ribbed needles, which are what are known as "latch-needles," are attached to sliders or jacks *L L*, which are fitted to the grooves *j j* and confined therein by a stationary cone-piece *M*, that is formed upon or secured rigidly to the end of the bearing *H'*. This cone-piece, which fits into the conical interior of the needle-ring *J*, has formed in it a wide groove, in which are fitted and secured suitable pieces of steel *l* to constitute a stationary cam for giving the necessary longitudinal motion to the ribbing-needles *i i*, whose jacks are furnished with projections *m*, to be acted upon by the said cam in their revolution.

The shafts *A* and *I* are required to rotate together, as though they were connected, and for this purpose the shaft *A* has secured to it a gear *S*, and the shaft *I* a gear *T*, of the same size, said gears gearing each with one of two gears *S'* and *T'*, of equal size, fast on a shaft *U*. By this means the two series of needles are caused to rotate together, and the needles *i i*, of which there are only half as many as of *a a*, are kept in proper rotation to the latter—that is to say, opposite to every second space left between the latter.

N N are the sinkers, each consisting of a narrow straight piece of steel made with a fork or V-shaped recess in one end to receive the yarns and a projection *n* on one side. These sinkers are fitted to radial grooves *o o* in the face of the flange *A'* of the shaft *A*, and are confined within the said grooves in such manner as to leave them capable of sliding longitudinally therein by a stationary annular plate *O*, which is supported by a standard *O'*, erected on the bed-plate *P*. The pro-

jections *n n* are left standing out from the face of the flange *A'* outside of the plate *O*, that they may work between two plates *Q Q'*, constituting a stationary cam, for the purpose of producing their necessary movement in a radial direction toward and from the axis of the shafts *A* and *I* by their revolution with the former shaft. These plates *Q Q'* are bolted to a standard *Q²*, erected upon the bed-plate, and the outer portion of the plate *O* is cut away to make room for them and permit the radial movement of the sinkers.

The flange *A'* has a recess *q q* formed round the interior of the hollow shaft *A* to make room for the operation of the yarn-conductor *n*, the needles, the presser *v*, and the sinkers. The number of the sinkers is equal to the whole number of needles, and they are so arranged at equal distances apart relatively to the two series of needles that one will work between each needle *i* and the needle *a* on each side of it, and one between every two of the needles *a* which have no needle *i* between them, the two series of needles being so arranged that there is the same amount of room laterally between the needles *a a* and *i i* as between those *a a* which have no needle *i* between them, as is commonly done in ribbed-knitting machines.

The yarn-conductor *R* consists of a small tube or eye attached to or formed in an arm *R*, which is bolted to the plate *O*, and which projects into the recess *q q* at a point at which the needles *a a* in their revolution with the shaft *A* arrive just before the said needles have completed their advance or outward movement from the shaft, and which is passed by the needles *i i* in their revolution with the shaft *I* just before they commence to advance and by the sinkers *N N* just before they commence their movement toward the center of the shaft.

The presser *v*, for closing the beards of the needles *a a*, is stationary. It consists of a curved piece of steel arranged at the back of the recess *q q* outside of the circle of the needles *a a* and is attached to an arm *V*, which is bolted to the front of the plate *O*.

t t are the elastic plates which support the rib-loops of the last course of knitting against the action of the ribbing-needles *i i* as they draw the stitches tight. These plates, which are made of thin steel, are arranged in a circle and are attached to the needle-ring *J* outside of the rib-needles. Each one is represented as wide enough to cover two rib-needles; but they may be made wider, so as to cover three or more needles, or narrower, that each needle may be covered by a separate one. The said plates combine to form a ring for supporting the rib-loops, the outer edge of such ring being in the same plane with the front edge of the interior of the shaft *A* and at such distance therefrom as to leave just room enough for the finished work to pass between them. The adjacent side edges of the said plates are turned slightly inward to

ward the axis of the shafts A and I to prevent their corners catching in the work. The construction of the ring for supporting the rib-loops of these plates enables it to be brought nearer to the inner front edge of the shaft A, which supports the other loops, than if it were a perfect unbroken ring, as in case of any thick place or knot occurring in the work the plate or plates *t*, to which it is contiguous, will yield and let it pass, which is an effect that could not be obtained with an unbroken ring.

The take-up mechanism of the machine is not shown, as it forms no part of my invention. Suffice it, then, to say that such mechanism is to be attached to the rear end of the shaft and rotates along with it.

The operation of the sinkers, in combination with the two series of needles, as they all revolve together, is as follows: The needles *a*, as they in their revolution with the shaft A successively approach the thread-conductor *r*, advance or move outward from the shaft A toward the position to receive the yarn from the said conductor, completing their advance soon after passing the conductor, and the needles *i* *i* commence and complete their advance a little later, crossing the path of the needles *a* *a*. The sinkers commence their movement toward the center of the shaft A immediately after passing the thread-conductor, completing such movement just as the needles *a* *a* complete their advance and while those *i* *i* are still advancing, and so not only press the yarn between the needles *a* *a* in a corrugated form to commence the formation of their loops, but take it in such form into the path of the rib-needles *i* *i* in such manner that as the latter continue their advance it (the yarn) will pass under their latches, and so be caught by their hooks as they recede. In this operation it will be seen that the pressers pass between the needles *a* *a* and *i* *i* simultaneously and commence the formation of the rib-loops as well as of the others, and in this respect their operation differs from the sinkers of other ribbed-knitting machines. I will here mention that the back prongs of

the sinkers—that is to say, the prongs next the shaft A—are beveled on both sides, as shown at 6 6 in Fig. 5, to form sharp points, that they may enter between the needles with less liability to catch them.

To apply my invention to a straight machine, the needles have to be arranged in straight plates, which are arranged parallel longitudinally, but at such angle transversely to each other as to give the two series of needles the requisite inclination to each other, and the sinkers will be arranged in grooves in a straight bed to work transversely to the two series of needles.

The needle-plates and sinker-bed may have a reciprocating longitudinal movement relatively to stationary cams to produce the operative movements of the needles and sinkers; but it will be more simple to have the said plates and bed stationary and to give a reciprocating movement to the cams and the yarn-conductor. The plates *tt* in the straight machine will be arranged in line near the needle-plate which contains the needles which correspond with *a* *a* of the machine represented.

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

1. To applying a series of sinkers in a ribbed-knitting machine, that they work between the two series of needles simultaneously, substantially as herein described.

2. The arrangement, in combination with series of sliding sinkers, of a series of bearded needles *a* *a* and series of latch-needles *i* *i*, arranged obliquely in opposite directions to a line perpendicular to the sliding movement of the sinkers, as illustrated in Fig. 1 and herein described.

3. The series of plates *t* *t*, applied substantially as described relatively to the two series of needles to support the last-completed course of rib-loops against the action of the rib-needles in forming the new course.

JOHN CHANTRELL.

Witnesses:

THOS. MITCHELL,

HENRY A. MITCHELL.