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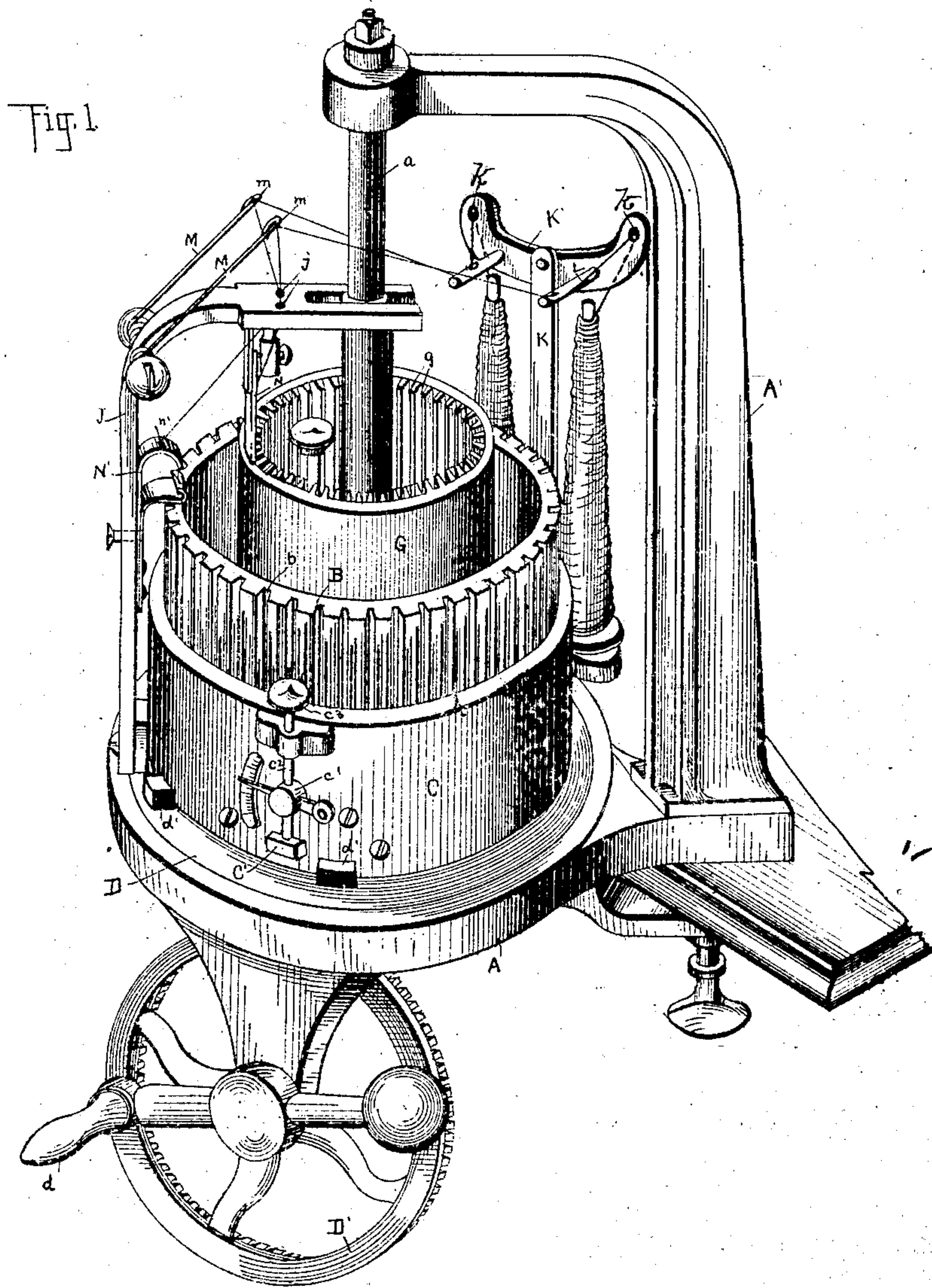
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J. B. SCHROEDER & M. J. HINDEN.

CIRCULAR KNITTING MACHINE.

No. 360,735.

Patented Apr. 5, 1887.



WITNESSES

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(No Model.)

