

(No Model.)

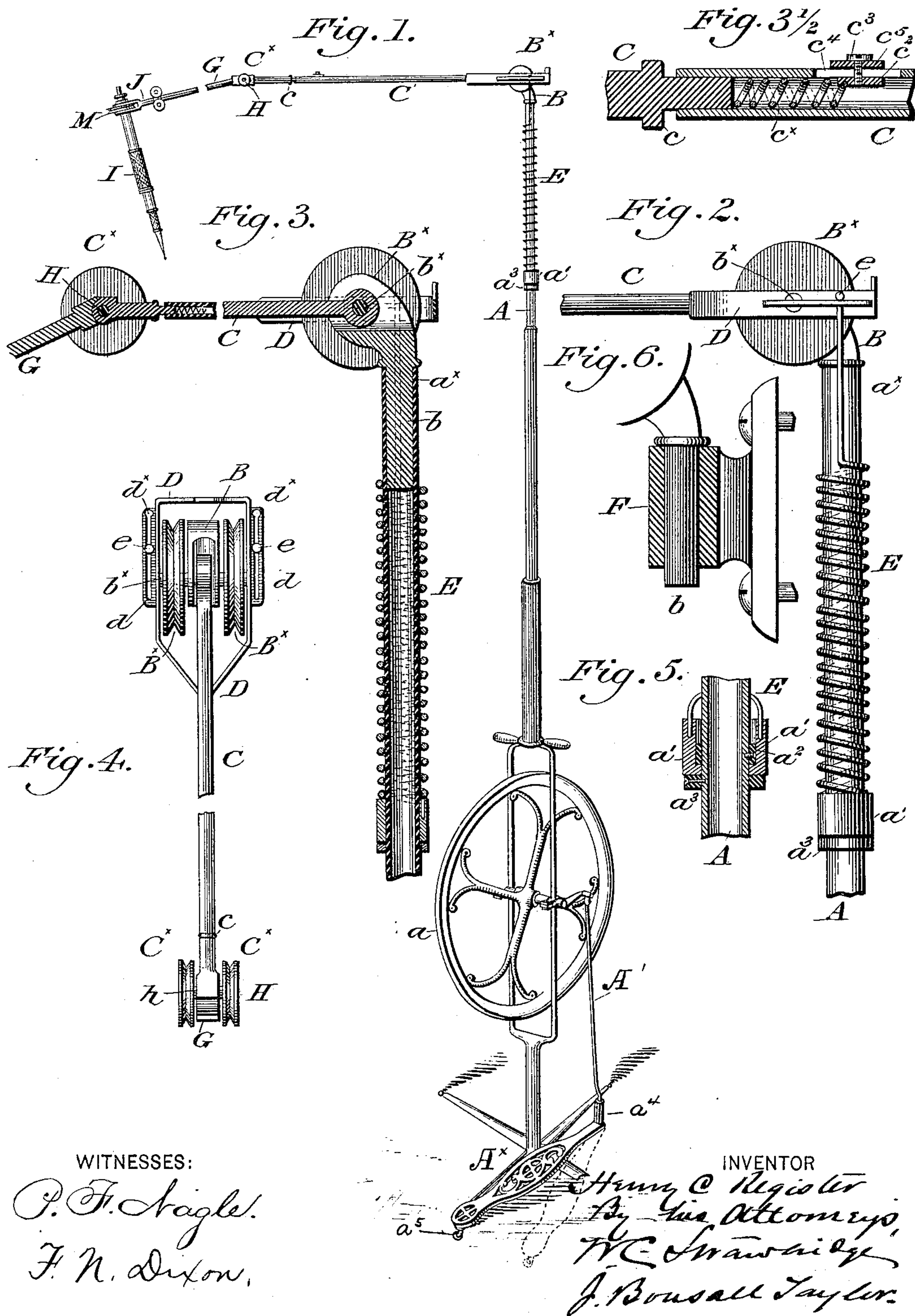
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H. C. REGISTER.

DENTAL ENGINE.

No. 365,098.

Patented June 21, 1887.



WITNESSES:

P. F. Nagle.
F. N. Dixon.

INVENTOR

Henry C. Register
By His Attorneys,
W. E. Strawbridge,
J. Bousall Taylor.

(No Model.)

