

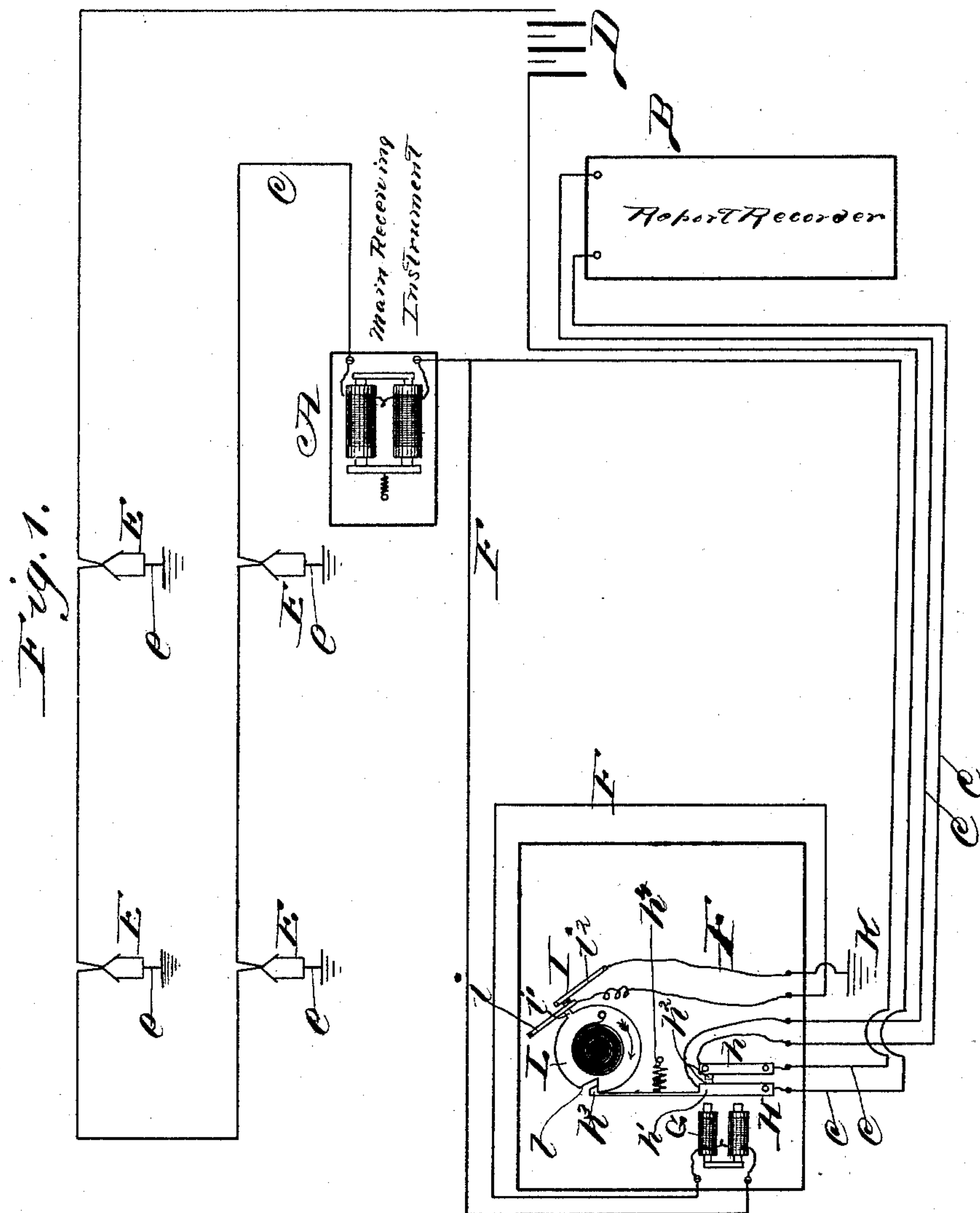
(No Model.)

5 Sheets—Sheet 1.

C. A. ROLFE.
POLICE TELEGRAPH SYSTEM.

No. 483,768.

Patented Oct. 4, 1892.



