

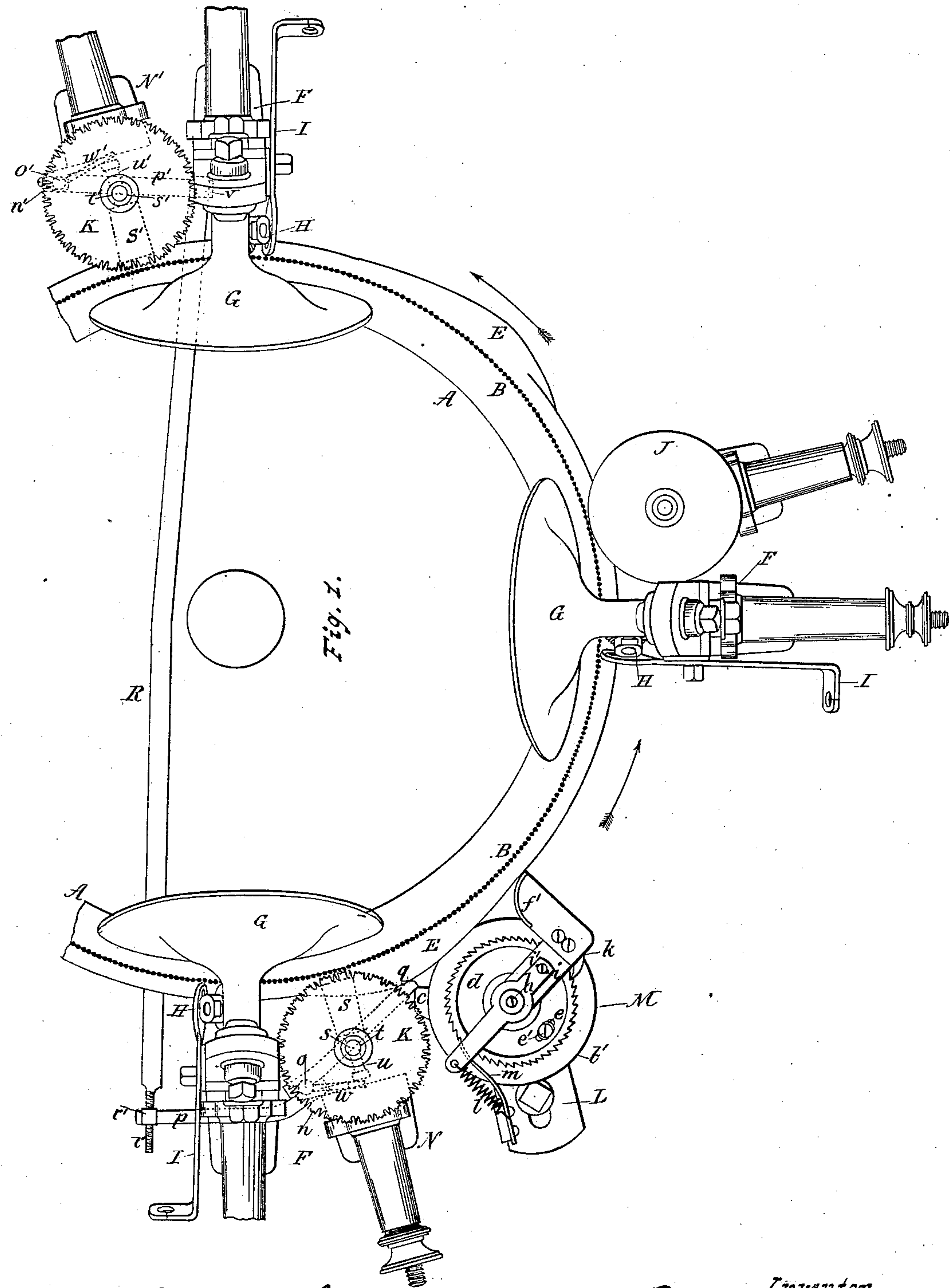
(Model.)

5 Sheets—Sheet 1.

P. I. HARVEY
CIRCULAR KNITTING MACHINE.

No. 253,531.

Patented Feb. 14, 1882.



W. Davidson Jones
Peter J. Lewis

Inventor.
Peter I. Harvey
By - C. P. Winegar
his Atty.

