

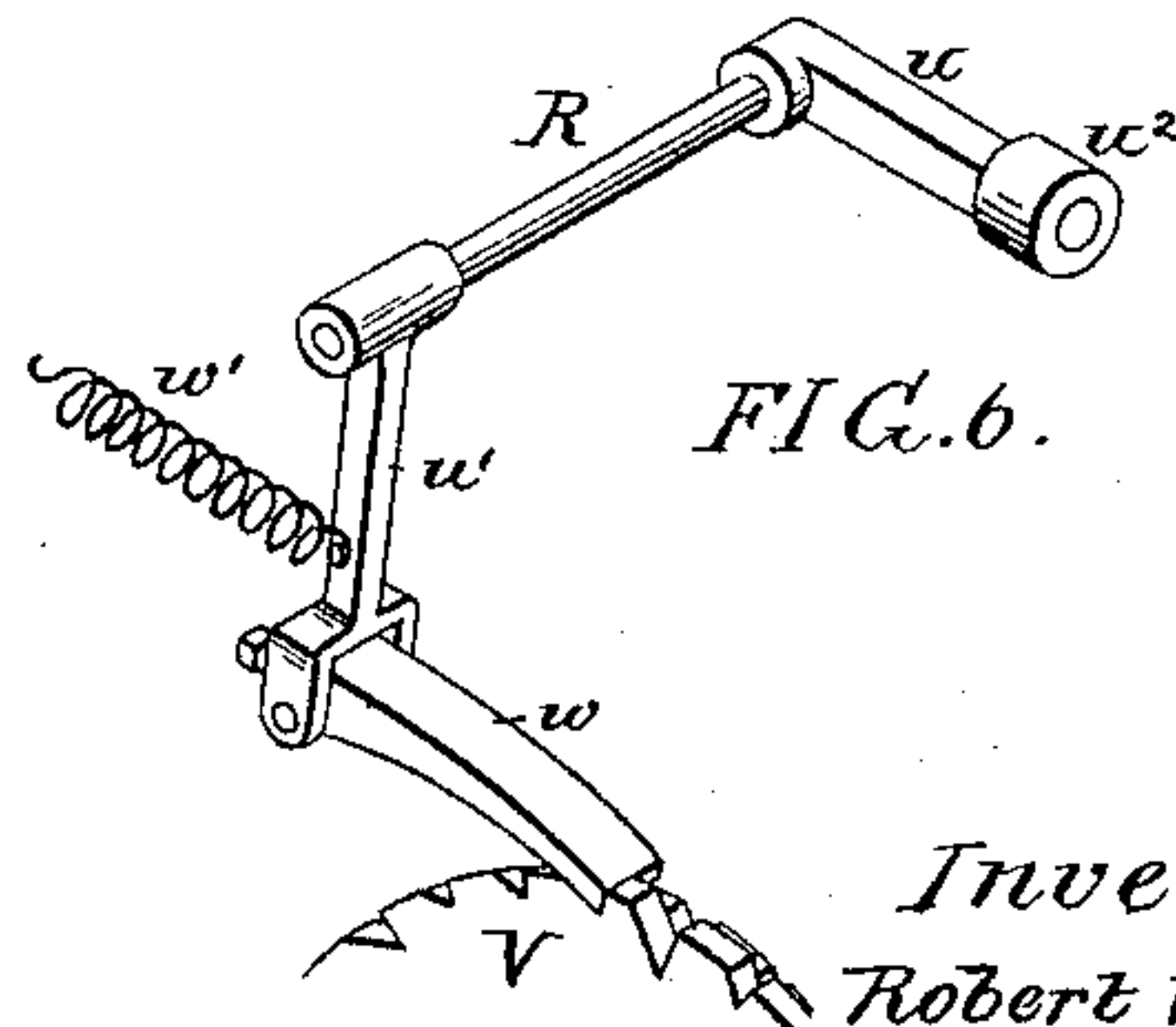
