No. 787,780. PATENTED APR. 18, 1905.

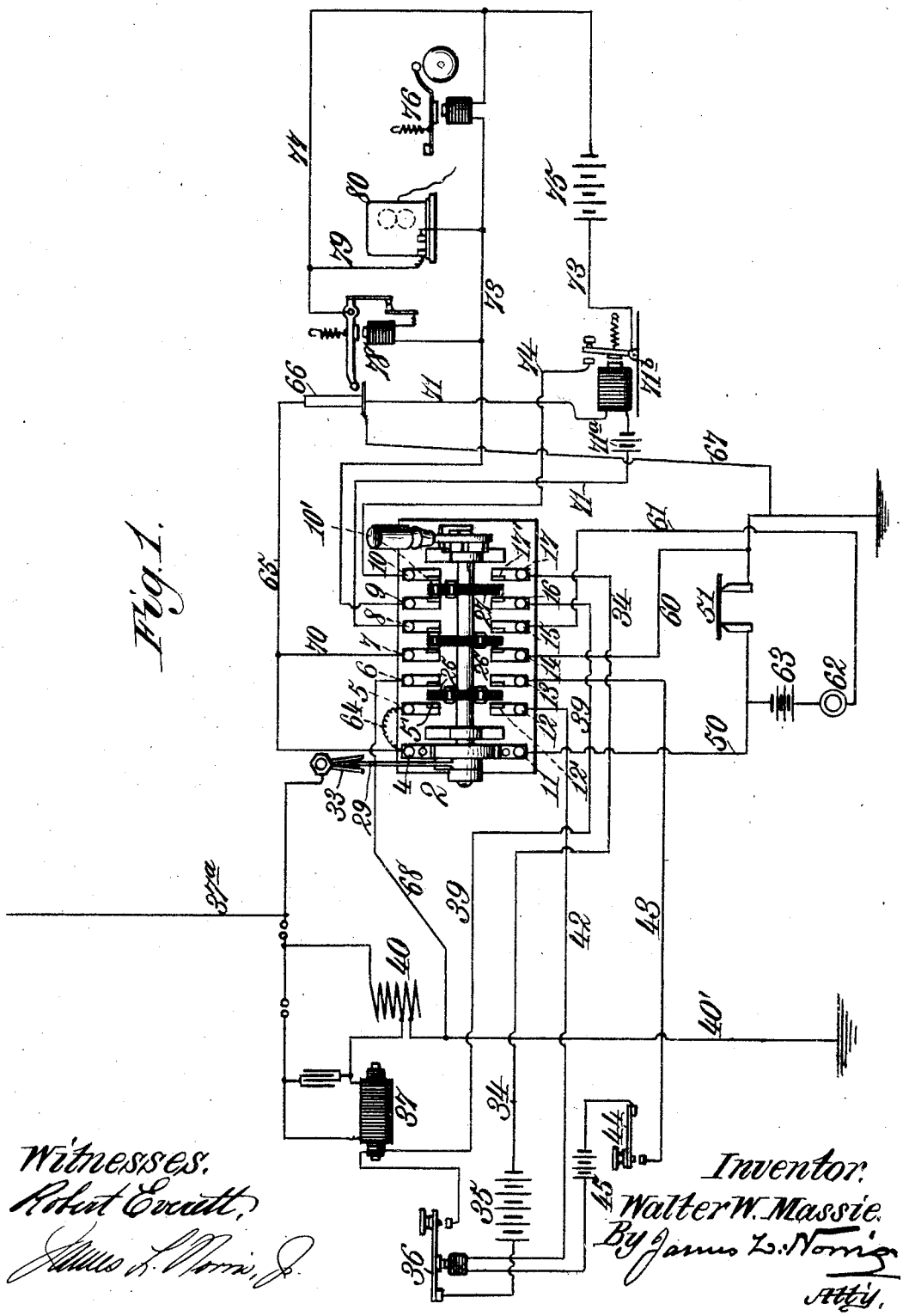
W. W. MASSIE.

WIRELESS TELEGRAPHIC SYSTEM.

APPLICATION FILED NOV. 1, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
Robert Everett,
James L. Norris, Jr.