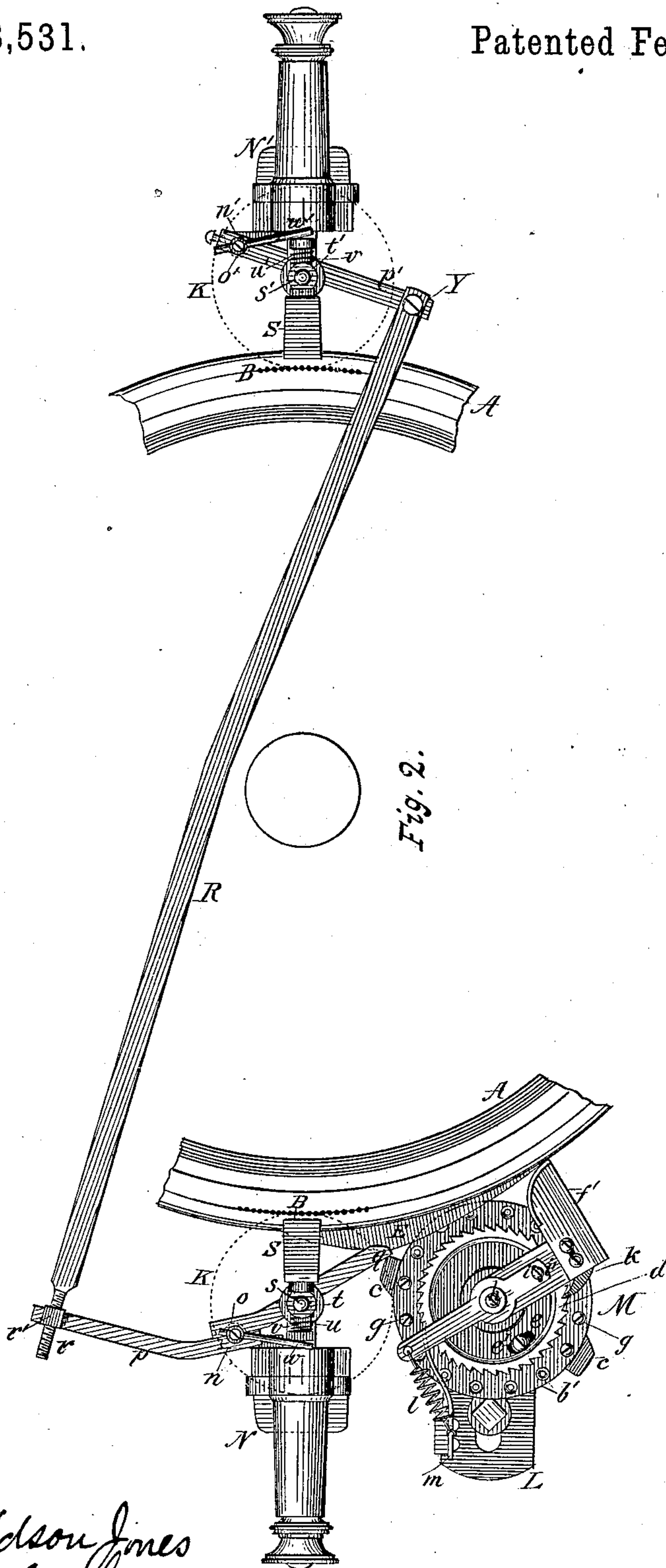
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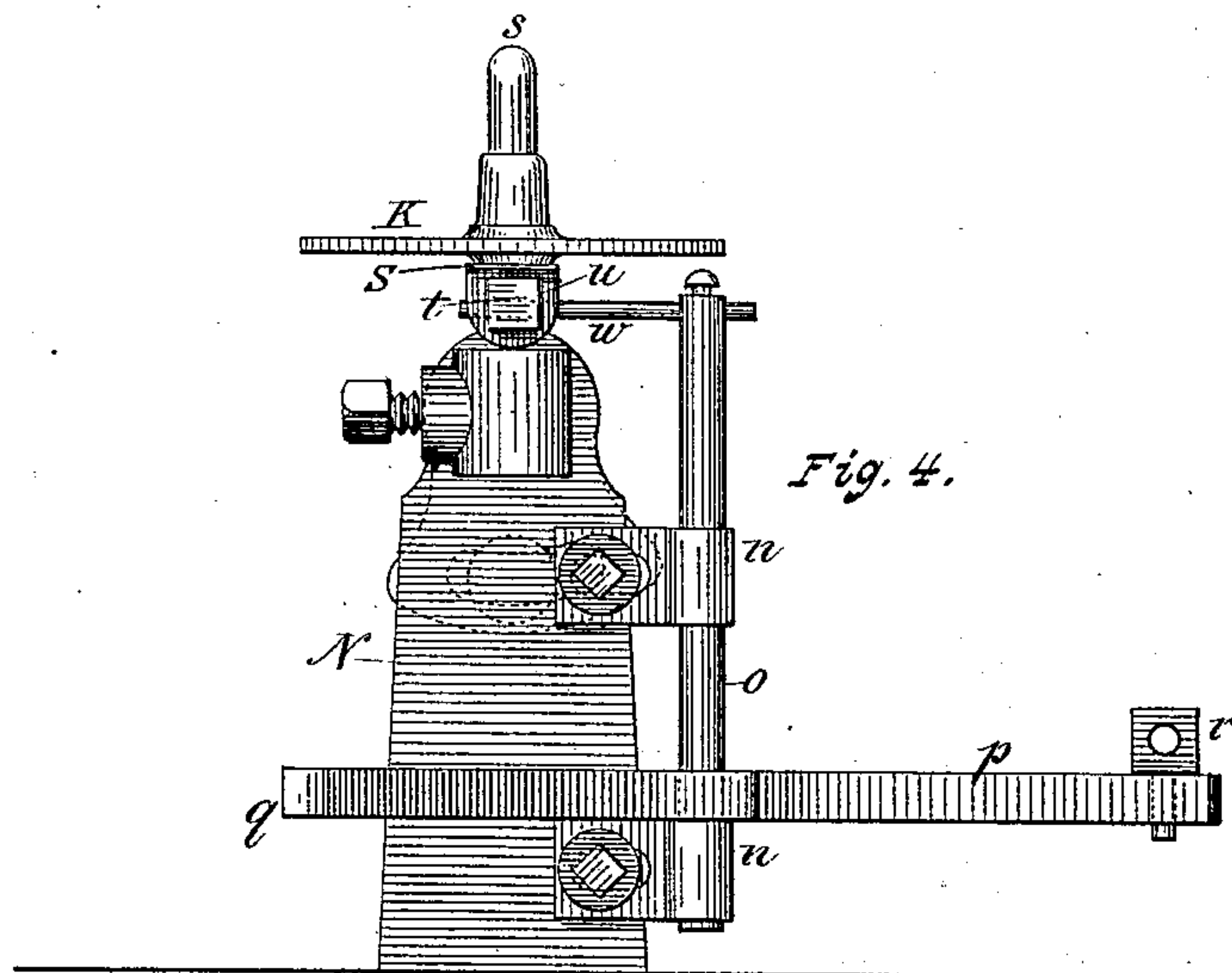
