

No. 693,390.

Patented Feb. 18, 1902.

F. B. HERZOG.
ELECTRIC SIGNALING APPARATUS.

(Application filed Oct. 19, 1886.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

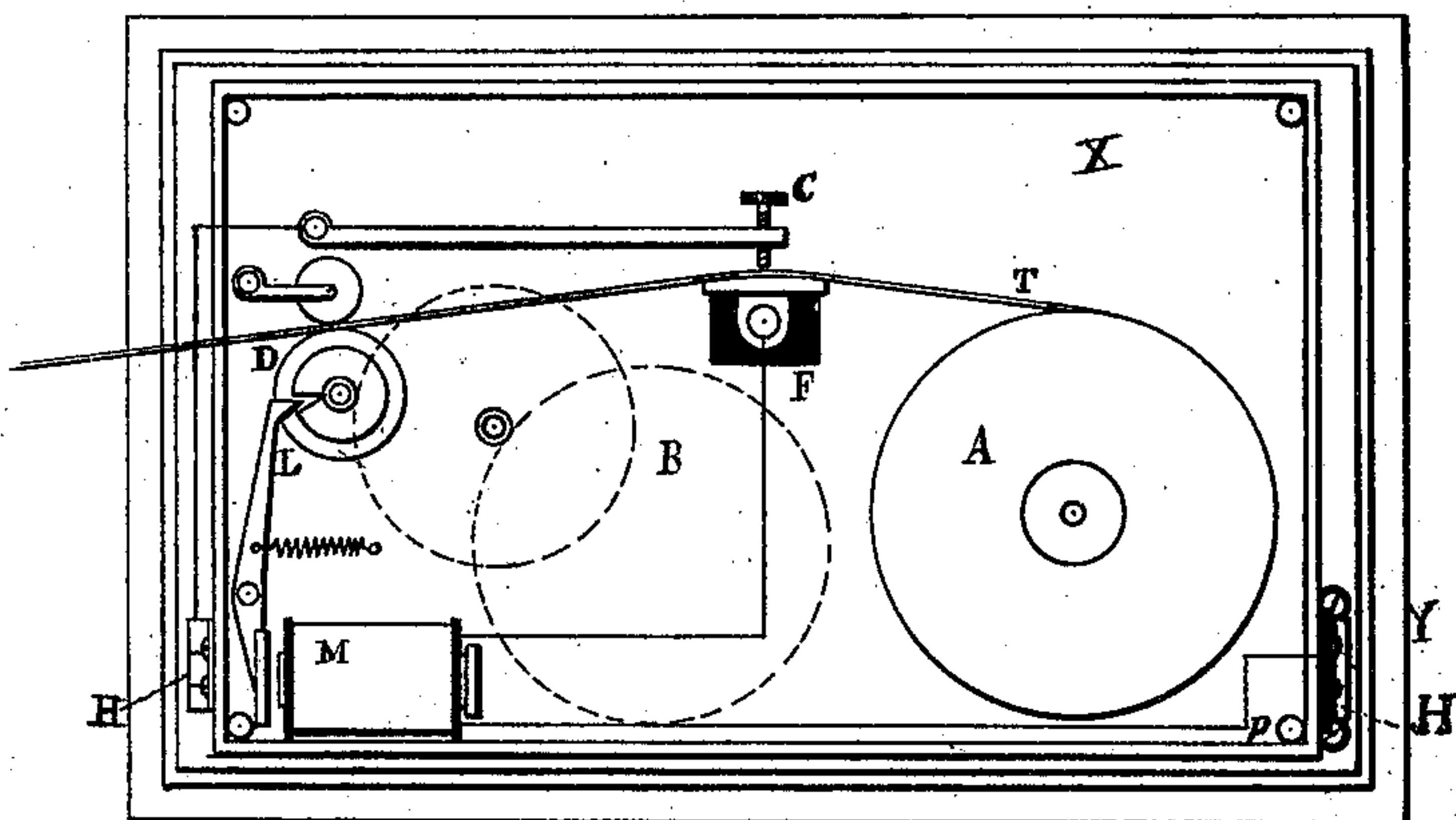


Fig. 2.

