

No. 752,150.

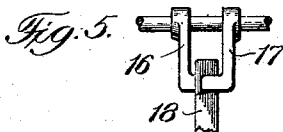
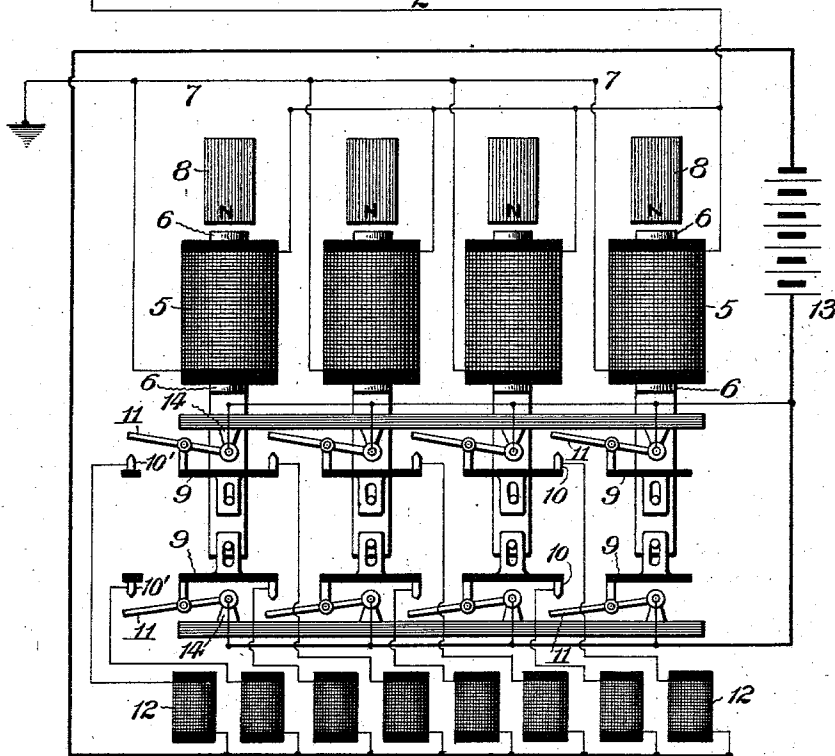
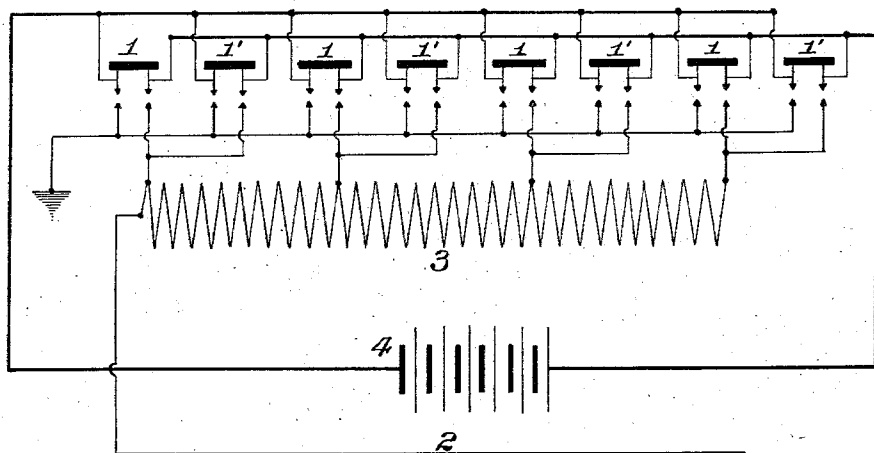
PATENTED FEB. 16, 1904.