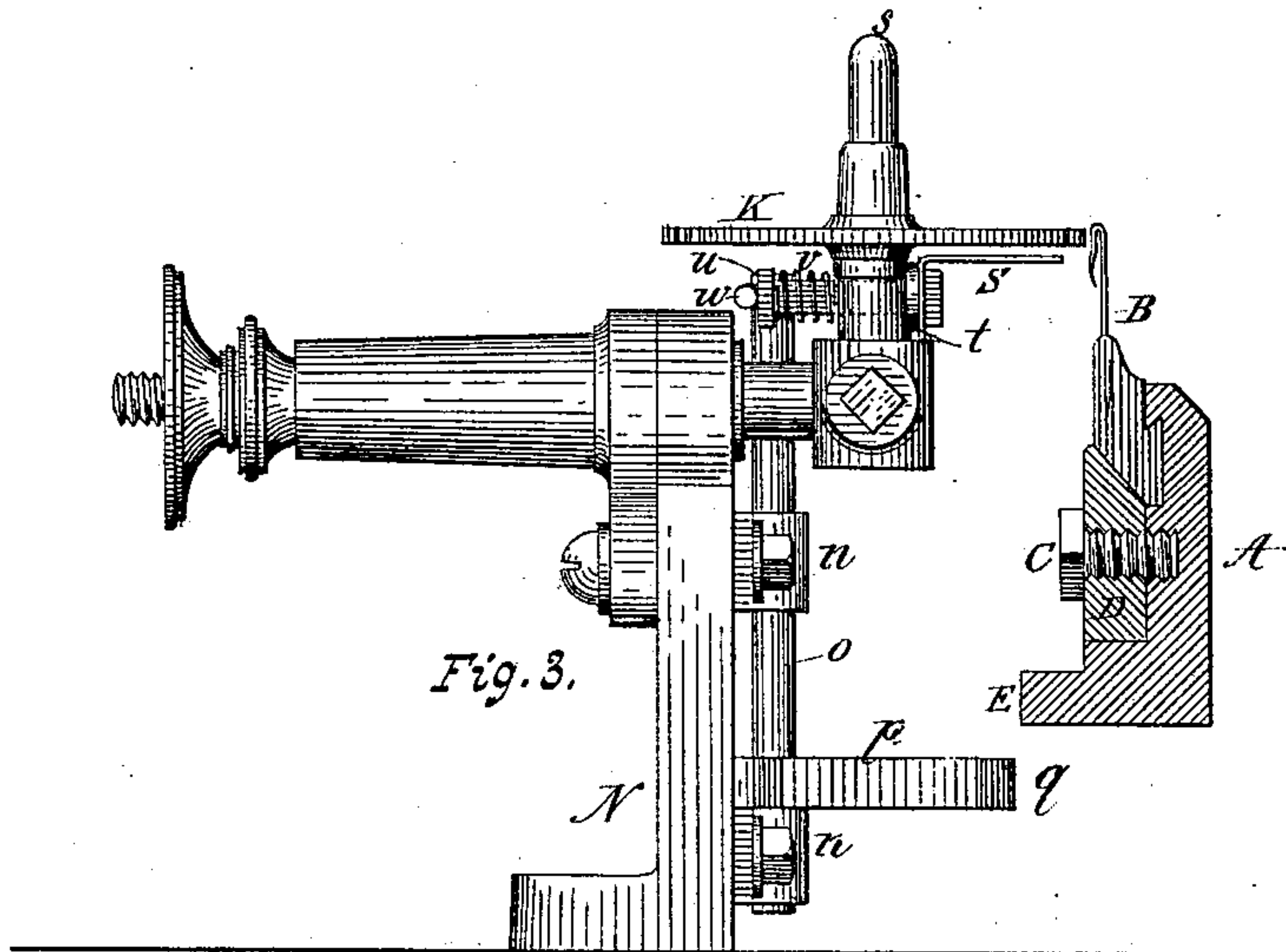
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