Inventor.
Walter W. Massie.
By James L. Norris
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3 SHEETS—SHEET 2.

Fig. 2.

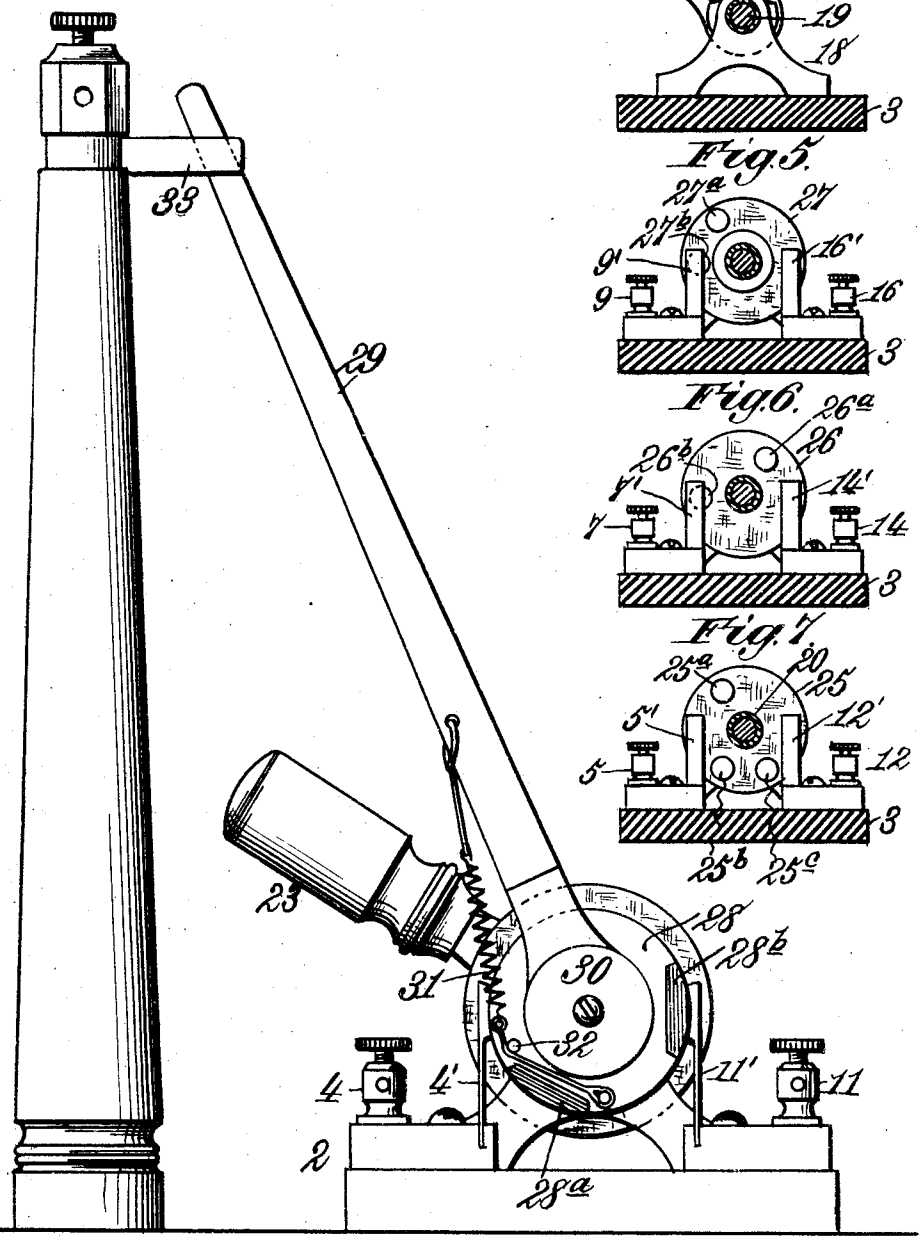

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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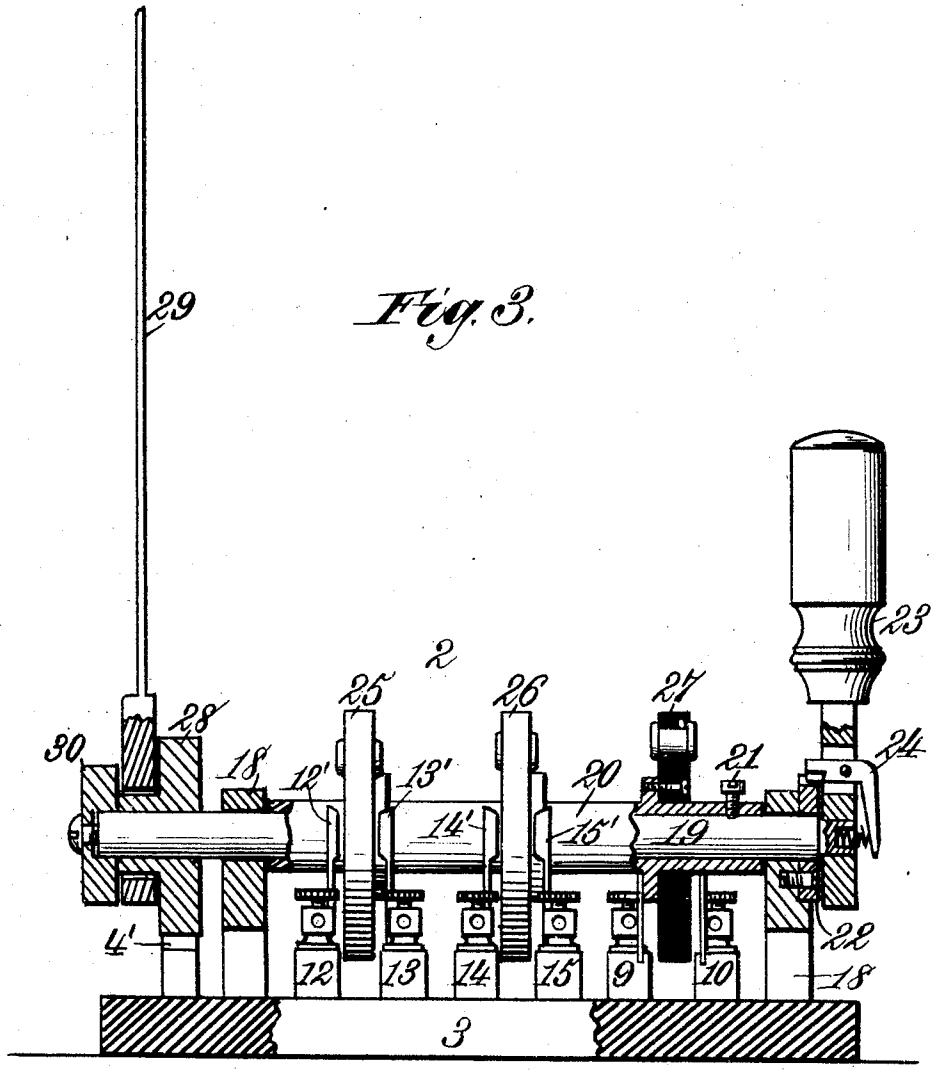
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER W. MASSIE, OF PROVIDENCE, RHODE ISLAND.

WIRELESS TELEGRAPHIC SYSTEM.

SPECIFICATION forming part of Letters Patent No. 787,780, dated April 18, 1905.

Application filed November 1, 1904. Serial No. 230,931.

To all whom it may concern:

Be it known that I, WALTER W. MASSIE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Wireless Telegraphic Systems, of which the following is a specification.

This invention relates to a wireless telegraphic system.

The system embodying my invention which, for convenience of indicating the advantages of said invention, I have selected for illustration in the drawings accompanying and forming a part of this specification involves at least three circuits, one of which I will term a "sending-circuit," while the other two I will term "receiving-circuits." The sending-circuit includes a sending or transmitting instrument, which may be of any suitable character—for example, a telegraph-key—while one of the receiving-circuits involves a suitable receiving instrument, which may be a telephone-receiver. The receiving device of the other receiving-circuit may be a so-called "tape-machine" or an alarm, such as a bell, or both. These details, however, are immaterial. In connection with the three circuits I provide means common thereto for closing the same in sequence. In the present instance the operation just named is secured by a switching device, a simple form of which I will set forth in detail in the following description.