Witnesses
W. H. Middleton
Reta M. Wagner

Inventor
Charles A. Rolfe
By *Chas. G. Page*
Atty

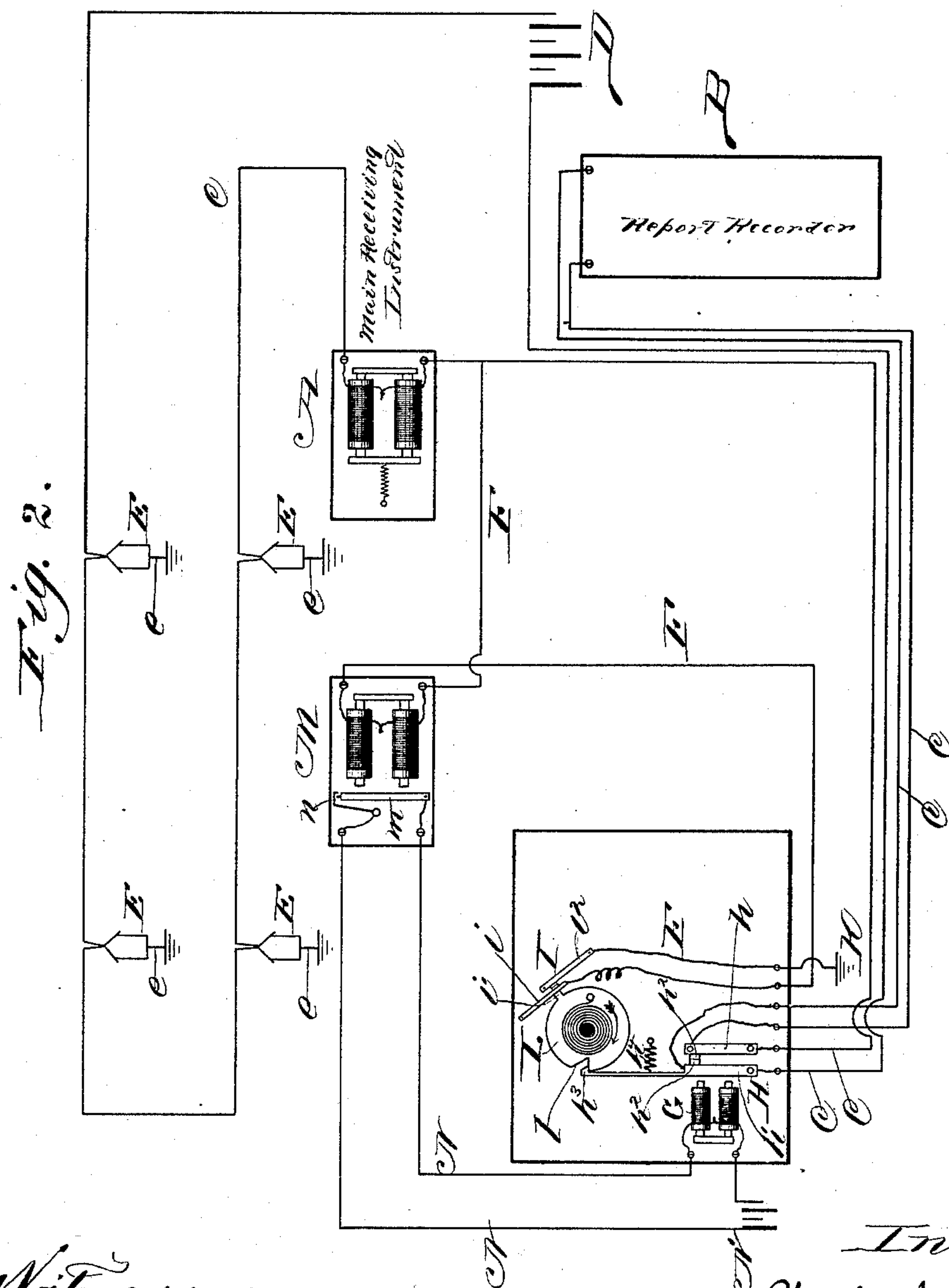
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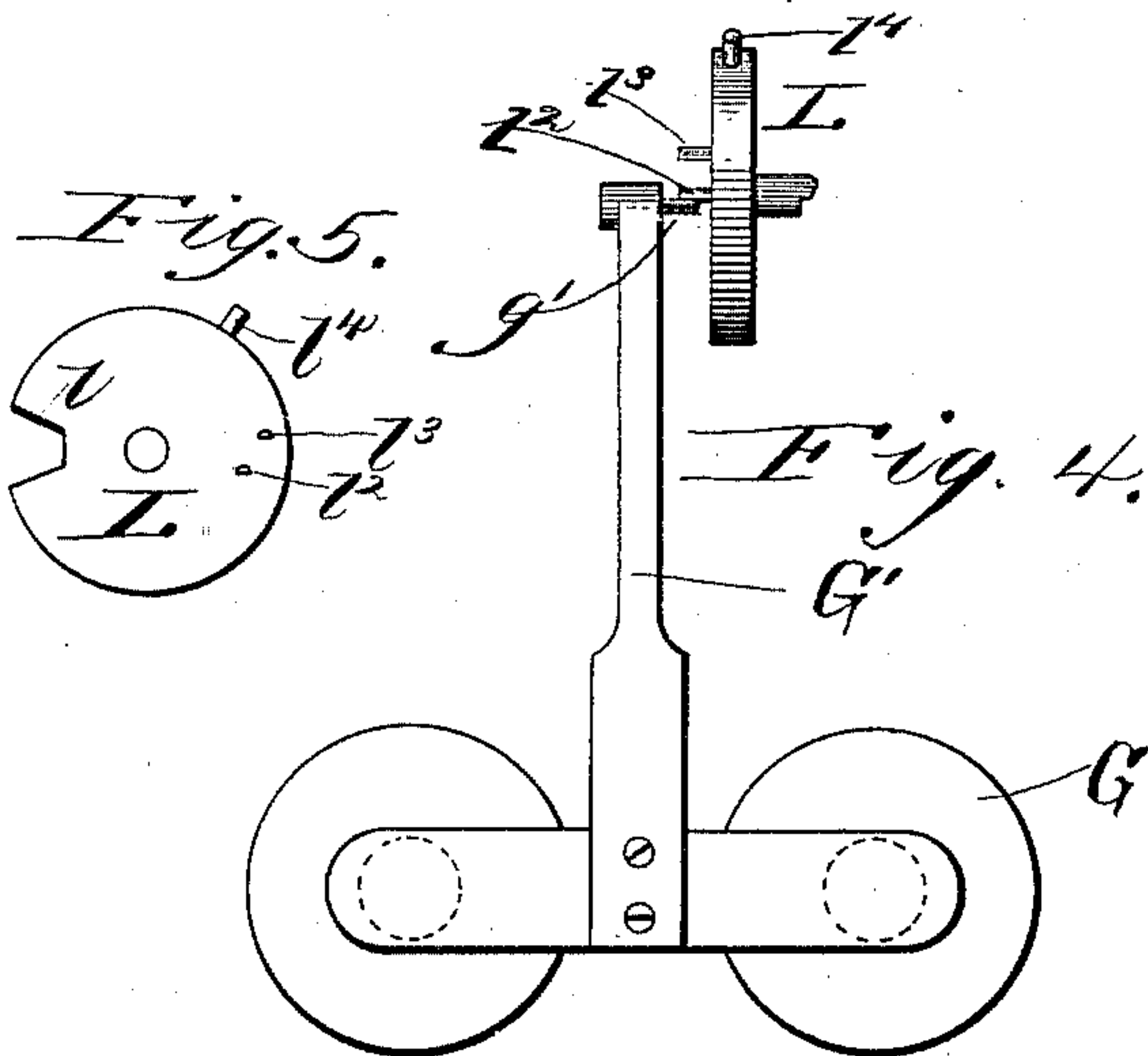
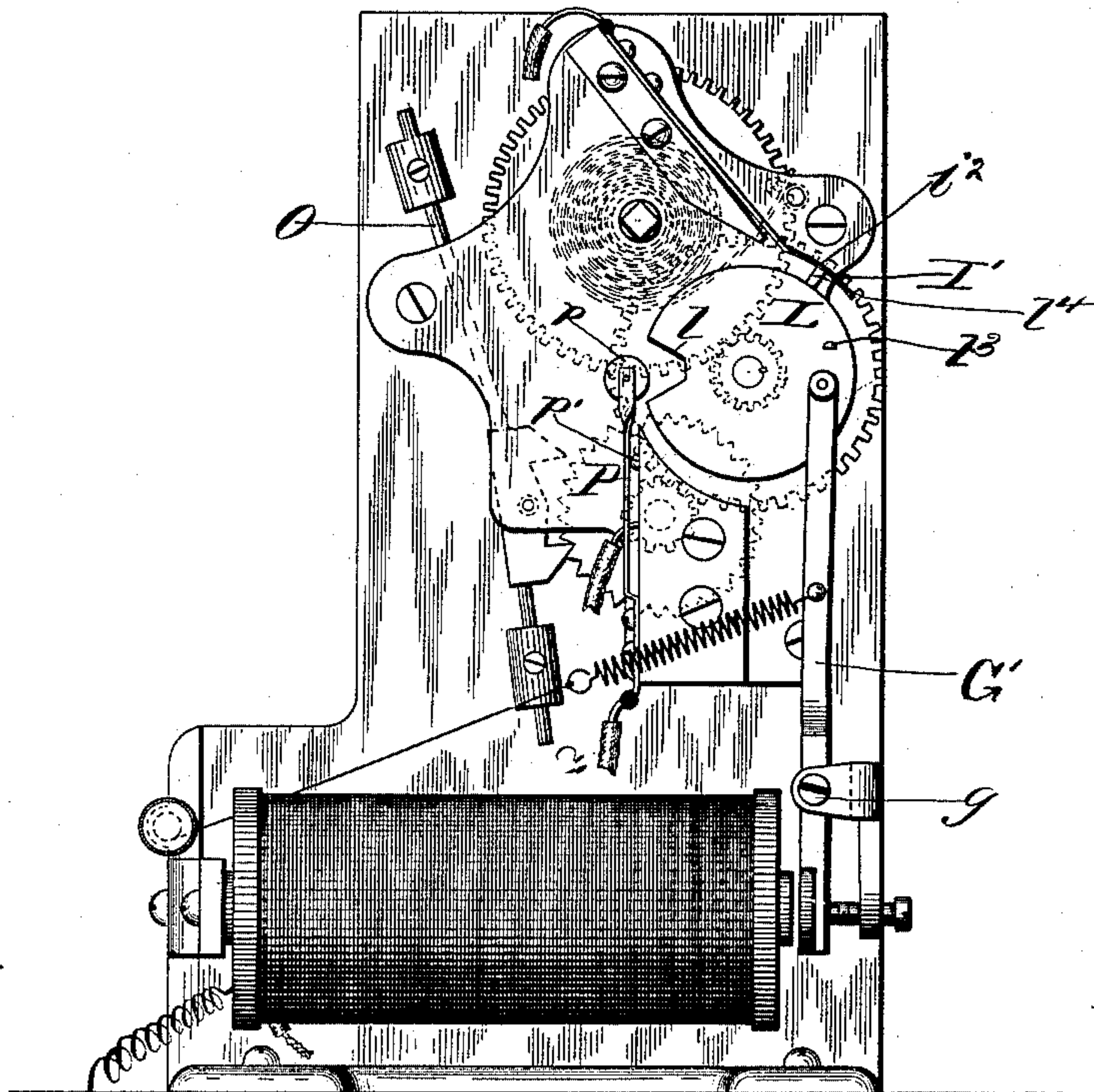
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Fig. 3.