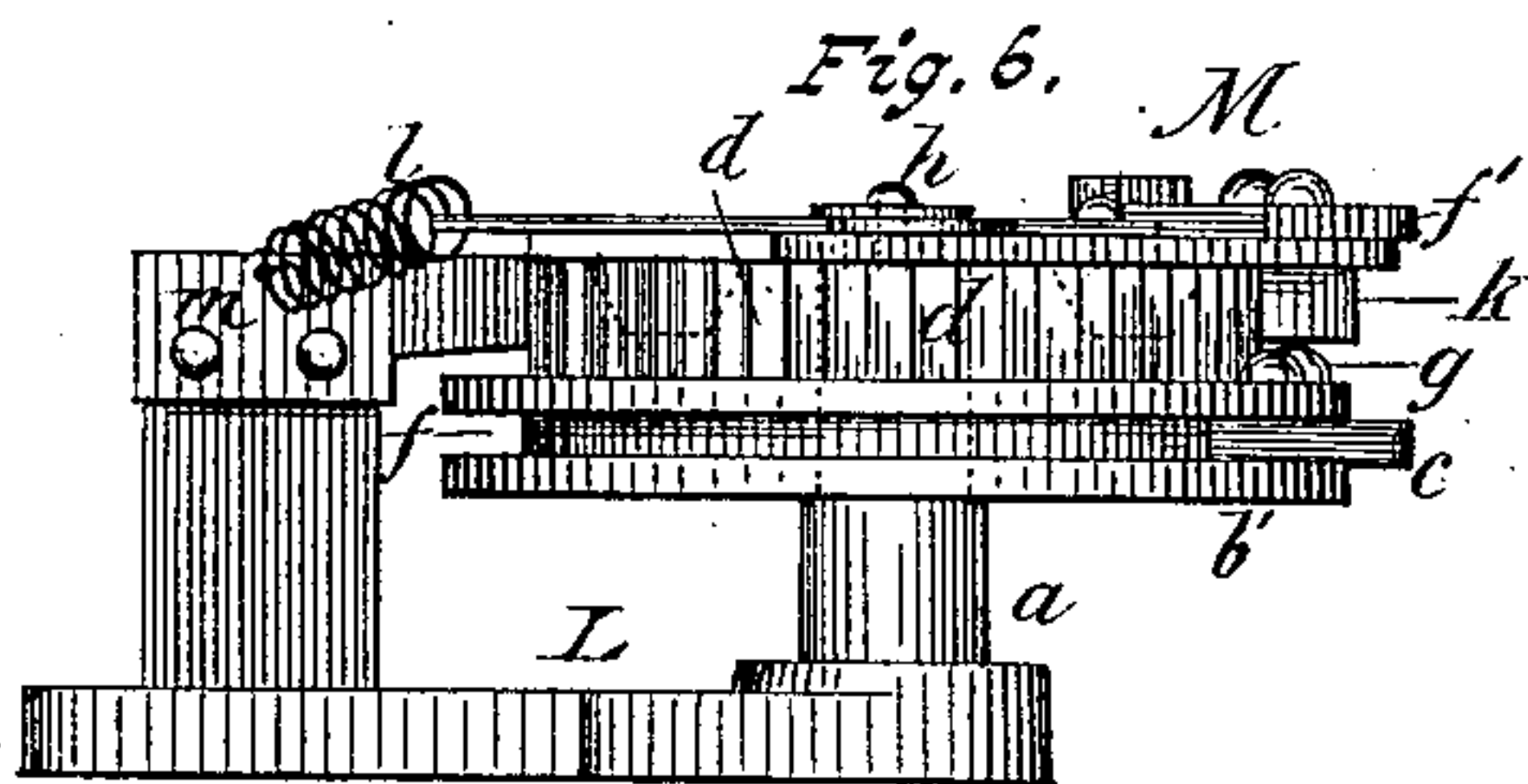
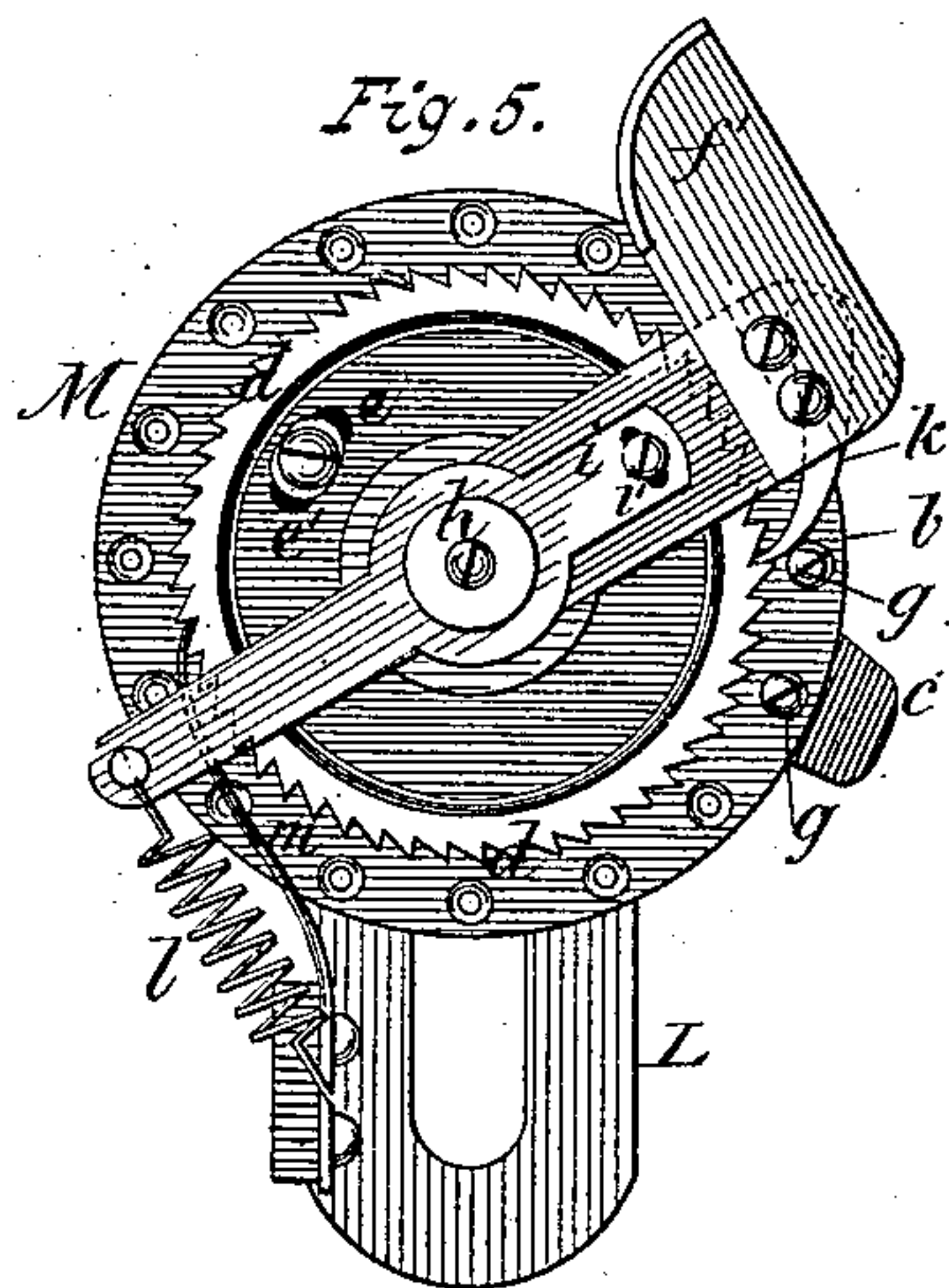
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