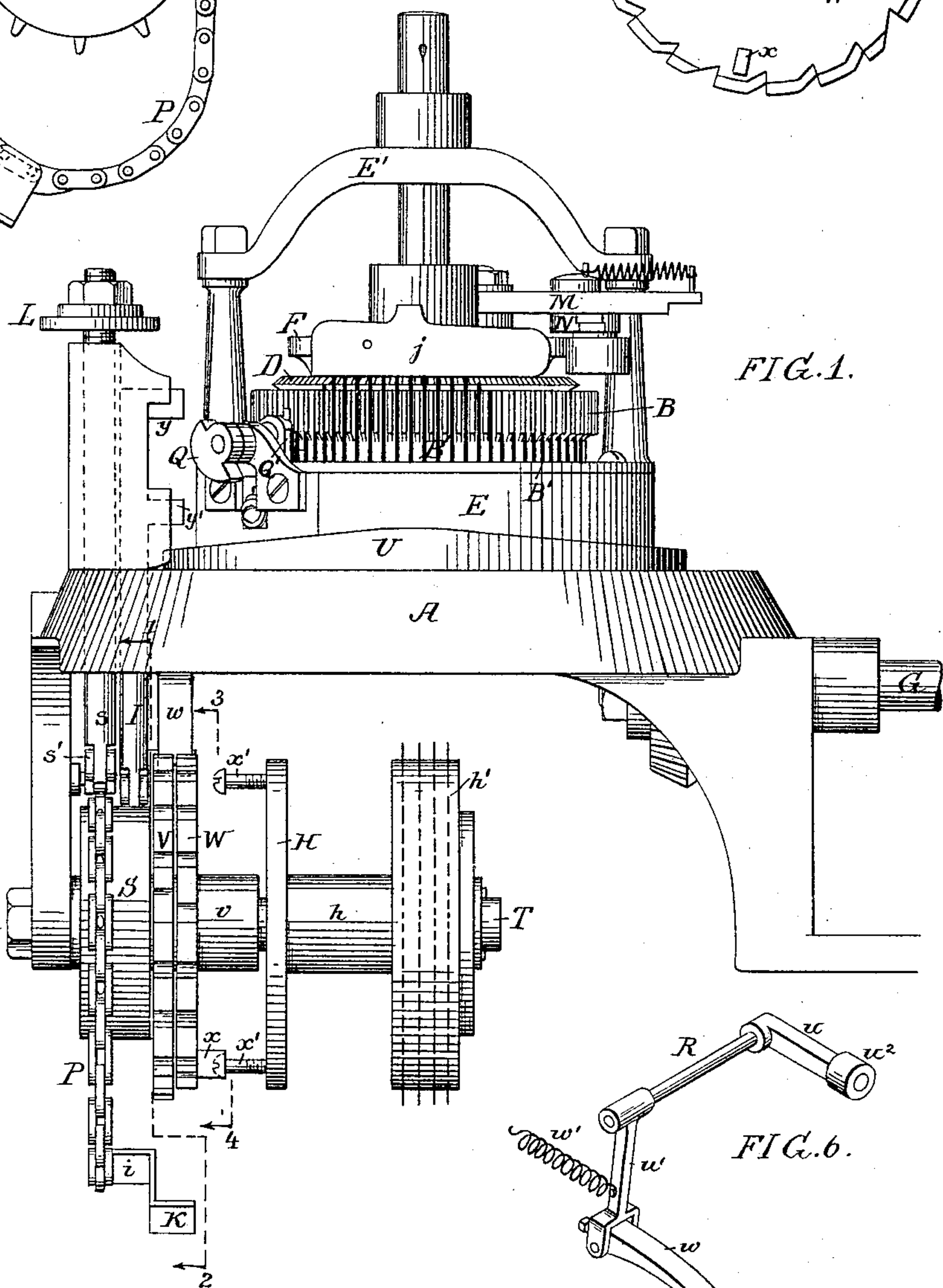