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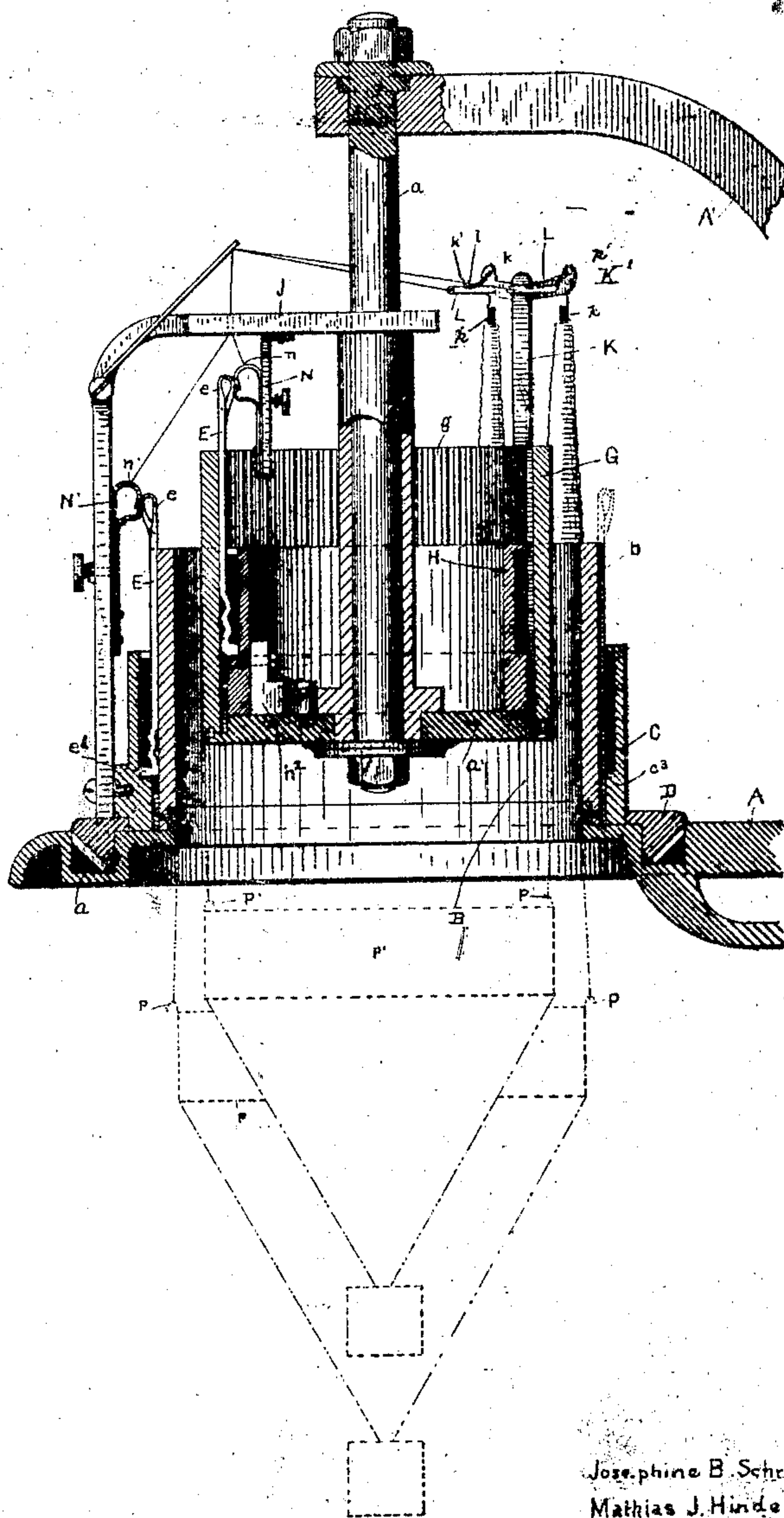
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Fig. 2



