

No. 699,177.

Patented May 6, 1902.

F. E. HUGGINS.
ELECTRIC CALL SYSTEM.

(Application filed Apr. 12, 1901.)

(No Model.)

2 Sheets—Sheet 1.

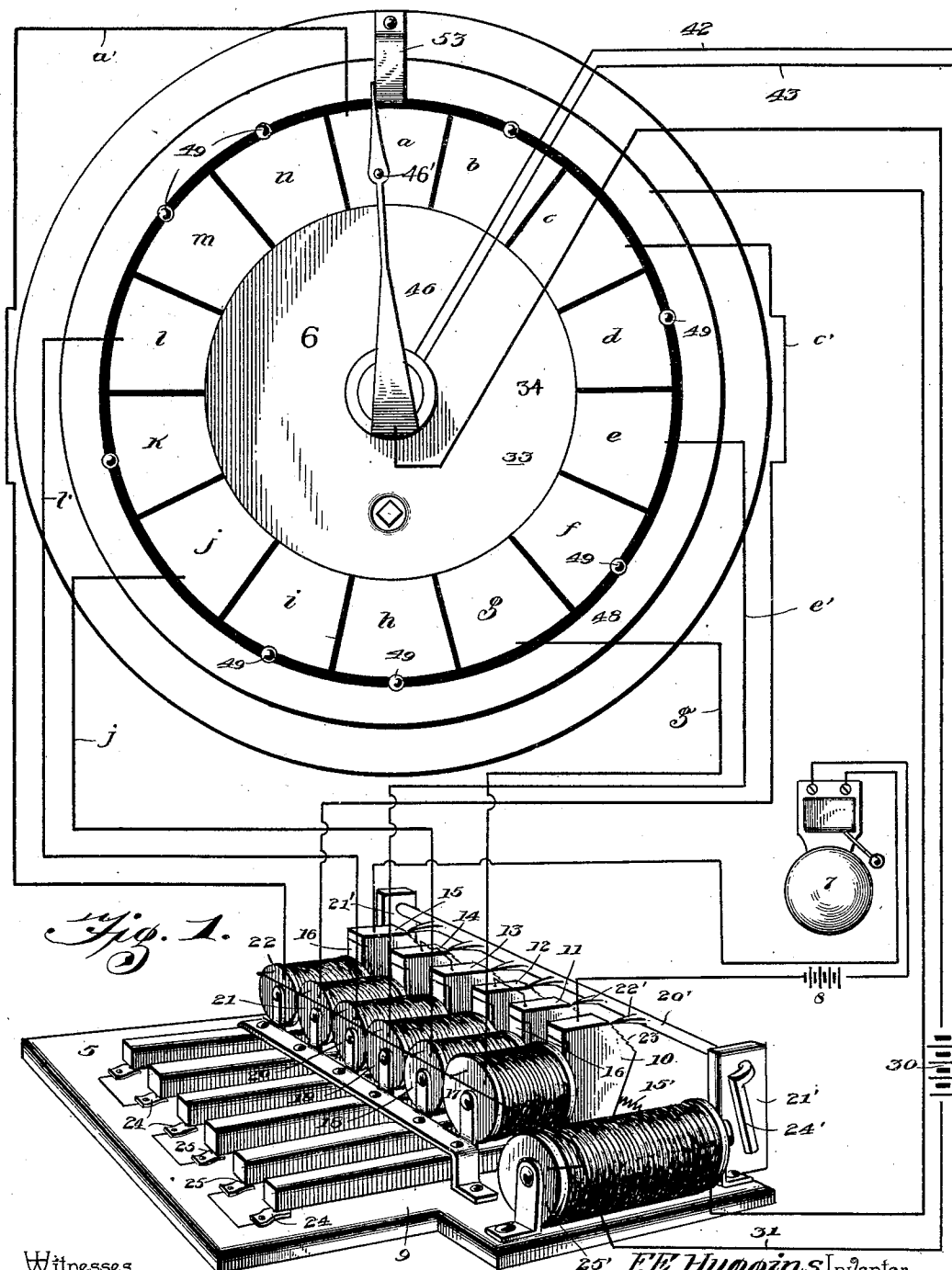


Fig. 1.

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2 Sheets—Sheet 2.

Fig. 2.