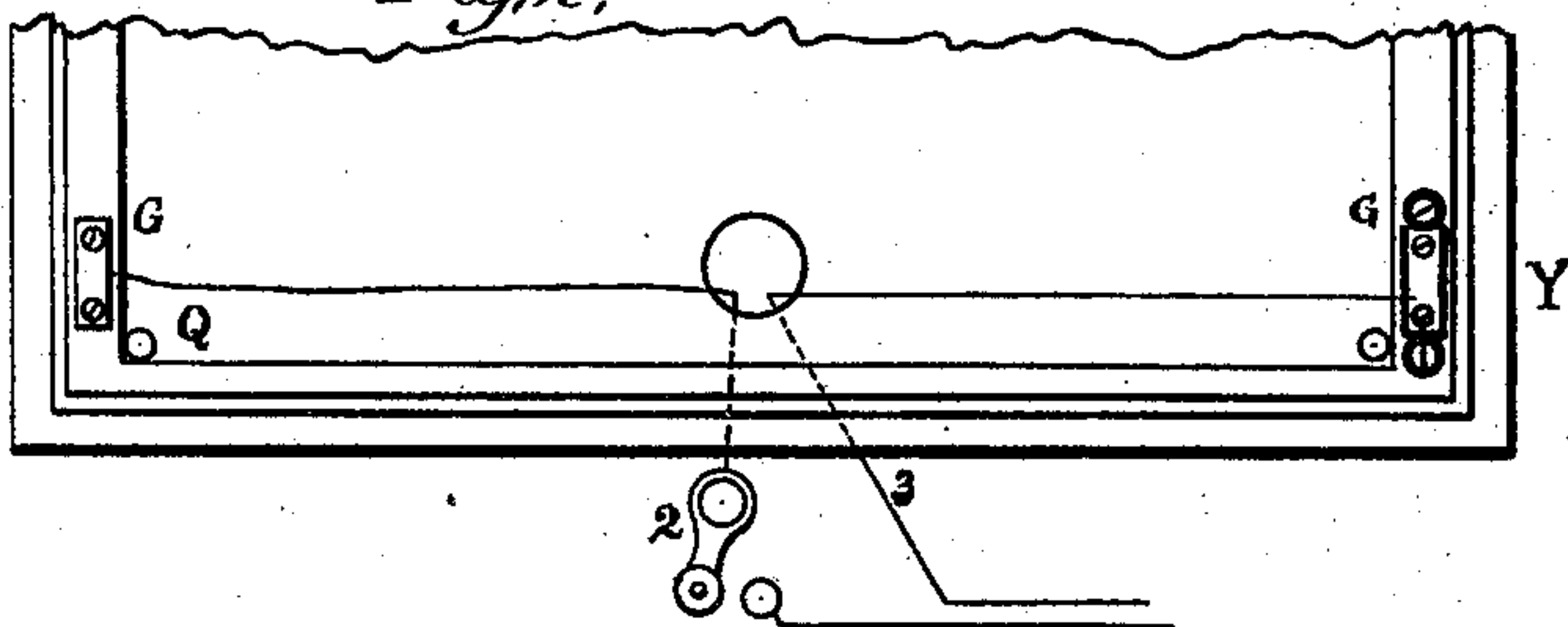
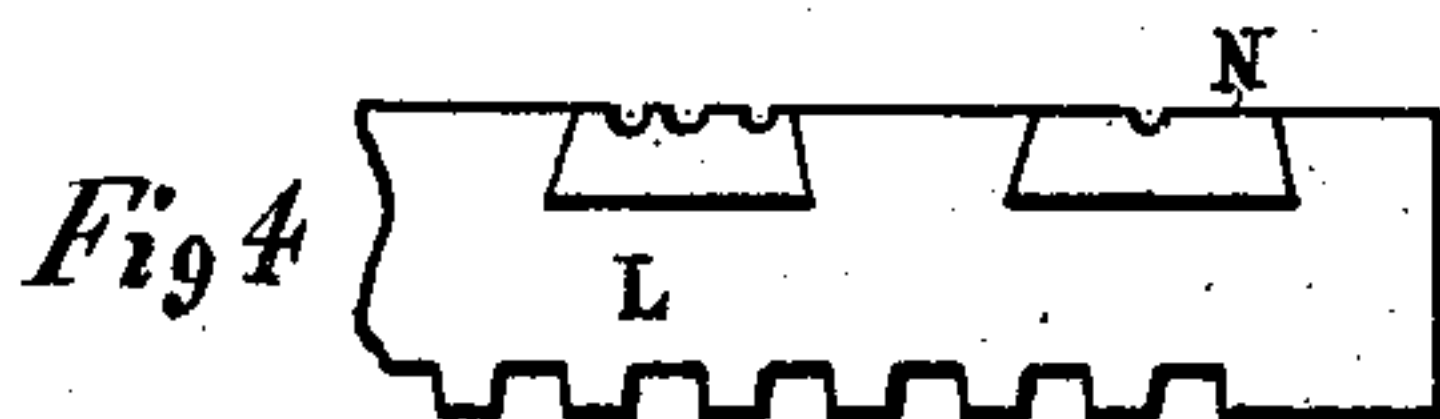
