

No. 666,912.

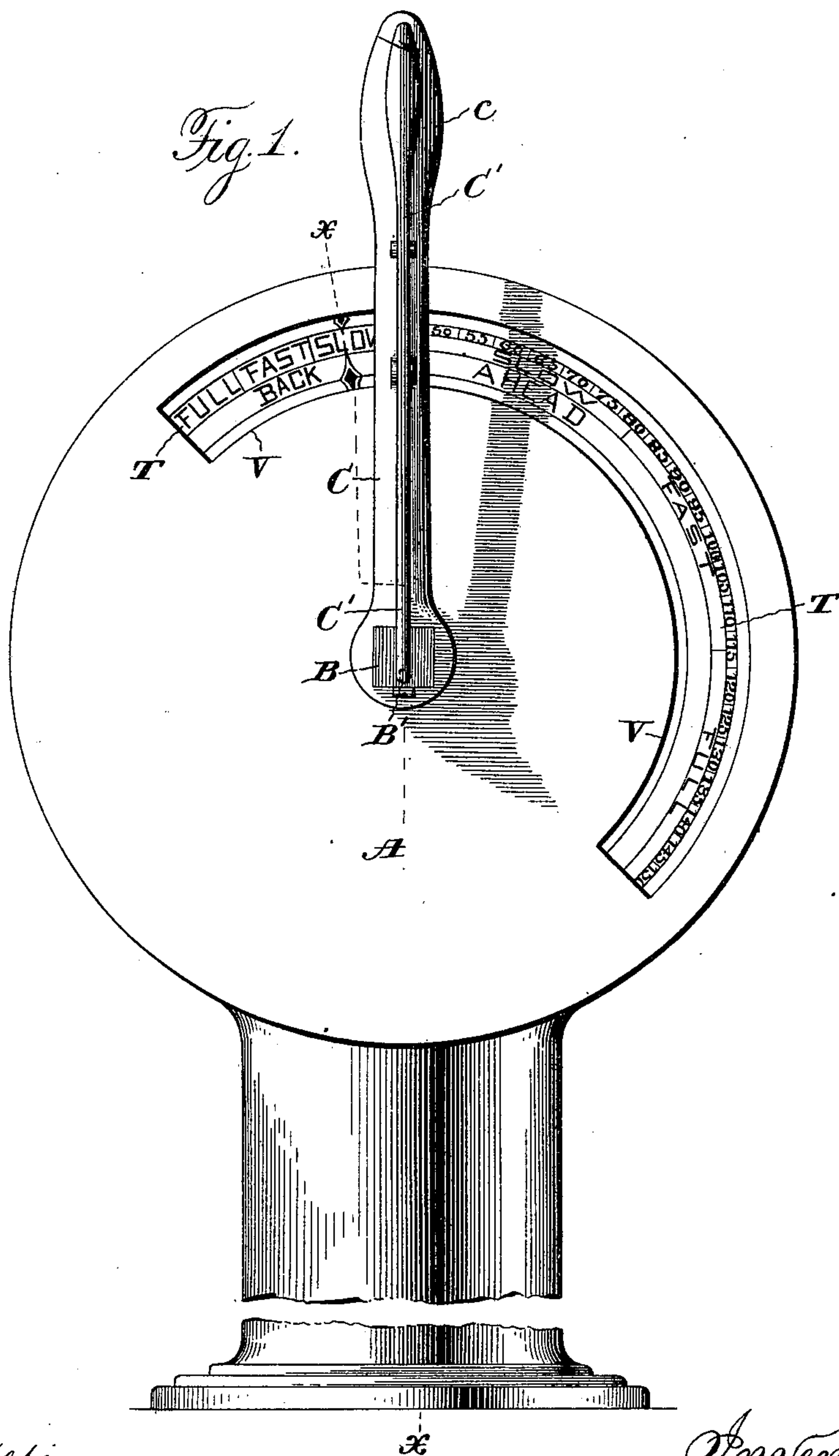
Patented Jan. 29, 1901.