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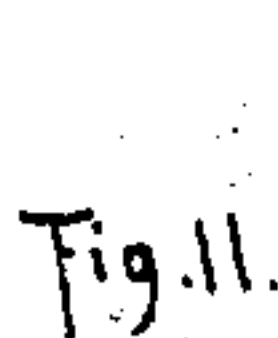
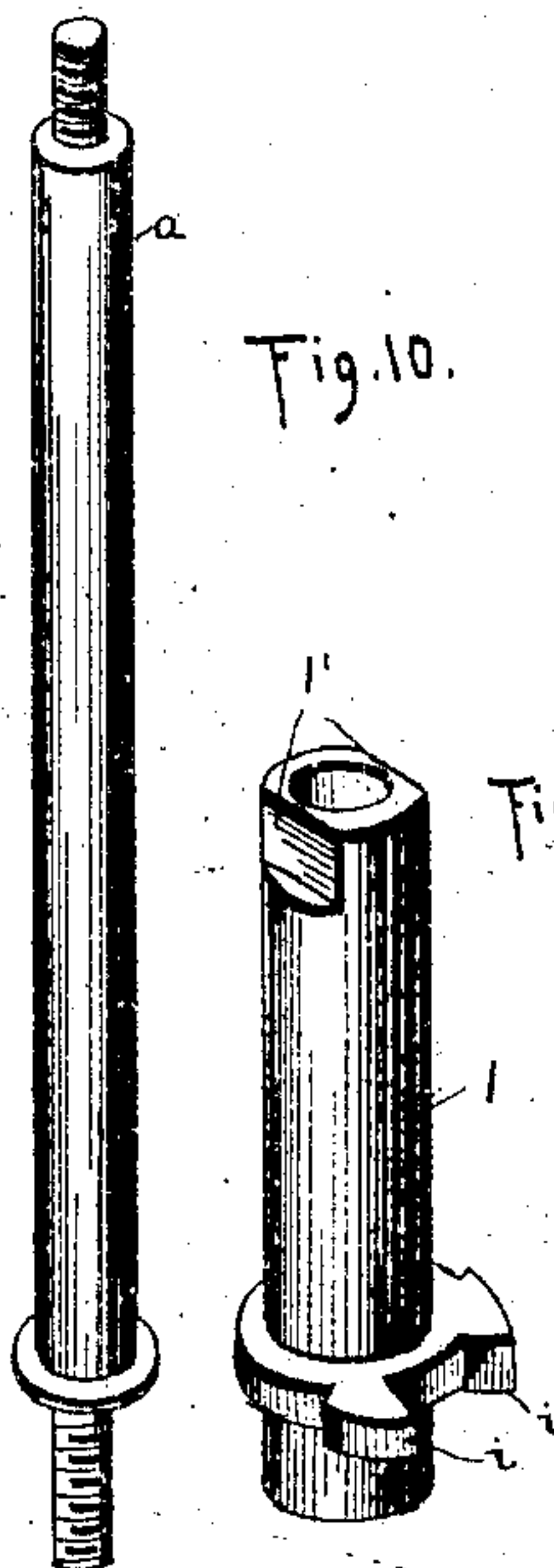