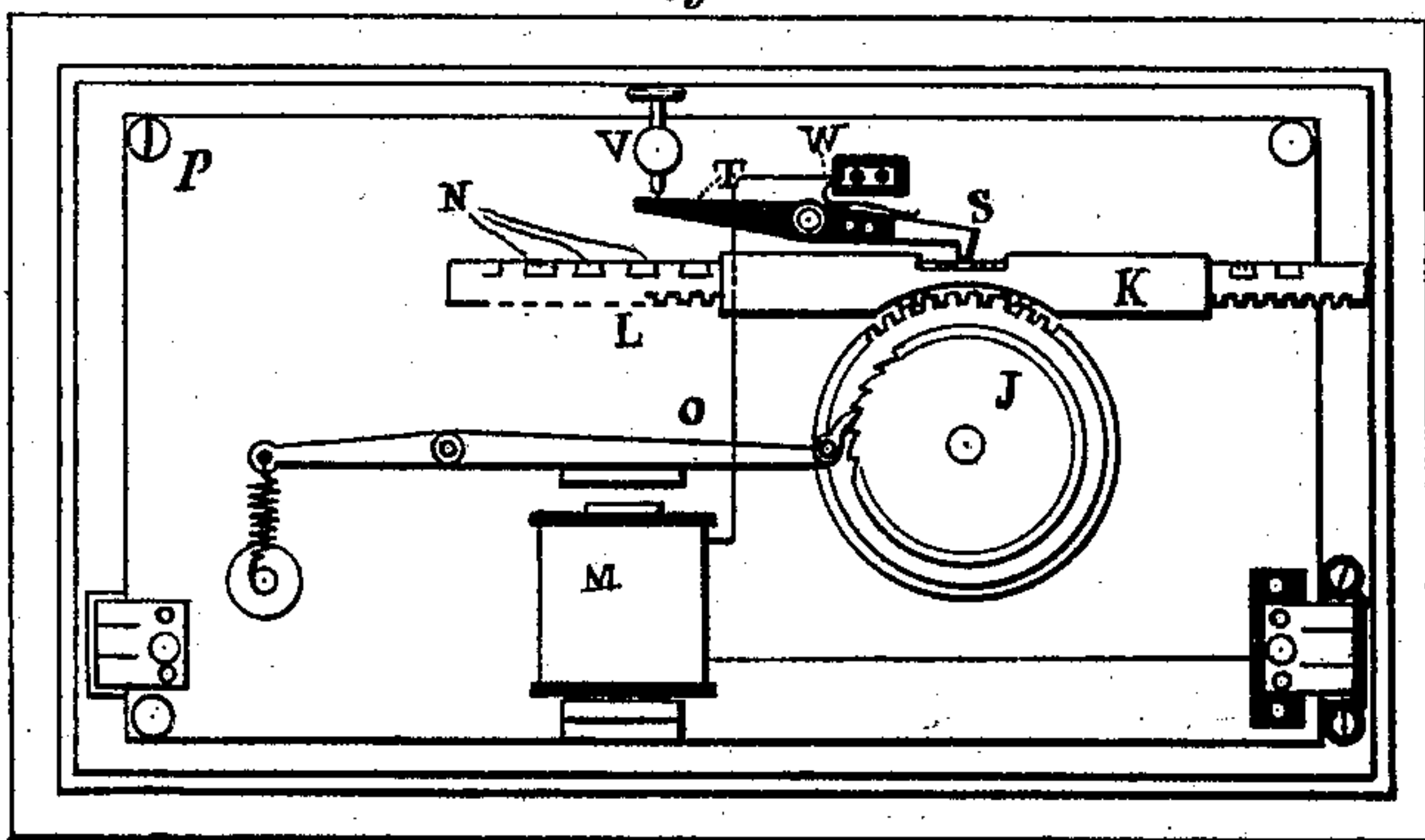