L. S. THOMPSON.
SHIP'S TELEGRAPH.

(Application filed May 25, 1899.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses:
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
Leon S. Thompson, by
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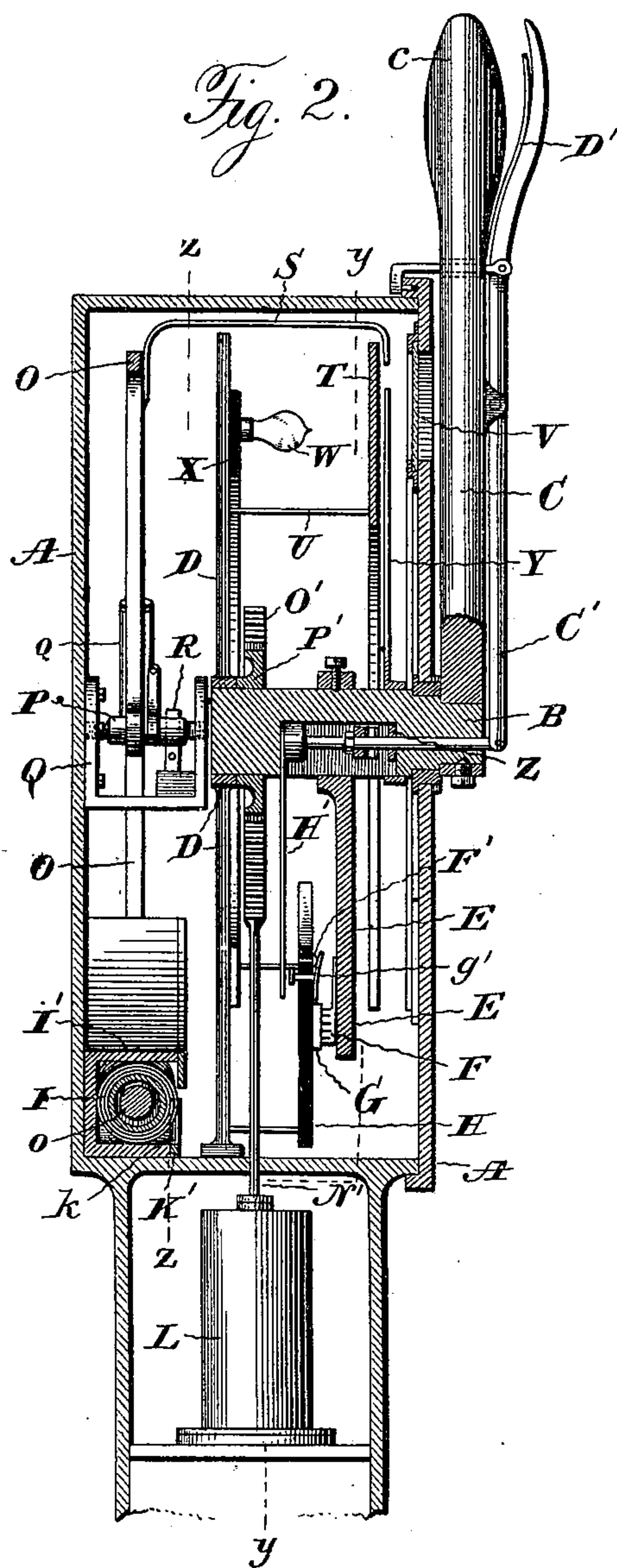
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6 Sheets—Sheet 2.



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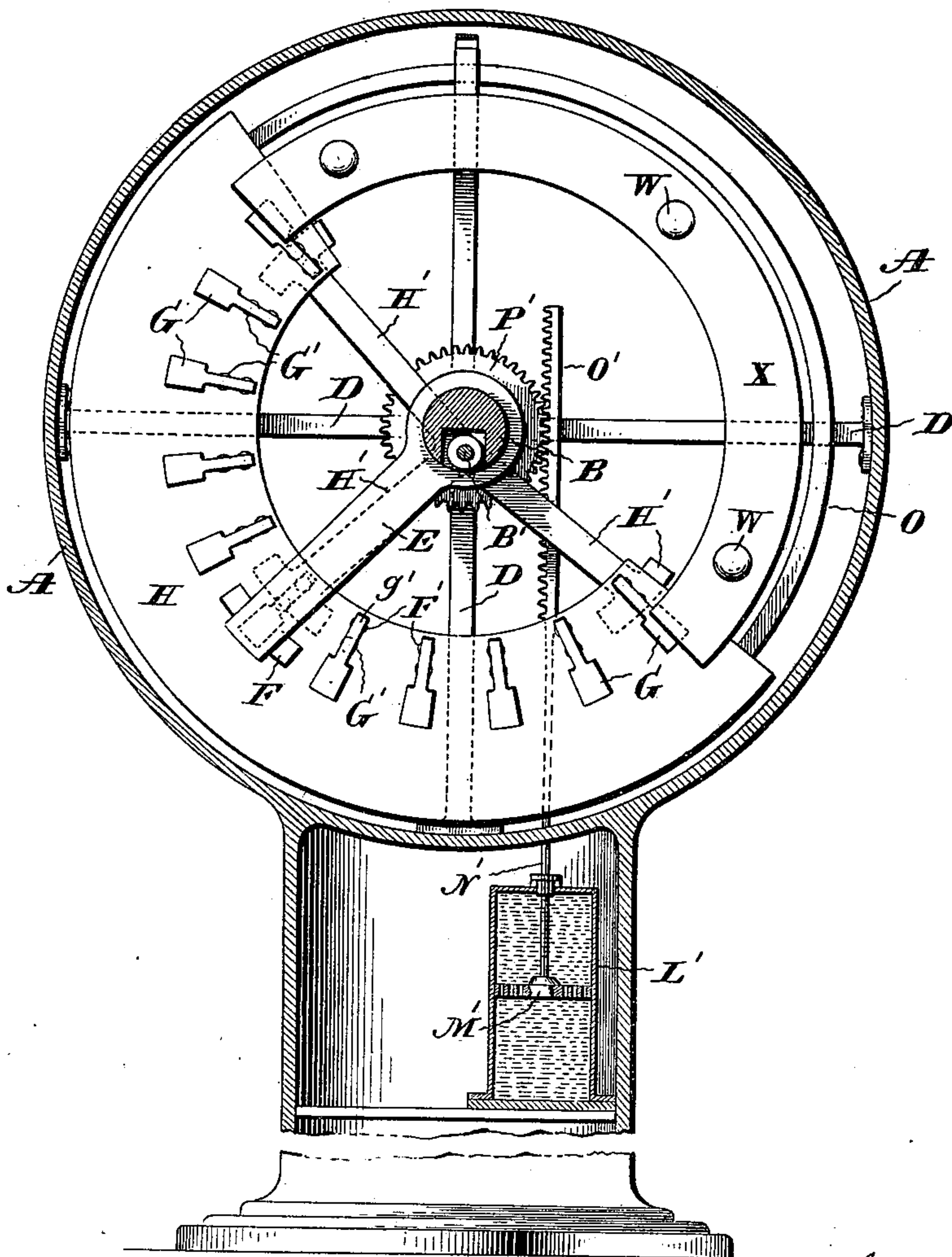
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Fig. 3.