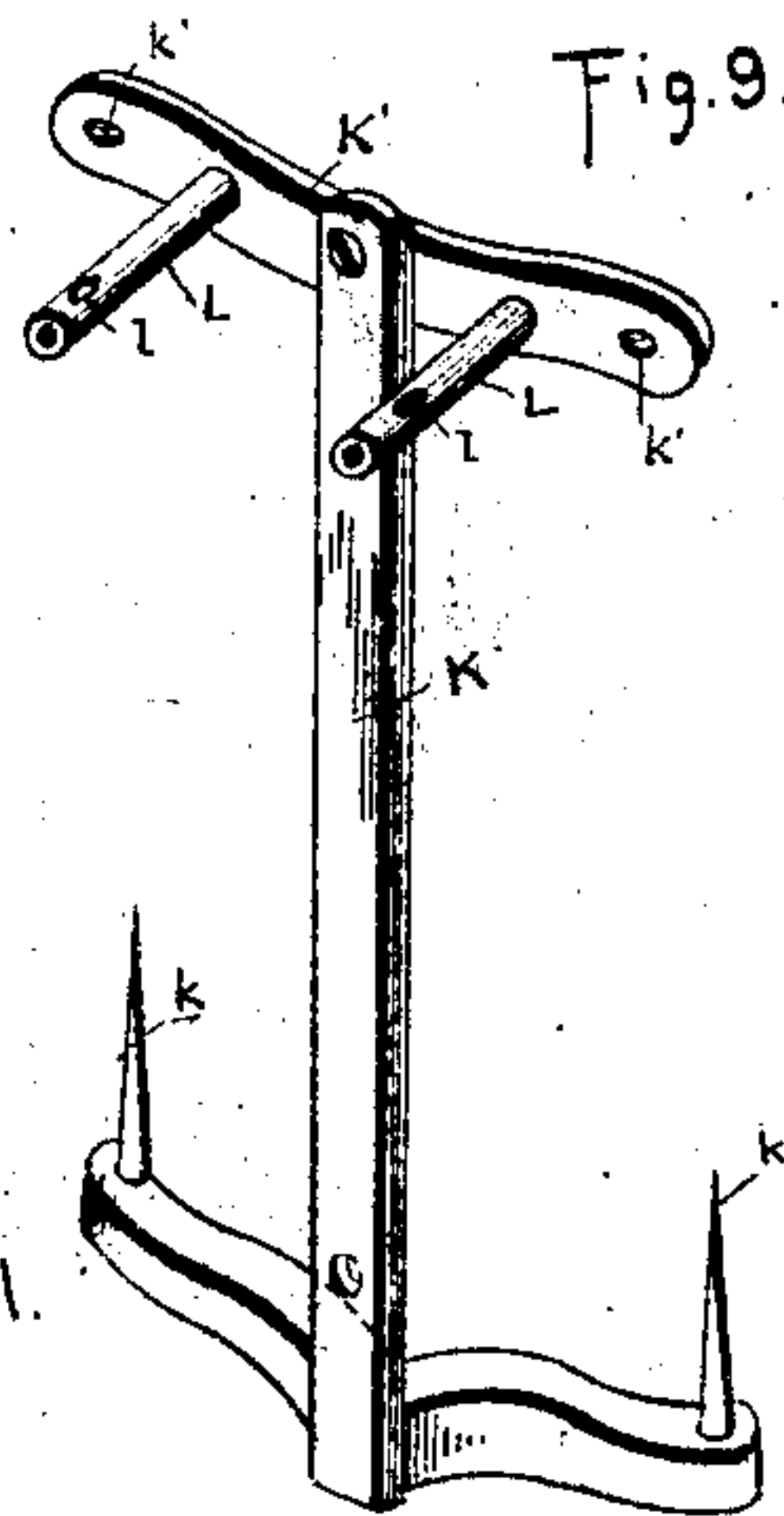
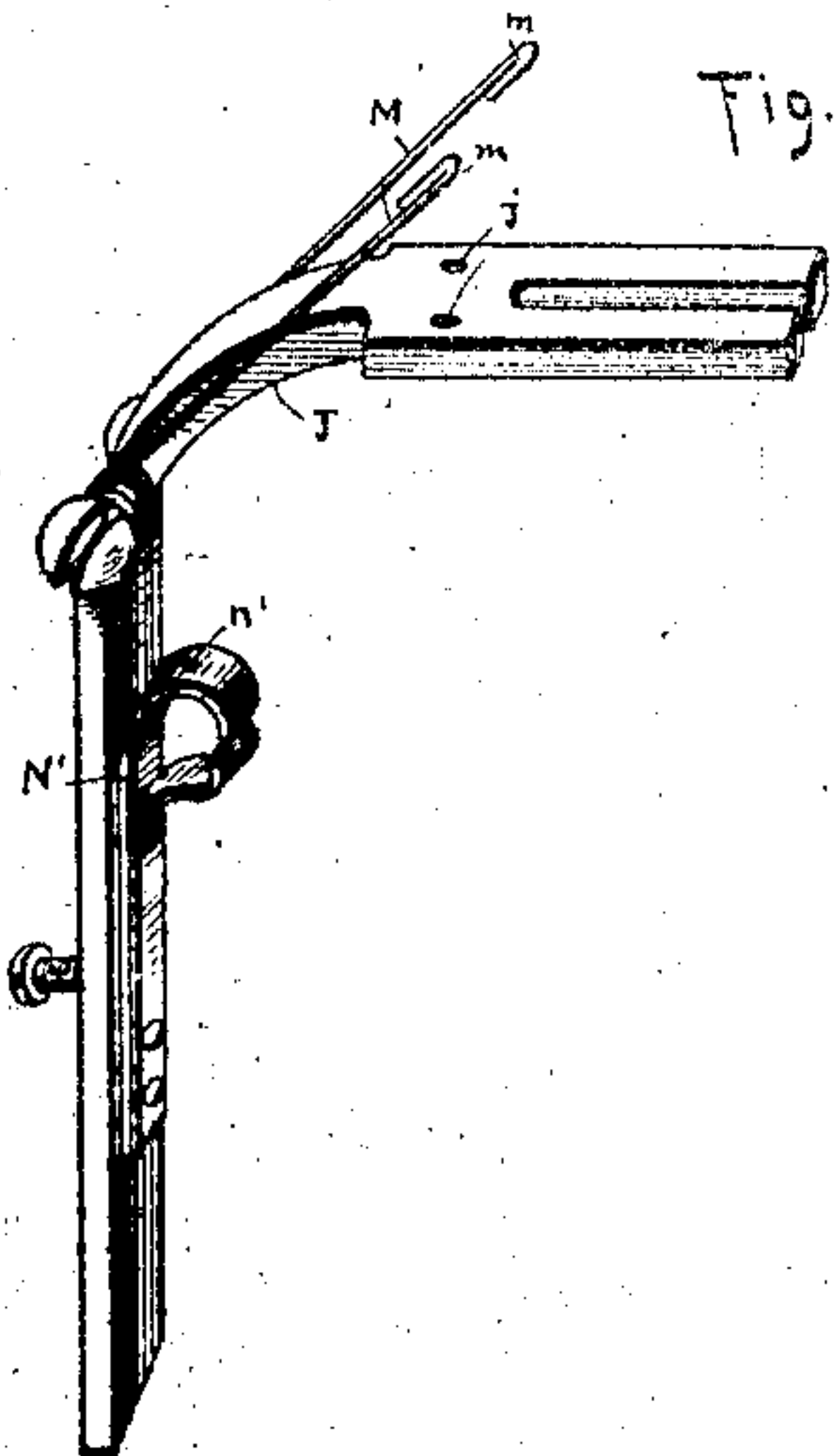
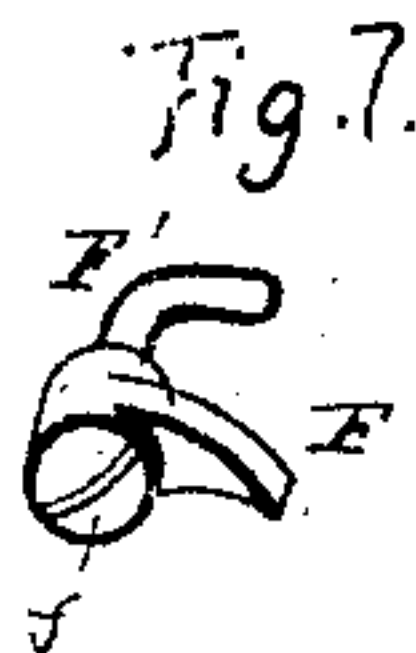