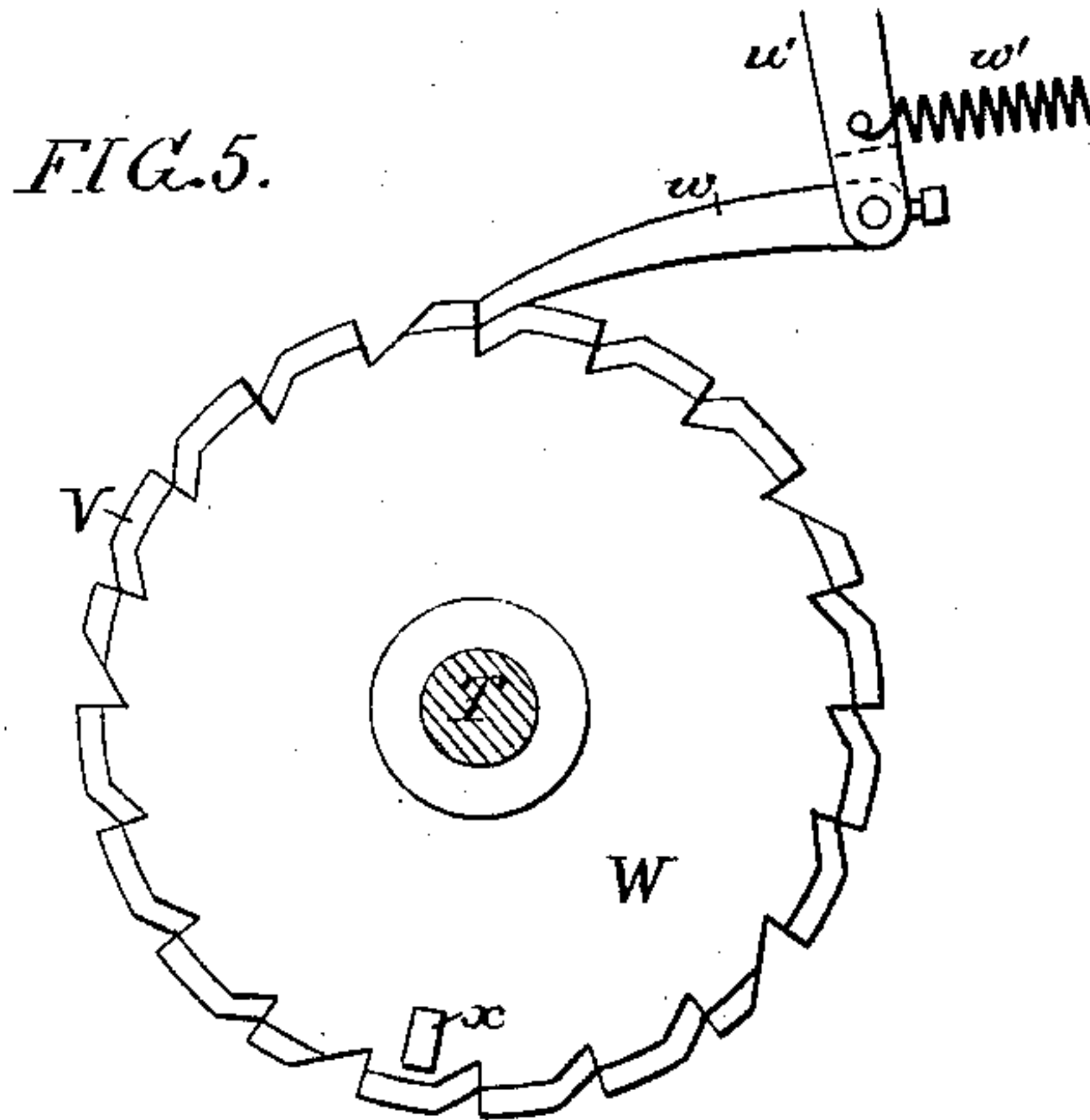