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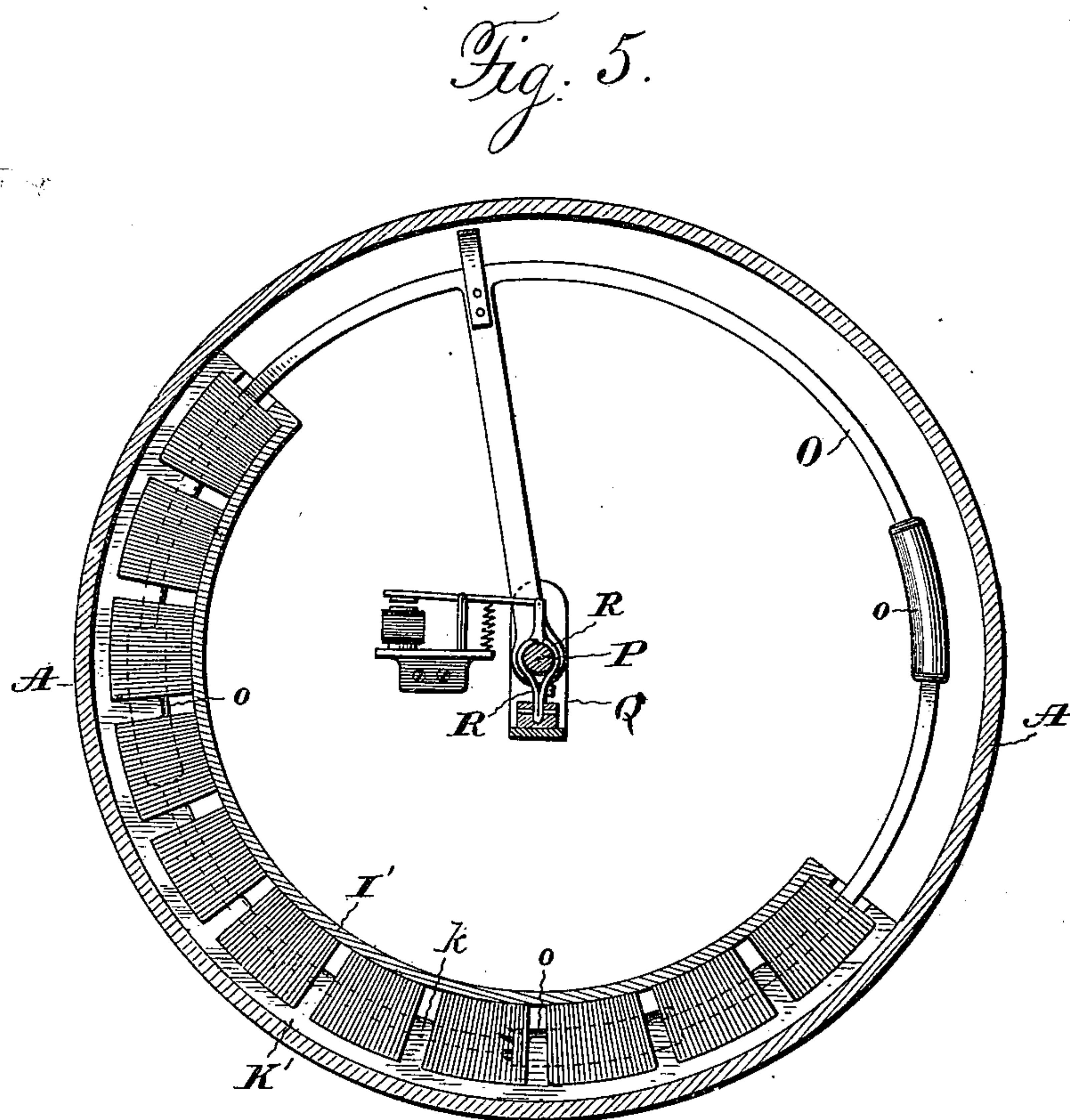
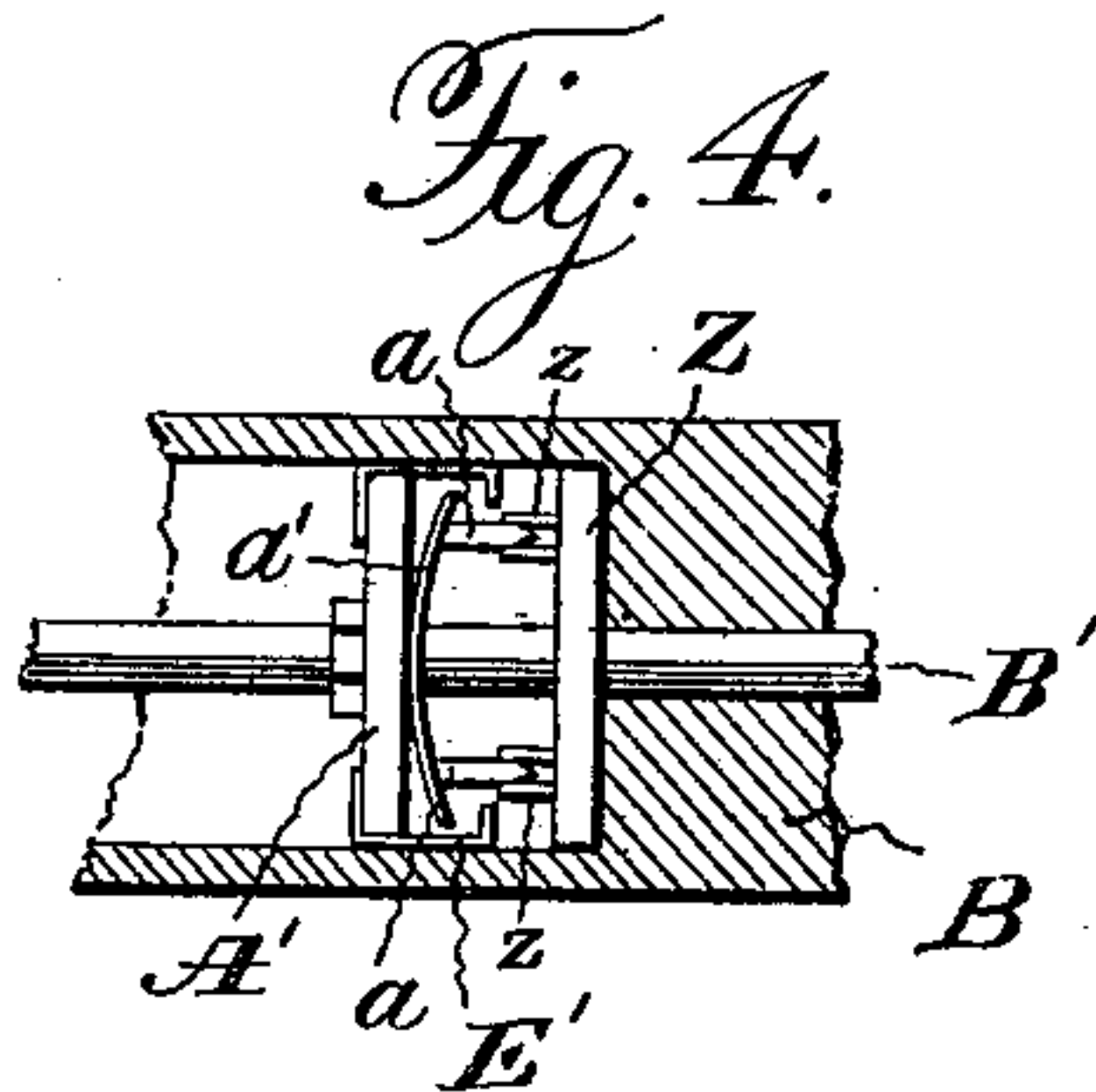
Patented Jan. 29, 1901.