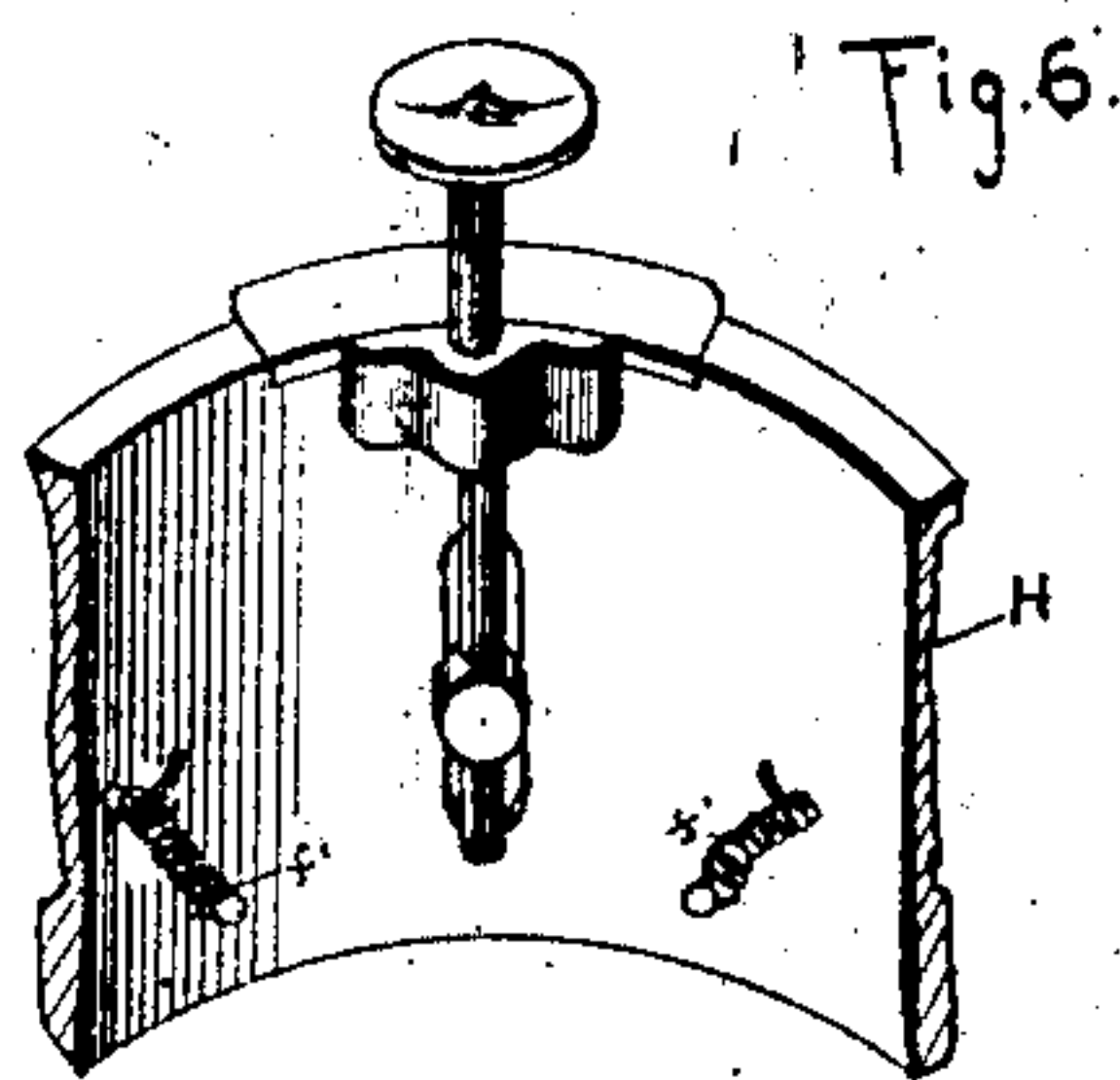
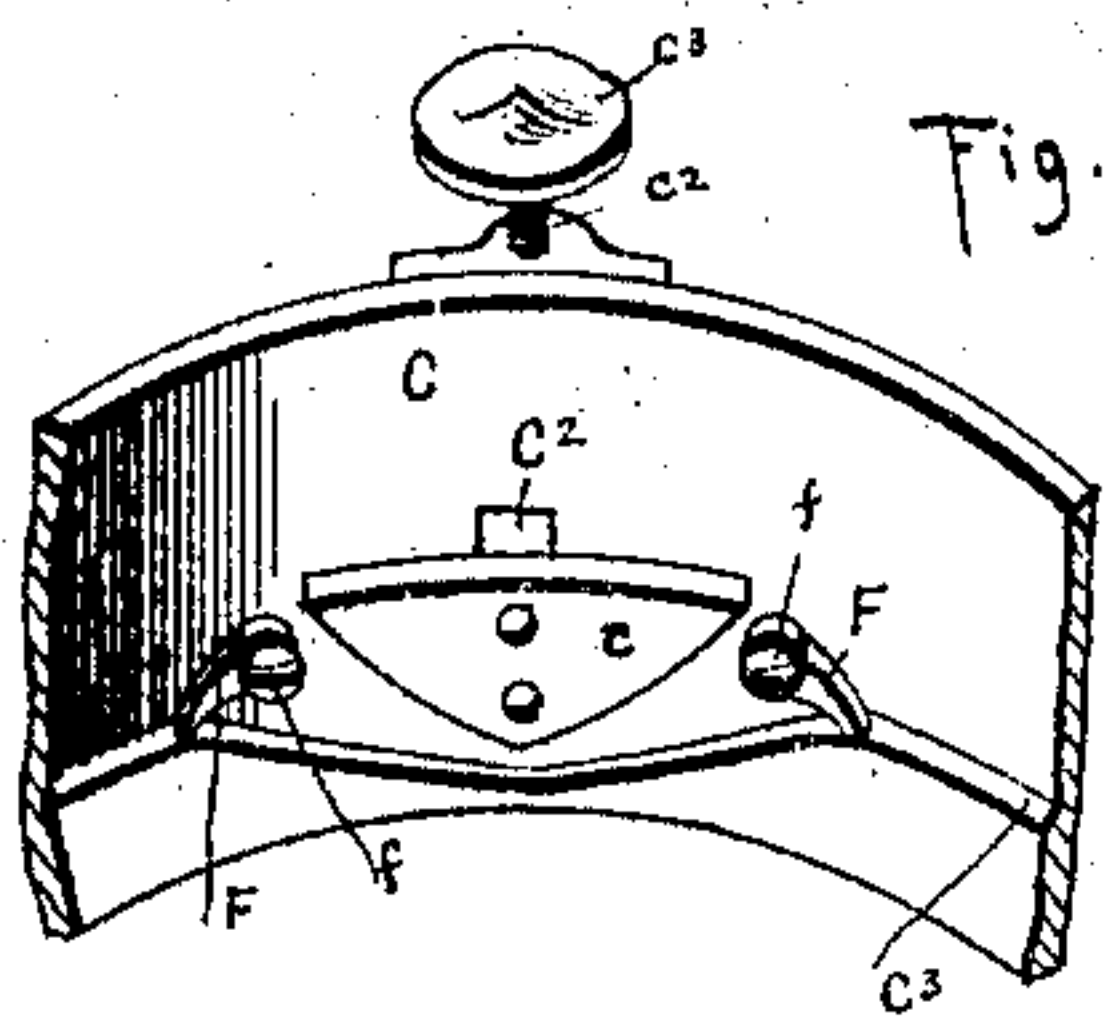
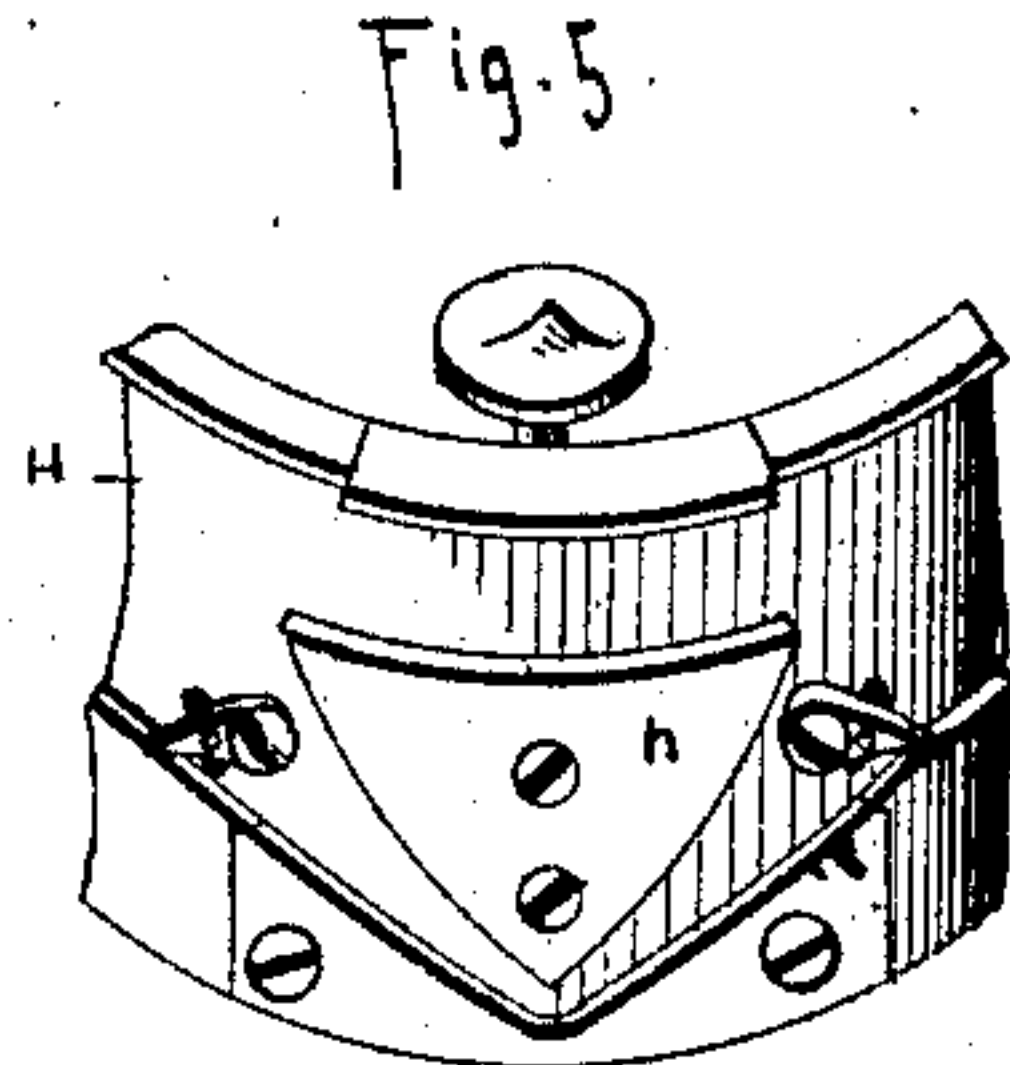