It should of course be understood that I do not restrict myself to the disclosure made by the drawings and description, for material variations may be made within the scope of my claims succeeding said description, an important one of which is a system involving the three circuits, such as those hereinbefore briefly alluded to, in connection with an instrumentality, common to them all, for sequentially closing them by a single or continuous motion or for opening them in like manner. By the organization set forth the receiving instruments and the operator are wholly protected while sending, as it is impossible to send while either of the receiving-circuits is in use, said receiving-circuits being in the present case open and grounded, while the transmitting or sending circuit is closed and in operation.

In the drawings, Figure 1 is a diagrammatic view of a wireless telegraphic system involving my invention. Figs. 2 and 3 are respectively a side elevation and a sectional front elevation of a switching device constituting part of the system. Figs. 4 to 7, respectively, are transverse sectional elevations of the said switching device and are on a reduced scale.

The system involves, as a part thereof, a switching device, and that embodiment thereof shown in the drawings I have designated in a general way by 2. The different parts of the switching device may be mounted in any desirable manner. For example, they may be supported upon a bed or block, as 3, made of suitable non-conducting material, such as vulcanized rubber. Upon the bed or block 3 and at opposite sides thereof are two rows of binding-posts, the binding-posts in one row being designated by 4 to 10, inclusive, while the binding-posts in the other row are designated by 11 to 17, inclusive.

Associated rigidly in any desirable way with the bed 3 and on the outer surface thereof are bearings each designated by 18 and constituting a convenient support for the rock-shaft 19. Surrounding the rock-shaft 19, between the bearings, is an elongated sleeve 20, ordinarily made from brass, the shaft and sleeve being united together for turning movement in unison in any desirable way—for example, by means of a screw 21, carried by the sleeve and adapted to bind against the shaft.

A peripherally-indented disk 22 is shown as rigidly connected with one of the bearings 18, and one end of the shaft 19, to which I have alluded, extends through said disk and has fastened thereto the hub of a hand-lever 23, by which the rock-shaft can be turned to bring the same in the present case into three different positions which are respectively assumed upon the closing of the three circuits hereinbefore mentioned. The hand-lever 23 is provided with a spring-pawl 24, the effective portion of which is adapted to be thrust into any one of the three peripheral indentations in the disk 22 by the action of the spring of the pawl in order to positively but yieldingly

maintain the shaft in its three positions. The tension of the spring should be sufficient to prevent shifting of the hand-lever and shaft by ordinary jars or shocks, but is not sufficient to prevent the ready manipulation of the lever and shaft by the operator.