3 Sheets—Sheet 2.

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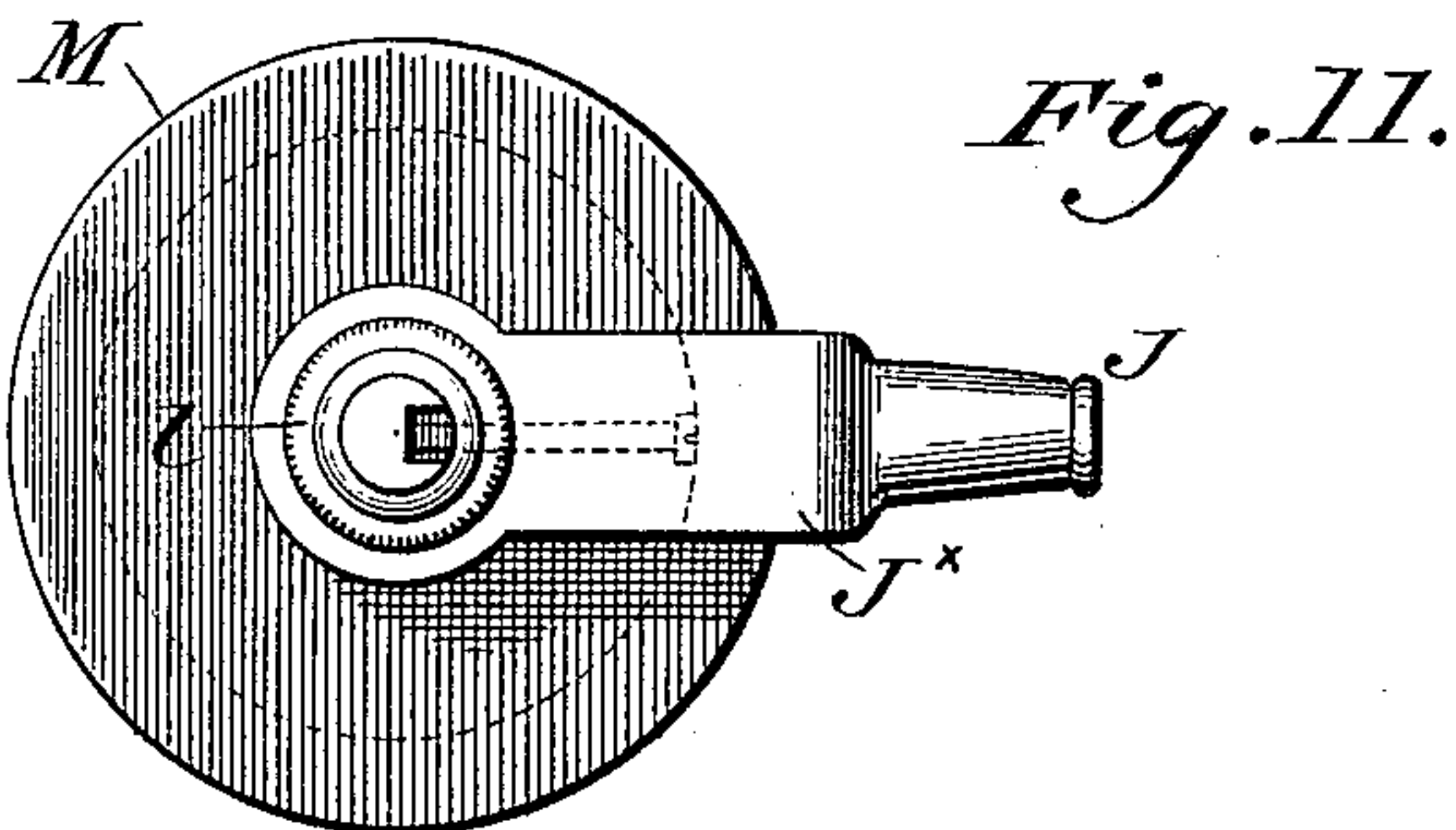
