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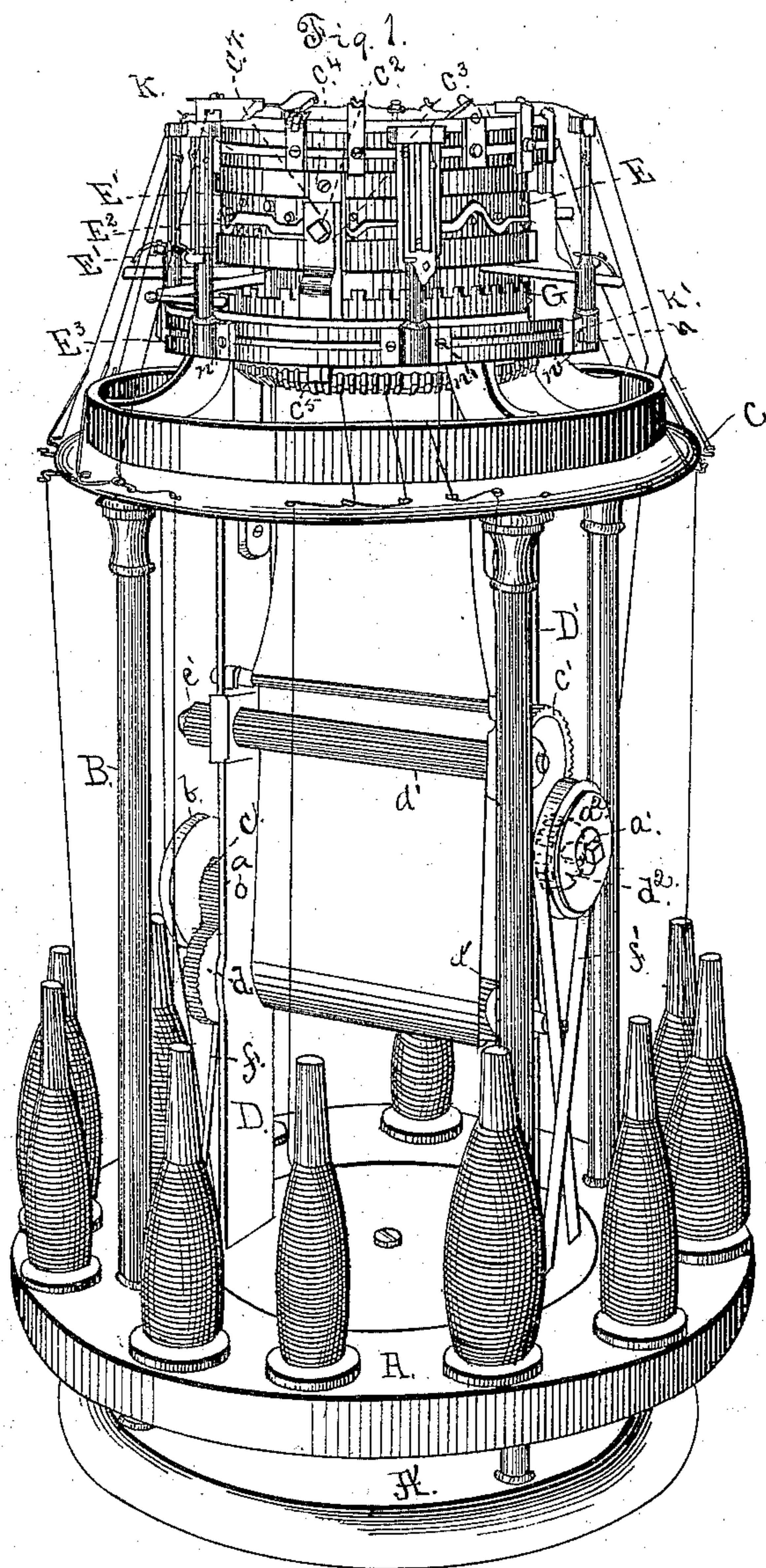
3 Sheets—Sheet 1.

F. HARDENBERGH.

CIRCULAR WEFT THREAD KNITTING MACHINE.

No. 309,348.

Patented Dec. 16, 1884.



Attest,  
W. A. Clark,  
W. J. Baggett

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(No Model.)