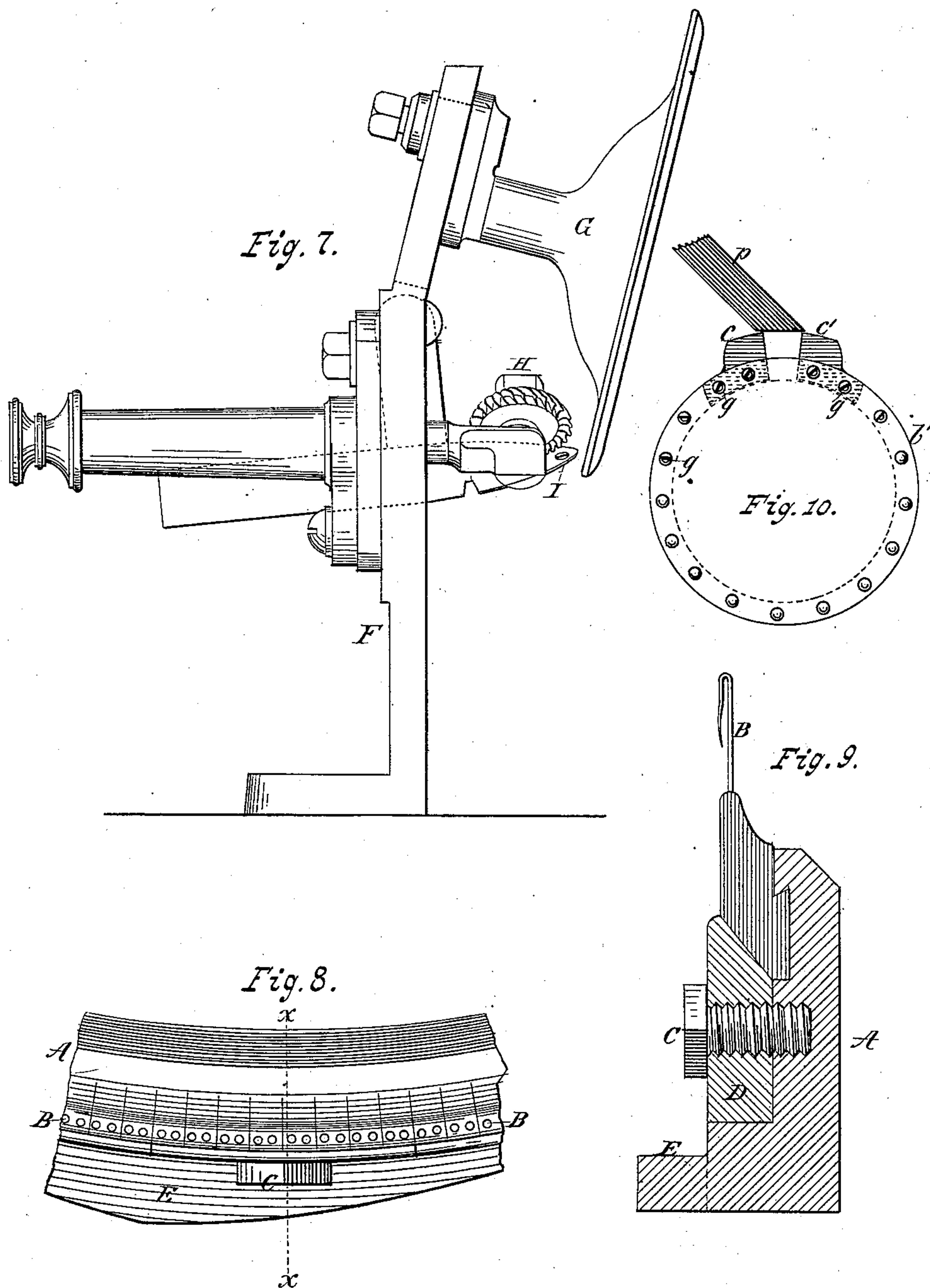
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UNITED STATES PATENT OFFICE.