J. A. GEHRUNG.
ELECTRIC SELECTIVE SYSTEM.
APPLICATION FILED FEB. 8, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



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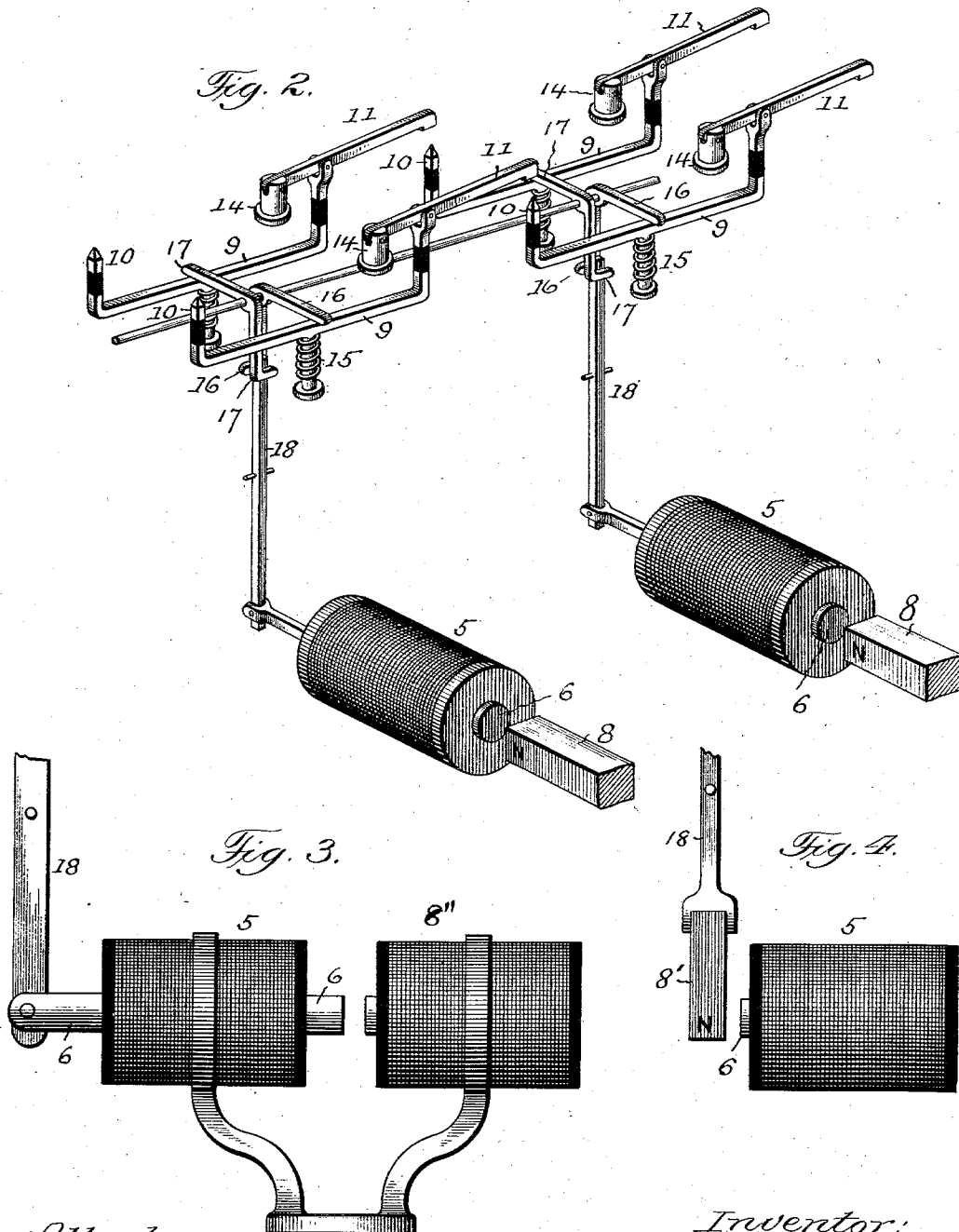
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JULIEN AUGUSTE GÉHRUNG, OF ST. LOUIS, MISSOURI.

ELECTRIC SELECTIVE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 752,150, dated February 16, 1904.

Application filed February 8, 1902. Serial No. 93,111. (No model.)

To all whom it may concern:

Be it known that I, JULIEN AUGUSTE GÉHRUNG, a citizen of the United States of America, and a resident of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Electric Selective Systems, of which the following is a specification.

The present invention relates to that particular type of electric selective systems which forms the subject-matter of my prior Letters Patent, No. 680,036, dated the 6th day of August, 1901, and in which a series of mechanisms at the receiving-stations are provided with interdependent actuating-electromagnets to constitute the automatic means whereby the particular electromotive impulse sent along the main line from the sending-station will only actuate the particular receiving mechanism or instrument for which it is intended; and the objects of the present improvements are to attain greater simplicity in construction, combined with greater accuracy and certainty in the operation of the system, and involves a construction and arrangement of the parts composing the series of mechanisms at the receiving station or stations in which the number of the component parts of such mechanisms are greatly reduced in number, and with which a correspondingly greater variation than heretofore can be made between each individual degree of the electromotive force employed to operate the system, all as will hereinafter more fully appear.