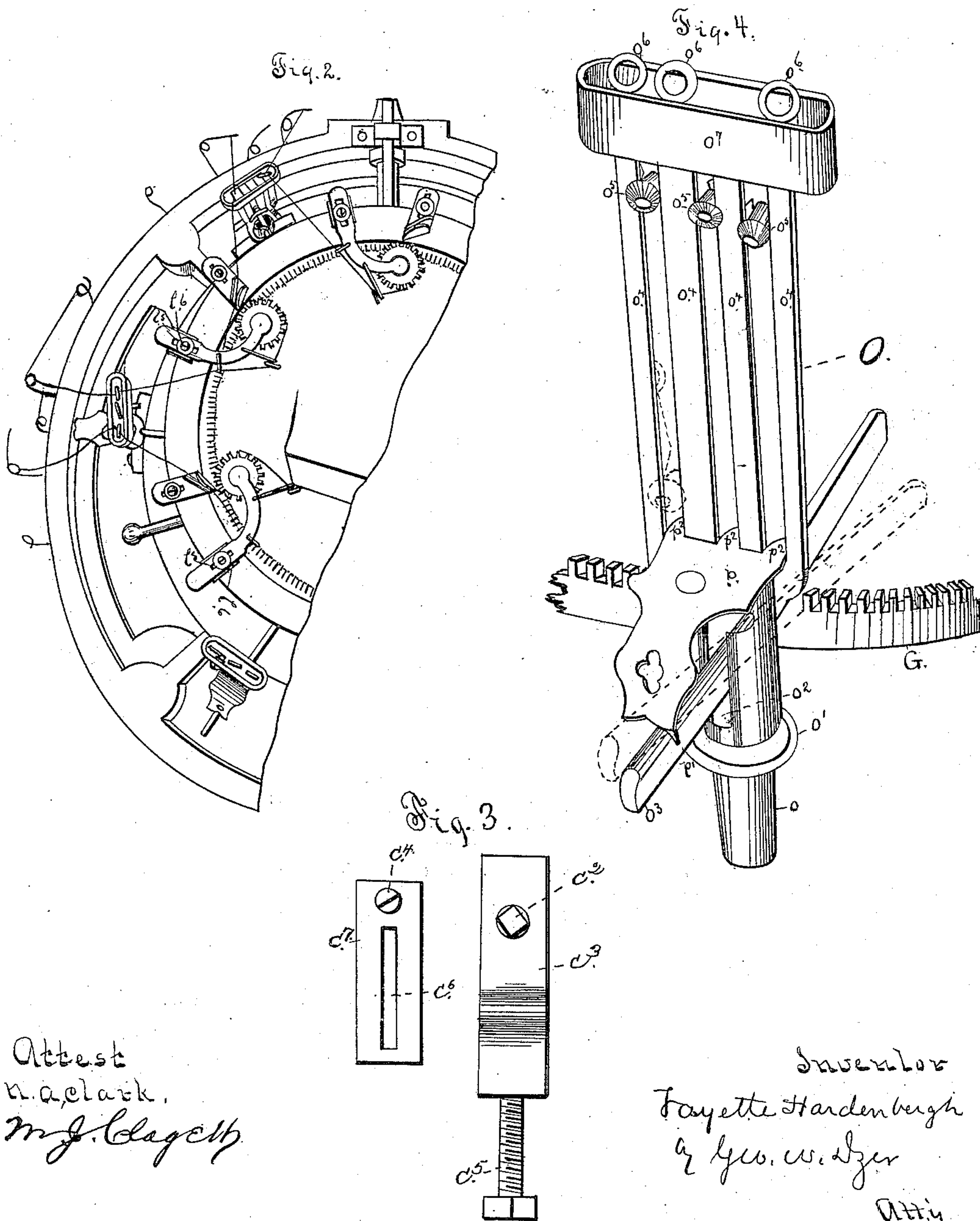
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