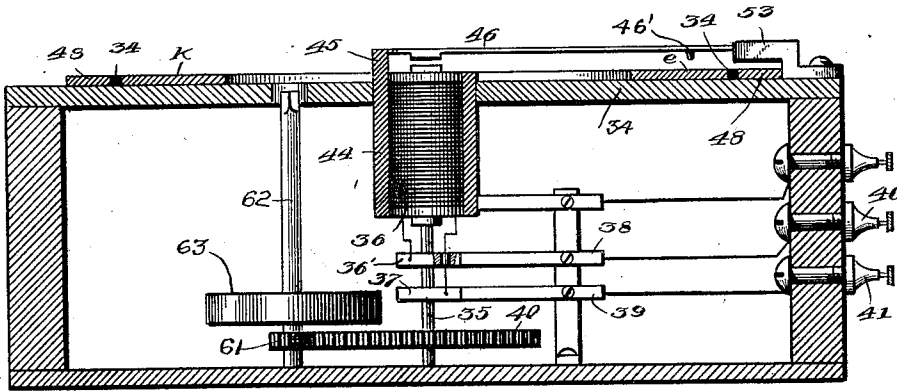
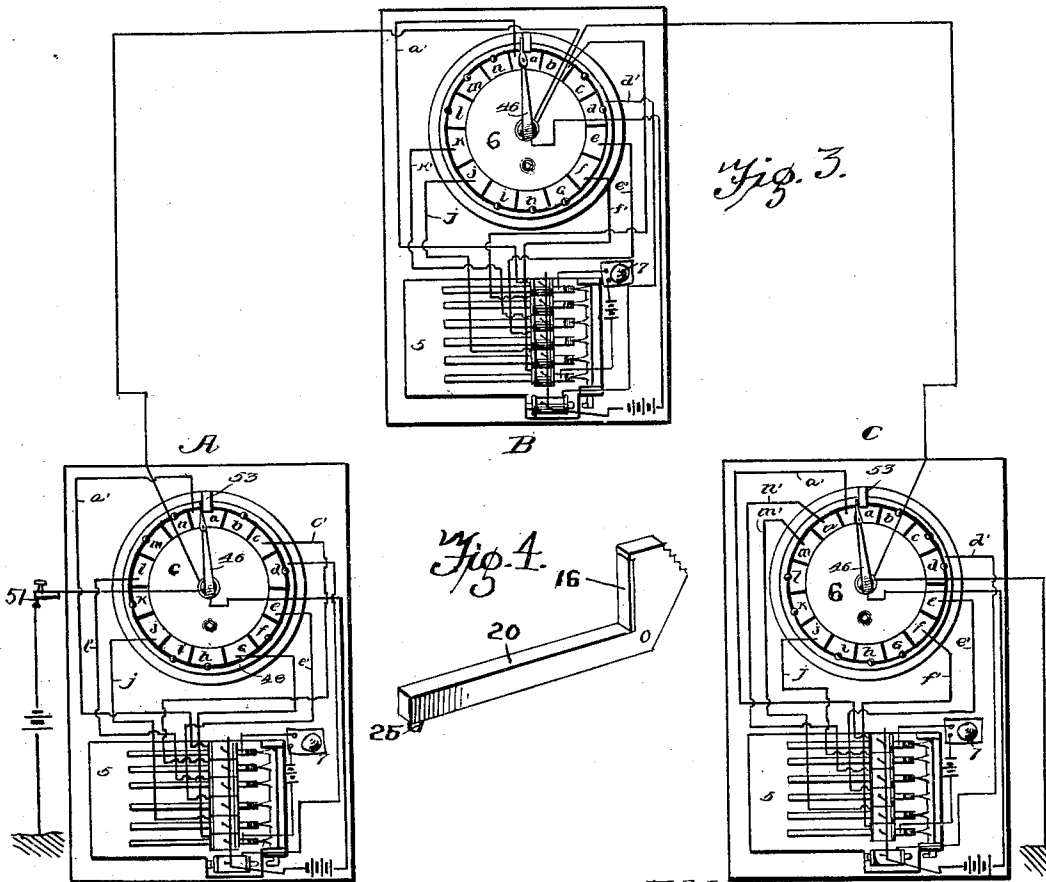


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK EMER HUGGINS, OF ZEANDALE, KANSAS.

ELECTRIC CALL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 699,177, dated May 6, 1902.

Application filed April 12, 1901. Serial No. 55,525. (No model.)

To all whom it may concern:

Be it known that I, FRANK EMER HUGGINS, a citizen of the United States, residing at Zeandale, in the county of Riley and State of Kansas, have invented a new and useful Electrical Call System, of which the following is a specification.