Fig. 3



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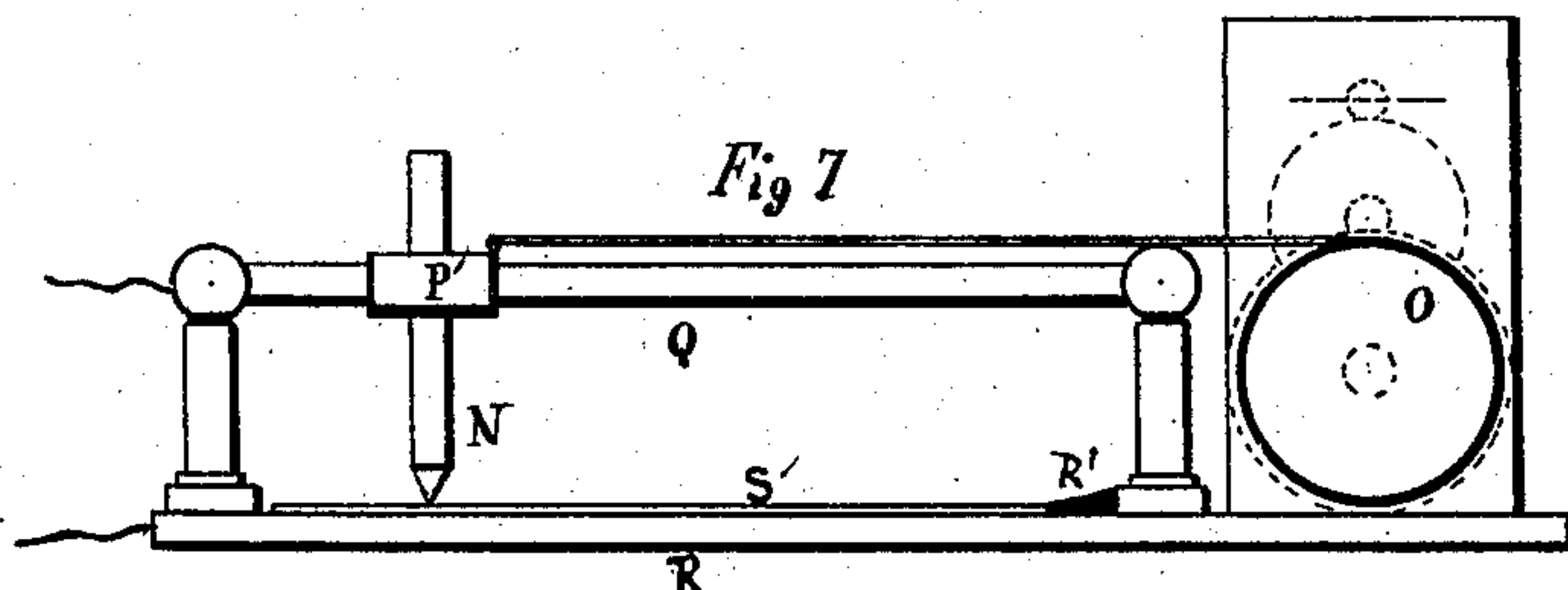