Rigidly fastened to the sleeve 20 in any desirable way are shown three disks of some suitable non-conducting material, such as vulcanized rubber, (designated by 25, 26, and 27, respectively,) and which disks are arranged to turn between the contact-strips 5′ to 10′, respectively, and 12′ to 17′, respectively, of the binding-posts 5 to 10 and 12 to 17, respectively. The contact-strips are connected to the bases of the coöperating binding-posts in any desirable way and are made of resilient material and ordinarily can be stamped from sheet-brass or in any other desirable way. As their ends are separated breaks are thereby provided in the several circuits, which breaks are adapted to be closed to secure different combinations by circuit-closers or bridging devices, which may be in the form of rivets extending through the several disks 25, 26, and 27, near the circumference thereof. The disk 25 has three of such bridging devices, (denoted by 25^a, 25^b, and 25^c,) while the intermediate and outer disks 26 and 27, respectively, have each only two of such bridging devices, as 26^a and 26^b and 27^a and 27^b, respectively. By turning the rock-shaft 19 under the action of the hand-lever 23 different combinations can be secured by causing the circuit-closers or bridging devices alluded to to extend across and in contact with the upper sides of the several perpendicularly-disposed contact-strips 5′ to 10′, respectively, or 12′ to 17′, respectively. Near the opposite end of the shaft 19, provided with the hand-lever 23, is suitably fastened the contact-wheel 28, which as it is turned is adapted to traverse the contact-strips 4′ and 11′, extending perpendicularly from the base of the binding-posts 4 and 11, respectively. Set into the periphery of the said contact-wheel 28 are the non-conducting-shoes 28^a and 28^b, respectively, the outer sides of which are adapted to engage the free portions of the two strips 4′ and 11′, respectively, when the shaft 19 is in different positions. Movably connected with the shaft 19 outside the contact-wheel 28 is the hub of a knife 29. In fact, said hub is loosely carried by said shaft to secure a relative motion between the knife and shaft, said knife constituting, as will hereinafter appear, a circuit-controller. The inner side of the hub of the knife 29 bears against the outer face of the contact-wheel 28, said hub, and consequently the knife, being held against displacement by a thin washer 30, fastened to the outer end of the shaft 19 in any desirable way. Between the knife and contact-wheel 28 is an extensible connection 31, indicated as a coiled pull-spring, one end of the spring being connected to the contact-wheel near its periphery, while the opposite end of said spring is connected to the knife at a point outward beyond the hub thereof. Upon the contact-wheel 28 is a laterally-extending and eccentrically-disposed stop or pin 32, which is adapted to abut against the knife 29 when the shaft 19 is in its first and second positions. The first position of the shaft or switch device *per se* is that where the bridge members 25^a and 25^c, respectively, of the disk 25 engage the upper sides of the contact-strips 12′ and 13′ and 5′ and 6′, respectively, and where the bridging device 27^b of the disk 27 engages the contact-strips 16′ and 17′, respectively. This is the sending position, the circuit-controller or knife 29 at this time being disconnected electrically with the vertical or antennæ. When the parts are in this relation, the pin 32 will be against the hub of the knife 29, while the spring-actuated pawl 24 will be in the first notch of the disk 22. By swinging the hand-lever over, the pawl can be carried into the second or intermediate notch, and during such swing the rock-shaft and several disks 25, 26, and 27 are turned, the knife 29 and contact-wheel 28 swinging therewith. When the pawl is in the intermediate notch, the parts will be in their receiving relations, the knife near its free end being engaged between the branches of a clip 33 in series with or forming a part of the vertical. To move the parts to the third position, the hand-lever will be swung farther over; but the knife will not move therewith by reason of its engagement with the clip 33 and its yieldable connection with the shaft 19, it being understood that in the second receiving position the knife must be in electrical connection with the vertical. During the second stage of the swinging motion of the hand-lever the pin 32 will be carried away from the knife. On the return motion from the third to the second position the pin will be carried against the knife, so that when the parts are moved from the second to the first position the pin by engaging the knife can swing the latter out of engagement with the clip 33.

From the binding-post 17 a conductor 34 extends to the primary of an induction-coil 37, said conductor being intersected by a generator, as 35, and a sending-key, as 36. From the post 16 a wire 39 extends to the primary of said coil. One terminal of the secondary of said coil is connected with the vertical 37^a, a spark-gap intervening, while the other terminal of said secondary is connected with the ground by way of the tuning-coil 40 and conductor 40′. I have described in a general way the connections comprising a wireless telegraphic sending-circuit. From the binding-posts 12 and 13 conductors 42 and 43 lead, constituting part of a local circuit involving an operating-key 44 and a generator, as 45. The sending-key 36 is not ordinarily actuated

directly by hand, owing to its size, but is preferably under the control of a magnet constituting part of the local circuit just alluded to and governed by the operating-key just mentioned. It will be apparent that when the parts of the switch are in the first position hereinbefore indicated—that is, when the strips 12′ and 13′ and 16′ and 17′ are bridged—the sending-circuit involving the key 36 is closed, and the same applies to the local circuit involving the operating-key, so that on the manipulation of the operating-key the sending-key will be actuated thereby under the influence thereof. When the parts are in the first position, the two receiving-circuits are grounded and are wholly electrically disconnected from the transmitting-circuit in order that the receiving instruments will be wholly protected from the heavy transmitting spark generated during the transmission of signals.