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(Application filed May 25, 1889.)

(No Model.)

6 Sheets—Sheet 4.



Witnesses:
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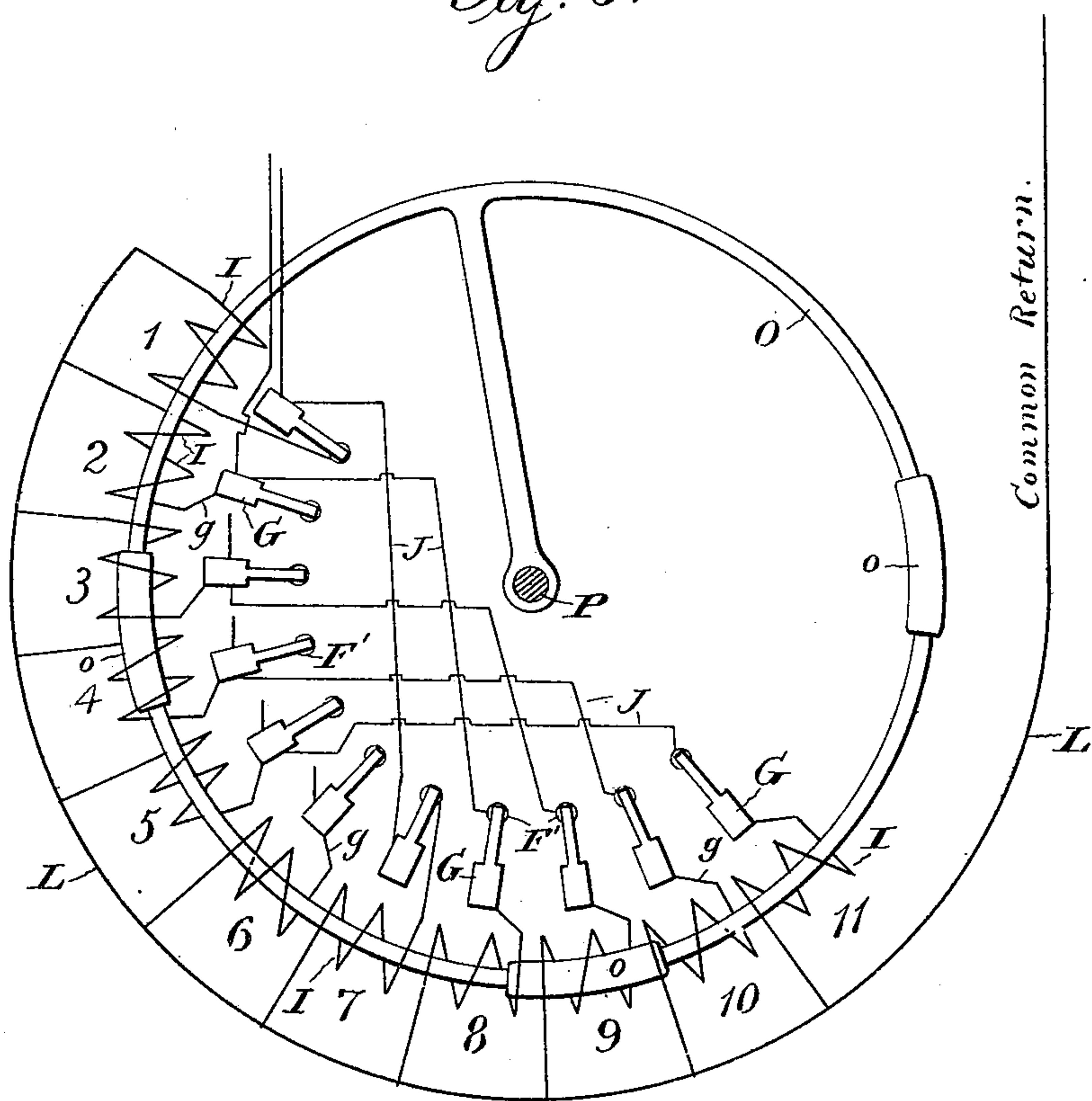
L. S. THOMPSON.