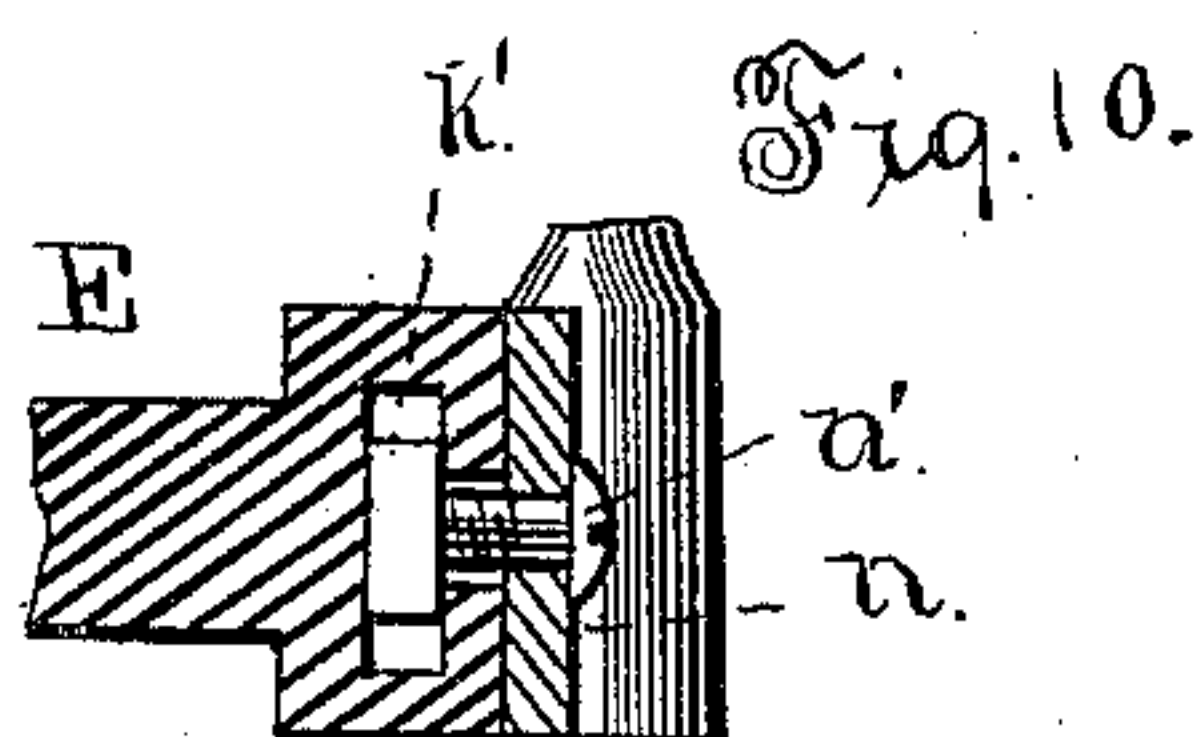
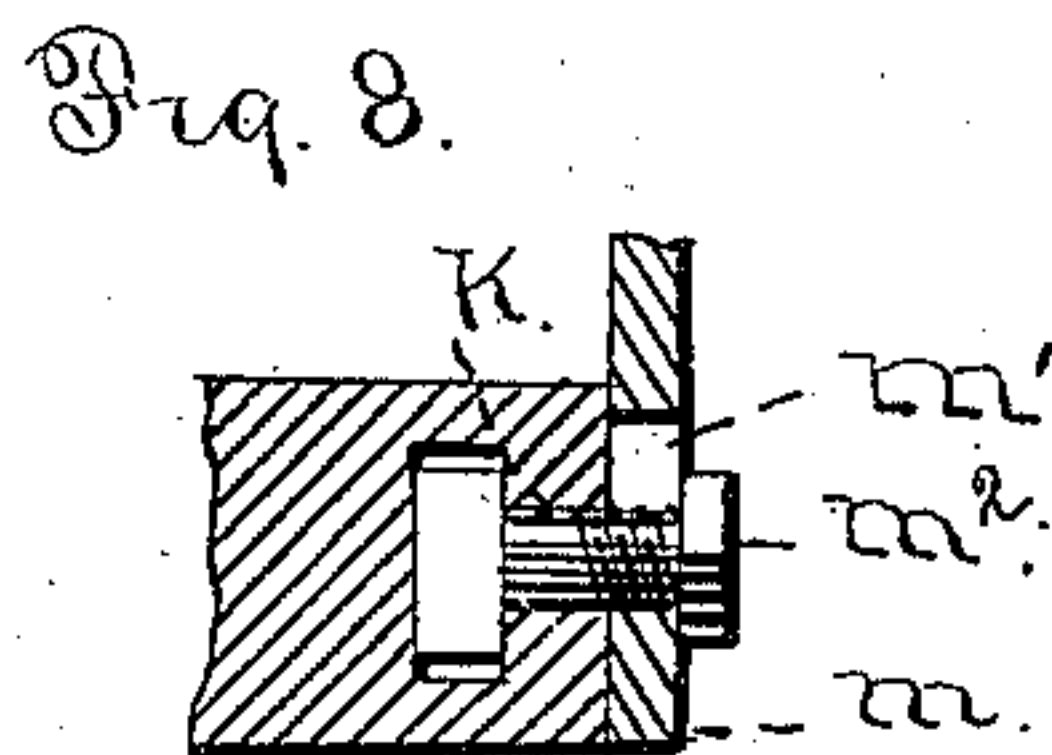
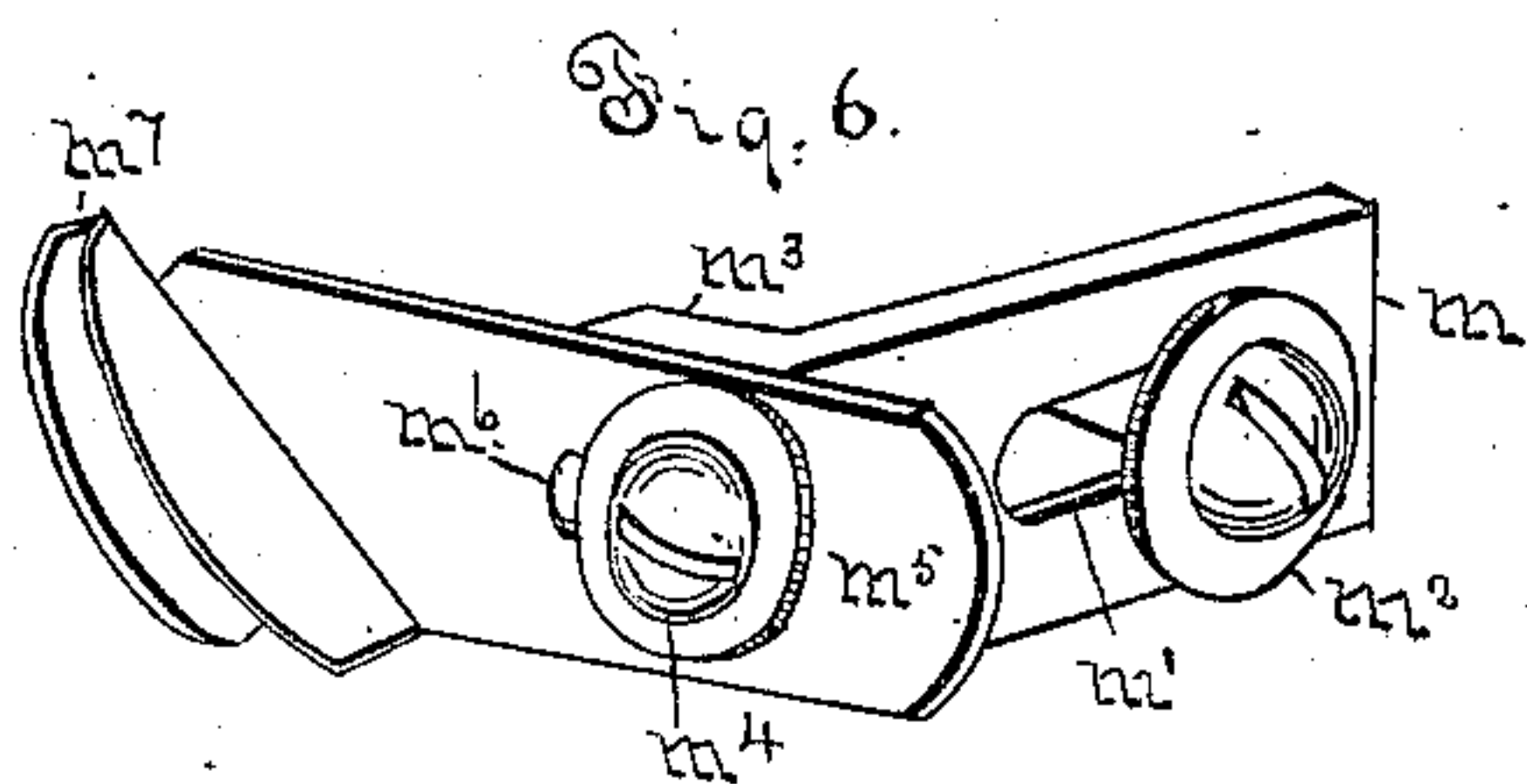