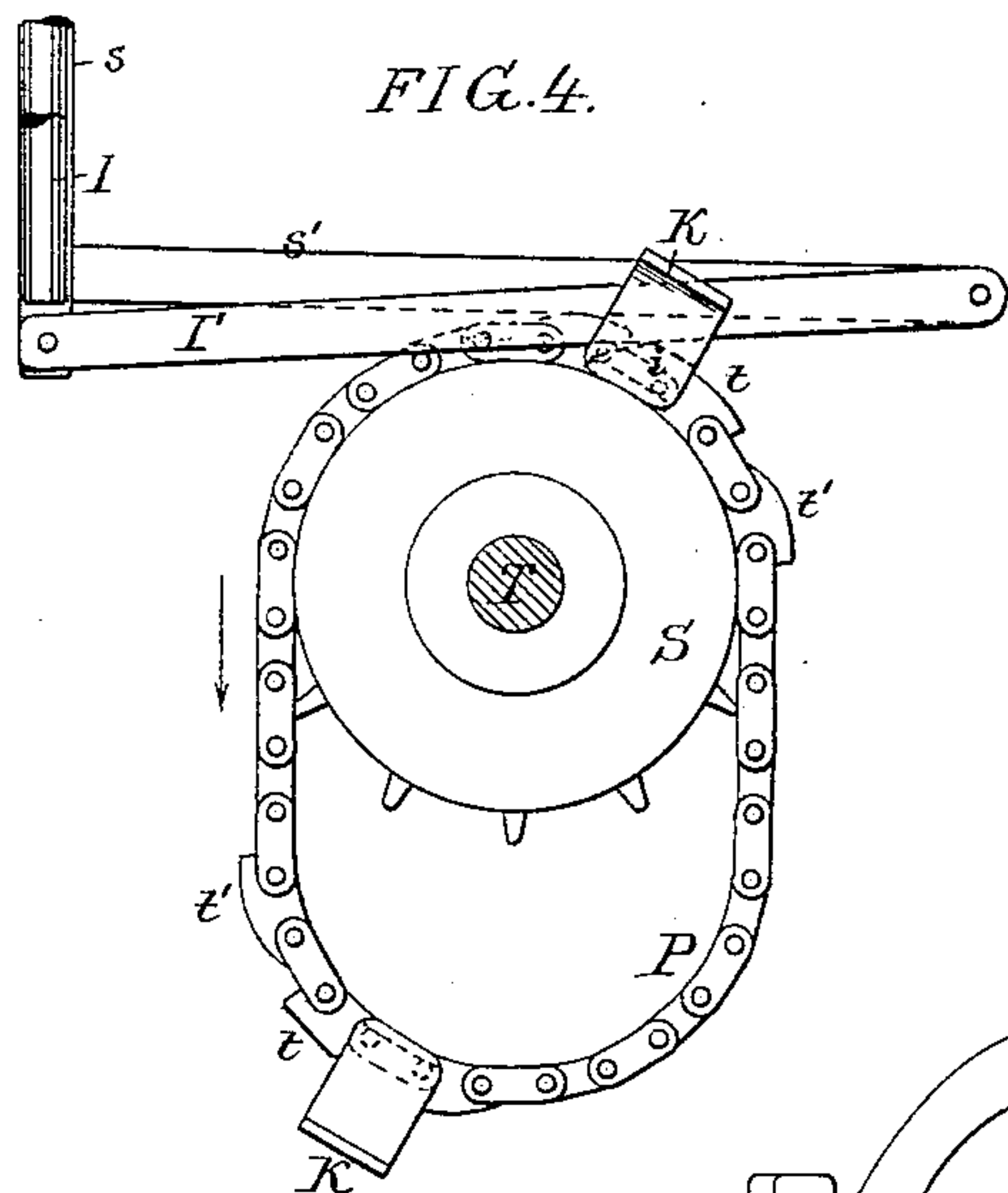
(No Model.)