From the binding-post 11 a conductor 50 leads to ground, being intersected by the wave-responsive device 51. From the binding-post 14 a conductor 60 leads to the conductor 50 between the wave-responsive device and ground, while a conductor 61 leads from the post 15 to the conductor 50 at a point between said wave-responsive device and the post 11, said conductor 61 being intersected by a receiving device, such as a telephone-receiver 62 and a battery 63. A conductor 64 connects the binding-posts 4 and 5. From the binding-post 4 a conductor 65 extends to the coherer 66, the coherer being connected to ground by a conductor, as 67, while a conductor 68 extends from the binding-post 6 to ground. When, therefore, the hand-lever 23 is in its intermediate or second position, the bridging device 25^a on the disk 25 and the bridging device 26^b on the disk 26 will engage with the contact-strips 5′ and 6′ and contacts 14′ and 15′, respectively. During the shift of the hand-lever 23 from the first position to the second position the knife 29 is thrust between the branches of the clip 33, constituting a part of the vertical, thereby putting the latter and the knife in electrical connection. When in such second position, the peripheral shoe 28^a of the contact-wheel 28, which moves with the shaft, will be against the contact 4′, while the metal part of the wheel will be against the contact 11′ to secure an electrical connection between the wheel and contact 11′. The wave-responsive device 51 and telephone while the switch parts are in the second position will be in electrical connection with the vertical through the knife 29 and coöperating parts, and as the contacts 5′ and 6′ and 14′ and 15′ are bridged the second circuit, or the first receiving-circuit, will be closed for the reception of messages from the telephone-receiver 62. When the hand-lever is thrown to its third position, the circuit-controller or knife 29 will remain in engagement with the clip 33 by reason of its connection with the shaft 19; but the contact-wheel 28 will turn with said shaft, so as to carry the shoe 28^b thereon into engagement with the contact 11′, while the metal portion of the said wheel will engage the contact-strip 4′, so that the latter will be in electrical connection with the vertical, the same statement applying to the coherer 66. When in the third position, the bridging device 26^b on the intermediate disk 26 will engage the contacts 7′ and 8′, while the bridging device 27^b on the disk 27 will engage the contacts 9′ and 10′.

The binding-post 8 is connected with the coherer 66 by a conductor 71, intersected by a battery 71^a and a relay 71^b. When the strips 7′ and 8′ are bridged, the relay will be closed. From one of the contact-points of the relay 71^b to the binding-post 9 a conductor 73 extends, while the conductor 74 extends from the other contact of the relay to the binding-post 10. The conductor 73 is intersected by a generator, as 75, and bell 76. The loop-conductor 77 is connected with the conductor 73, and interposed in said loop-conductor is a tapper 78 for the coherer. Connected with said loop-conductor 77 and conductor 73 is a conductor 79, and interposed in the conductor 79 is a tape-machine 80.

I have described in a general way several circuits involving instruments ordinarily in use in wireless telegraphy and which circuits, as will be understood, are successively closed by a switching device, one form of which I have hereinbefore described in detail.

It will be apparent that when the sending-circuit is closed for use both receiving-circuits are open and grounded, so that no injury can result to the operator or receiving instruments while the operator is sending.

Ordinarily I employ in the third circuit a bell, and what I have described as the third position of the switching device is the normal one—that is, the bell-circuit or equivalent circuit is normally closed, so that when the bell or equivalent signaling device is operated this will indicate to the operator that a distant operator wishes to communicate with him, and in this case the hand-lever 23 is thrown to its second position, or that for closing the telephone receiver-circuit.

From the foregoing description it will be obvious that when the switch parts are in the first position, or that assumed in sending, the sending-circuit of course being closed, both receiving-circuits will be open and the coherer and responder therein are short-circuited and grounded, and that when the second circuit, or the first receiving-circuit, is closed the coherer 51 will be in the same relation as in the first position of the switch—that is, it will be short-circuited and grounded through the contacts 5′ and 6′.

It will be evident that my invention in wireless telegraphy involves three circuits, one of

which in the present case constitutes a sending-circuit, while the other two constitute receiving-circuits, and a means common to them for closing the same. The closure of the said circuits, as will be gathered, is a successive one. Each of the receiving-circuits, as will be understood, involves a wave-detector, and it naturally follows that I provide means common to these two circuits for closing them in desired order.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A wireless telegraphic system involving a sending and at least two receiving circuits, each of the latter involving a receiving instrument, and the receiving instruments being of different character, and a means common to the three circuits for closing them.