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(Application filed May 25, 1899.)

(No Model.)

6 Sheets—Sheet 5.

Fig. 6.



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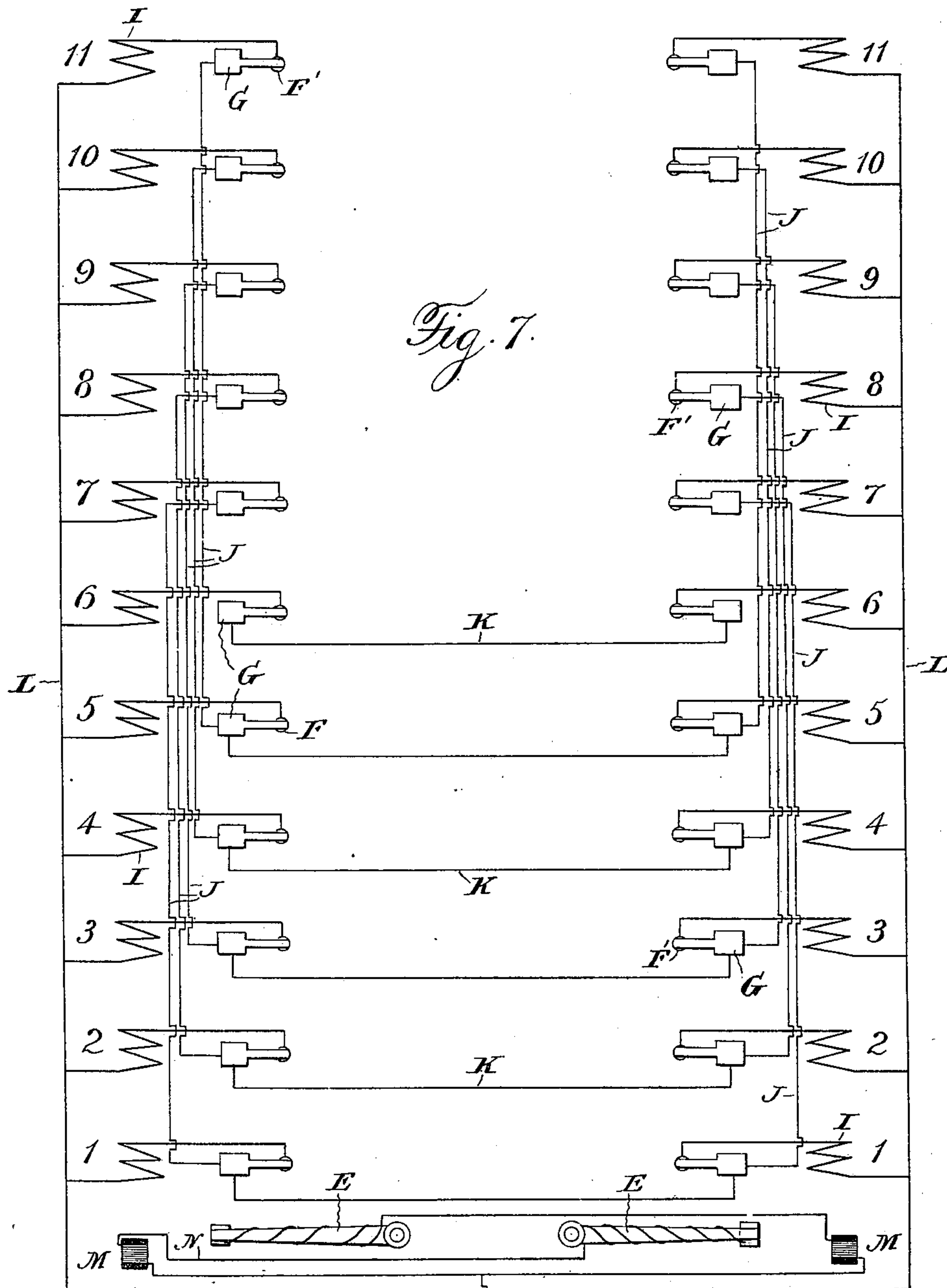
Patented Jan. 29, 1901.