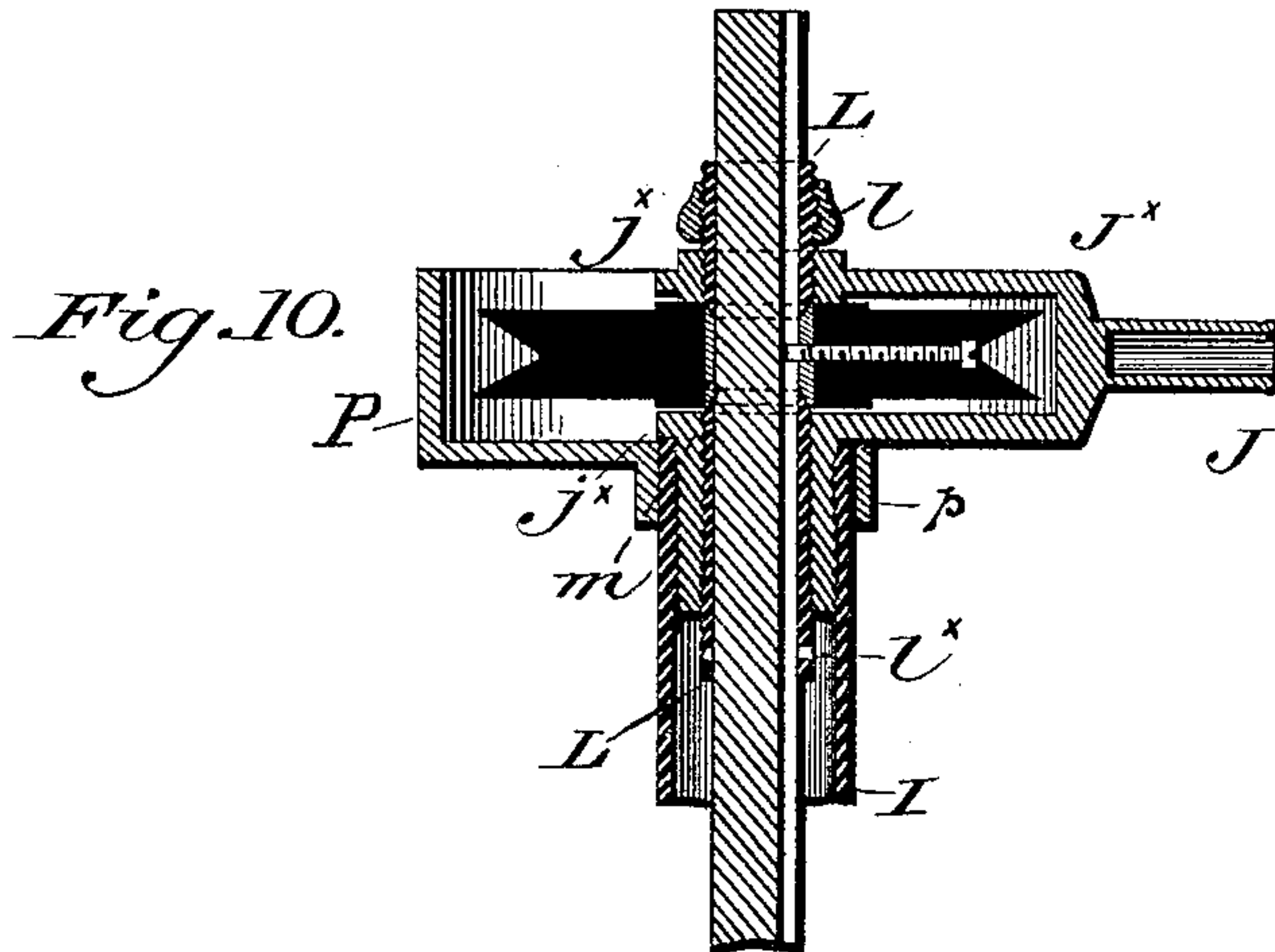
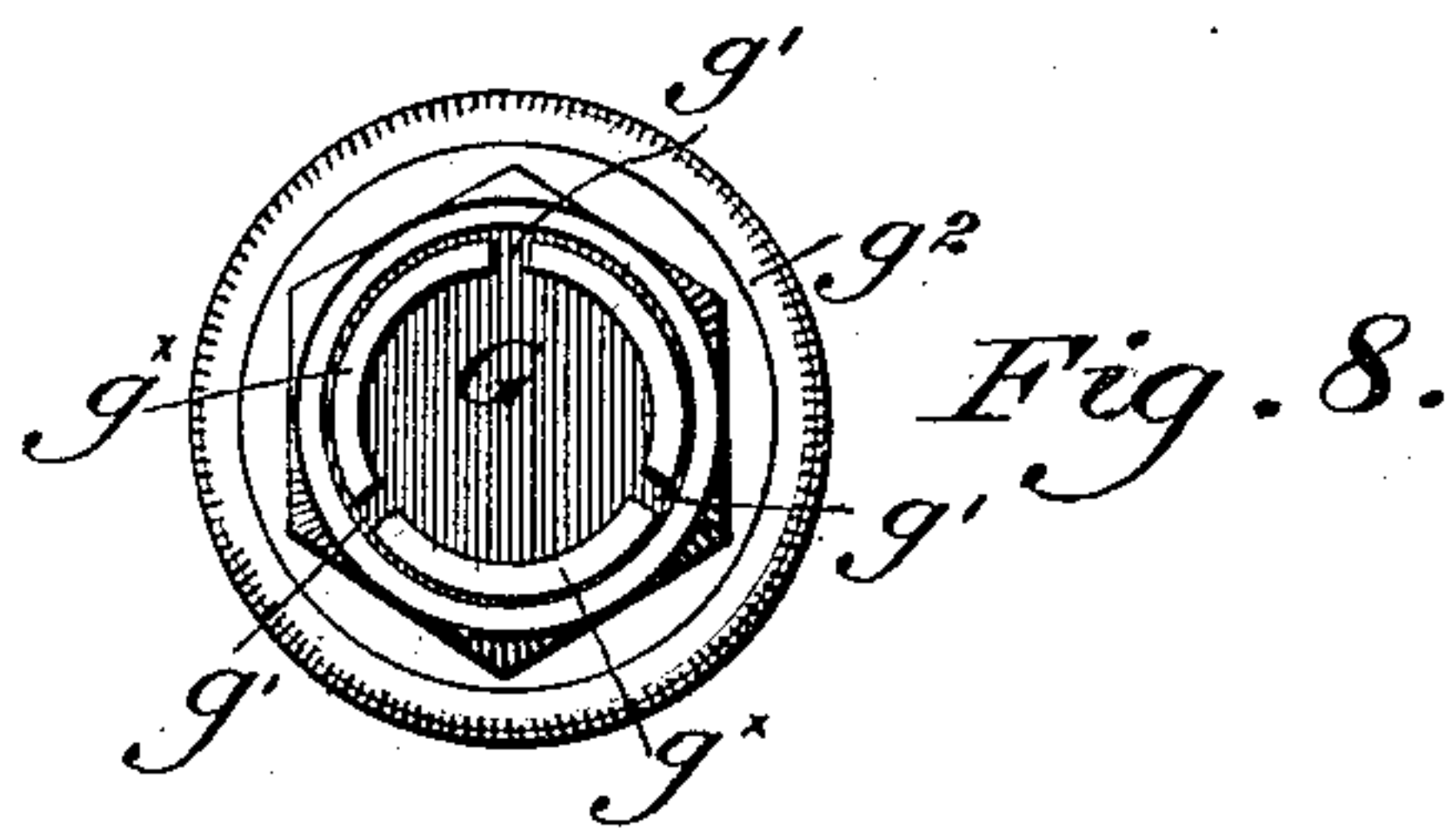