PETER I. HARVEY, OF AMSTERDAM, NEW YORK, ASSIGNOR OF ONE-HALF
TO AUGUSTUS CLARK AND PERRY KLINE, OF SAME PLACE.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 253,531, dated February 14, 1882.

Application filed July 26, 1881. (Model.)

To all whom it may concern:

Be it known that I, PETER I. HARVEY, a citizen of the United States of America, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Circular-Knitting Machines; and I 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in circular-knitting machines in which auxiliary loop-pressers (operated by suitable mechanism hereinafter described) are placed underneath and close to the circular-figured pressers, so as to engage and press down at intervals the barbs of the needles at the same place the figured pressers engage and press down the barbs of the needles, thereby producing alternate circumferential strips or sections of plain and figured knit cloth.

In the accompanying drawings, Figure 1 is a plan of a section of a circular-knitting machine with my invention attached. Fig. 2 is a plan of the special parts comprising and embodying my invention. Fig. 3 is a side elevation of a loop-presser stand containing the auxiliary presser S, a portion of its operating mechanism, and its relative position to a section of the cylinder containing the barbed needles. Fig. 4 is a front elevation of Fig. 3 with the section of needles removed. Fig. 5 is a plan of my cam ratchet-wheel containing the operating-lever f' , cams, &c. Fig. 6 is an elevation of Fig. 5, showing the operating-lever f' , groove f in the hub b' containing the cam c , spring b , &c. Fig. 7 is a side elevation of a feed-stand containing the feed-guide, loop-wheel or sinker-burr, and presser. Fig. 8 is a sectional plan of a portion of the needle-cylinder having the operating-cam E attached. Fig. 9 is an elevation of a section of the needle-cylinder on the line xx in Fig. 8, and having attached thereto the operating-cam E on the lower outward portion. Fig. 10 is a modi-

fication of cam c in the groove of the hub b' , consisting of separate parts c c' , so as to increase or diminish the length of knit cloth composed of plain stitches by placing the cams c c' a greater or less distance apart. The arrows indicate the directions of motion.