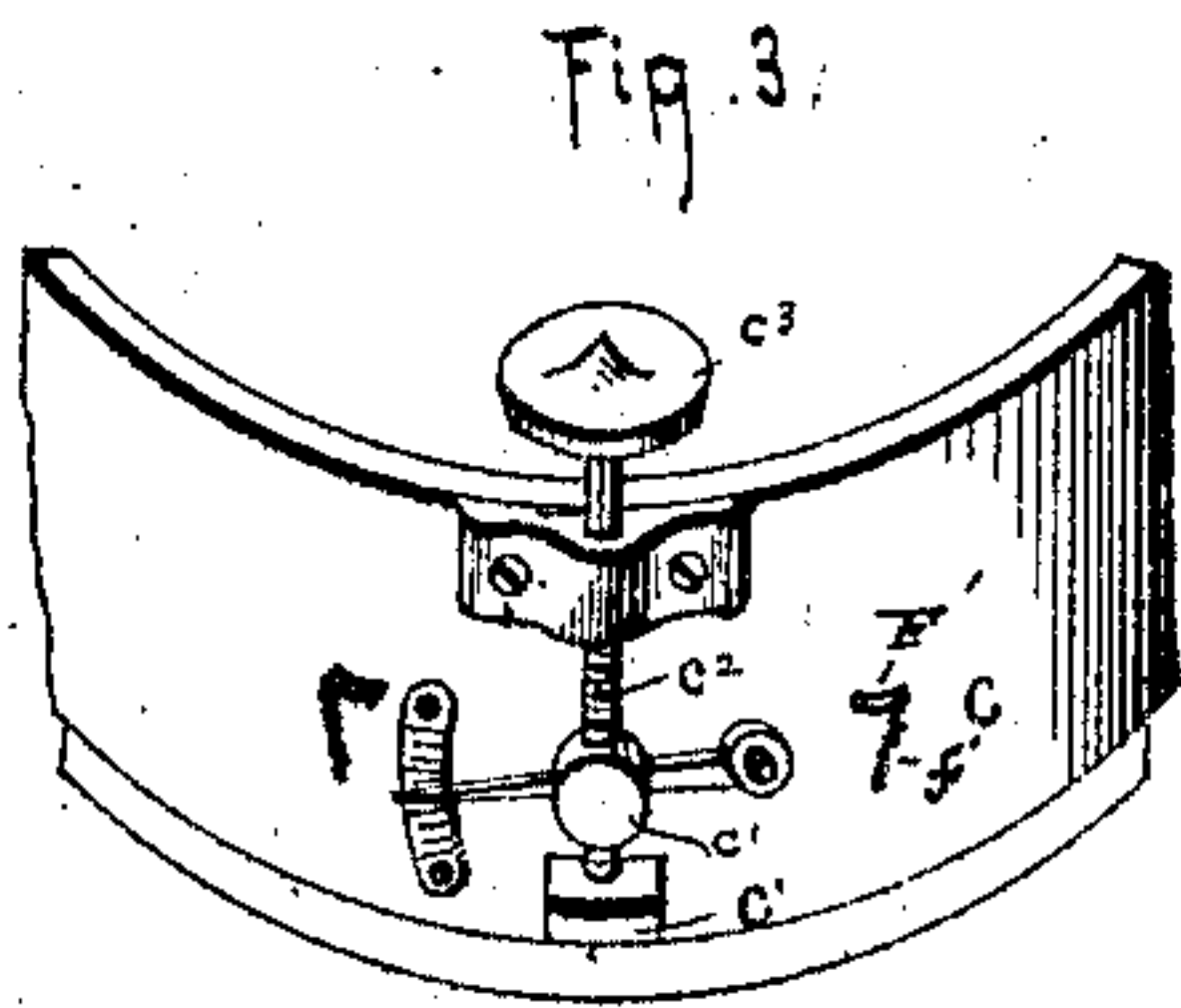
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UNITED STATES PATENT OFFICE.