L. S. THOMPSON.
SHIP'S TELEGRAPH.

(Application filed May 25, 1899.)

(No Model.)

6 Sheets—Sheet 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

LEON S. THOMPSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

SHIP'S TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 666,912, dated January 29, 1901.

Application filed May 25, 1899. Serial No. 718,151. (No model.)

To all whom it may concern:

Be it known that I, LEON S. THOMPSON, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Ships' Telegraphs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of an instrument used for the transmission and receipt of signals or messages in an embodiment of my invention for telegraphing between a ship's bridge or other point and the engine-room. Fig. 2 is a vertical section on line *xx* of Fig. 1. Fig. 3 is a section on the line *yy* of Fig. 2. Fig. 4 is a detail view in section of the snap-switch used; Fig. 5, a detail view in section on the line *zz* of Fig. 2. Fig. 6 is a diagrammatic view showing the mode of wiring the instrument, and Fig. 7 a like view showing the mode of wiring the complete system for communication between two stations.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is the provision of mechanism for the telegraphing or transmission of signals, messages, or indications from one point or place to another that will be simple of construction and reliable in operation; and my object more especially is to improve the apparatus and arrangement of circuits shown in my United States Patent No. 623,637, issued April 25, 1899; and to these ends said invention consists in the mechanism having the features of construction substantially as hereinafter specified.

For the illustration of my present improvements I show the same embodied in a telegraph for use on shipboard for communicating between the ship's bridge and the engine-room, and, as in the similar embodiment set forth in my above-named patent, I employ a transmitter and receiver at each point, the transmitter at one point being electrically connected with the receiver at the other point, and the transmitting and receiving mechanisms at one point being mounted in the same casing. As is the case with the instrument of said patent, a cylindrical casing A is employed, at the axial center of which is a shaft B, with one end projecting through and journaled in a packed opening in the casing-front,

and to which end is fastened a radially-extending crank or operating-handle C, whose grip part *c* projects beyond the periphery of the casing. The inner end of the shaft B is journaled in a bearing provided in an open frame or spider D, having four equidistant radial legs, three of which are fastened to the interior of the casing. The fourth leg, which is an upper vertical one, does not reach to the casing-wall, and hence between the latter and the outer end of said leg is a space.

Carried by the shaft B within the casing is a radial arm E, that has on one side, near its outer end, a brush or contact-piece F, that is adapted to be placed successively in contact with one or any two adjacent ones of a semi-circular series of contact-pieces G and G, mounted on a suitable support H, of insulating material, which is itself supported by the spider D. In the apparatus of my patent referred to each of the contacts corresponding to the contacts G and G is connected electrically by an independent wire or conductor with the corresponding one of the series of contacts of the distant instrument, and a wire or conductor connects each of the contacts of an instrument with one of the solenoids of the receiving instrument mounted in the same casing. In my present construction I retain the latter feature—that is, the electrical connection—by a wire or conductor *g* between each of the contacts G and G and one of the solenoids I and I of the receiving instrument, which is placed in the same casing with said contacts; but to reduce the number of conductors between the two instruments I now connect the contacts G and G of one instrument in pairs in parallel by wires or conductors J and J and connect one contact G of each pair of one instrument by a wire or conductor K with one of the pair of the other instrument. I am thus enabled to substitute the short wires I and I that connect the contacts of the same instrument for the long wires that in the former construction connected one-half of the contacts thus connected with the corresponding contacts of the other instrument. The contacts that are coupled in pairs are those that between which intervene half of the entire number less one, which number is an odd number, so that for a reason to hereinafter appear the middle one of the se-

ries will be independent of the others. Thus the number of contacts shown in the drawings being eleven, the first of the series is connected by a wire J with the seventh, the second with the eight, and so on, leaving the sixth or middle one without electrical connection with any other contact of the same series. The solenoids are connected to a common return-wire L, that leads to one pole of a battery M or other source of energy, whose other pole is connected by a wire N with the traveling contact F.