My invention is applicable to the ordinary upright circular-knitting frames, which frames are so well understood by those skilled in the art of knitting that I deem it unnecessary to describe their construction or operation, except so much thereof as may be necessary to illustrate the construction and operation of my invention connected therewith.

Referring to the drawings, (see Figs. 1, 2, 3, 8, and 9,) A is the needle-cylinder, or section of the same, having secured therein the barbed needles B. These needles are secured, substantially as shown, (see Figs. 3, 8, and 9,) by the screws C and followers D.

E (see Figs. 1, 2, 8, and 9) is a cam, constructed substantially as shown, and permanently secured to the lower outward part of the needle-cylinder. I usually employ one of these cams upon a cylinder. However, two or more may be used, as occasion may require, without changing the nature of that portion of my invention.

The feed-stands F (see Figs. 1 and 7) have attached thereto the presser-wheels G, loop or sinker burrs H, and thread-guides I, and are placed or adjusted in their relative position to the series of needles, as is usually done by those skilled in the art of knitting.

It may be well here to observe that the frame is also provided with the usual cast-off wheels, stop-motions, take-up, &c.

The loop-presser J (see Fig. 1) is plain, so as to produce at this quarter of the cylinder a plain stitch in the usual and ordinary manner; so also is the loop-presser directly opposite, which is not shown in the drawings.

K (see Fig. 1) is a circular presser provided with serrations upon its outer edge spaced at the same distance apart as the needles in the cylinder. Some of the serrations are flush, so as to engage and press down the barbs of the needles, thereby allowing the new loop or stitch to be formed in the usual way, while

other serrations are cut deep enough so as not to press the barbs of the needles down, thereby forming at these last-named needles false loops or weft-threads.

With suitable figured pressers operated in connection with plain pressers at the intermediate quarters of the cylinder, figured cloth may be produced to correspond to the design or pattern cut in the figured pressers.

Knitting with plain and figured pressers combined, or figured pressers separately, has been long in use, and is well understood by those skilled in the art, and I disclaim all such devices as old and unpatentable. By automatically dividing figured knit fabric while in the process of being knit into alternately plain and figured circumferential sections or strips improves and adds to the beauty and attractiveness of the knit fabric. To accomplish these results I place upon the lower outward portion of the cylinder one or more cams, E. (See Figs. 1, 2, 8, and 9.) Upon the stand L, I place the cam ratchet-wheel M. (See Figs. 1, 2, 5, and 6.) This cam ratchet-wheel I construct by placing upon the stem *a* (see Fig. 6) of the stand L a grooved disk, *b'*, containing one or more cams *c*. (See Figs. 1, 2, 5, and 6.) The cam or cams *c* are adjustable in the groove *f* in disk *b'* by the screws *g*, as shown in Figs. 2, 5, 6, and 10. Upon the same stem *a*, I secure upon the top of the grooved disk *b'* the ratchet-wheel *d*. (See Figs. 1, 2, 5, and 6.) This ratchet-wheel *d* is adjustable upon the grooved disk *b'* by the set-screw *e* in slot *e'*. (See Figs. 1, 2, and 5.)

Upon the ratchet-wheel *d*, I place the adjustable cam-lever *f'*. (See Figs. 1, 2, 5, and 6.) This lever *f'* vibrates upon the stem *a*, and is secured in position by the screw *h*, and is adjustable with the screw and slot *i i'*.

Upon the under side of the larger end of the lever *f'*, I attach the pawl *k*, (see Figs. 1, 2, 5, and 6,) which engages the teeth of the ratchet-wheel *d*. The lever *f'* is held in its normal position by the spiral spring *l*. The combined cam ratchet-wheel M is prevented from revolving backward by the pawl *m*.

The compound cam *c c'*, Fig. 10, is a modification of the cam in grooved disk *b'*, and they may be set close together or a short distance apart, substantially as shown, so as to present a longer or shorter space for the end of the lever *p* to bear against, thereby producing a longer or shorter circumferential strip of plain cloth.

Upon the loop-presser stand N, I place in suitable boxes, *n*, the rock-shaft *o*. (See Figs. 1, 2, 3, and 4.) Upon the lower portion of the rock-shaft *o*, I place the lever *p*, substantially as shown. Cam *c* engages lever *p* at *q* at intervals. The outer end of lever *p* is connected to the connecting-rod R by the screw *r* upon the end of the rod R and the swivel-nut *r'*. (See Figs. 1, 2, and 4.)

Upon the upper end of rock-shaft *o*, I secure the arm *w*, which engages the head of the square rod *u*. I also place upon the presser-stand N', (this stand is directly opposite to

presser N,) in suitable boxes, *n'*, a rock-shaft, *o'*. Upon the lower portion of the rock-shaft *o'* I place a lever, *p'*, which lever *p'* performs at the same time the same functions as lever *p* on presser-stand N, by being connected together with the connecting-rod R. Upon the upper end of rock-shaft *o'*, I secure the arm *w'*, which engages the head of the square rod *u'*.