JOSEPHINE B. SCHROEDER AND MATHIAS J. HINDEN, OF CLEVELAND,
OHIO; SAID HINDEN ASSIGNOR TO SAID SCHROEDER.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 360,735, dated April 5, 1887.

Application filed February 15, 1886. Serial No. 191,932. (No model.)

To all whom it may concern:

Be it known that we, JOSEPHINE B. SCHROEDER and MATHIAS J. HINDEN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Circular-Knitting Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to improvements in knitting-machines in which are employed two needle-cylinders arranged concentric with each other, together with the necessary mechanism for operating two sets of needles and for guiding two threads, respectively, to the different sets of needles, to the end that two stockings or other garments that are necessarily fac-similes of each other are simultaneously wrought at one operation of the machine.

In the accompanying drawings, Figure 1 is a view in perspective of our improved knitting-machine, the needles being omitted to save complication in the drawings. Fig. 2 is a vertical section through the center of the machine. Figs. 3 and 4 are enlarged views in perspective, illustrating, respectively, the outside and inside of the cam-ring C. Figs. 5 and 6 are enlarged views in perspective, respectively showing the outside and inside of the cam-ring H. Fig. 7 is a view in perspective of one of the inclines F. Fig. 8 is a view in perspective of the arm J and attachments. Fig. 9 is a view in perspective of the spool-rack and attachments. Fig. 10 is a view in perspective of the rod a. Fig. 11 is a view in perspective of the sleeve I.

A represents the base of the machine, to which is rigidly attached the needle-cylinder B, the latter having the ordinary needle-grooves, b, facing outward. The base A has an annular chamber, depression, or groove, a, in which operates the lateral beveled gear-ring D, that is engaged by an upright gear, D', the latter having a crank, d, for operating the machine, the axle of the gear D' being journaled in suitable boxes depending from the base A. The base has an opening (not shown) at the bottom of the chamber a, that admits of the engagement of the two gears aforesaid.

The gear-ring D has lugs d', that engage the lug C' of the cam-ring C, causing the latter to turn with the movement of the gear. The cam-ring is journaled in the lower part of the cylinder B, and has operating vertically on its inner face a cam, c, that engages the outwardly-projecting toes c' of the needles E, and operates the same, the needles having hook ends e above, and being of the ordinary variety in common use. The cam c has a hub, c', that extends through a slot, C', of the cam-ring. This hub, outside the ring, has a threaded hole that engages the screw-threads of the vertical spindle c''. This spindle is journaled in suitable lugs or boxes connected with the ring C, and the spindle, above the ring, has a thumb-piece, c'', for rotating the spindle, by operating which the cam c may be elevated or depressed, to reduce or increase the depression or throw of the needle. When the needles are at rest, the toes c' rest on the ledge C' of the ring C. The cam-ring, on either side of the cam c, has inclines F, pivoted to the ring C, and presenting, respectively, from the cam the points or free ends of the inclines, resting on the ledge C'. When the cam-ring is revolved, one of the inclines F, according to which way the cam is moved, engages successively the toes c', that by this means are first elevated as the toes pass up over the incline, after which the toes engage the cam c and are depressed below the line of the ledge C' as the toes pass successively under the cam. The toes pass out under the opposite incline, F, the latter being tilted by each outgoing toe. The inclines F are rigidly secured, respectively, on pins f, that pass through holes in the ring C, and on the opposite side are bent at an angle, forming arms F', that have slight springs f' attached, the tension of the spring acting in the direction to close the cams F upon the ledge C'. The inclines being so slight, it is not safe to depend on their gravity for closing them. By pivoting the inclines, instead of allowing them to work up and down in grooves, as heretofore, the friction at this point is reduced to a minimum.