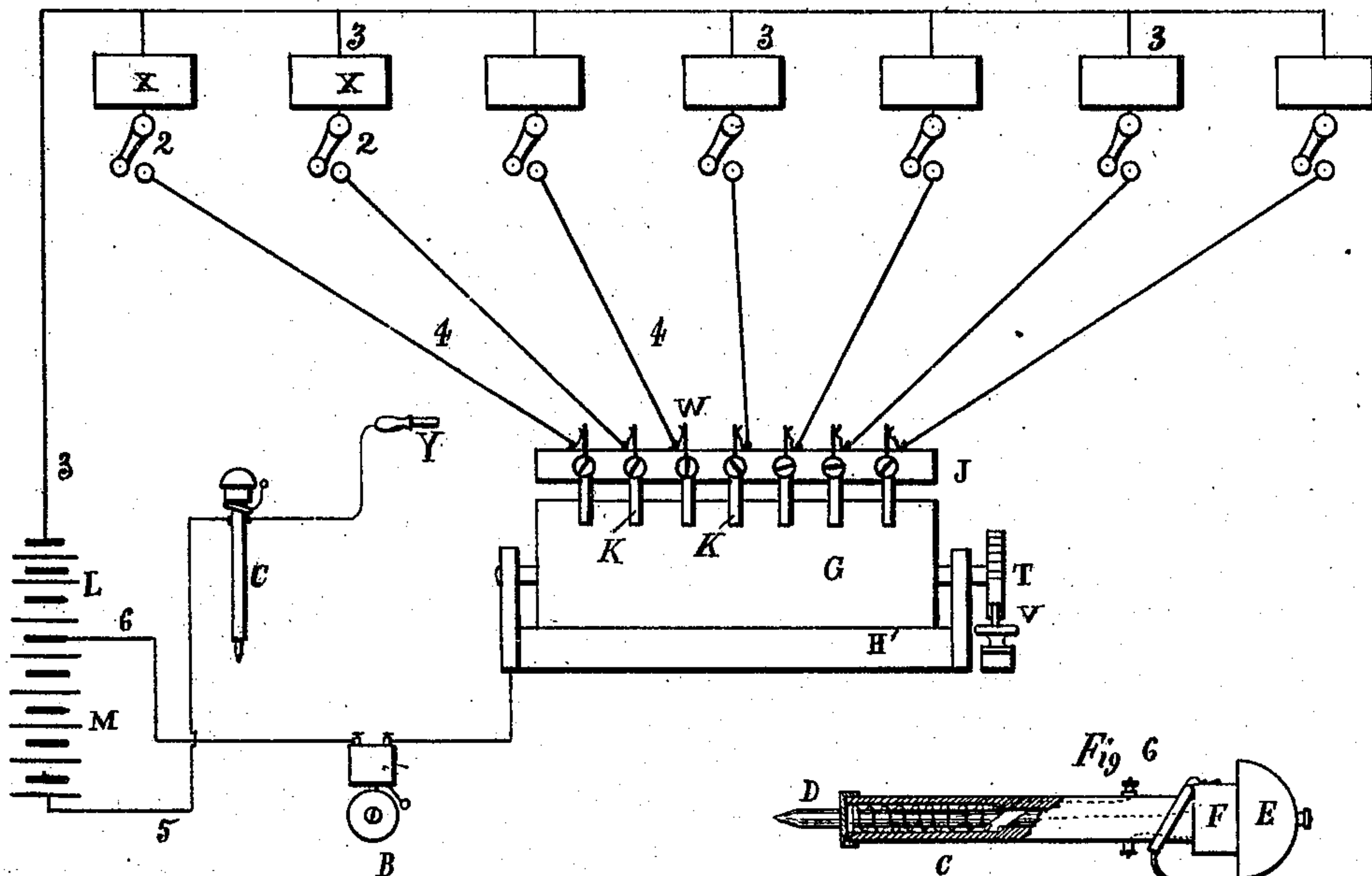
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(No Model.)