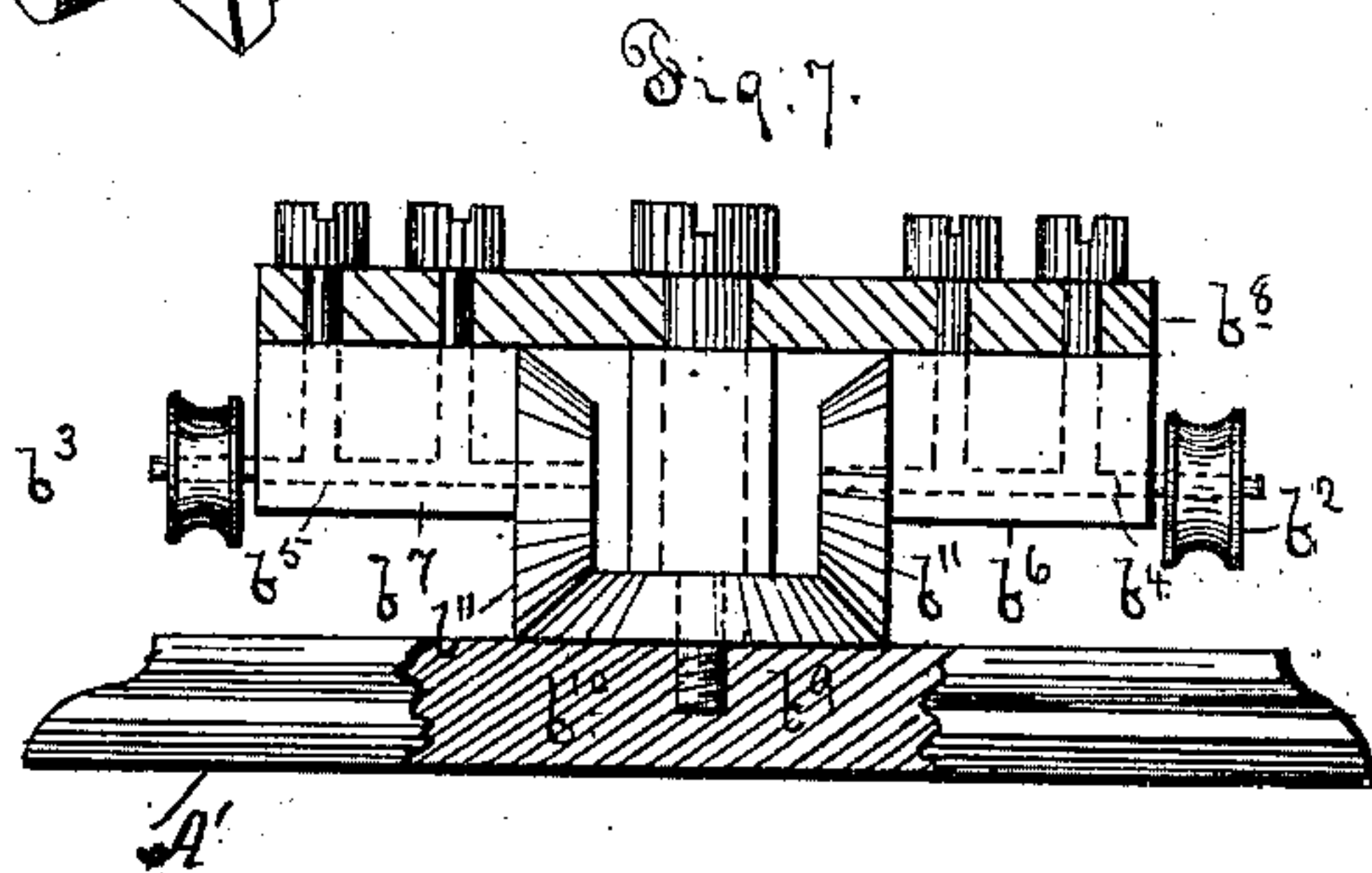
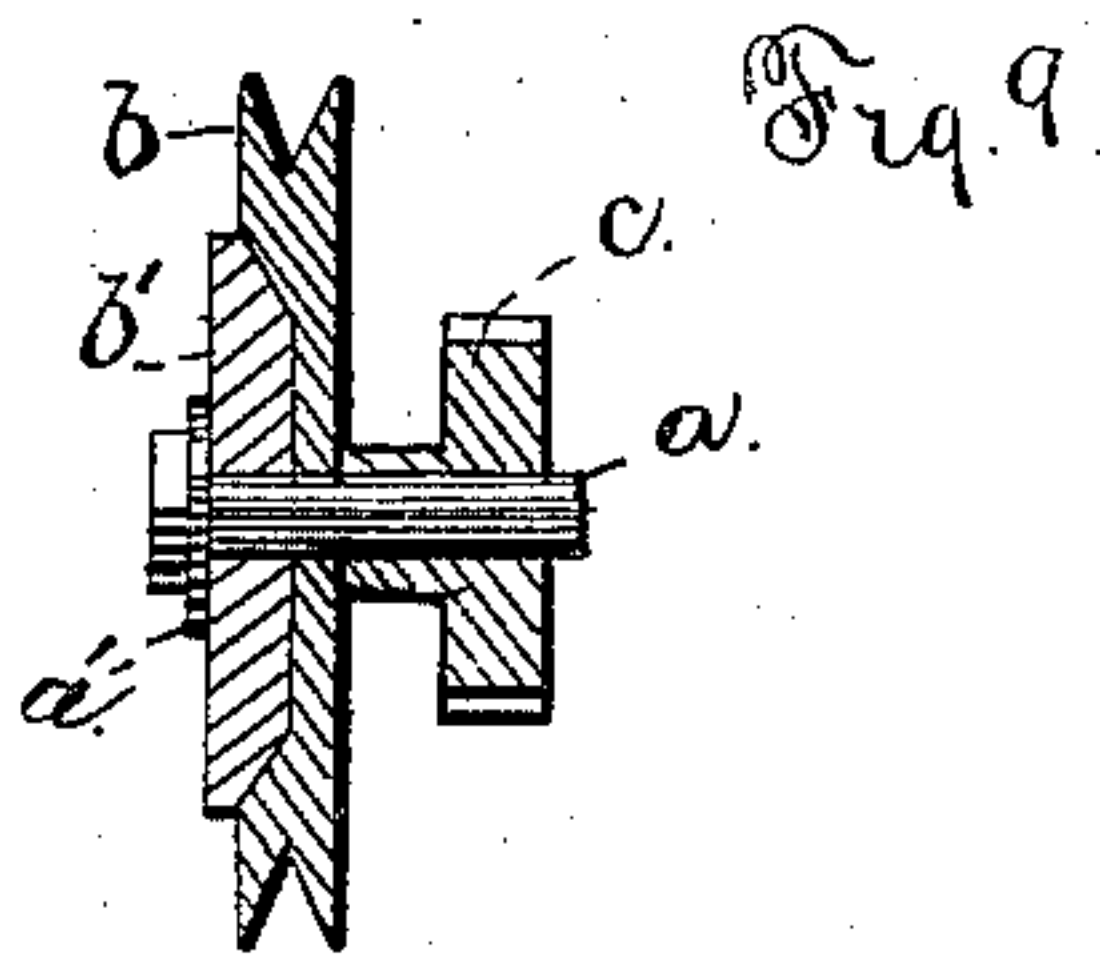