2 Sheets—Sheet 1.

R. W. SCOTT.
CIRCULAR KNITTING MACHINE.

No. 368,429.

Patented Aug. 16, 1887.



Witnesses:
David S. Williams
William J. Davis

Inventor:
Robert W. Scott
by his Attorneys:
Haven and Co.

(No Model.)

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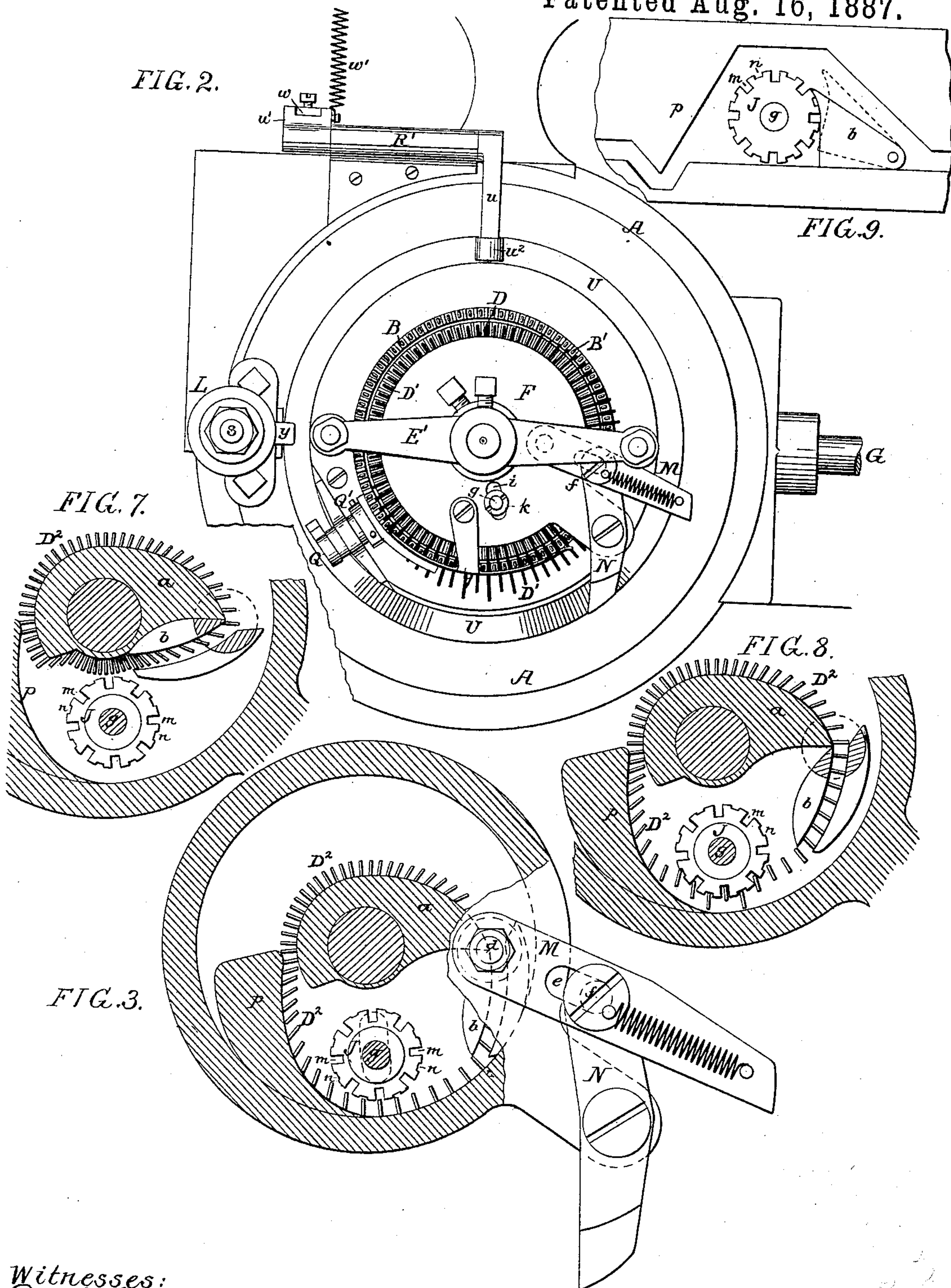
2 Sheets—Sheet 2.