2 Sheets—Sheet 2.

Fig 5



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FELIX BENEDICT HERZOG, OF NEW YORK, N. Y.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 693,390, dated February 18, 1902.

Application filed October 19, 1886. Serial No. 216,682. (No model.)

To all whom it may concern:

Be it known that I, FELIX BENEDICT HERZOG, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Signaling Apparatus, (Case No. 36,) of which the following is a specification.

In United States Letters Patent Nos. 289,834 and 292,115 and in numerous subsequent patents and applications I have shown various forms and constructions of signal-transmitting apparatus differing broadly from all previous inventions in that the signal to be transmitted is not sent at the instant of setting nor operated by the transmitting operator solely, but requires some additional coöperation of mechanism at the receiving-station before it transmits its signal. The transmitter shown in the present new system and organization is of this general character.

Figure 1 represents this transmitter. Fig. 2 shows a detail of its construction and attachment in circuit; Fig. 3, a modification thereof; Fig. 4, an enlarged view of a detail; Fig. 5, a general view of the system as well as of my novel annunciator and signal-receiving mechanism; Fig. 6, an enlarged view of this signal-receiving mechanism; Fig. 7, another form thereof.

In Fig. 1, A is a reel operated by a clockwork-train B D and carrying a roll of paper or metal tape which has been previously perforated, embossed, or dotted with an insulating-ink or otherwise suitably prepared in a manner usual in a well-known branch of automatic telegraphy. This reel-operating clockwork can be wound and remains wound until it is permitted to operate by the withdrawal of a detent, which engages with a suitable part of its mechanism, (in this case the notched disk D.) The detent is released by the operation of the armature-lever L of the magnet M when the latter is energized by a closure of the circuit and insertion of sufficient battery at the receiving-station after the entire transmitting apparatus has been put in circuit by the closure of the switch-lever 2, Fig. 2. As soon as this detent is removed the reel begins to roll up the paper, (or, if desired, it may be made to feed out the paper which is held closely or is drawn up by

a second drum, not shown,) or the clockwork may operate suitable pawl and ratchet or friction roller, or any other suitable and well-known device to be used for the purpose. The circuit after passing through the magnet passes into the contact bed or bracket F and thence, as the respective perforations pass, into the metal screw C to the return-wire or ground, as the case may be. The mechanism may be so organized that the message-tape is of about the length to be entirely carried along by one winding of the spring, or, if preferred, it may be much shorter, in which case it is desirable not to waste the spring energy, which waste may be prevented as shown—that is, for instance, by causing the disk D to revolve once for a certain length of tape—and if there be no perforation or equivalent, and hence no closure of the circuit during this time, then the armature-lever will fall into the notch in the disk and stop the movement. If desired, an electromotor, either in local or in shunt circuit, (as elsewhere shown by me,) may be employed to feed the tape in place of the clockwork.

In Fig. 5 is seen my new annunciator, as follows: A metal drum is covered by a sheet of paper G, held in place by adjustable rings or other suitable means. (Not shown.) This paper is of such character as is usually employed in automatic electrochemical telegraph-receiving apparatus and is kept moist partly by its capillarity and partly by being from time to time rotated on its arbor so that its surface passes through the solution in the trough H', which contains solutions such as iodid or ferrocyanid of potassium or other solutions, such as are well known in electrochemical telegraph-receivers. Coöperating with this solution-moistened paper on its metal drum is a stylus or spring of iron, tin, platina, tellurium, or ruthenium, &c., so placed that when a current passes through the paper from the stylus to the drum it leaves a mark on the paper. Any of the well-known coöperating solutions and terminals in electrochemical telegraphy may be used, and of course it is understood that where a stylus is used which is decomposed by the current without the presence of a moist paper, or where the moisture is not required for the purpose of lessening the resistance, the trough

is dispensed with; or the paper may be covered with a hygroscopic solution. There is a stylus K for each and every terminal and transmitter X at the distant station, and these
 5 are mounted on an insulating-frame J. To the spindle carrying the paper-mounted drum is fastened a ratchet-wheel T, which is operated step by step at each depression of the pawl-knob V, and this at each depression of
 10 this knob turns the drum sufficiently for the operator to observe the space which till then had been under the stylus-point—that is, about one-quarter to one-half inch. Each line comprises a spring-jack W, and cooperating with the pin thereof are a hollow plug and
 15 a flexible cord, terminating in the battery and thence leading to the return-wire. In this cord or circuit is looped the receiving-pencil instrument C, which can be made in various
 20 forms, but which in the instance shown in Fig. 6 consists, essentially, of a hollow tube C, to the upper end of which is fastened a small sounder or diaphragm or electric bell E, the operating-magnet F of which sound-
 25 producing instrument is in the circuit of the flexible cord; but this circuit is broken within the tube and can only be completed by pressure upon the pencil-point D. This pencil is an ordinary lead-pencil or pen or writing-
 30 point of any desired character fastened into a rod, which has on it a collar against which bears a cylinder-spring. A metal cap with a hole sufficiently large to permit the pencil to move freely up and down within it, but not
 35 large enough to permit the spring-retaining collar to protrude, keeps the parts together. A modification of this instrument, in which the circuit is closed by means of a switch operated by the pressure of the fingers on the
 40 pencil instead of by the pressure of the pencil on the paper, is made by me the subject of another application.

The operation of the parts above described is as follows: The sending operator adjusts
 45 the message-tape, (perforated beforehand in any suitable manner,) winds the feed-train, and closes the switch-lever 2, thereby closing the circuit through the corresponding stylus K, the sheet of paper G, metal drum-frame,
 50 bell B, and battery L. The resistance of the paper on the drum is so great that the magnet M is not energized, and hence the clockwork is not released. The receiving operator presses knob V once, and thereby causes the
 55 drum to rotate sufficiently to perceive clearly the discoloration made by the current in the place occupied by the stylus corresponding to the operated line. He thereupon inserts the plug Y in the corresponding spring-jack W, and thus completes the line, with the excep-
 60 tion of the break within the receiving instrument. By pressing the point of the tube to paper the circuit is completed, and a current sufficiently strong to release the mechanism
 65 of X causes the paper to be fed, and the circuit will thereupon be controlled by the perforations in the tape. The object of the pen-

cil instrument is so that a means of recording the "ticks" as they come in is always at hand without danger of being out of order or of
 70 requiring delicate adjustment. These ticks or breaks are heard on the audible receiving instrument on the bell, (or, if desired, this is placed elsewhere, as it is merely for convenience so placed,) and as these are counted the
 75 number of the breaks in each group can easily and rapidly be recorded in numerals instead of being thereafter counted as spots or spaces on a printing-register tape. The contacts
 80 within the tube are so arranged that the pressure on the writing-point may vary considerably without breaking the circuit.