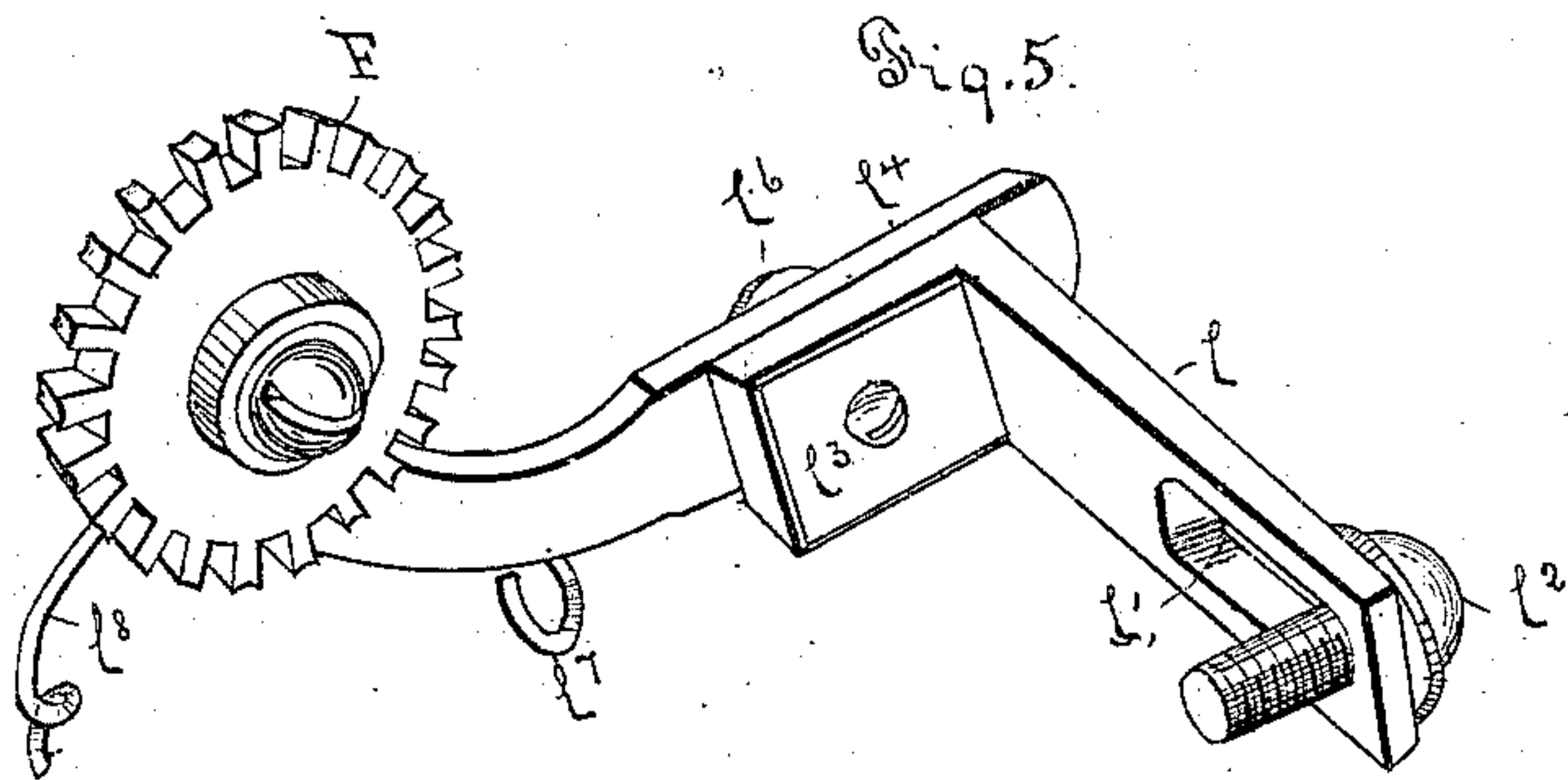
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# UNITED STATES PATENT OFFICE.