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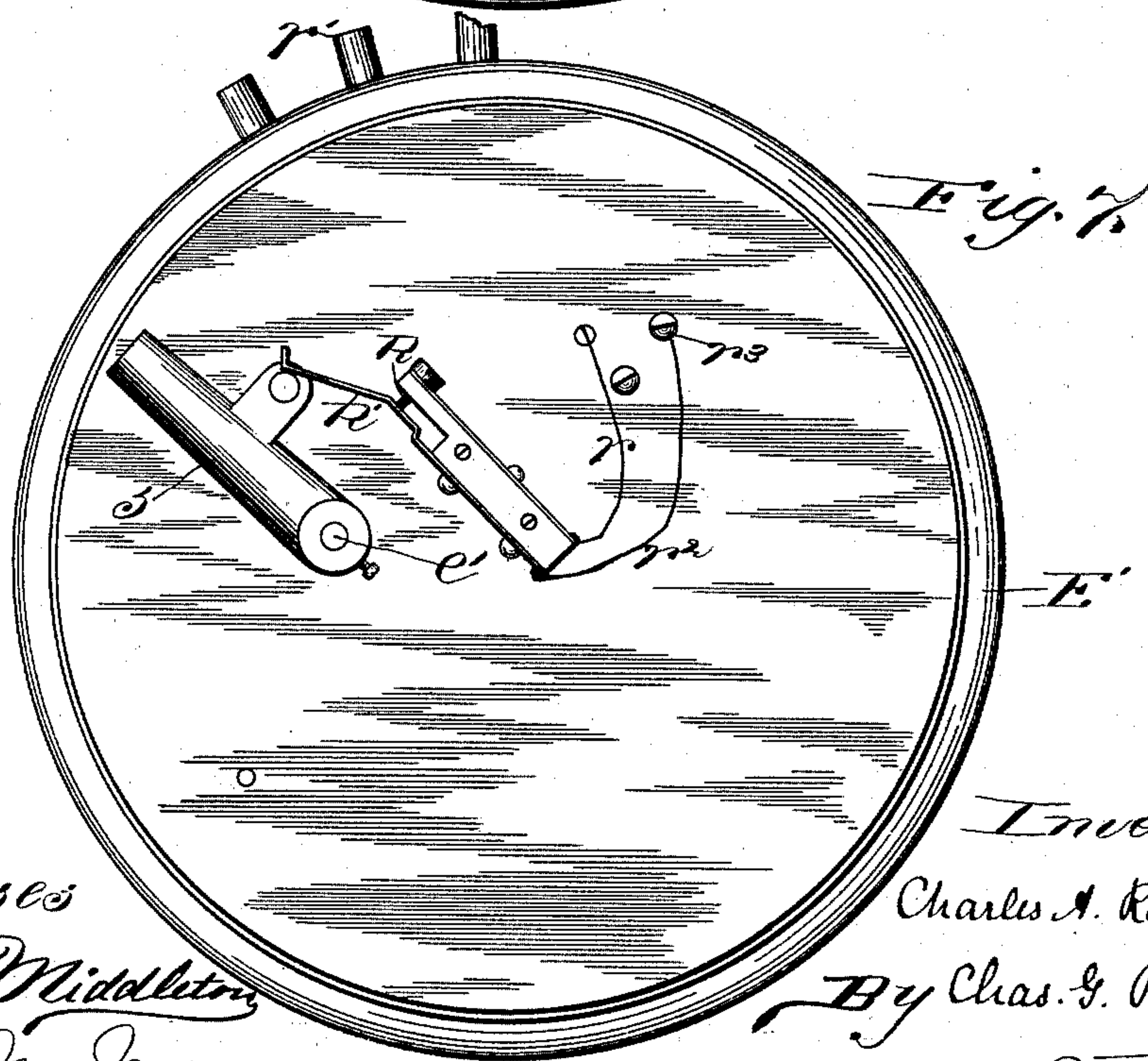
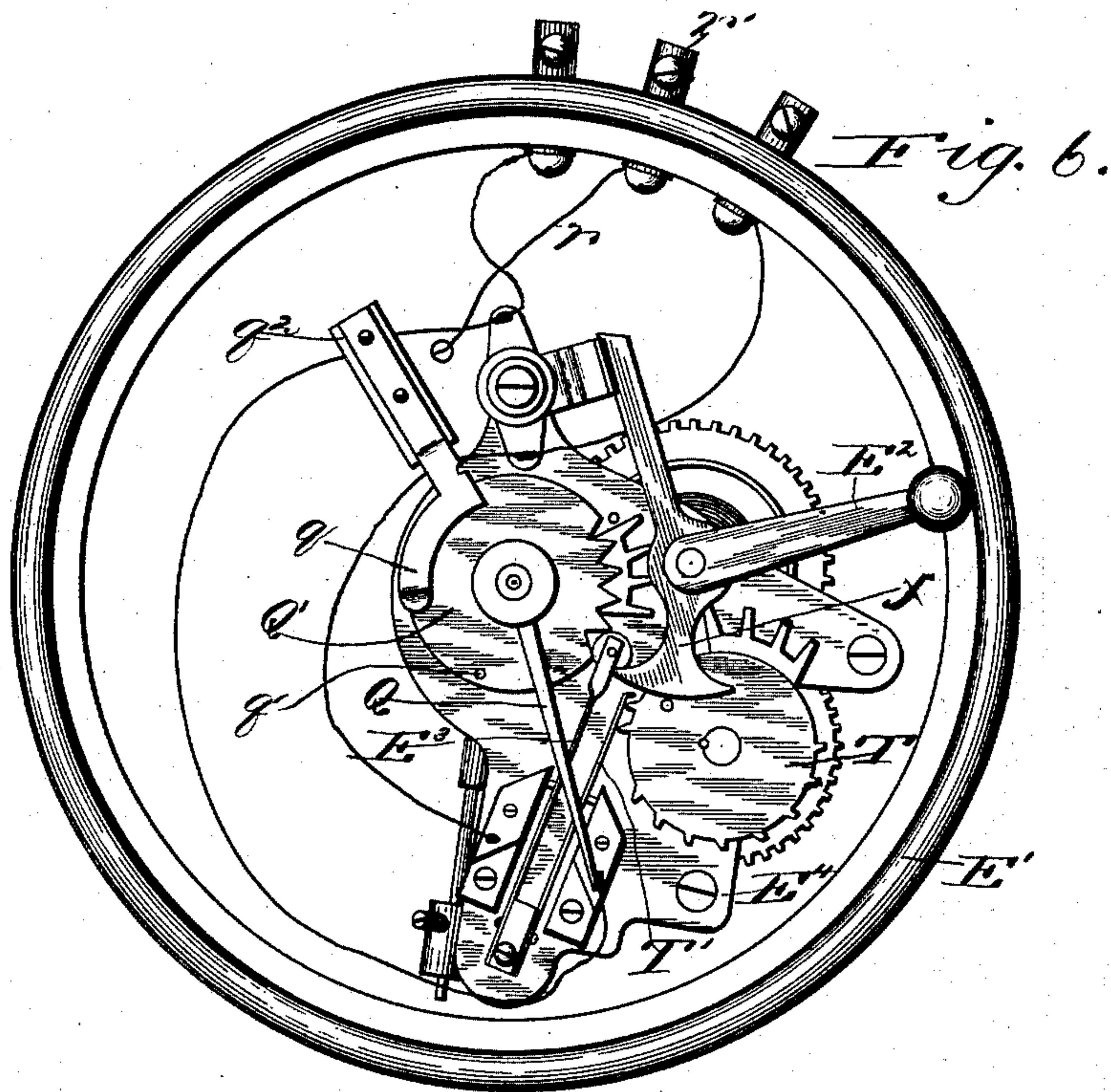
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