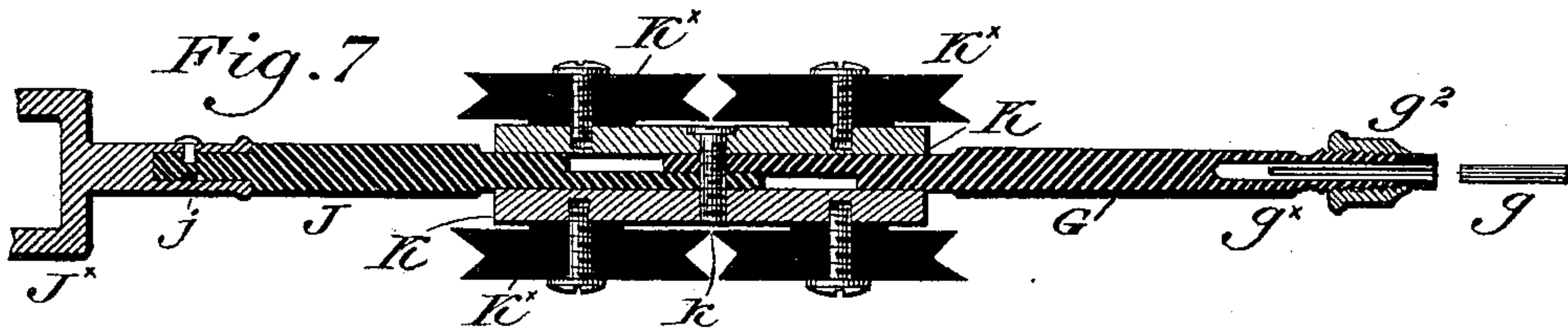
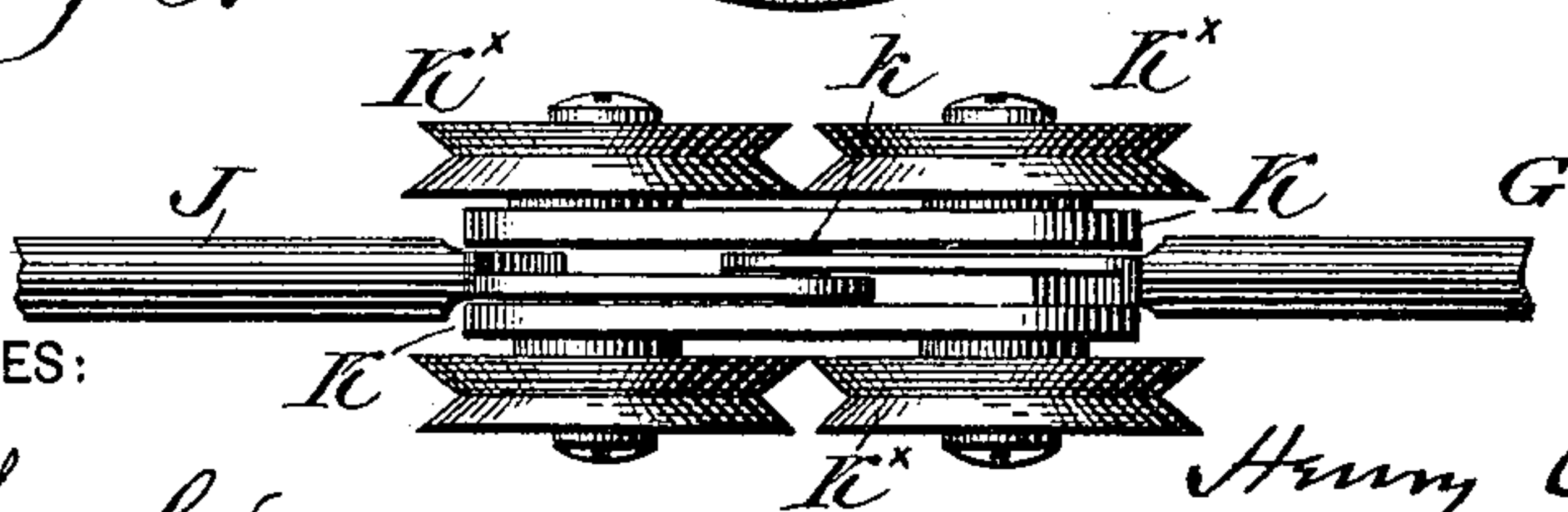