It is apparent, of course, that by connecting a pair of contacts in parallel, as described, the two solenoids connected, respectively, to the two contacts of a pair will be simultaneously energized when the traveling contact F of the distant transmitter rests on either one of the corresponding pair of contacts. I therefore construct the core of the solenoids so that there will be two parts or armatures to be simultaneously exposed to the influence of the current passing through two solenoid-coils. In view of the fact that the coils extend through substantially a semicircle and that this is the amount of angular motion of the core it is necessary to have three armatures *o, o, and o*, placed ninety degrees apart on the wheel O to insure that two armatures shall always be within the field of attraction of the energized coils. Were there but two armatures arranged an angular distance apart, agreeing substantially with the angular distance between each pair of parallel connected coils, it is obvious that either of the two could be at times wholly outside the range of attraction of the end coils. There is a necessity for the odd or independent coil at the middle of the series for the reason that without it should either end coil and its intermediate pair be energized with the two extreme armatures within the field of attraction of the respective end coils, the magnetic pull of the end coil in circuit would be in a direction antagonistic to the magnetic pull of the intermediate coil in circuit. By the provision of the intermediate odd or independent coil the intermediate armature alone is acted upon when the extreme armatures are both within the magnetic fields of the respective end coils.

The armature or core-carrying wheel O is supported by a single radial arm or spoke from a shaft P, said shaft P being journaled in bearings in a U-shaped frame Q, that is secured to the back of the casing A, the bearings being preferably of the familiar adjustable type consisting of screws that engage conical ends of the shaft. Excessive or objectionable oscillation of the wheel is prevented by a friction device or brake formed of two spring-jaws R and R, that embrace the shaft, an adjusting-screw being provided to enable the regulation of their friction or pressure upon the shaft. Said jaws are conveniently supported by being attached to the U-shaped frame Q.

The pointer or indicator S, carried by the wheel O, coöperates with a dial T in the form of a segment-shaped plate that is supported by rods or bolts U and U from the spider D, a glazed opening V, of like shape, being provided in the front of the casing to enable the readings of the dial to be seen. The markings of the dial are the customary ones. Preferably the dial-plate is of translucent material, and back of it are placed several small incandescent lamps W and W, which are attached to and supported by a segment-shaped plate X, of hard rubber, which is fastened to the spider D. The one dial serves for both the receiver and the transmitter, an indicator or pointer Y being attached to the transmitter-shaft B to enable the dial to be used as a part of the transmitter.

As in the apparatus of my former patent, the present apparatus works with an open circuit, and a switch is provided to open and close the circuit. Said switch is preferably a snap-switch to avoid arcing, and comprises a fixed member Z, fastened to the shaft B and having two sets of contact-jaws *z* and *z*, and a movable member A', carrying a knife *a* to coöperate with each pair of jaws. The member A' is attached to a rod B', extending longitudinally through the shaft B and attached at its outer end to a lever C', pivoted to the side of the handle C and pressed by a spring D' in a direction to move and hold the rod B' inward and separate the members of the switch. When the handle C is grasped, the lever C' will be moved against the pressure of its spring and bring the switch members together, closing the circuit. The knives *a* and *a* are attached to the free ends of a spring-plate *a'*, and overhanging each end of said plate is a lug E'. When the lever C' is released and the movable switch member A' is moved away from the fixed member, the knives *a* and *a* will remain in the jaws *z* and *z* until the spring *a'* bends enough to cause its ends to be engaged by the lugs E' and E', whereupon on the further movement of the movable member the lugs will quickly snap the knives out of contact with the jaws.

In view of the fact that each of the contacts G and G is electrically connected with a solenoid-coil of each instrument it is apparent that in the absence of means for breaking the circuit through a conductor *g* between a contact G of the sending instrument and the electrically-connected solenoid-coil of said contact of the same instrument the current will divide. To prevent this and insure that the current shall flow only as desired, means are provided to cut out of the circuit those coils at the transmitting instrument that are in electrical connection with the contact or contacts G and G upon which the movable or traveling contact rests. Said means are the following: From each contact G there projects a spring-tongue *g'*, that bears yieldingly against a screw or post F', to which the wire *g* from the coil is electrically connected, and

engaging said tongue g' , on the same side of the latter which bears on the screw, is a pin G' , that passes through an opening in the contact-support H , the end of the pin being projected beyond the side of the latter. Attached to the inner end of the rod B' are three radially-extending arms H' , H' , and H' , arranged ninety degrees apart, whose ends reach to a point to bring them in line with the pins G' and G' , so that when the rod B' is moved outward when the lever C is grasped and moved said arms will engage and move certain of the pins, and thus lifting the spring-tongues engaged by the pins break the circuit through the respective solenoids at the transmitting instrument which may have electrical connection with the contacts G and G , whose tongues are thus raised. The three arms H' and H' are provided to insure the cutting out of a pair of parallelly-connected coils, and three are necessary for a reason similar to that for which the three armatures are employed—to wit, to insure that there will always be at least two in position to act. The width of the pin-engaging portion of each arm is such that it may span and simultaneously engage two adjacent pins when the circuit is closed by the contact of the traveling contact with two adjoining contacts G and G . The solenoid-coils are mounted in a semi-circular frame or box I' , which incloses them on three sides and partly on the fourth side, and each coil being kept apart from its neighbor by a tooth or projection k upon a curved strip K' , fastened to the side of the box.