In the accompanying drawings, illustrative of the present invention, Figure 1 is a diagrammatic view illustrating the general arrangement of the mechanisms, circuits, and connections of the present improved electrical selective system; Fig. 2, a perspective view of a group of the selective mechanisms of the present invention. Figs. 3 and 4 are side elevations of a modified form of the operating-magnets of an individual selective mechanism. Fig. 5 is a fragmentary side elevation illustrating the individual operative connection of a pair of bell-crank levers with their common operating-lever.

Similar numerals of reference indicate like parts in the several views.

In the present system the same general arrangement of parts will be employed as that shown and described in my former patent, No. 680,036, of August 6, 1901, and will embrace a series of individual circuit-closers or sending-keys 1 at the sending-station, corresponding in number to the different signals or the like which it is required to send from the main sending-station to a corresponding number of individual receiving mechanisms located at one or more distant receiving points or stations. Each sending-key, as in my former patented construction, is adapted to introduce along the main line 2 an electrical impulse the strength or polarity of which differs from any of the other electrical impulses introduced along the main line by the other sending-keys of the series. The variations and differences in the strength or electromotive force of the different electrical impulses above referred to may be attained by any of the usual means or appliances known to the present art, preferably, however, a group of resistance-coils 3, arranged in series, as shown in Fig. 1.

As in my former patented construction, the corresponding series of receiving mechanisms will also have an interdependent connection, so that each particular mechanism will only respond and become active when an electrical impulse of a predetermined strength is sent along the main line from the sending-station.

In the present improvement the circuit-closers or sending-keys are connected up in pairs 1 and 1', as illustrated in Fig. 1 of the drawings. The arrangement is such that the sending-keys 1 of each of said pairs are adapted to send along the main line electrical impulses of varied or diverse degrees and of an electropositive nature, while the other sending-keys 1' of said pairs are adapted to send electrical impulses of like varied or diverse degrees but of a different polarity, and such different natures of the electrical impulses are adapted in manner hereinafter more fully set forth to coact with the other novel features of the present invention in the attainment of a simplicity of parts, combined with increased accuracy and certainty of operation. To this

end the signal-receiving mechanism corresponding to the sending-keys are divided into two groups or sets, and each opposed pair of such groups has in turn operative connection with a single selective or operating electromagnet 5, the arrangement being such that with the passage of an electrical impulse of the proper strength and of one polarity through such electromagnet the armature or core of the same will be moved in one direction to operate one of said pair of receiving mechanisms, the companion receiving instrument remaining dormant, and with the passage of an electrical impulse of the like strength but of an opposite polarity through said electromagnet the previously-dormant receiving mechanism will be actively operated, while the previously-active receiving mechanism will be left in a dormant condition. As so arranged but one-half the number of selective electromagnets 5 required in my former patented construction are required to perform a like range of work with the present construction, and accordingly the material features of the present invention will comprise, first, a construction and interdependence of parts whereby with the passage of an electrical impulse of one polarity through one of the selective electromagnets 5 its armature 6 will be attracted and with the passage of a like electrical impulse of an opposite polarity said armature will be repelled, and, second, independent operative connections between said armature and the above-mentioned pair of receiving mechanisms whereby with an attraction of said armature by its operating-electromagnet one of said mechanisms will be independently operated, and with a repulsion of said armature the other of said pair of mechanisms will be independently operated.

In the construction shown in Figs. 1 and 2 as illustrative of the present invention, 5 represents the series of selective and operating electromagnets, the windings of which are preferably arranged in parallel and connected at one end with the main-line wire 2 and at the other end with a return wire or conductor 7, which may extend to ground or to a pole or terminal of the main-line battery 4 or other source of electromotive force, as may be found most desirable. As in my former patented construction, the electromagnets 5 will have progressively-varied or diverse electromotive powers or intensities and which correspond with the progressively varied or diverse electromotive forces of the electrical impulses sent along the main line 2 by the series of sending-keys aforesaid. For example, the first pair of sending-keys aforesaid to the right in Fig. 1 are adapted to send electrical impulses of the maximum strength of the battery along the main line, and each succeeding pair of such sending-keys to the left are adapted to send electrical impulses of a proportionately less strength along

the main line, and in like manner a corresponding difference in the resistance or torque of the different electromagnets 5 will prevail—*i. e.*, the electromagnet to the extreme left in Fig. 1 will be formed in any usual and suitable manner with a minimum degree of resistance or torque and each succeeding electromagnet will have a proportionately-increased degree of resistance or torque until the maximum is reached in the electromagnet 5 to the right.