Fig. 9.



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(No Model.)

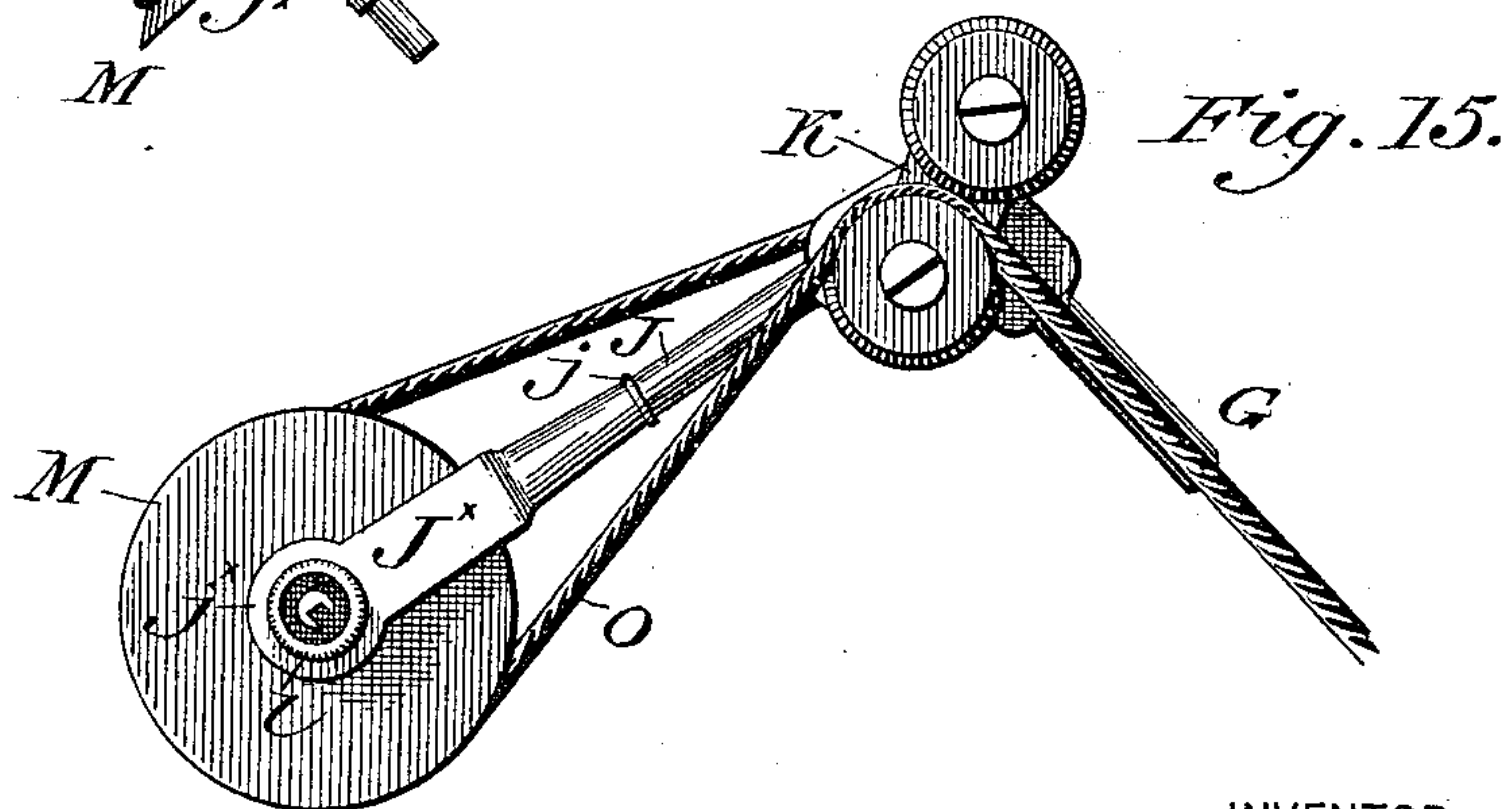
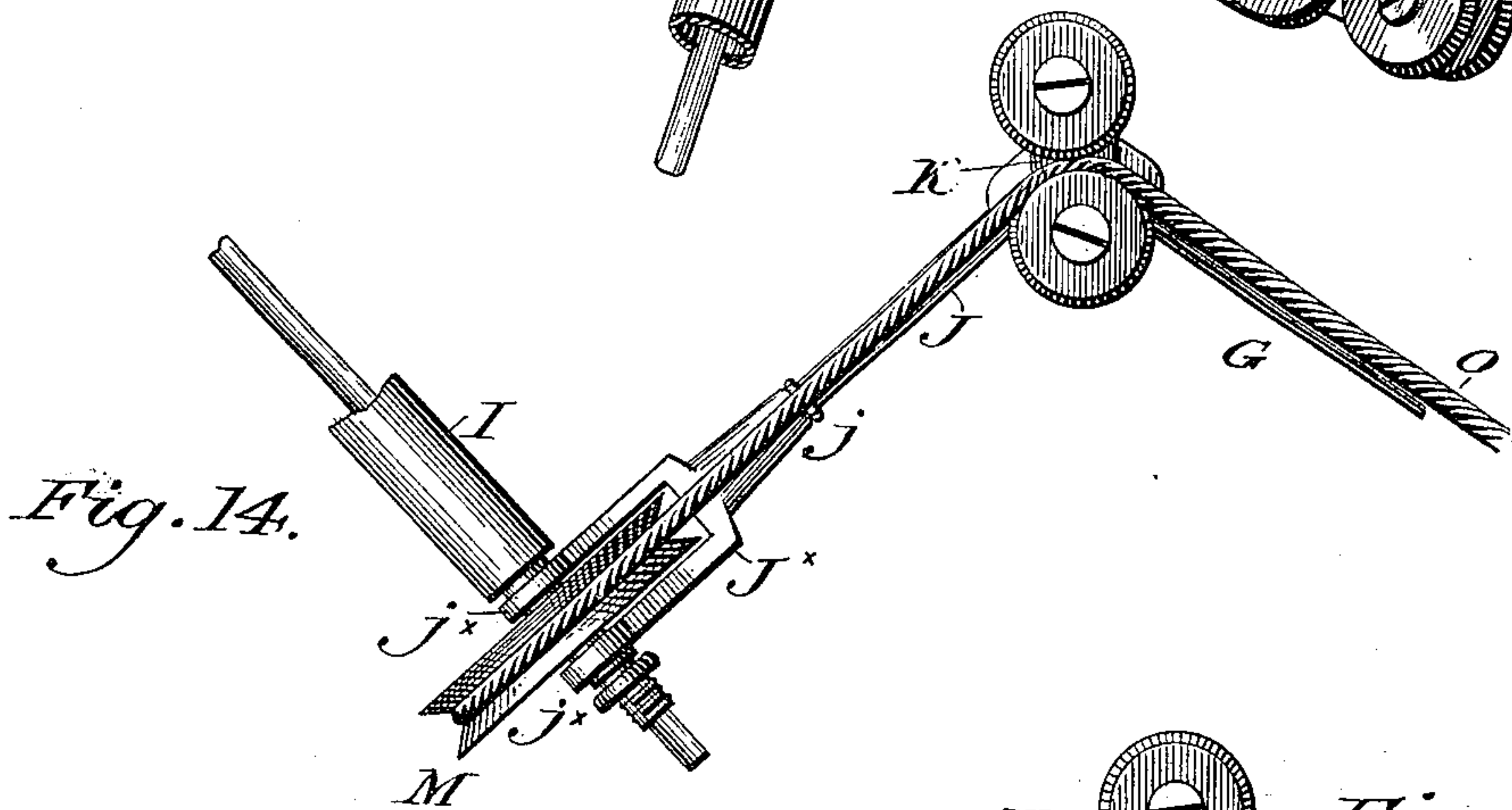