CIRCULAR KNITTING MACHINE.

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Patented Aug. 16, 1887.

FIG. 2.



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Inventor:
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by his Attorneys,
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UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 368,429, dated August 16, 1887.

Application filed October 12, 1885. Serial No. 179,651. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Knitting-Machines, of which the following is a specification.

One object of my invention is to so construct a knitting-machine as to produce tucked work with the use of but a single feeder, or to produce an independent tuck for each feeder when
10 more than one feeder is used; a further object being to improve the construction of the dial-cams when the machine is intended for making welted ribbed fabric; and a still further
15 object being to simplify the means employed for operating the movable dial-cam.

In the accompanying drawings my improvements are illustrated as applied to a machine similar to that for which Letters Patent No. 286,003 were granted to Joseph Heginbotham
20 October 2, 1883, Figure 1 being a front view of the machine; Fig. 2, a plan view of the same; Fig. 3, a plan view, partly in section and on a larger scale, of part of the machine; Figs. 4
25 and 5, transverse sections, respectively, on the lines 1 2 and 3 4, Fig. 1; Fig. 6, a perspective view of part of the machine, and Figs. 7 and 8 diagrams illustrating different positions of the movable portion of the dial-cam. Fig. 9
30 is a view illustrating a modification of one feature of my invention.

A is the fixed frame or bed of the machine, B the fixed cylinder for the vertical needles B', and D the fixed circular plate or dial for
35 the horizontal needles D'.

E is the rotating cam-ring for operating the needles of the cylinder B, and F the rotating cam-plate for operating the needles of the dial D, the ring E being driven by bevel-gearing
40 from the driving-shaft G, and the cam-plate F being suspended from and rotating with the arch E' of the cam-ring E, all of these parts being common to circular rib-frames as usually constructed.

45 On the under side of the plate F is a cam, *a*, acting on the bits D² of the needles of the dial-plate and projecting the same into the path of a slotted cam, *b*, the latter being secured to a spindle, *d*, which passes through
50 the plate F, and has above the latter an arm, M, to a slot, *e*, in which is adapted a pin, *f*,

on a lever, N, hung to a bracket on the plate F. A pin, *g*, is adapted to a radial slot, *i*, in the plate F, being secured in any desired position therein by means of a nut, *k*, and this
55 pin carries beneath the plate a wheel, J, the periphery of which is notched, deep notches *m* alternating with shallow notches *n*, as shown in Figs. 3, 7, and 8.

On the under side of the plate F is a cam, *p*,
60 the action of which on the dial-needles has the effect of retracting said needles.

When the cam *b* is adjusted to the position shown in Fig. 3, the dial-needles will be fully projected thereby and the bits of the needles
65 will clear the periphery of the wheel J on the outside, and if the cam *b* is adjusted to the position shown in Fig. 7 the dial-needles will not be projected and will clear the periphery of the wheel J on the inside; but if the cam
70 *b* is moved inward to the position shown in Fig. 8, it will direct the bits of the needles against the periphery of the wheel J, and said bits will enter alternately the shallow and deep notches of the wheel. Said wheel is
75 thereby caused to rotate, and the needles whose bits enter the shallow notches will be projected so as to slip their loops back of the latches, whereby the stitches on said needles will be cast off when the needles are retracted
80 by the cam *p*. The needles whose bits enter the deep notches, however, will not be projected; hence their loops will not slip back of the latches, the stitches being retained on these
85 needles so as to form a tuck.