Various types of operating-electromagnets may be employed in effecting the operations of the present invention, and accordingly the scope of the present invention is not limited to any precise form or arrangement of the same, the only vital requisite being that with a current of one polarity the armature or core will be attracted and with a current of an opposite polarity the armature or core will be repelled. In Figs. 1 and 2 I show a solenoid type of electromagnet and in which the armature or core is either attracted or repelled by a stationary magnet 8, according as a positive or negative polarity is employed to energize the electromagnet. In Fig. 4 the said armature is shown as formed by a movable magnet-bar 8', which is also adapted to be attracted or repelled in accordance with the use of a positive or negative polarity in the electrical impulse which energizes the electromagnet. It is within the province of this part of the present invention to form the magnet 8 or the magnet-bar 8' of a permanently-magnetized steel bar or by an electromagnet 8'', as illustrated in Fig. 3, in which a constant electric current is maintained during the operation of the system. In such Fig. 3 the electromagnets 5 and 8'' are stationary, and the core 6 has movement to operate the lever 18, hereinafter described.

The receiving or signaling mechanisms above referred to are substantially similar in construction to that of my former patent and will in detail comprise an arrangement of parts as follows: 9 is a movable yoke or head operatively connected in the manner herein-after described to the armature of its operating-electromagnet 5 and carrying in insulated condition a contact-point 10 and a contact-finger 11, which finger is adapted under certain conditions to contact with the contact-point on the next adjacent movable yoke or head to close the local-battery circuit to in turn operate the actuating-electromagnet 12, by which the particular signal is recorded or otherwise employed and which under other conditions is adapted to prevent such closure of the local circuit upon and the consequent operation of such particular electromagnet 12.

The first-mentioned condition, just stated, will prevail when the electrical impulse passing along the main line does not possess the requisite strength to operate the selective and

operating electromagnet 5 of the second or last-mentioned yoke or head 9 but which possesses the requisite strength to actuate the selective and operating electromagnet of the first-mentioned yoke or head 11.

The other condition, before referred to, will prevail when the electrical impulse passing along the main line has sufficient strength to actuate the operating-electromagnets of both the above-mentioned yokes or heads. Accordingly with the sending of an electrical impulse of a predetermined strength along the main line the same will actuate all of the selective operating-electromagnets 5 which have a lesser resistance until an electromagnet is reached which is incapable of actuation by such predetermined strength of the electrical impulse, and in consequence the local circuit will be closed at this point only to operate a predetermined local actuating-electromagnet 12, by means of which the signal is recorded or otherwise utilized. This operation is due to the fact that the contact-point 10 of such last-mentioned selective and operating electromagnet retains its position to enable the companion contact-finger 11 of the next preceding selective and operating electromagnet to have electrical contact therewith to close the described particular local circuit, and to the further fact that all the other contacts are either dormant or have been moved out of the way from establishing any other circuit than the one above mentioned under the prevalence of the described conditions.

In the present as in my former improvement the last selective electromagnet 5 of the series will have its contact-point 10' corresponding to the contact-point 10 of the remainder of the series in the form of a stationary point or post, as shown.

With the release of the sending-key used by the operator the main-line circuit will be broken and the various parts will automatically return to a normal position, ready for subsequent use.

In my preferred mechanical construction of the receiving mechanisms, as illustrated in Fig. 2 of the drawings, 10 represents a series of insulated contact-points carried by the series of vertically-moving yokes or heads 9 and individually connected to the series of local electromagnets 12 aforesaid and through the same to one pole of the local battery 13 of the receiving point or station. 11 represents a series of movable and insulated contact-fingers pivotally connected to the series of vertically-moving heads 9. Such contact-fingers are connected by individual branch conductors with the other pole of the local battery 13 aforesaid, and their free ends are adapted under the conditions heretofore described to close the local circuit through the contact-point 10 of the next adjacent yoke or head 9 upon the particular actuating-electromagnet 5.