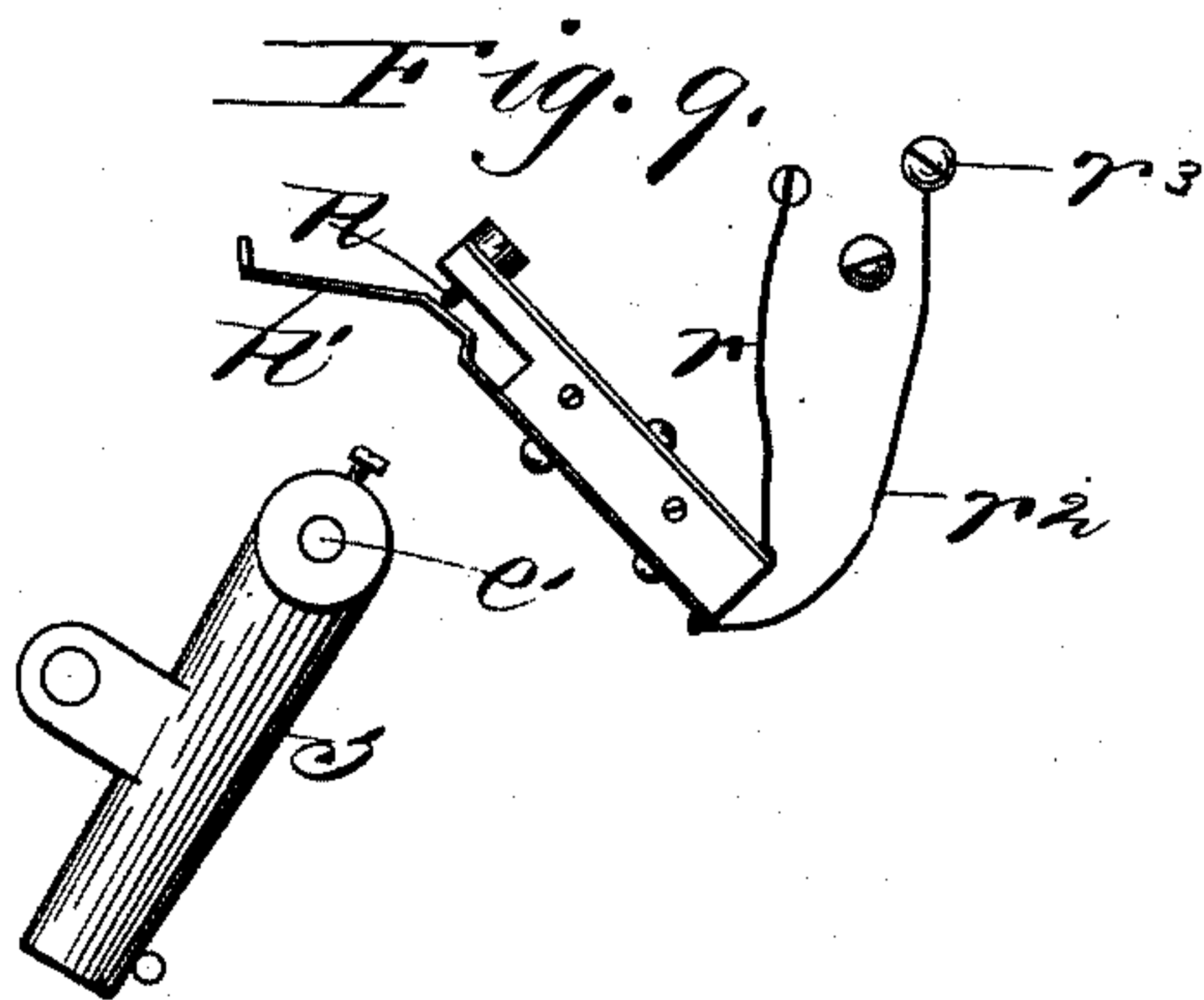
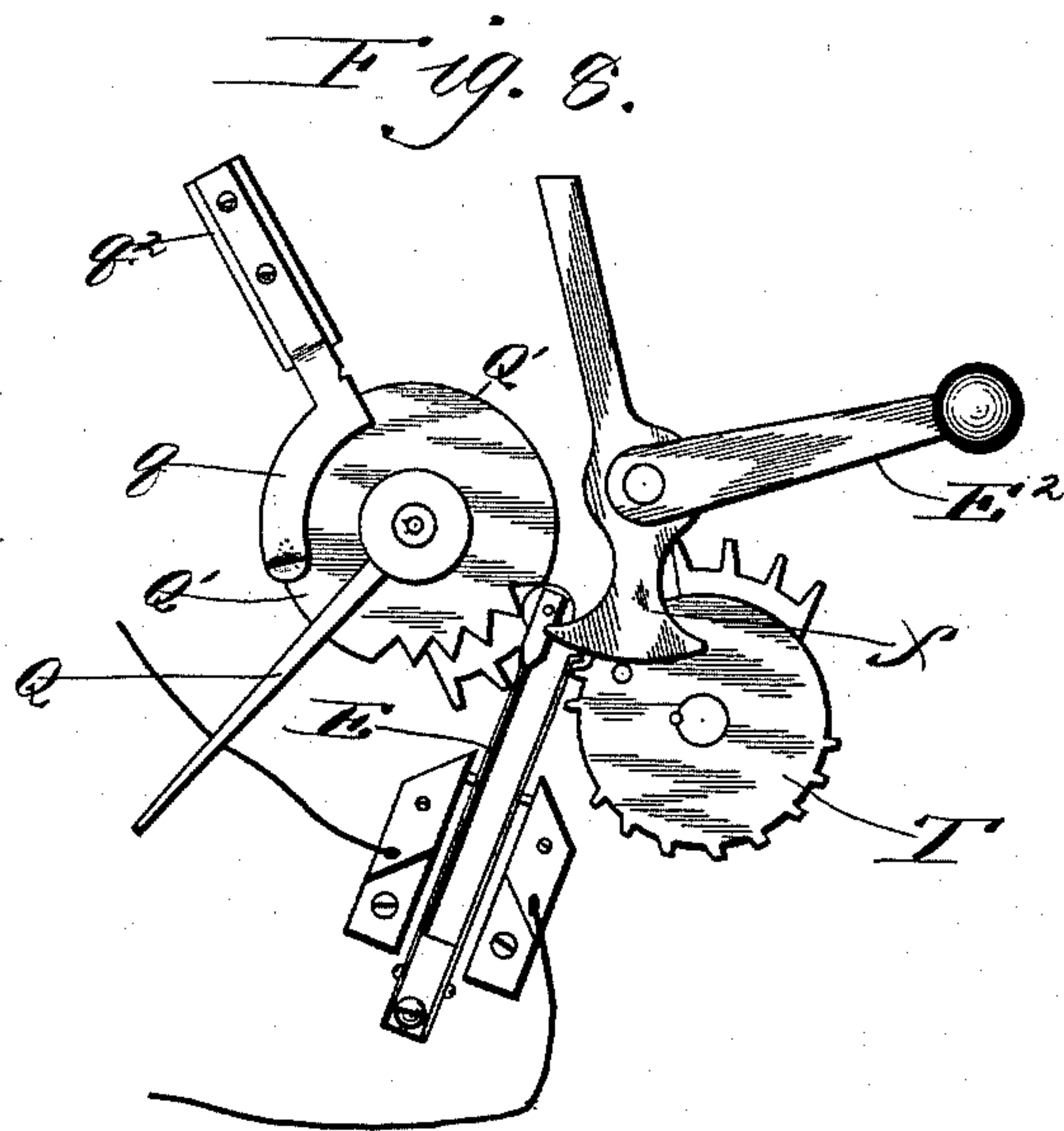
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5 Sheets—Sheet 5.