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## CIRCULAR WEFT-THREAD KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 309,348, dated December 16, 1884.

Application filed January 18, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, FAYETTE HARDENBERGH, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Circular Weft-Thread Knitting Machines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to knitting-machines of that class wherein a weft or filling is introduced into the fabric; and its object is to do away with noise consequent to the use of such machines, and, further, to render more simple and effective the construction and more certain the operation of such machines in certain particulars; and to this end the invention consists in the novel construction, arrangement, and combination of certain of the component parts of the machine, all as more fully hereinafter described, and designated in the claims.

The novel features of my improved machine are clearly shown in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a view in perspective of a knitting-machine embodying my improvements; Fig. 2, a perspective view of part of the machine, taken from the top, showing clearly the position of the filling-wheels, the knitting or locking thread guides, and the stop-motion mechanism; Fig. 3, a view in detail showing the manner of securing and adjusting the cam-plates; Fig. 4, a view in detail of the stop-motion mechanism, showing in dotted lines the lever engaging with ratchet-ring; Fig. 5, a detail view of the filling-wheel and of means for securing it to the machine; Fig. 6, a view in detail of the knitting or locking thread guide and the means for securing it to the machine; Fig. 7, a view in detail of the gearing for imparting motion to the winding and take-up rolls; Fig. 8 a section in detail illustrating the construction of the groove and the means by which the arms of the yarn-guides are secured to the machine; Fig. 9, a section in detail illustrating the construction and arrangement of the friction-clutches, pulleys, and