2. A wireless telegraphic system involving a sending and at least two receiving circuits, each of the latter having a wave-responsive device and a receiving instrument, the wave-responsive devices and receiving instruments each being of different character, and means common to the three circuits for closing them in desired order.

3. A wireless telegraphic system involving a sending and at least two receiving circuits, each of the latter having a receiving instrument, the receiving instruments each being of different character, and a means common to the three circuits for closing them in sequence and for protecting each receiving instrument while the sending-circuit is closed.

4. A wireless telegraphic system involving a sending and at least two receiving circuits, each of the latter having a wave-responsive device and a receiving instrument, the wave-responsive devices and receiving instruments each being of different character, and means common to the several circuits for closing them in succession and for protecting each receiving-circuit and the instrument therein while the sending-circuit is closed.

5. A wireless telegraphic system involving a sending and at least two receiving circuits, and means common to the several circuits for closing them in sequence, said means having a movable member provided with circuit-closing means, and a circuit-controlling member arranged for operation by said movable member during a portion only of its movement.

6. A wireless telegraphic system involving a plurality of circuits, and means common to said circuits for closing them in succession, said means having a movable member provided with circuit-closing means, and a circuit-controlling member arranged for operation by said movable member during a portion only of its movement.

7. A wireless telegraphic system involving a plurality of circuits, and means common to the several circuits for closing them in succession, said means having a movable member carrying non-conducting disks provided with circuit-controlling means, and a circuit-controlling member arranged for operation by said movable member during a portion only of its movement.

8. A wireless telegraphic system involving a sending and at least two receiving circuits, and means common to the several circuits for closing them in succession, said means having a shaft carrying circuit-closing means, and a circuit-controlling member associated with the shaft and arranged for operation by said shaft for a portion only of its movement.

9. A wireless telegraphic system involving a plurality of circuits, means common to the several circuits for closing them in succession, said means having a movable member provided with circuit-closing means, a circuit-controlling member arranged for operation by said movable member during a portion only of its movement, and means for holding the movable member positively in different positions.

10. A switching device for use in a wireless telegraphic system involving a movable member provided with circuit-closing means, a circuit-controller movably connected with said movable member, and an extensible connection between said circuit-controller and movable member.

11. A switching device for use in a wireless telegraphic system involving a movable member provided with circuit-closing means, a circuit-controller movably connected with said movable member, and a spring connecting the circuit-controller and movable member.

12. A switching device for use in a wireless telegraphic system involving a movable member provided with circuit-closing means, a contact-device rigidly associated with said movable member and provided with non-conducting portions, a circuit-controller movably connected with said movable member, and an extensible connection between the circuit-controller and movable member.

13. A switching device for use in wireless telegraphic systems involving a movable member, disks rigidly associated with the movable member and provided with circuit-closing means, a contact-wheel rigidly associated with said movable member and provided with peripheral shoes of non-conducting material, and a circuit-controller arranged for operation by said movable member during a portion only of its movement.

14. A switching device for use in wireless telegraphic systems, involving a movable member provided with circuit-closing means, a contact-wheel rigidly associated with said movable member, a circuit-controller movably connected with said movable member, a spring connecting the circuit-controller and contact-wheel, and a pin on the wheel to engage the said circuit-controller.

15. A wireless telegraphic system involving a sending and at least two receiving circuits and a means common to the several circuits for closing them in sequence, said means having a movable member provided with circuit-controlling means and a circuit-controlling member yieldingly connected with said movable member.

16. A switching device for use in a wireless telegraphic system, involving a movable member provided with circuit-closing means, and a circuit-controller yieldably connected with said movable member.

17. A switching device for use in a wireless telegraphic system, involving a movable member provided with circuit-closing means, and a circuit-controller yieldingly connected with said movable member, the latter being provided with means for positively operating said circuit-controller.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WALTER W. MASSIE.

Witnesses:
JOHN G. MASSIE,
FRANKLIN D. FORD.