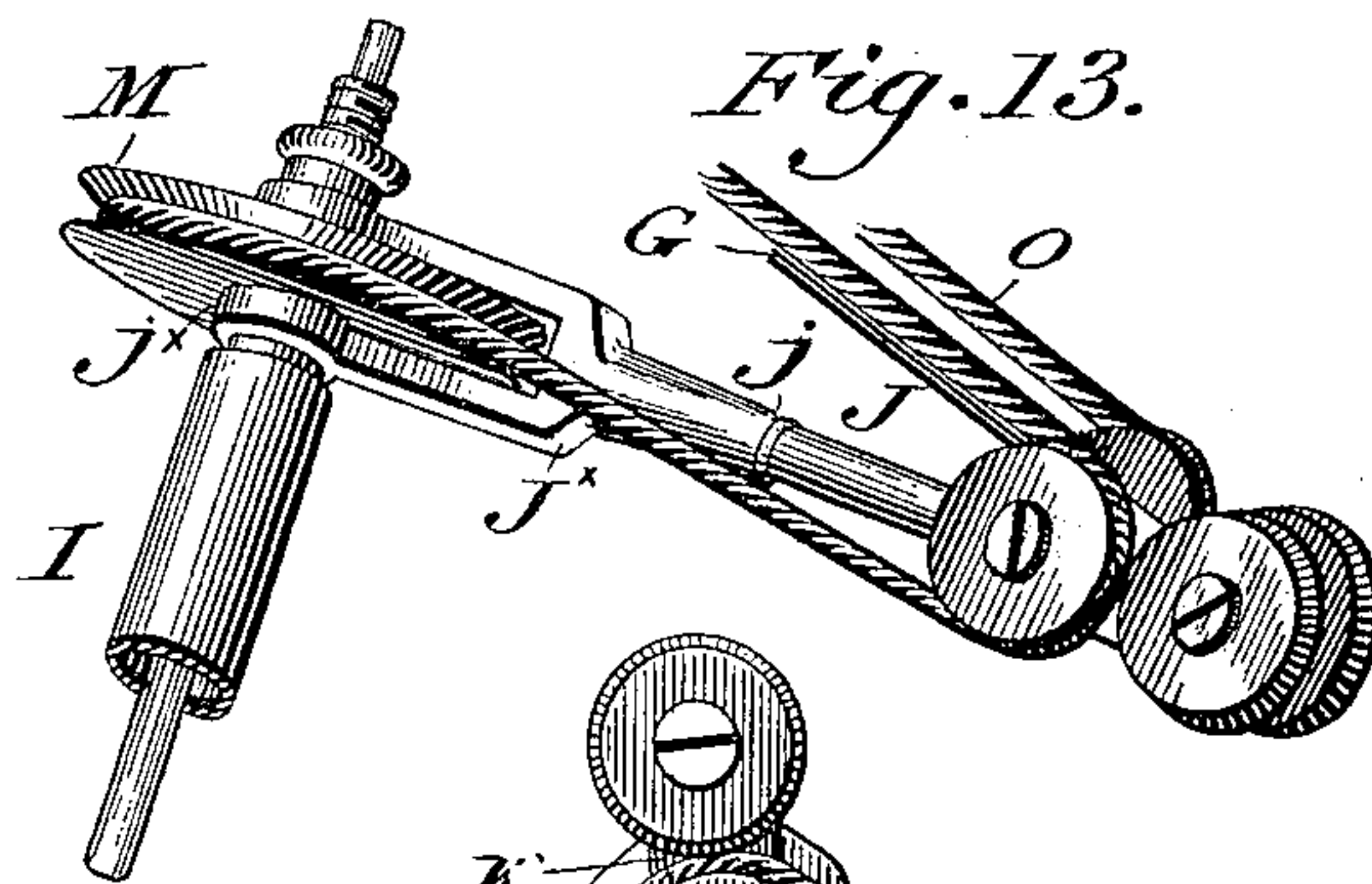
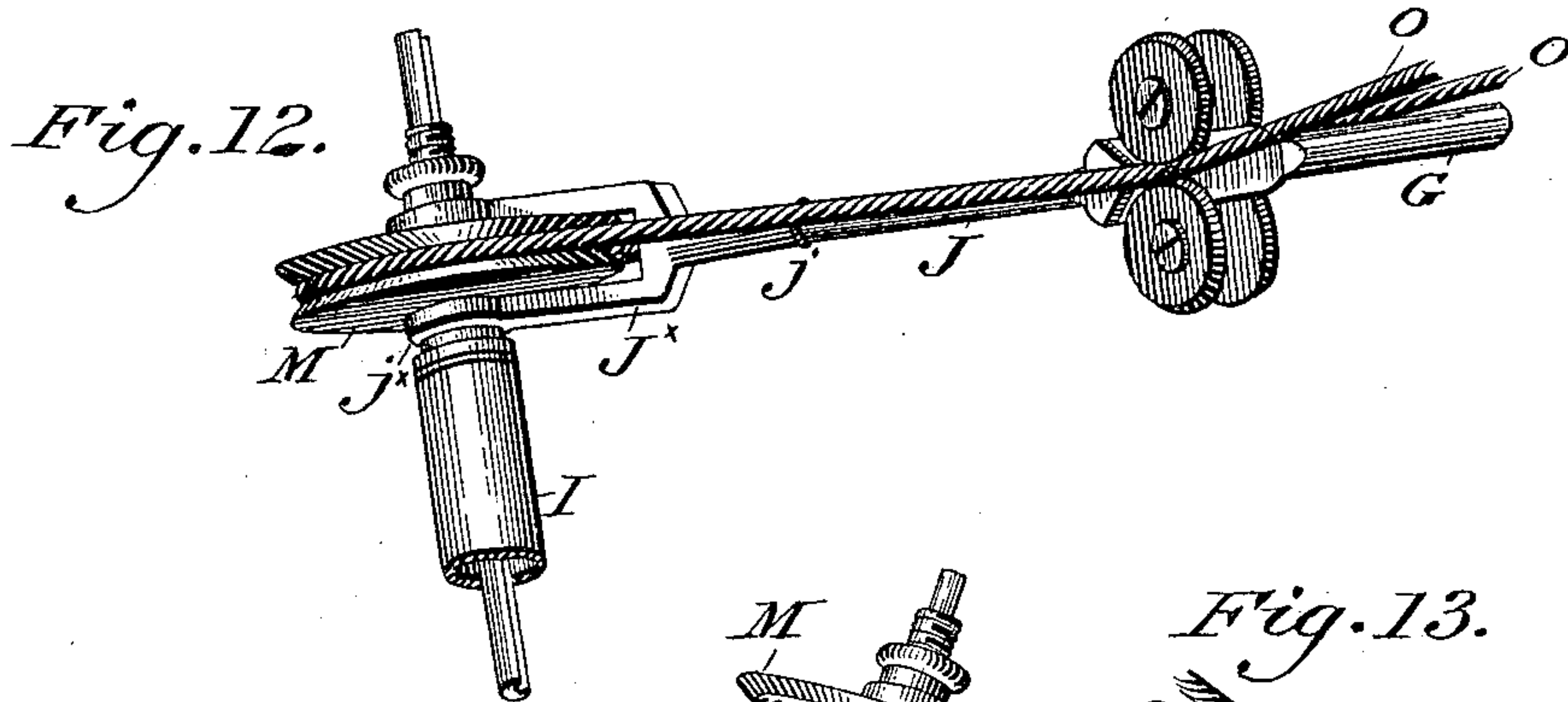
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UNITED STATES PATENT OFFICE.