The notches of the wheel J are so arranged in respect to the number of needles carried by the dial D that the needles which tuck on one revolution of the cam-plate will cast their
90 stitches on the next revolution, the alternate needles then tucking. This may be effected by having an odd number of needles on the dial, so that while on one revolution of the cam-plate the tuck-needles will, for instance, be needles 2 4 6 8, &c, on the next revolution
95 the tuck-needles will be needles 1 3 5 7 9, &c.; or instead of having the tuck on alternate needles the tucking may be on alternate sets of two or more needles. It will be seen, therefore, that by the use of the notched
100 wheel I am enabled to effect in a single-feeder machine results which have heretofore re-

quired the use of two feeders and two sets of cams, one cam being a plain cam and the other a tuck-cam.

The wheel can, it will be evident, be used in connection with the needles of the cylinder, as well as with the needles of the dial, when it is desired to tuck on the cylinder-needles.

Fig. 9 shows the location of the tucking-wheel in respect to the lifting-cam and depressing-cam of the cylinder.

The cams *a* and *b* are constructed in a manner somewhat different from the corresponding cams shown in the patent to Heginbotham, before referred to.

In the patented machine the fixed cam only carried the dial-needles outward to what is known as the "welt-point"—that is to say, a point at which the hooks of said dial-needles are not projected sufficiently to catch the thread—so that a number of single courses can be formed on the needles of the vertical cylinder for the production of a thickened rib or welt on the fabric.

The cam *m* of the patented machine corresponding to the cam *b* took the needles at the welt-point and carried them either to the tuck-point or to the full-knitting point, depending upon the adjustment, and owing to the extent of outward movement imparted by said cam when adjusting the needles to the full-knitting point the cam was necessarily of considerable length, so that the angle of projection should be gradual. As a consequence of this the dial-needles failed to reach the point of greatest projection until after the rise of the cylinder-needles, and this led to the frequent stabbing of the work on the cylinder-needles by the needles of the dial. I overcome this objection by constructing the fixed cam *a* so that it will project the dial-needles to the tuck-point, the cam *b* taking the needles at this point and either projecting them to the full-knitting point, as in Fig. 3, retracting them to a welt-point, as in Fig. 7, or permitting them to remain at the tucking-point, as in Fig. 8, the cam being slotted for the reception of the bits of the needles, so as to control them both as regards inward and outward movement. A further advantage of this method of constructing the cams is that the needles are projected to such an extent before the yarn-guide *j* comes over them that the latches of the needles are turned back by the stitches on said needles, so that each needle properly takes its thread.

The shifting of the cam *b* is effected automatically, as in the case of the corresponding cam, *m*, of the Heginbotham machine, by means of a disk, *L*, carried by a rod, *s*, guided in a standard on the frame of the machine, the lower end of said rod being connected to a pivoted arm, *s'*, acted upon by cams *t t'* on a chain, *P*, carried by a toothed drum, *S*, on a sleeve, *v*, which is free to turn on a bolt, *T*, secured to the frame of the machine, the disk *L* acting first upon the lever *N* and then upon the arm *M*, as in the above-mentioned machine.

I am aware that a machine has been de-

vised in which the fixed cam of the dial had a swell or enlargement for partially projecting the needles, the movement being completed by pivoted directing-cams. The free ends of such cams were, however, adjacent to the enlargement of the fixed cam, the pivotal points of the directing-cams being near their rear ends. When fully projected, therefore, the front end of the inner directing-cam presented an abrupt shoulder for the bits of the needles to strike against, thus causing wear and undue strain upon the free or movable end of the said cam. This objection I overcome by pivoting the cam *b* immediately adjacent to the enlarged portion of the cam *a*, so that the needle-bits pass easily from one to the other, whatever the position of the cam *b*. I use, moreover, but a single slotted cam with one large pivot having an extended bearing, whereas heretofore independent cams separately pivoted and linked together for joint operation have been resorted to.