Figs. 2, 3, and 7 show details and variations of what has already been described.

Fig. 2 shows a plate of wood, iron, or other
 85 suitable material which is fastened to a stand or a wall, and the terminal wires for the signaling instrument are connected to metal plates G. Attached to corresponding points
 90 in the framework of the signaling instruments are other pieces of metal H, which form the terminals of the circuits in the instrument. At each corner are seen screw-holes P, by means of which the back plate and the frame
 95 can be fastened together, and when so fastened the circuit connections are automatically made without further necessity for putting wires in binding-screws or making splices, &c. If the parts are made interchangeable, a further advantage lies in the fact that new
 100 instruments can be quickly and safely inserted by those ignorant of the circuits and connections. In Fig. 3 there is a modification of this "back contact," which of course is equally applicable to signal-receiving ap-
 105 paratus, and in another application I show a construction thereof wherein the contact also serves to hold the parts together.

Fig. 3 is a modification of the signal-transmitter of Fig. 1. A step-by-step-actuated elec-
 110 tromotor takes the place of the clockwork and the signals are received at the receiving-station in a manner analogous to that shown in before-mentioned Patent No. 292,115 and in a pending application for a "district-box."
 115 At each demagnetization of the magnet M the ratchet-wheel J is moved one step and carries with it the gear-wheel meshing with a rack L, which causes this to move one step, and during this progression the contact brush
 120 or point S is carried over the character-blocks N, (enlarged in Fig. 4,) and thus transmits to the receiving operator signals at each break, which is caused whenever a notch in N passes under S. These pieces N can be inserted at
 125 will by the operator, and thus the signals may be varied.

Of course it is evident that the message-transmitting mechanisms of Figs. 1 and 3 are interchangeable, the pertinent essential fea-
 130 ture of difference being that the apparatus shown in Fig. 1 is operated after a single impulse from the receiving-station, while that of Fig. 3 requires as many receiving-impulses as

there are individual signals or parts of signals.

Fig. 7 is another instance of and a modification of the signal-receiver of Fig. 6. A slide 5 P' is carried on a horizontal bar insulated from the metal bed R, on which rests a strip or cord of chemically-prepared paper S'. In the slide P' is drilled a hole, loosely fitting within which is carried the stylus N, of suitable metal, chemically cooperating with the 10 solution in which the paper has been moistened to form discolored dots or dashes whenever they touch whenever the circuit is closed. The weight of this pin N is sufficient to cause it to drop upon the paper with sufficient force 15 to close the circuit at the paper, or, if preferred, a weak spring may be made to do this. The pin-carrying slide P' is fastened to a cord, the other end of which is wound around 20 a coiled spring-drum O, which is prevented from running down too rapidly when the spring is wound by the train and fan escape-ment shown. When it has run down, it brings the stylus-point to rest upon the rubber 25 block R', thus breaking the circuit. The operation of this recorder is as follows: When the operator wishes to cause the distant signal to transmit and this receiver to record, he grasps the pin and, lifting it slightly, (so as to 30 keep the point from the paper,) he draws it to the end of the rod Q and permits it to drop and at the same time to be drawn back by the cord and train. As it drops it closes the circuit, and as it is drawn back uniformly it produces a record of the dots and dashes. 35

In practice I prefer to put the stylus of the annunciator within an inch of the surface of the liquid in the trough, as then the capillary of the paper will keep it sufficiently moist, 40 and by the time the rotation has brought a spot once more under the stylus the former marks will have faded, so as not to interfere with the later ones. A glass frame covers the annunciators.

45 What I claim is—

1. An electrolytic receiver comprising a cylinder-surface and a bath-reservoir cooperating with a portion only of the surface.

2. An electrolytic receiver, comprising a 50 cylinder-surface, a fixed circuit-terminal and a progressive feed device, operating to partially rotate the cylinder at each unit of operation.