pinions, which convey motion to the winding and take up rolls; and Fig. 10, a section in detail showing the means for securing the stop-motion mechanism to the cylinder.

Like letters refer to corresponding parts in the several views.

The main frame-work of the machine being of ordinary construction but slight reference will be made to it.

Extending upwardly from a circular base, A, are a suitable number of pillars, B, which support on their upper ends a circular ring, C, which serves as a support or base for the principal operative parts of the machine.

Extending from the bottom or base of the machine up to points below the needle-carrying cylinder are two uprights, D D'.

At the point shown in Fig. 1 of the drawings is a stud, *a*, mounted in the upright D and carrying on its outer end a friction-clutch, *b*, which fits within and has close contact with a pulley, *b*, mounted upon said stud, and having connections with a gear-wheel or pinion, *c*, also upon this stud. In its revolution this gear *c* meshes with a similar gear-wheel or pinion, *d*, mounted upon one end of a shaft carrying the winding-roll *d'*, and by this engagement of the gears motion is transmitted to said winding-roll. A similar stud, *a'*, is mounted in the upright D' and carries a friction-clutch, *b'*, a pulley, *a*<sup>2</sup>, and a gear-wheel or pinion, *d*<sup>2</sup>, all of similar construction and arrangement as before described in connection with the parts mounted upon stud *a*. This last-mentioned gear-wheel *d*<sup>2</sup> engages with a similar gear-wheel, *c'*, mounted upon one end of one of the upper take-up rolls *d'*. (Only one shown in Fig. 1.)

Upon the opposite ends of each of rolls *d'* is a pinion, *e'*, which pinions mesh with one another and impart motion to said rolls.

Passing around each of the pulleys *b* and *a*<sup>2</sup> are driving belts or chains *f f'*, said belts or chains also passing over pulleys *b*<sup>2</sup> and *b*<sup>3</sup>, mounted, respectively, on the outer end of shafts *b*<sup>4</sup> and *b*<sup>5</sup>, Fig. 7. The shafts *b*<sup>4</sup> and *b*<sup>5</sup> have bearings in blocks *b*<sup>6</sup> and *b*<sup>7</sup>, which are secured by means of screws to a plate, *b*<sup>8</sup>, to which are secured the lower ends of uprights D and D'.



Passing through an opening made in the center of plate  $b^8$  is a screw,  $b^9$ , upon which is mounted a stationary beveled friction-gear,  $b^{10}$ , said screw being secured at its lower end to base-plate  $A'$ .

Upon the inner end of each of the shafts  $b^4$  and  $b^5$  is mounted a beveled friction-gear,  $b^{11}$ , the beveled surface of said gears resting upon the beveled surface of gear  $b^{10}$ .

When power is applied to the needle-cylinder and to the other operative parts of the machine, the gears  $b^{11}$  are caused to revolve slowly upon gear  $b^{10}$ .

Owing to the frictional contact between the gears  $b^{11}$  and  $b^{10}$ , the shafts upon which said gears  $b^{11}$  are mounted are revolved, and with them the pulleys  $b^2$  and  $b^3$ , mounted on their outer ends, and by means of belts or chains  $f$   $f'$  motion is imparted to the winding and take-up rolls, referred to, through the medium of friction-clutches, pulleys, and pinions mounted on studs  $a$   $a'$  and the pinions on the shafts of said rolls.

I have found by frequent experiment that the use of two bevel-gears on the same shaft, instead of one large gear, lessens to a great extent the noise attending the operation of these machines.

In my machine the needle-cylinder, manner of operating the needles, and all other parts not specially hereinafter referred to, are similar in construction and use to similar parts shown and described in Letters Patent No. 254,079, issued to W. W. Westcott, February 21, 1882.

Around the outer face of the cylinder  $E$ , Fig. 1, and at a point near the upper edge thereof is formed a groove,  $k$ , into which are inserted screws for securing arms carrying the filling-wheels and knitting or locking thread guides, the construction and arrangement on the machine, of which parts will now be given in detail, reference being made to Figs. 5 and 6 of the drawings. As shown in Fig. 5, there is an arm,  $l$ , provided at its lower end with a slot,  $l'$ , through which is passed a screw,  $l^2$ , said screw being intended to pass into the groove  $k$  before mentioned, in order to secure said arm  $l$  to the cylinder  $E$ .

Cast upon the upper end of the part  $l$  is an outwardly-projecting arm,  $l^3$ , which passes over the top of cylinder  $E$  and rests upon the upper face thereof, as shown in Fig. 2. Resting upon this arm  $l^3$  and secured to it, as will be described, is a curved arm,  $l^4$ , to one end of which is secured the filling-wheel  $F$ , which is similar in construction to the one described in the Letters Patent referred to.

The arm  $l^4$ , to which the filling-wheel is secured, is provided near its other end with a longitudinal slot,  $l^5$ , through which a screw,  $l^6$ , is passed to secure said arm to the projecting arm  $l^3$  of piece  $l$ .

By means of the construction and arrangement of the parts above referred to the filling-wheels  $F$  are capable of adjustment in any direction.

To the arm  $l^4$ , which carries the filling-wheels, are secured suitable yarn-guides,  $l^7$  and  $l^8$ .

In Fig. 6 I have shown one of the knitting or locking thread guides, as illustrated. It consists of an arm,  $m$ , provided with slot  $m'$ , screw  $m^2$ , and outwardly-projecting arms  $m^3$ , all of which parts are similar in construction and arranged upon the machine in the same manner as the same parts described in connection with filling-wheels.

To the projecting arm  $m^3$ , which rests upon the upper face of cylinder  $E$ , is secured, by means of a screw,  $m^4$ , to an arm,  $m^5$ , said arm being provided at one end with a longitudinal slot,  $m^6$ , through which the screw  $m^4$  passes.

Upon the upper face of arm  $m^5$  and at a point near one end thereof, is cast or secured a trough or guide,  $m^7$ , by means of which the knitting or locking thread is guided to the needles. It will be readily seen and understood that this guide may be adjusted.