HENRY C. REGISTER, OF PHILADELPHIA, PENNSYLVANIA.

DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 365,098, dated June 21, 1887.

Application filed November 15, 1886. Serial No. 218,910. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. REGISTER, a citizen of the United States residing in the City and County of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

My invention relates to a class of devices well known in dentistry, and which also have application both in general surgical practice and in the mechanical arts.

The object of my invention is the construction of a dental engine, adapted to be driven either by pedal or other power, possessing exceptional flexibility, simple and durable in construction, and largely self-sustaining when in use, although adapted to be disposed within small compass when not in use.

An engine embodying my improvements is represented in the accompanying drawings and described in this specification, the particular subject matter claimed as novel being hereinafter definitely specified.

In the drawings, Figure 1 is a view partly in elevation and partly in perspective of a dental engine embodying my improvements. Fig. 2 is a side elevational detail of the pulley head, showing the application of the balance spring to the arm. Fig. 3 is a central, sectional, elevational view of the parts represented in Fig. 2, showing also in section the elbow joint. Fig. 3½ is a fragmentary longitudinal detail of the swivel in the arm, showing also the cord tension spring. Fig. 4 is a top plan view of the parts represented in Fig. 3. Fig. 5 is a central, vertical, sectional detail of the adjustable swivelling collar for connecting the balance spring with the standard. Fig. 6 is a fragmentary, partly sectional, detail showing the application of the pulley head to a wall socket. Fig. 7 is a central, longitudinal, sectional top detail of the wrist joint, and of an adjustable swivel which can be applied to the forearm. Fig. 8 is a right hand end view on an enlarged scale of the swivel devices represented in Fig. 7. Fig. 9 is a side elevational view of the wrist joint. Fig. 10 is a central sectional detail through the fork of the driving wheel, and the cone bearings of said driving wheel, showing also the wheel guard. Fig. 11 is a top plan view

of the parts represented in Fig. 10, the wheel guard being, for greater clearness, removed. Figs. 12, 13, 14 and 15, are perspective details of the wrist joint, wrist, fork, and driving wheel of the hand piece, showing the different positions assumed by the cord and the wrist joint in the manipulation of the hand piece—the wheel guard not being shown.

Similar letters of reference indicate corresponding parts.

In the drawings, A is a standard or pedestal provided with a pedal-driven band wheel *a*;

A^x is the foot pedal;

A' is the connecting rod between the crank of the band wheel and the foot pedal, which is formed with a swivel *a*⁴ to allow the pedal A^x (which is conveniently provided with one or more casters *a*⁵) to be moved around as shown in dotted lines in Fig. 1, to accommodate it to different positions taken by the operator.

The rotatable head of the standard, or pulley head B, as it is termed, is provided with a stem *b* and equipped with two idler pulleys B^x mounted upon a shaft *b*^x which also serves as the inner pivot of the arm C.

D is what I term a pulley housing, best shown in Fig. 4, the same being a part of the arm C, and serving to encompass the pulleys of the pulley head and retain the outer extremities of the pulley shaft *b*^x. The stem *b* of the pulley head is, in Figs. 1, 2, and 3, shown as rotatably socketted in a sleeve or socket *a*^x either being, or formed as a part of, the top portion of the standard, and the pulley head is therefore capable of rotation with respect to said socket. Encircling the upper portion of the standard is what I term a balance spring E, the same being preferably composite of two intermeshed spirals, the respective upper extremities of which are provided with hooks, knobs, stops, or other catches, *e*, which I term spring stops, and which pass through and engage against the upper surfaces of spring keepers *d* being slotted ways applied to or formed as a part of the pulley housing D, as a reference to the drawings will make clear.

The shaft *b*^x of the pulley head B is located beyond the stem of the head, or, in other words, occupies a plane in advance of a plane projected in parallelism with said shaft and

bisecting the axis of said stem; the result of which location and relationship or parts is that the arm C is capable of being moved upon said pulley shaft b^x , which, as stated, is its pivot, down into parallelism with the standard so as to lie against the front thereof, such placing of said arm being effected by exerting force sufficient to extend the balance spring and permit its stops to traverse the keepers through which they play.

The lower end of the balance spring is fixedly secured to a cup-shaped rotatable collar a' surrounding and swivelling upon the standard, and loosely engaged between an annular stop a^2 which lies within the collar and is fixed to the standard, and another annular stop a^3 below the collar and likewise fixed to the standard. When the arm is raised to a horizontal position as shown in Figs. 1, 2, 3, and 4, the balance spring, through the engagement of its stops with the keepers, maintains the arm in such position, the tension of the spring through the adjustment of the stops a^2 a^3 being regulated to be sufficiently great for the purpose. Of course, although the arm, when extended, is maintained in such horizontal position, it can be moved either up or down or be swung around in either direction, the spring and its swivelling collar accommodating themselves to permit such movement. When, for any reason, it is desired to disengage the spring from its keepers, the upper extremities of the spring which are preferably as shown straight prolongations of the spring proper, are flexed so that their stops can be passed through enlargements d^x of the slots of the spring keepers d , shown in Fig. 4.

Where it is desired to apply other than foot power to the driving of the hand piece the stem of the pulley head can, as shown in Fig. 6, be introduced into a wall socket F, or other socket or keeper secured to the wall or to any other fixture.

The arm C is of any desired length, and at its outer extremity is equipped with a forearm G, the union between the arm and forearm being by means of a hinge or elbow joint H, Figs. 3 and 4, the pivot h of which carries two idler pulleys C^x which I term the hinge pulleys. The hinge joint or elbow joint is of such form as, when open, to occasion the permanent deflection of the forearm from alignment with the arm, the heels of the hinge not permitting the said members to open apart to an extent greater than, for instance, ninety degrees or to an extent sufficient to throw the cord of the elbow pulleys C^x .

The arm C is preferably hollow, provided with a swivel c , and contains a cord tension spring c^x , the office of which is to keep the solid and the hollow parts which together compose the arm pressed apart a distance sufficient to take up any slack of the cord occasioned by a change of position of the parts.

The spring c^x is to the foregoing end preferably made adjustable by having one of its extremities connected with a sliding plate c^2

which can be clamped against the interior surfaces of the hollow arm C, by a clamp screw c^3 passing through a longitudinally extending slot c^4 in the arm and through a sliding keeper c^5 travelling on the exterior surfaces of the arm.