3. In combination with a separate wire for 55 each of several different substations, an annunciator comprising a record-surface and a series of electrodes connected to these different wires and arranged in a group; means for causing the electrode corresponding to a substation, upon the closure of its circuit thereat, to mark the surface in a position predetermined for each electrode; an audible signal; and a manual feed constructed to change 60 the position of the electrodes with respect to the surface; whereby an operator at the annunciator-station is notified that an electrode has made a mark and is enabled to feed the

surface so that all the electrodes may be in a position to make a fresh mark at the subsequent operation. 70

4. An annunciator comprising a series of electrolytic terminals connected to different substations and cooperating with an endless belt or cylinder surface constructed and arranged to receive the electrolytic marks when 75 corresponding circuits are closed at their respective substations; a feed constructed so that it will rotate a given unit of surface under the electrodes a second time, and means 80 for causing the marks made by an operation to disappear prior to the complete rotation of the surface; whereby the apparatus is adapted to work continuously.

5. A telegraphic receiving instrument comprising a cylinder-surface; an element constructed to mark it and connected to and controlled through an operated circuit to a distant station; a feed constructed so that it will rotate a given unit of surface into position to be subsequently marked a second time; and a 90 means for causing the marks to disappear automatically prior to that time; whereby the apparatus is adapted to work continuously.

6. A circuit-controller, comprising a marking-point, a circuit-closer, and adjusting devices; the whole cooperating so that pressure 95 on the marking-point will control the circuit-closer.

7. A record-surface; a recording device—as a pencil-point—with a handle, constructed 100 and attached to other parts of the mechanism at a controlling-station so that it may be moved in any direction in the plane of the record-surface as well as perpendicularly thereto; a circuit-controlling switch including an element constructed to be movable 105 with respect to a part of the handle; guiding devices cooperating to produce such operation during the perpendicular motion of the handle in one direction; and a device—as a 110 spring—constructed and operating to return the element at the reversal of the perpendicular motion of the handle.

8. A record-surface; a recording device—as a pencil-point—with a handle constructed 115 and attached to other parts of the mechanism at a controlling-station so that it may be moved in any direction in the plane of the record-surface as well as perpendicularly thereto; a circuit-controlling switch constructed 120 to close the circuit by the pressure of the point on the surface during the act of recording and including an element constructed to be movable with respect to a part of the handle; and a device—as a spring—constructed to reopen 125 the circuit upon the removal of the pressure; together with a magnet and circuit connections through which it is controlled by way of the switch; all cooperating so that the magnet can be controlled as a result of the act of 130 pressing the recording-point upon the surface.

9. A record-surface; a recording device with a handle cooperating with other parts of

the mechanism at the controlling-station and constructed so that it may be moved in the plane of the surface, and a switch including two parts carried by the handle and constructed to cooperate one with the other in the act of switching; together with electrical connections of the switch with other parts of the system; and means for manipulating both switch and recording device by the handle; the whole constructed and arranged so that an operator requires only one hand to switch or record.

10. A record-surface; a recording device with a handle constructed and arranged to be movable both in the plane of the surface and up and down; and a circuit-controlling switch including as an element a yielding contact constructed and arranged to be controlled by the up-and-down motion of the handle.

11. A record-surface; a recording device—as a pencil-point—with a handle cooperating with other parts of the mechanism at the controlling-station and constructed so that it may be moved in the plane of the surface and also perpendicularly thereto; a switch including two elements together with adjunctive devices and connections; all cooperating so that the relative positions of the switch elements are controlled by the perpendicular motion

of the pencil but not by the motion along the plane.

12. A signaling system comprising a number of signal-transmitters on separate circuits, each including a controlling-magnet, an independent high-resistance annunciator for each circuit, and battery beyond the annunciator, the whole so organized that the normal strength of current is sufficient to operate the annunciator, but not sufficient to operate the transmitter-controlling magnet.

13. A signal system comprising a number of signal-transmitters, each including a controlling-magnet and each being in a circuit, an independent high-resistance annunciator for each circuit, and a battery beyond the annunciator, the whole so organized that the normal strength of current which operates the controlling-magnet of a transmitter, is insufficient to operate or affect any other at the same time.

Signed at New York, in the county of New York and State of New York, this 18th day of October, A. D. 1886.

F. BENEDICT HERZOG.

Witnesses:

L. L. SPRING,
PHILIP HERZOG.