A shaft, *R*, is adapted to a bearing in a bracket, *R'*, on the frame of the machine, this shaft having two arms, *u* and *u'*, the former of which is provided with an anti-friction roller, *u²*, bearing upon a cam, *U*, on the cam-ring *E* of the machine. The other arm, *u'*, of the shaft *R* is acted upon by a spring, *w'*, the tendency of which is to maintain the roller *u²* constantly in contact with the cam *U*, and hung to said arm *u'* is a pawl, *w*, which engages with the teeth of a ratchet-wheel, *V*, turning loosely on the sleeve *v*, and located adjacent to a disk, *W*, secured to said sleeve. The ratchet-wheel *V* is moved to the extent of one tooth for each rotation of the cam-ring *E*; but this movement is not imparted to the sleeve *v* until at intervals a deep tooth in the wheel *V* permits the pawl *w* to drop far enough to engage with a tooth in the disk *W*.

In order to avoid the use of a long pattern-chain, *P*, the pawl *w* is thrown entirely out of action at intervals by a lifting-plate, *K*, on the said chain, movement of the sleeve *v* being thus arrested until a projection, *x*, on the disk *W* is struck by a pin, *x'*, on a disk, *H*, carried by a sleeve, *h*, which is also provided with a toothed drum, *h'*, the rotation of which is due to contact with the tube of knitted fabric passing down from the machine, the movement of the disk *W*, due to this contact of the projections *x x'*, being sufficient to withdraw the plate *K* from beneath the pawl *w*, and thus permit the latter to again engage with the ratchet-wheel *V*. The present machine has, as in the patented one, a rod, *I*, which is connected to a pivoted arm, *I'*, acted upon by a cam, *i*, on the pattern-chain, said rod *I* having toes *y y'* for operating a tappet, *Q*, on a shaft which carries a cam, *Q'*, whereby the cam which acts upon the needles of the vertical cylinder of the machine is adjusted so as to produce a slack course in the work, this part of the machine, however, forming no part of my present invention.

I claim as my invention—

1. The combination of the needle cylinder

or plate of a knitting-machine and the needles carried thereby, with a wheel having notches of different depths, and a cam for directing the needles, whereby their bits are
5 caused to enter the notches of said wheel, all substantially as specified.

2. The combination of the needle cylinder or plate of a knitting-machine and the needles carried thereby, with a notched wheel for acting on the needles, a cam for guiding the needles, and means for adjusting said cam, whereby the bits of the needles may be caused to engage with the wheel or clear the same, all substantially as specified.

15 3. The combination of the circular plate or dial of a knitting-machine and the needles carried thereby, with a fixed cam having an enlargement constructed to move the needles outward to the tuck-point, and a directing-cam
20 pivoted immediately adjacent to the end of said enlargement of the fixed cam and free to swing both outward and inward at its rear end, so as to direct the needles either outward or inward from the tuck-point to a welt-point,
25 all substantially as specified.

4. The combination of the circular plate or

dial of a knitting-machine and the needles carried thereby, with the fixed cam *a*, having an enlargement constructed to move the needles outward to the tuck-point, and the slot-
30 ted cam *b*, having a single pivot located immediately adjacent to the end of the enlargement of the cam *a*, said cam *b* being free to swing both outward and inward at its rear
35 end, so as to direct the needles either to the full-knitting point or to the welt-point, all substantially as specified.

5. The combination of the drum *S* and the chain thereon, with pawl-and-ratchet mechanism for operating the drum, a lifting-plate, *K*,
40 and a supplementary starting device having a wheel engaging with the fabric passing from the machine, and a projection for operating one of the ratchet-wheels of the drum-actuating mechanism, all substantially as specified.
45

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBT. W. SCOTT.

Witnesses:

WILLIAM F. DAVIS,
HARRY SMITH.