Upon the presser-stands N and N', I place figured circular pressers K. These pressers in Fig. 2 are indicated by broken lines. These pressers are adjusted so as to operate upon the barbs of the needles in the ordinary manner.

Upon lines radiating from the center of the cylinder I make through the stumps *s s'*, on which the circular figured pressers revolve, and just underneath the said pressers, square holes *t t'*. In these holes I insert corresponding square rods, *u u'*. (See Figs. 1, 2, 3, and 4.) Upon the inner ends of the rods *u u'*, I secure the flat pressers S S', and between the heads of these square rods *u u'* and the stumps *s s'*, I interpose around the rods spiral springs *v v'*. The object of these springs is to cause the flat pressers S S' to recede from the barbs of the needles when the end of the lever *p* on rock-shaft *o* is released from the action of the cam *c* on cam ratchet-wheel M. Levers *p* and *p'* are connected together by the connecting-rod R.

It is necessary that the pressers S S' should move forward to engage with and recede from the barbs of the needles B at the same time. This is accomplished by adjusting the swivel-nut upon the screw at the end of the rod R.

The operation of my invention is as follows: Motion is given to the cylinder in the direction of the arrows, (see Fig. 1,) and the yarn is fed under the barbs of the needles by the sinker-burrs H at the four quarters, in the usual and ordinary manner. The lever *f'* is adjusted so as to come in contact with the outer lower portion of the cylinder A. By each revolution of the cylinder A the cam E on the cylinder engages and throws back the lever *f'*, thereby causing the cam ratchet-wheel M, through the medium of the pawl *k*, to revolve forward, preferably the distance of one tooth. The motion may be increased by the addition of cams E on the cylinder A. The spiral spring *l* returns lever *f'* to its normal position. By the movements of the cam ratchet-wheel forward the cam *c* therein (see Figs. 1 and 2) engages lever *p*, substantially as shown, and presses it forward until the end of lever *p* rides upon the outer surface or face of said cam *c*, thereby holding it stationary in that position until cam *c* passes the end of lever *p* at *q*. The length of time lever *p* is held in position so as to engage the pressers S S' with the needles may be varied, as desired, by the length of the face of the cam *c*. By this movement of lever *p* by cam *c* the plain pressers S S' underneath the figured pressers K are thrown forward and engage the barbs of the needles through the conjoint action of said levers *p p'*, rock-shafts *o o'*, connecting-rod R, arms *w w'*,

and square rods *u u'*. The spiral springs *v v'* restore the last-named devices to their normal position as soon as cam *c* passes the end of lever *p* at *q*.

5 By the operation just described the barbs of the needles are all pressed down at intervals in the corresponding indentations in the shanks of the needles, thereby producing a circumferential strip or section of plain knit cloth corresponding in length to the time lever *p* is held upon the face of cam *c*. When the plain pressers *S S'* recede from the barbs of the needles the figured pressers perform their functions again, thereby producing figured cloth.

15 It is obvious that a single feed or two feeds embodying and containing my invention will produce the same results without changing the nature of my invention.

20 By the use of my invention cloth of many beautiful designs may be produced, and garments made from such cloth are very desirable in the market and find a ready sale.

25 Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The needle-cylinder provided with barbed needles and cam *E*, combined with a feed-stand containing a loop or sinker burr, thread-guide, and presser *G*, a stand, *N*, provided with a figured circular presser, an auxiliary plain presser, rock-shaft *o*, arm *w*, spring *v*, lever *p*, and

a cam ratchet-wheel consisting of a grooved disk having secured therein the cam *c*, ratchet-wheel *d*, spring *l*, pawl *m*, lever *f'*, and stand *L*.

2. The combination of the needle-cylinder 35 having barbed needles and cam *E* attached thereto, with loop or sinker burrs *H*, thread-guides *I*, and pressers *G* at the quarters or headings containing the figured and auxiliary plain pressers, and the stands *N* and *N'*, having attached thereto the rock-shafts *o o'*, arms 40 *w w'*, springs *v v'*, rods *u u'*, figured pressers *K K'*, auxiliary pressers *S S'*, connecting-rod *R*, and the cam ratchet-wheel *M*, constructed as described.

3. The combination of the cam ratchet-wheel, 45 constructed as described, with the needle-cylinder provided with needles and a cam, *E*, attached, a series of feed-stands *F F F F*, containing loop or sinker burrs, thread-guides, and 50 pressers, a series of presser-stands provided with plain and figured pressers *S S'* and *K K'*, rock-shafts *o o'*, arms *w w'*, rods *u u'*, springs *v v'*, levers *p p'*, rod *R*, and a series of presser-stands, containing plain circular loop-pressers 55 *J J*, as specified.

In testimony whereof I affix my signature in presence of two witnesses.

PETER I. HARVEY.

Witnesses:

W. DAVIDSON JONES,
PETER J. LEWIS.