The manner of holding together and adjusting the cam-plates  $E'$ , between which the cam-slot  $E^2$  is formed, is as follows: At suitable points on the upper cam-plate are secured by means of screws  $c^4$ , or other suitable means, three or more plates,  $c^7$ , which hang down below the cam-slot, and each of which is provided with a vertical slot,  $c^6$ , or groove to receive a bolt,  $c^2$ . These bolts  $c^2$  pass through an opening made near the upper end of posts  $c^3$ , said posts being secured by means of bolts  $c^5$  to the bed-plate  $E^3$ , and corresponding in number to plates  $c^7$ .

Around the upper edge of the table or bed-plate  $E^3$  is formed a horizontal groove,  $k'$ , similar to the one  $k$  before referred to.

At suitable points on the bed-plate  $E^3$ , and secured to the same by means of screws  $n'$  passing into the groove  $k'$ , are suitable journal-boxes,  $n$ , Fig. 1, which serve as bearings for perpendicular shafts, carrying the stop-motion mechanism, which will now be described. This stop-motion mechanism is clearly illustrated in Fig. 4 of the drawings, and consists of the following parts, viz: A perpendicular shaft,  $o$ , which is inserted into one of the journal-boxes  $n$ , before mentioned, is provided at a suitable point with a flange,  $o'$ , which rests upon the upper end of said journal-box  $n$  when in position. Directly above this flange  $o'$  the shaft  $o$  is provided with a slot or opening,  $o^2$ , through which a lever,  $o^3$ , is passed and in which it is pivoted. Upon its upper end this shaft  $o$  has cast or secured a number of perpendicular arms,  $o^4$ , between which weighted rollers  $o^5$  move. These rollers  $o^5$  are suitably connected to rings  $o^6$ , which protrude above the band  $o^7$ , formed to connect upper ends of arms  $o^4$ , and through said ring  $o^6$  the thread is passed to the filling-wheels and the knitting or locking thread guides.

The parts above referred to—viz., the vertical shaft, the flange and slot with which it is provided, the perpendicular arms, and the ring connecting said arms at their upper ends—



will all be referred to, as a matter of convenience, as the frame O.

At or near the points where the arms  $o^4$  are connected to the shaft  $o$  is pivoted a spring-latch,  $p$ , said spring-latch having one of its ends curved and extending down to engage with a notch,  $p'$ , formed near one end of lever  $o^3$ . Upon the opposite or straight end of spring-latch  $p$  are cast a suitable number of prongs,  $p^2$ , one of which projects a short distance through each space formed between the arms  $o^4$ . The inner end of the lever  $o^3$  is weighted, and when released from contact with spring-latch  $p$  falls and engages with the teeth of a ratchet-ring, G, as shown in dotted lines in Fig. 3 of the drawings.

The operation of the stop-motion mechanism is as follows: The knitting or locking thread and filling-thread, which are arranged on alternate spools situated on base A, pass from said spools through suitable yarn-guides arranged on the base of the upper portion of the machine up to the rings  $o^6$ , which are connected to the weighted rollers  $o^5$ . From these rings  $o^6$  the knitting or locking thread passes to the knitting or locking thread guide, and thence to the needles, and the filling-thread to the filling-wheel, and thence to the needles. As long as the threads remain intact the lower end of curved spring-latch  $p$  remains in notch  $p'$ , formed on outer end of lever  $o^3$ , whereby the inner and weighted end of said lever is held in an elevated position, which prevents it from coming in contact with ratchet-ring G, which is revolving with the needle-cylinder. As soon, however, as one of the threads breaks, the weighted roller secured to the ring through which it is passed is released and falls down between the arms  $o^4$  until it comes

in contact with one of the prongs  $p^2$ , formed on the end of spring-latch  $p$ . This withdraws the curved end of said spring from the notch  $p'$  on lever  $o^3$ , and allows the weighted end of said lever to fall and engage with teeth on ring G, which stops the revolution of said ring and of the needle-cylinder, to which it is secured.

Having thus described my invention, what I claim as new therein is—

1. The combination, with the uprights D D' and bevel-gear  $b^{10}$ , of pulleys  $b^2$   $b^3$ , and shafts therefor, driving-belts  $f$   $f'$ , gearing intermediate of said bevel-gear and pulleys, studs  $a$   $a'$ , frictional clutches  $b'$   $b'$ , pulleys  $b$  and  $a^2$ , mounted, respectively, on said studs, pinions  $c$   $d$  and  $c'$   $d^2$ , and the upper and lower take-up rolls, the parts arranged and operated substantially as described and shown.

2. The combination, with bed-plate E<sup>3</sup>, provided on its outer circumference with groove  $k'$ , of journal-boxes  $n$ , adjusting-screws  $n'$ , and frame O, as and for the purpose set forth.

3. The combination, with the cylinder E, provided near its top with the groove  $k$ , of filling-wheel F, adjusting-screws  $l^2$ , and arms  $l$  and  $l^3$ , said arms being adjustably connected, as described, and for the purpose set forth.

4. The combination, with the cylinder E, provided with groove  $k$ , of the trough or guide  $m^1$ , adjusting-screws  $m^2$ , and arms  $m$  and  $m^6$ , said arms being adjustably connected, as described, and for the purpose set forth.

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

FAYETTE HARDENBERGH.

Witnesses:

D. R. STANFORD,  
HENRY A. SPAFARD.