C. A. ROLFE.
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No. 483,768.

Patented Oct. 4, 1892.



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UNITED STATES PATENT OFFICE.

CHARLES A. ROLFE, OF CHICAGO, ILLINOIS.

POLICE-TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 483,768, dated October 4, 1892.

Application filed May 6, 1892. Serial No. 432,034. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. ROLFE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Police-Telegraph Systems, of which the following is a specification.

Prior to my invention it has been customary in arranging and operating police-telegraph systems to provide at the main office or receiving-station an instrument for receiving or receiving and registering the various calls and reports from the several transmitting boxes or instruments included in its circuit and to place such receiving or receiving and registering instrument under the control or supervision of a subordinate whose duty, as a rule, includes the entering up in a record-book of the times at which the officers in making their allotted rounds or beats send in their reports from the transmitting-boxes. This arrangement is, however, open to the objection that by collusion with the attendant in charge of the receiving-instrument the officers may and frequently do shirk their duty and neglect to send in reports from certain boxes at required times. The object of my invention is to render such collusion between the officers and attendant impracticable or of no avail, and to provide means whereby any irregularity or neglect on the part of the officers in sending in their reports can be readily detected by the chief or officer in charge of the main station.

To the attainment of such end, my invention contemplates the employment of a separate report-recording instrument in connection with any ordinary or suitable police-telegraph system and the provision of means for cutting out or shunting such report-recorder from the main-line circuit, except at the times when reports are sent in from the transmitting-instruments. In this way the report-recorder can be kept under lock and key and the fact that each report must be received and recorded by the report-recorder will render unavailable any attempt at collusion between the officer and an attendant, who, although in charge of the main receiving-instrument, is denied access to the special report-recorder.

As a simple, reliable, and effective arrangement for cutting out or shunting the report-

recorder from the main line, except at the times when reports are sent in from the signal-sending boxes, I provide the main line with normally-open ground branches at the several signal-sending boxes and with a normally-closed ground branch at the receiving-station, and normally cut-out or shunt the report-recorder by an automatic shunt device, which operates to place the report-recorder in the main-line circuit when, as a result of closing the ground branch at any one of the signal-sending boxes, a current or impulse is directed over the ground branch at the receiving-station.

As a step preliminary to the sending in of a report from any one of the signal-sending boxes, the main line is grounded at such point, whereupon a current will be established or impulse made over the normally-closed ground at the receiving-station, and the shunt device, which is subject to or controlled by such current or impulse, will be operated so as to place the report-recorder in the main-line circuit, and thus permit it to receive and record the report transmitted from the signal-sending box. The shunt device is held in position to keep the report-recorder in circuit until the report has been made, and upon the termination of such service the shunt device is automatically restored to its normal position, so as to again cut out or shunt the report-recorder. I also provide means whereby the ground must be put on and taken off at each signal-box preparatory to the transmission of a report therefrom, and also provide means whereby after the report-recorder has been placed in the main-line circuit, as aforesaid, it will be so maintained for a period proportional to any delay on the part of an officer in sending in his report, as hereinafter more fully explained.

In the accompanying drawings, Figure 1 is a diagrammatic representation of a police-telegraph system embodying the principle of my invention, the magnet of the shunt-relay being arranged directly in the ground branch or connection at the receiving-station. Fig. 2 is a like view, the magnet for the shunt-relay being, however, arranged in a local-battery circuit which is closed by a relay arranged in the ground branch or connection at the receiving-station. Fig. 3 represents in eleva-

tion an automatic shunt device embodying my invention. Fig. 4 represents the armature-lever and rotary cam of the preceding figure. Fig. 5 shows the said rotary cam. Fig. 6 is a front view of a signal-transmitting box or instrument embodying means for grounding the main line preliminary to the sending in of a report in accordance with my invention. Fig. 7 is a rear view of said box. Fig. 8 is a view showing certain of the members of Fig. 6 and illustrating the pointer in position to establish connection between the main line and ground. Fig. 9 shows the make-and-break device and vibratory arm of Fig. 7, with the arm in position to allow the make-and-break device to open.