14 represents a series of stationary fulcrum-blocks, to which the movable contact-fingers 11 are fulcrumed at one end and which are adapted to normally hold such contact-fingers 11 out of contact with its companion contact-point 10 on the next adjacent movable head or yoke. 15 represents a series of individual springs, tending to normally hold the series of yokes or heads 9 in an elevated position. 16 and 17 represent a series of counterpart bell-crank levers, individual to their particular yoke or head 9 and which in the present invention are arranged in pairs to form two independent groups to correspond with the heretofore-described twin-group arrangement of the other parts of the present invention. In the construction shown the pendent arms of the said bell-crank levers will have adjacent and parallel relation. 18 represents a series of intermediate operating-levers, one to each selective electromagnet 5 and to a pair of bell-crank levers 16 and 17. At one end said levers are pivotally connected to the respective armatures of the electromagnets 5, while at their other ends the said levers have engagement between the pairs of bell-crank levers 16 and 17, as shown, the construction being such that with a movement of any one of said levers 18 in one direction an independent movement will be imparted to one bell-crank lever, while a movement of said lever 18 in an opposite direction will impart an independent movement to the other bell-crank lever. By such arrangement as just described an electrical impulse of a positive nature is adapted to operate a selective or receiving mechanism of one group, while an impulse of a negative nature is adapted to operate a selective or receiving mechanism of the other group.

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

1. In an electrical selective system of the character herein described, the combination of a main line, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selected electromagnets having correspondingly-graded electromotive forces, and two groups of interdependent circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, substantially as set forth.

2. In an electrical selective system of the character herein described, the combination of a main line, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and each comprising an electromagnet, an armature and a constant magnet, and two groups of interdependent circuit-closers arranged

parallel with opposing pairs operatively connected to a single selective electromagnet, substantially as set forth.

3. In an electrical selective system of the character herein described, the combination of a main line, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, substantially as set forth.

4. In an electrical selective system of the character herein described, the combination of a main line, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and two groups of interdepending circuit-closers arranged in parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, the final contact-point of the series having a fixed position, substantially as set forth.

5. In an electrical selective system of the character herein described, the combination of a main line, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, the said contact-fingers comprising bars fulcrumed at one end to stationary brackets and pivotally connected at their middle with individual yokes obtaining movement from the selective electromagnets, substantially as set forth.

6. In an electrical selective system of the character herein described, the combination of a main line, a source of electromotive force, an electrical resistance divided into sections connected in series, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive

forces, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, substantially as set forth.

7. In an electrical selective system of the character herein described, the combination of a main line, a source of electromotive force, an electrical resistance divided into sections connected in series, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and each comprising an electromagnet, an armature and a constant magnet, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to a single selective electromagnet, substantially as set forth.

8. In an electrical selective system of the character herein described, the combination of a main line, a source of electromotive force, an electrical resistance divided into sections connected in series, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, substantially as set forth.

9. In an electrical selective system of the character herein described, the combination of a main line, a source of electromotive force, an electrical resistance divided into sections connected in series, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive forces, and two groups of interdepending circuit-closers arranged in parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, the final contact-point of the series having a fixed position, substantially as set forth.

10. In an electrical selective system of the character herein described, the combination of a main line, a source of electromotive force, an electrical resistance divided into sections connected in series, a series of sending-keys adapted to send varied or diverse electrical impulses of different polarities along the main line, a series of selective electromagnets having correspondingly-graded electromotive

forces, and two groups of interdepending circuit-closers arranged parallel with opposing pairs operatively connected to single selective electromagnets, one contact-finger of each
5 local-circuit closer being controlled by one selective electromagnet and the companion contact-point by the next adjacent selective electromagnet, the said contact-fingers comprising bars fulcrumed at one end to stationary
10 brackets and pivotally connected at their mid-

dle with individual yokes obtaining movement from the selective electromagnets, substantially as set forth.

Signed at St. Louis, Missouri, this 3d day of February, 1902.

JULIEN AUGUSTE GÉHRUNG.

Witnesses:

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EUGÈNE S. GÉHRUNG.