The parts thus far described, with the exception of pivoting the inclines, are of the ordinary construction, and are operated the same as heretofore. It is therefore not considered

necessary further to describe the operation of this part of the machine.

G is a needle-cylinder having needle-grooves *g*, that face inward. This cylinder carries the same number and kind of needles as the outside cylinder, B, the needle-grooves being of the same thickness, but the ribs between the needle-grooves being narrower than those of the outside cylinder.

The manner of supporting the cylinder G is as follows: An arm, A', is rigidly attached to the base A. This arm, as shown, extends laterally over the center of the machine, and has rigidly attached thereto the depending rod *a*, the latter being concentric with the cylinders B and G. To the bottom of the rod *a* is attached the plate or head *a'*, to which latter is rigidly secured the cylinder G. Owing to the difference in the diameters of the cylinders B and G, an annular space is left between the two cylinders, that is unobstructed below, and through which annular space the two stockings or other garments wrought are made to pass, the one garment being inside of the other. A cam-ring, H, operates inside of the cylinder G. This ring has a cam, *h*, and inclines that operate the same as those just described on the outside cam-ring. The cam-ring rests on the plate *a'*, and has a lug, *h'*, that is engaged by the lugs *i* of the sleeve I, the latter being mounted on the rod *a*. The upper end of the sleeve I is flattened, as shown in Fig. 11, and this flattened portion is embraced by the forked end of the arm J, this latter arm being rigidly secured to the cam-ring C. When the latter is rotated, the sleeve I and ring H are also rotated, the two cam-rings, of course, moving in unison. The ring H and its cam and inclines operate the needles of the cylinder G in the same manner that the ring C operates the needles of the cylinder B.

A standard, K, is rigidly attached to the ring C, and is usually located opposite the arm J. Spindles *k* are attached, on which spools are mounted. In place of these spindles, cages or holders for balls of yarn or thread may be substituted. The thread, yarn, or whatever material is used, leads upon the outside of the cross-piece K', and thence forward through a hole, *k'*, thence into the eyes of the spindles L, and out at the end opening of the same. From thence the respective threads lead through loops *m* of the tension-wires M. From thence, respectively, through hole *j* in the arm J, and from thence through holes *n* and *n'* in the springs N and N', the latter being connected with the arm J, and located, respectively, in such position that the hole *n'* will guide the thread to the needles of the outside cylinder, B, and the holes *n* will guide the thread to the needles of the inner cylinder, G. The springs N and N' pass along, respectively, in front of the respective series of needles, and prevent the threads from a possible premature disengagement from the needle hooks.

A series of loops or hooks, P, are attached to a band, *p*, the latter being usually of tin. These hooks are for attaching the loops of yarn or thread in starting the garment that is to be wrought on the outside cylinder, the same as in ordinary knitting-machines. To the band *p* is attached a weight to keep the garment taut. A smaller inside ring, *p'*, with hooks P', is provided for the inside garment, and of course has weights attached for keeping this garment taut. The two garments thus simultaneously wrought on the machine, if made of the same material, will be fac-similes of each other. The outer garment may be stretched a trifle during the knitting, or the inner garment may be compressed a trifle; but when the two garments are removed from the machine and separated it is impossible to tell from their appearance which was the inner and which was the outer garment in the process of knitting.

It of course takes double the time to start the two garments that it would take to start the one garment on a single machine; but after the starting the two garments may be wrought in the same time that a single article would be wrought on a single machine, with the further advantage that the two articles designed for a pair will be absolutely alike, whereas with the single machine the second article wrought may or may not be like the first, according as the operator has or has not measured correctly, or has or has not manipulated the machine the same in knitting the heel and other irregular parts of the two garments.

What we claim is—

1. In a knitting-machine, the combination, with two needle-cylinders and needles and two cam-rings arranged substantially as described, of an arm and sleeve, as shown, for connecting the two cam-rings so that they move in unison, substantially as set forth.

2. In a knitting-machine, the combination, with the needle-cylinders and needles, two cam-rings arranged substantially as described, and an arm and sleeve connecting the two cam-rings whereby they move in unison, of the spindles for supporting the material, and guides, the said spindles and guides being supported by the outer cam-ring so as to revolve with the same, substantially as set forth.

3. In a knitting-machine, the combination, with two needle-cylinders and needles, two cam-rings, and the cams and pivoted inclines, of an arm and sleeve, as shown, for connecting the two cam-rings so that they move in unison, substantially as set forth.

In testimony whereof we sign this specification, in the presence of two witnesses, this 8th day of January, 1886.

JOSEPHINE B. SCHROEDER.

MATHIAS J. HINDEN.

Witnesses:

ALBERT E. LYNCH,
CHAS. H. DOBER.