This invention relates to call systems; and it has for its object to provide a construction and arrangement wherein each station will be provided with a selecting device adapted to close the circuits of a series of switch-magnets successively to close a local alarm-circuit, the construction and arrangement of the parts of the system being such that the switch-magnets will be responsive only to certain timed pulsations through the selecting device, so that any one of the switch mechanisms may be operated to close its alarm-circuit without similar operation of any other switch mechanism.

Further objects and advantages of the invention will be apparent from the following description.

In the drawings forming a portion of this specification, and in which like characters of reference indicate similar parts in the several views, Figure 1 is a view showing the local switch and alarm, one in perspective and the other in elevation, and showing the selecting device in top plan, the circuits and batteries being indicated in diagram. Fig. 2 is a vertical section taken diametrically through the circuit-closer. Fig. 3 is a diagram showing three of the instruments connected in a line for operation one from another. Fig. 4 is a detail perspective view of one of the levers of the switch mechanism.

Referring now to the drawings, at each station there is disposed an instrument including a switch 5, a selecting device 6, and an alarm 7, having a local battery 8, to be closed by the switch through the alarm, to sound the latter. The switch, as shown, consists of a base 9, upon which are pivoted the levers 10, 11, 12, 13, 14, and 15, each of which consists of a horizontally-disposed stem and a head at one end projecting vertically therefrom, the levers being so pivoted that their head ends are normally depressed, while the opposite ends are normally raised, this position of each lever being insured by a helical

spring 15, attached at one end to the head and at the opposite end to the base of the switch. The levers are each of brass or other suitable metal of high conductivity, and the vertical face of each head adjacent to the opposite end of the lever is provided with an armature 16, and for the armature of each of the levers 10, 11, 12, 13, 14, and 15 there is provided an electromagnet 17, 18, 19, 20, 21, and 22, respectively, mounted upon a support 23, secured to the base, and as each magnet is energized it attracts its respective armature to raise the head end of the corresponding lever. On the base 9 are mounted the contact-springs 24, one of which is disposed beneath the end of a lever farthest from the head thereof, and on each lever is a contact-pin 25, which when the lever is moved under the influence of its magnet is brought into contact with the spring 24 therebelow. Lever 10 at its head end is connected with one terminal of battery 8, the other terminal being connected with the head end of the lever 15 through the bell 7. The heads of the levers 11 and 12 are connected electrically, as also are the heads of levers 13 and 14, as shown. The spring under lever 10 is connected to spring under lever 11, spring under lever 12 is connected to spring under lever 13, and spring under lever 14 is connected to spring under lever 15. Thus if the several magnets be energized they will shift their respective levers to engage the contact-pins with the contact-springs therebelow, and the levers will thus be connected in series in the circuit of battery 8 and will close the circuit of said battery to sound the bell, it being noted that it is necessary that all of the levers be with their heads in raised positions and their opposite ends lowered to accomplish this result. In order that each magnet need be only momentarily energized to rock and set its lever, a shaft 20' is rockingly mounted in uprights 21' on the base 9, and has a series of spring fingers or pawls 22', which lie against the serrated inclined faces 23' of the heads of the levers, so that when a lever is rocked by attraction of its magnet the spring-finger by engagement with the serrations will hold the lever against return movement, the spring quality of the fingers permitting movement of the heads. When all of the levers have

been set and it is desired to release them to permit them to return to break the alarm circuit, it is only necessary to rock the shaft 20', when the pawls will be raised from the serrated faces of the heads of the levers and the levers will drop back to their former positions to raise the contact-pins from the springs thereunder, it being understood that the magnets are at such time deenergized.

- 10 To rock the shaft 20', it is provided with a lever 24' at one end and which is provided with an armature or forms an armature of a releasing-magnet 25' in the field of force of which it is disposed. When this releasing-magnet is energized, it attracts the armature, and the shaft is rocked and the pawls are raised.

- To energize the several magnets of the switch and the releasing-magnet, a battery 30 is provided, to one terminal of which one terminal of the winding of each magnet is connected through the wire 31 and the other terminal of the battery is connected with the contact-finger 46 of the selecting device 6. This selecting device consists of a casing, upon which is disposed an annular series of segmental plates *a, b, c, d, e, f, g, h, i, j, k, l, m, and n*, the several plates being of metal and mounted upon an insulating-plate 34, forming the top of the casing. Within the casing is disposed a clock mechanism, including a spindle 35, which projects upwardly and upon the end of which and coaxially therewith is mounted an electromagnet 36, the terminals of which are connected with the collector-rings 36' and 37, mounted upon and insulated from the spindle 35, and in contact with these rings are brushes 38 and 39, electrically connected with posts 40 and 41, and with these posts are connected the line-wires. (Shown in Fig. 1 in diagram at 42 and 43.)