The conventionally-illustrated main receiving or registering instrument A is understood to be arranged at the main or police station and may be of any ordinary or suitable construction, it being observed, however, that its service as a means for receiving and indicating reports of officers from the several street signal-boxes is dispensed with or supplemented by the special service of a separately-arranged report-recorder, indicated at B and of any suitable construction adapting it for receiving and recording such reports.

The main line C, herein illustrated, includes the main receiving or registering instrument A, the main battery D (or equivalent source of electrical supply) the several signal-transmitting boxes or mechanisms respectively located at the several street-sentry booths or boxes E, the report-recorder B, and a shunt device H, by which the current over the main line is short-circuited, so as to normally cut out or shunt the report-recorder.

The ground branches e at the signal-sending boxes are understood to be normally off, and to be closed only in the event of the sending in of an officer's report. The ground branch F at the main or receiving station is normally closed, and includes in Fig. 1 the magnet of a relay G for actuating the shunt device H, and a normally-closed make-and-break device I, shown arranged between the "shunt-relay" (as I may term it) and the ground K. When, therefore, the main line is grounded at one of the signal-sending boxes, there will be an impulse over the closed ground branch F at the receiving-station, and this will energize the magnet of the shunt-relay, so as to cause the shunt to operate in a way to place the report-recorder B in circuit with the main line.

As explanatory of the operation of the automatic shunt device diagrammatically illustrated in Fig. 1, said shunt device comprises a couple of conducting members h and h' so arranged and connected up in the main line that when they are closed or in electrical contact with one another the main-line current will be short-circuited at such point and the report-recorder will be cut out or shunted from the main line. To such end, therefore, the shunt members are provided with con-

tacts h^2 , which are brought together to short-circuit the main-line current and thereby cut out or shunt the report-recorder B, and which are separated from one another in order to place the report-recorder in the main-line circuit. The separation of the shunt members is effected when the shunt-magnet G is energized by an impulse over the ground branch F at the receiving-station, and to such end the shunt member h' is movably supported and arranged to operate as the armature for said magnet. When, therefore, the shunt-magnet is thus energized, it will attract and draw the shunt member h' away from its companion shunt member h , thereby breaking the short-circuit connection at contacts h^2 and placing the report-recorder in the main-line circuit.

In order to hold the shunt-contacts h^2 apart or open during the period required for transmitting a report-signal from any one of the signal-sending boxes, I provide a rotary cam L, consisting of a notched wheel or disk which is subject to any suitable arrangement of spring-actuated gear-train and normally locked by a catch h^3 on the movable shunt member. When the shunt-contacts are closed, the catch will engage in the notch l of rotary cam, and thereby lock the same. As a result, however, of a momentary energization of the shunt-relay magnet and consequent attraction of the movable shunt member the catch h^3 will be freed from its aforesaid positive engagement with the rotary cam or stop, which latter will thereupon be permitted to turn and carry its notch out of register with the catch. The shunt-contacts cannot therefore again close until the rotary cam has made a revolution and again brought its notch into register with the catch for the reason that although the energization of the shunt-relay magnet and its attraction of the movable shunt member may be only momentary the catch will bear against the perimeter of the rotary cam during the revolution of the latter, and thus prevent the movable shunt member from resuming its normal closed position until the notch in the cam is again in register with the catch. As soon, however, as the notch is again in register with the catch the action of a spring h^4 , tending to normally close the shunt-contacts, will cause the catch to fall back into the notch, and thereby permit the movable shunt member h' to again close upon the stationary shunt member h . In order to attain the best results, I also provide for a rotary cam or cam-stop, which operates in unison with the rotary cam L and serves to open or permit the opening of the make-and-break device I when the shunt-contacts are separated and close or permit the closing of such make-and-break device when the shunt-contacts are closed. As a simple expedient for such purpose I provide the cam wheel or disk L with a peripherally-arranged projection i' , which engages and holds a movable spring member i of the make-and-break device in contact with the stationary member

2² of said device when the said cam wheel or disk is locked by the shunt device. When the cam wheel or disk is released by the catch h^3 , it will rotate in the direction of the arrow and in so doing will liberate the make-and-break device, and thus permit the same to open and break circuit through the ground branch or connection F. Upon the completion of the revolution of the cam wheel or disk the projection thereon will again engage the make-and-break device, and thereby close the same, in which way the ground branch will again be closed and will so remain until the next operation of the shunt device. The period required for a revolution on the part of the rotary cam or cam-wheel is timed with reference to the time required for sending in a report, and during such period the shunt-contacts are separated, so as to place the report-recorder in circuit to receive the report, and the grounds at the transmitting-instrument in service and at the receiving-station are both off or open, it being observed that the ground at the transmitting-instrument is closed only as a preliminary to the sending in of the report, and opened prior to the transmission of such report, as hereinafter more fully explained.

Thus far I have described the system as involving a shunt-relay which is directly controlled by a current or impulse over the ground branch at the receiving-station. I may, however, and in practice prefer to control the shunt-relay from a current or impulse over such ground branch or connection indirectly through the medium of a local-battery circuit, as illustrated in Fig. 2, wherein the parts which correspond with those found in Fig. 1 are correspondingly lettered, and need not therefore be particularly described. In said Fig. 2 the ground branch F includes the magnet of a relay M, which is employed to close a local-battery circuit N as the result of an impulse or current over the ground branch, and the magnet of the shunt-relay G is included in this local-battery circuit. The local-battery circuit is illustrated as also comprising a local battery N', a contact n , and one end of the vibratory armature m of the local-battery relay M. When, therefore, the main line is grounded at one of the signal-sending boxes or instruments, the consequent impulse over the ground branch F at the receiving-station will energize the magnet of the local-battery-circuit relay M, which will thereupon attract its armature and close such local-battery circuit. Thereupon the magnet of the shunt-relay G will become energized and attract the movable member of the shunt device, so as to separate the shunt-contacts for the purpose hereinbefore described. The further operation is the same as that described in connection with Fig. 1, and need not therefore be repeated. It is obvious that in both arrangements the shunt device is subject to and primarily operated by a current or impulse over the ground branch at the receiving-station,

the magnet of relay G, which comprises as its armature the movable shunt member, being in one arrangement placed directly in such ground branch and in the other arrangement placed in a local-battery circuit which is closed by reason of an impulse or current over said ground branch.