As in my former apparatus, a suitable retarding device to prevent too-rapid movement of the handle C is provided, and in the present instance it consists of a fluid-containing cylinder L' , a perforated piston M' therein, a piston-rod N' , a rack-bar O' , connected to the latter, and a gear-wheel P' , engaging the rack and secured to the shaft B . The cylinder or dash-pot is preferably placed outside of the casing. A latch device is provided, essentially the same as that of the apparatus of my prior patent, to insure that the lever C' shall be operated to close the circuit by means of the switch on the shaft before the handle C can be moved and also while it is being moved.

As in my former patent, a brake controlled by a magnet in the solenoid-circuits is provided to hold the wheel O at the position to which it is moved to make the desired indication, and there is a bell-circuit for ringing one or more bells to give an audible signal in the engine-room when a message is transmitted; but as in these particulars the apparatus shown herein does not differ from that of the former patent there is no need for description thereof herein.

Having thus described my invention, what I claim is—

1. An indicator or receiver comprising a series of solenoids certain of which are electrically connected so as to be simultaneously en-

energized, a core comprising a plurality of armatures, and indicating means whose indications are produced by the energizing of the solenoids, substantially as and for the purpose described.

2. An indicator or receiver comprising a series of solenoids, electrically connected in pairs, a core comprising a plurality of armatures, and indicating means whose indications are produced by the energizing of the solenoids, substantially as and for the purpose specified.

3. An indicator or receiver comprising a series of solenoids electrically connected in sets, a core comprising a number of armatures in excess of the number of solenoids in a set, and indicating means whose indications are produced by the energizing of the solenoids, substantially as and for the purpose described.

4. An indicator or receiver comprising a series of solenoids electrically connected in sets, except one, a core comprising a plurality of armatures, and indicating means whose indications are produced by the energizing of the solenoids, substantially as and for the purpose described.

5. The combination of similar instruments composed each of a series of electromagnetic devices, conductors between certain of the devices of the same instrument that connect them electrically in sets, a conductor leading from one of the devices of a set in one instrument to one of the devices of a set in the other instrument, whereby a single conductor serves to connect all of the devices of a set in circuit and a suitable return-conductor, substantially as and for the purpose described.

6. The combination of similar instruments composed each of a series of electromagnetic devices, and means for cutting the respective devices into and out of circuit, conductors electrically connecting the devices of the two instruments, and means for cutting out the device at the transmitting instrument when the like device in the receiving instrument is cut in, substantially as and for the purpose described.

7. The combination of similar instruments composed of a series of electromagnetic devices, a switch to cut the respective devices into and out of circuit, and conductors electrically connecting the devices of the two instruments having circuit opening and closing devices operative by the switches of the two instruments, whereby when the switch of one instrument is operated to cut in circuit the device of the other instrument, the circuit of its own instrument will be opened, substantially as and for the purpose described.

8. The combination of similar instruments, comprising each a series of electromagnetic devices, a contact for each device, a switch to cooperate with the respective contacts, and conductors connecting the contacts in sets, a conductor from one of the contacts of a set of one instrument, to one of the contacts of

the set of the other instrument and a suitable return-conductor, substantially as and for the purpose described.

9. The combination of similar instruments 5 comprising each a series of solenoids, a contact electrically connected with each solenoid, a switch to cooperate with the respective contacts, and conductors connecting the contacts in pairs, a conductor from one of a pair of 10 contacts of one instrument, to one of a pair of contacts of the other instrument and a suitable return-conductor, substantially as and for the purpose described.

10. The combination of similar instruments 15 comprising each a series of solenoids, a series of contacts, a conductor having a circuit opening and closing device that electrically connects each solenoid with a contact, a switch to cooperate with the respective contacts, and 20 conductors connecting the contacts in sets, a conductor from one of the sets of contacts of one instrument to one of the sets of contacts of the other instrument and a suitable return-conductor, substantially as and for the purpose 25 described.

11. The combination, in a receiving and transmitting instrument, of a series of solenoids, a core therefor, contacts having electrical connections with the respective solenoids, a circuit opening and closing device 30 forming a part of each of said connections that normally closes the circuit, and a switch to cooperate with the respective contacts, substantially as and for the purpose described.

35 12. The combination, in a receiving and transmitting instrument, of a series of solenoids, a core therefor, contacts having electrical connections with the respective solen-

oids, a circuit closing and opening device forming a part of each of said connections 40 that normally closes the circuit, and a switch to cooperate with the respective contacts and said circuit opening and closing devices, substantially as and for the purpose described.

13. The combination, in a receiving and 45 transmitting instrument, of a series of solenoids, a core therefor, contacts having electrical connections with the respective solenoids, a normally-closed circuit-opening device forming part of each of said connections, 50 a switch to cooperate with the respective contacts, and a part connected with the switch-operating means that operates said circuit-opening devices, substantially as and for the purpose described. 55

14. An indicator or receiver, comprising a series of electromagnetic devices electrically connected in sets, a plurality of armatures in excess of the number of said devices in a set, and a common support for said armatures, 60 substantially as and for the purpose described.

15. An indicator or receiver, comprising a series of solenoids electrically connected in sets, and a core comprising a plurality of 65 armatures in excess of the number of solenoids in a set, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 1st day of 70 May, 1899.

LEON S. THOMPSON.

Witnesses:

WM. HEMPHILL BELL,
TREVOR W. LEUTZE.