The forearm G, which is hinged to the outer end of the arm C, may, if desired, be made in the manner represented in Fig. 7, that is to say of a solid part g and a hollow part g^x , the outer extremity of which hollow part has one or more slits g' and is externally threaded to carry an internally-threaded tightening collar g^2 , the office of which is to tighten the grip of the hollow member upon the solid member and regulate the ease with which the parts swivel.

J is the wrist piece, herein termed the wrist, or member pivoted to the outer extremity of the forearm, being preferably a solid arm provided with a swivel j and terminating at its outer extremity in the fork J^x to which the hand piece I is connected.

The joint between the forearm and the wrist is called the wrist joint, and is of the following construction:— k is a pivot pin between the outer extremity of the forearm and the inner extremity of the wrist. This pin extends upon each side beyond the wrist and forearm, which at their jointed extremities are, as shown, preferably oppositely dressed off, countersunk or flattened so as to lie snugly against each other, and not exceed the breadth of either member at a point remote from the joint and it is as to its respective extended extremities equipped with a pair of oppositely disposed pivoted plates which I term the pulley carriers K, and which are each formed as a flat elongated plate or side bar lying respectively against the opposite outer sides of the forearm and wrist in the region of their overlap or joint, and being each of sufficient length to be each provided with two wrist pulleys K^x applied upon their outer sides at equal distances beyond their pivots. Each pair of the said pulleys, that is to say each two pulleys applied to a particular carrier, is so mounted that the peripheries of said pair of pulleys are almost in contact, so as to barely admit of the introduction of the operating cord O between them. It is obvious that, each of these carriers being capable of rotation about a common pivot pin k which is at the same time the pivot of the wrist joint or joint between the forearm and wrist, and the pulleys with which each carrier is provided being of such diameter as to bring their peripheries in the region of their apposition in practical alignment beyond said pivot pin,—the doubled cord which passes over the driving wheel of the hand piece and between the respective pairs of pulleys, will at the central point of its tangency with either pulley of either pair be supported in line beyond the pivot pin k , so that no strain can be put upon the cord whatever be the angle which the wrist assumes with respect to the forearm.

It is, therefore, apparent that the wrist joint as an entirety is one of extreme flexibility, its pulleys, while capable of being placed in almost any position—instances of which are represented in Figs. 12 to 15,—under the varying disposition of the parts, necessarily accommodating themselves, in any possible position, so as to support the cord in such manner that when bent its bent portion centers itself, so to speak, with respect to the pivot pin of the joint, with the result that no extreme tension can be put upon said cord but that perfect accommodation and ease of movement must be secured for it in any possible position of the parts,—and this notwithstanding such movement of the fork carrying the hand piece about its swivel as is likely to happen in the use of the tool.

The fork J^* terminates in hubs j^* , each of which is internally threaded to contain an externally-threaded cone bearing L adapted to be respectively adjusted within said heads and when adjusted to journal the driving wheel M of the hand piece (preferably formed of rubber) which contains a fixed conically-ended steel bushing m taking its bearing upon the said cone bearings L . Each of the cone bearings is, as stated, adjustable and can be locked in any adjusted position either by means of a lock nut l or a set screw l^* , key, or other preferred contrivance.

P is a wheel guard, being a dish-shaped or walled device for protecting the hand of the operator from the wheel. It is provided with a hollow sleeve p by means of which is applied to and secured upon the hand piece I .

Such being a description of a dental engine embodying my improvements, its operation will from the foregoing description have been sufficiently understood, while its advantages will be apparent to those familiar with the use of such engines as are now in the market. Suffice it to add that the engine when out of use can be folded to occupy but little space, while, when in use, the weight of the arm, fore-arm, and wrist, is practically taken off the hand piece by the action of the balance spring; while, again, the construction of the elbow joint prevents a backward flexure sufficient to unseat the cord from the elbow pulleys; and while, finally, the disposition of the elbow and wrist pulleys is such that the cord falls directly in line with the driving wheel and is invariably presented to said wheel at a practically uniform tension and without the liability of either slipping or binding.

Having thus described my invention, I claim:—

1. In a dental engine, the combination of a standard or kindred support,—a spiral balance spring encircling, and connected at its

lower extremity with, said standard or support,—a rotatable pulley head applied to said standard or support,—an arm pivoted to said pulley head,—and slotted keepers applied to said arm for connection with the upper extremity of the balance spring, substantially as set forth.

2. The combination of a standard or support, a spiral balance spring coiled directly around said standard and expansible thereon, a rotatable pulley head upon said standard, an arm pivoted to said pulley head and extending to the rear of its pivot, means, essentially such as set forth, for connecting the upper extremity of the balance spring with the arm to the rear of the pivot, a rotatable collar with which said spring is at its lower extremity connected, and means for maintaining the collar in given adjusted positions, substantially as set forth.

3. A joint for a dental engine composed of two arms or members pivoted together, and of two pivoted carriers each provided with a pair of pulleys, substantially as set forth.

4. In a dental engine, an arm or wrist, a hand piece swivelled with respect to said arm or wrist, a fore-arm pivoted to said arm or wrist by a pivot pin, two carriers each provided with a pair of pulleys and pivoted upon said pivot pin, an arm hinged to said fore-arm, and a balance spring for supporting said arm with respect to a standard or other support for a pulley head, and a pulley head with respect to which said arm is at its upper extremity pivoted, substantially as set forth.

5. In a dental engine, a driving wheel having a conically ended bushing, in combination with a fork, to which the hand piece is connected, the hubs of which are internally threaded to contain externally-threaded conically-ended bearings adapted to the bushing of said wheel, substantially as set forth.

6. In a dental engine, a two-part extensible arm containing an adjustable spiral spring for extending the parts of said arm one of which is slotted as set forth, in combination with a sliding plate, sliding keeper, and uniting clamp screw, for adjusting the tension of said spring, substantially as set forth.

7. In a dental engine, the combination, of a driven band wheel, a foot pedal provided with castors and a swivel, and a connecting rod applied to said swivel, substantially as shown and described.

In Testimony Whereof I have hereunto signed my name this 29th, day of October, A. D., 1886

HENRY C REGISTER,

In the presence of

J BONSALL TAYLOR

F. NORMAN DIXON.