For the broader purposes of my invention I may employ any suitable construction of shunting mechanism which normally shunts the report-recorder and which automatically places the report-recorder in circuit to receive a report as a result of an impulse over the ground connection at the receiving-station, and hence I do not limit myself to the particular construction diagrammatically illustrated in Figs. 1 and 2. As a matter of further improvement, however, I have shown in Figs. 3 and 4 a construction of shunting mechanism particularly adapted for my purpose and generally corresponding with the means illustrated in Figs. 1 and 2. In said Figs. 3 and 4 the cam or cam wheel or disk L is revolved by the action of a spring-actuated train of gearing, which is properly timed by an escapement O. In place, however, of locking the cam L by a catch upon one of the shunt members or contacts, as hereinbefore described, I lock and release the cam by the vibratory armature-lever G', which is employed in conjunction with the magnet of the shunt-relay G. To such end, therefore, the armature-lever is pivoted at g and provided on its upper end with a stud g' , arranged to engage a corresponding stud l^2 on one side of the cam when the armature-lever is unattracted and in its normal position. When the armature-lever is attracted by its allotted magnet, it will release the cam, which latter will thereupon commence to turn. It may happen, however, that the officer who is about to send in his report carelessly prolongs the closing of the ground branch at the box and delays the transmission of the report-signals, and in such case the cam L might complete or nearly complete its rotation before the transmission or completion of the transmission of the report. To avoid such accident, I provide the cam with a second stud l^3 , which is arranged adjacent to the stud g' , but at a greater radius from the center or axis of the cam, as best shown in Fig. 5. The attraction of the armature-lever G' by the magnet releases its stud g' from engagement with stud l^2 on the cam, but places its said stud g' in the path of stud l^3 on said cam. Should, therefore, the ground be held on at the signal-sending box, the cam can make only a partial turn, since its movement will be arrested by reason of its stud l^3 engaging stud l^2 upon the armature-lever. The moment, however, the ground branch at the signal-sending box is opened the armature-lever will be released by its magnet and will drop back to its normal position, and in so doing will release the stud l^3 on the cam and allow the latter to continue and complete its allotted rotation. If, how-

ever, the ground at the signal-sending station is put on and taken off so as to simply cause an impulse through the ground branch at the receiving-station, the momentary attraction and subsequent release of the armature-lever G' will cause it to first release the stud l^2 on the cam, so as to permit the latter to commence its rotation, and then permit said armature-lever to fall back to its normal position in time to avoid engagement with the second stop or stud l^3 on the cam, which latter will complete its rotation without the hereinbefore-described preliminary interruption.

The cam L is shown provided with a notch l , but in place of providing one of the shunt-contacts upon the armature-lever, as in Figs. 1 and 2, I provide a separately-arranged spring contact-piece P , which is utilized as one of the shunt-contacts. With this arrangement the spring-body of the contact-piece can be in connection with the main line and its end p , which is to be engaged by the cam can consist of a small roller. When the cam is in position to permit the armature lever stud or stop g' to engage the stud or stop l^2 on the cam, the notch or low portion l of the cam will be opposite the end of the spring shunt-contact piece P , and will allow said contact-piece to close upon the remaining stationary shunt-contact p' , which latter is also understood to be connected up in the main line. When the armature-lever G' is attracted and stud l^2 on the cam released, the cam will turn so as to carry its low portion out of register with the end of the spring contact-piece O and bring its high or unnotched peripheral portion in engagement with said contact-piece, so as to force the latter out of contact with the stationary shunt-contact p' . Should any delay occur in taking off the ground at the signal-sending box, the cam will be arrested by reason of the engagement of its second stop l^3 with the armature-lever, but such stop will not take place until the cam is in position to hold the spring contact-piece P out of engagement with the remaining shunt-contact p' . The principle involved in connecting up these contacts P and p' in the main line and their service in the system herein involved will be fully understood by the description of the corresponding contacts h^2 in Figs. 1 and 2, it being observed that I do not limit myself to any particular arrangement of wiring so long as the principle herein involved is adhered to.

The make-and-break device I' in Fig. 3 corresponds in function and purpose with the make-and-break device I in previous figures herein illustrated and comprises a single spring member i^2 , which is at one end connected with the earth branch F and its other end connected with the earth branch through the cam and frame when a stud l^4 on the cam is in contact with its said end. With such arrangement the stud l^4 will engage the spring contact-piece i^2 when the cam is locked, as in Fig. 3, and in such case the roller p on the

spring shunt-contact piece P will be of insulating material or properly insulated from the body of said contact-piece. The stud l^4 is therefore in normal engagement with the spring contact-piece of the make-and-break device I , so as to normally close the ground branch at the receiving-station, while on the other hand, during the main portion of each revolution on the part of the cam L , its stud l^4 will be out of engagement with the spring contact-piece i^2 , so as to open said ground branch at the receiving-station.

Referring now to the last four figures of the drawings, E' indicates the casing of one of the signal-sending boxes, and E^2 the crank-lever, which is to be operated for the purpose of sending in a report or signal. This crank-lever is subject to a spring-actuated train and is to be given a partial turn against the resistance of the winding-spring employed, so that when the crank-lever is released it will be turned back to its normal position by the action of the spring-actuated gearing or clock mechanism, as is usual in signal-sending instruments. The dial-pointer Q is fixed upon the arbor of a toothed wheel Q' , and is understood to move over the face of an ordinary dial provided with designations of the several signals, so that after the pointer has been placed opposite some one call or signal designation on the dial the subsequent return rotation of the toothed wheel will, while carrying the pointer back to its first position, also cause the make-and-break device E^3 to operate with a series of actions proportional in number to the number of teeth on the wheel which were carried past the make-and-break device in setting the pointer, as usual. In connection with such arrangement I contemplate arranging the report-designation on the dial, so that in order to bring the pointer in register therewith said pointer must be turned forward to the end of its allotted forward movement, and with such arrangement I provide for closing the ground branch at the signal-box when the pointer is thus brought opposite the report-designation on the dial. To such end, I provide in the ground branch at the signal-sending box a spring-contact q , supported within the case, and a contact q' , arranged upon the wheel Q' , so that when the latter is brought into position to place the pointer opposite the report-designation on the dial said two contacts will come together, and thereby close the ground branch.

At the back of the box or case E' , I provide a couple of contacts R R' , which are also arranged in the ground branch, the wire r , in connection with contact R , being carried through the back of the case, so as to connect with the binding-post r' , while, on the other hand, the wire r^2 , from the contact R' , is understood to connect with a metallic support q^2 for the contact q within the case by means of any suitable connection at r^3 , Fig. 7, through the back of said case. The contacts q q' , Fig. 6, are normally open, and the con-

tacts R R', Fig. 7, are normally closed—that is to say, when the crank-lever is in its normally-back position, as in Fig. 6, the first-mentioned contacts are open and the second-mentioned contacts are closed. The closing of the contacts R R' is effected by an arm S, arranged at the back of the case and fixed upon the spindle e' of the crank-lever, so that when the latter is in its back position its said arm S will engage the spring-contact R' and hold the same in engagement with the contact R. The remaining portion of the signal-transmitting mechanism is of ordinary construction, and need, therefore, be only incidentally mentioned in describing the service of the foregoing-described two sets of contacts, as follows: Normally the crank-lever E^2 is in its back position and the contacts q and q' are separated or open, as in Fig. 6, and the contacts R R' are closed by the arm S, as in Fig. 7. Preliminarily to sending in his report the officer will turn the index or pointer forward, so as to bring it into the position illustrated in Fig. 8, thereby placing the pointer opposite such report-designation as may be upon the dial and closing the contacts q q' . This therefore closes the ground branch at the signal-sending box and grounds the main line, it being observed that the ground-branch conductor at such juncture may be traced from binding-post r' , through wire r , (within and at the back of the box,) contacts R R', wire r^2 , the contact-support q^2 , Fig. 6, and connection at r^3 , Fig. 7, between the same and the wire r^2 , the contact q , the contact q' , the wheel Q', and the frame E^4 to the main line. Ground connections being thus established between the main line and earth at the signal-sending box, an impulse will necessarily be made over the normally-closed station for the purpose hereinbefore fully described. The officer will then give a partial forward turn to the crank-lever and in so doing will cause the arm S to turn or swing away from the spring-contact R', which latter will thereupon automatically separate from its companion contact R, and thereby again open the ground branch at the signal-sending box. The aforesaid forward turn of the crank-arm also winds up the spring-clock mechanism, which in unwinding controls and causes the back movement of the crank-lever, which returns at a rate of speed governed by the allotted running-down speed of the clock mechanism. During the first portion of the return movement of the crank-lever the wheel Q' remains stationary, and a toothed-wheel T, which operates a make-and-break device T' of the signal mechanism, and which is released by the forward movement of the crank-lever, makes the signal-sending portion of its revolution, and as soon as such portion of the revolution of wheel T is made the wheel Q' commences to revolve, so as to perform its allotted signal-sending work. The completion of a revolution on the part of wheel

T brings a stop thereon in engagement with a stop-arm f on the crank-lever shaft or spindle, and hence arrests such wheel, at which junction the wheel Q' will have completed its partial back rotation and brought its allotted pointer Q also to its back or normal position. The back rotary movement of wheel Q' separates, as a matter of course, the contacts q q' ; but prior to such action the ground branch at the signal-sending box will have been opened by the forward movement of the crank-lever E^2 . Should the reporting officer, after moving the pointer forward so as to close the ground branch at the signal-sending box, delay to "pull" or turn the crank-arm E^2 , his error will be corrected at the receiving-station, whereat, as an incident to this closing the ground branch at the signal-sending box, the armature G', Fig. 3, at the receiving-station will first release cam L, so as to permit the same to separate the contacts and then lock said cam until the officer at the signal-sending box turns forward the crank-lever thereat and breaks the ground connection at such box by causing the arm S to liberate the spring-contact R'. It will also be seen that when the officer turns the crank-lever forward the ground connection at the signal-sending box will be opened by reason of the movement of arm S in a direction away from spring-contact R' in such ground connection, and hence, although the signal-sending wheel Q' may not come into action until after the signal-sending wheel T has performed a portion of its allotted revolution, the fact that the contacts q q' are temporarily closed will make no difference, since the ground connection in which they are included will be opened by the action of arm S and spring-contacts R' the instant the crank-arm is turned forward. I do not limit myself, however, to the particular arrangement of devices shown for opening and closing the ground branch at the signal-sending box, since various arrangements and modifications of the same can be made, as will be obvious to those skilled in the art to which my invention appertains, and obviously different arrangements must also be made to suit different styles of signal-sending mechanisms.

What I claim as my invention is—

1. In a police-telegraph system, the combination of the main line, including a signal-transmitting instrument, a normally-open ground branch thereat, a main receiving-instrument and a normally-closed ground branch at the receiving-station, a report-recorder to receive and record reports separate from the main receiving-instrument, and an automatic shunt device normally shunting the report-recorder from the main-line circuit and comprising a relay, which is operated by a current or impulse over the normally-closed ground branch, so as to place the report-recorder in circuit with the main line when the ground branch at the signal-transmitting instrument

is closed as a preliminary to the sending in of a report therefrom, substantially as described.

2. In a police-telegraph system, the combination of the main line, including a signal-transmitting instrument, a normally-open ground branch thereat, a main receiving-instrument, and a normally-closed ground branch at the receiving-station, a report-recorder to receive and record reports separate from the main receiving-instrument, a local-battery circuit comprising a relay which is operated to close the local-battery circuit by a current or impulse over the normally-closed ground branch, and an automatic shunt device normally shunting the report-recorder from the main-line circuit and comprising a relay, which is arranged in the local-battery circuit and operative to cause the shunt device to place the report-recorder in the main-line circuit when the ground branch at the transmitting-instrument is closed as a preliminary to the sending in of a report, substantially as described.

3. The combination of the main line, including a transmitting-instrument, a normally-open ground thereat, a main receiving-instrument, and a normally-closed ground at the receiving-station, a report-recorder to receive and record reports separate from the main receiving-instrument, an automatic shunt device normally shunting the report-recorder from the main-line circuit and comprising a relay, which is subject to a current or impulse over the normally-closed ground branch and operative to cause the shunt device to place the report-recorder in the main-line circuit, and an automatic make-and-break device arranged in said normally-closed ground branch and operating to open the same when the report-recorder is placed in the main-line circuit, substantially as described.

4. The combination, in a police-telegraph system, of the main line, including a signal-transmitting instrument, a normally-open ground thereat, a main receiving-instrument, and a normally-closed ground branch at the receiving-station, a report-recorder to receive and record reports separate from the main receiving-instrument, a shunt device operating to place the report-recorder when both of said grounds are closed, and a make-and-break device included in the ground branch at the transmitting-instrument and arranged to open the same after said branch has been closed for the purpose of causing the report-recorder to be placed in the main-line circuit, but prior to the transmission of the report, substantially as described.

5. The combination, in a system such as set forth, of the automatic shunt normally

shunting the report-recorder from the main-line circuit and operating to place the report-recorder in said circuit when an impulse or current is induced over the ground branch at the receiving-station, an automatically-actuated cam operating to maintain the shunt device in condition to keep the report-recorder in circuit during the transmission of a report over the main line, and an automatic stop to arrest the cam at the termination of the report, substantially as described.

6. The combination, in a system such as set forth, of the shunt-relay, the shunt-contacts normally shunting the report-recorder from the main line, a rotary cam arranged for holding the shunt-contacts apart during each of its revolutions, and a stop device governed by the shunt-relay and operating to release the rotary cam when its magnet is energized as a result of an impulse over the ground branch at the receiving-station, substantially as described.

7. In a system such as set forth, the combination, with a suitable transmitting-instrument, of a ground branch connected with the main line and comprising a couple of normally-separated contacts, which are closed only by the preliminary action necessary to the transmitting of a report, and a couple of contacts which are normally closed and opened when the instrument is operated for the purpose of transmitting a report or signal, substantially as described.

8. In a system such as set forth, the combination, with a suitable transmitting-instrument, of a ground branch connected with the main line and comprising a couple of normally-separated contacts, which are closed only by the preliminary action necessary to the transmission of a report, and the contacts R R', which are normally closed, and a vibratory arm S, connected with the crank-lever of the instrument and closing said contacts R R' when the crank-lever is in its normal position, substantially as described.

9. The combination of the shunt-contacts, the rotary cam provided with stops and arranged for separating the shunt-contacts for the purpose set forth, and the shunt-relay having its armature arranged to engage one of the cam-stops when said armature is in its normal position and to stand in the path of the remaining cam-stop, so as to engage the same when said armature is attracted by the relay-magnet, substantially as and for the purpose described.

CHARLES A. ROLFE.

Witnesses:

W. D. MIDDLETON,
CHAS. G. PAGE.