- To rotate the spindle 35 it is provided with a gear 60, which engages a pinion 61 on the winding-spindle 62, which is provided with a common form of spiral spring 63, the spring, spindle, and gearing forming a motor for rotating the spindle 35.

- The magnet is rotatable with the spindle, and it has a brass or other metal jacket 44, at the upper end of which is a stud 45, on which is mounted a spring-finger 46, which projects diametrically across the pole of the electromagnet and above and beyond the annular series of contact-plates, aboved referred and lettered, and this finger has an armature 47 attached to its under face and directly above the magnet 36, so that when the latter is energized the finger will be drawn down with its contact 46' into engagement with whatever contact-plate it may be over, but without engaging the ring 48, it being understood that as the spindle 35 rotates, and therewith the magnet 36, the finger is rotated, so that its outer end traverses the entire series of contact-plates.

As above stated, one terminal of each magnet is connected to the battery. The oppo-

site terminals of the magnets or their windings are connected as follows: 22 is connected to plate *a* by wire *a'*. 21 is connected to plate *c* by wire *c'*. 20 is connected to plate *l* by wire *l'*. 19 is connected to plate *e* by wire *e'*. 18 is connected to plate *j* by wire *j'*, and 17 is connected to plate *g* by wire *g'*, the second terminal of magnet 25' being connected to an annular metal plate 48, mounted upon the insulating-plate that carries the contact-plates of the selecting device 6 and insulated from the said contact-plates. Each of the plates to which no magnets are connected are connected electrically with the annular plate 48 by interposed plugs 49. Thus if the contact-finger 46 be rotated over the series of segmental contact-plates and if the magnet 36 be energized at the proper times this finger will be drawn downwardly and into contact with the plates *a, c, e, g, j, and l*, successively, and the magnets 17, 18, 19, 20, and 21 will be successively energized to shift their respective levers so that the local circuit of the battery 8 will be closed through the bell to actuate the latter. If, however, the finger 46 be drawn downwardly to contact with one of the remaining contact-plates, the circuit of the local battery will be closed through magnet 25, and the rock-shaft will be operated to raise the pawls from the heads of the circuit-closing levers to permit them to return and break the circuit of battery 8.

As shown in Fig. 3 of the drawings, the magnets 36 of all of the instruments included in a main-line circuit running from a central office are connected in series in the main line, which latter is provided with the battery 50, and at said central office is a key 51 for opening and closing the main-line circuit to send the proper pulsations through the magnets 36 of all of the selecting devices 6 at the various stations A B C.

In station A the plates are connected as above described, in station B it is the contact-plates *a, b, e, f, j, and k* that are connected with the magnets, and in station C it is the plates *a, e, f, j, m, and n* that are connected.

The operation of the apparatus is as follows: Each selecting device has a stop-block 53 in the path of rotation of the finger 46 when the latter is in raised position. When the operator or train-despatcher, for instance, at the central office and in control of the key 51 wishes to call up any particular station—say A—without sounding the alarm 7 at any other station, he opens his key for a length of time sufficient to permit all of the contact-fingers 46 to move to positions against their respective stops 53. The fingers are thus all over the plates *a* and are at rest, the main-line circuit being open. The operator at the key 51, having a chart before him showing the combination of plates necessary to be contacted to operate the selecting device at A to actuate the switch and close the alarm-circuit, closes the key, and the fingers 46 of

all selecting devices are drawn down by the energization of the magnets 36 from contact with the sides of the stops 53, permitting the clockwork or motor to act and rotate said finger. This downward movement of the finger 46 causes a contact-point 46' thereon to come into contact with the plate *a*, and as this contact-plate at station A is connected to electromagnet 22 said magnet will be energized and attract its lever 15. The key is then raised, and the finger 46 of each selecting device is permitted to rise and rotate until over plate *c*, when the key is again closed and magnets 36 are energized to draw down all of the fingers 46 on their respective plates *c*, energizing magnet 21 at station A, but energizing magnets 25 at the other stations by reason of the fact that plates *c* at the other stations are plugged to the contact-ring plate 48, which is connected direct to that terminal of magnet 25 opposite to that connected to the local battery. The rock-shaft is then operated, and the pawls at stations B and C are raised to permit levers 15 to return to their original positions. The key is depressed to close the line-circuit when fingers 46 are over plates *e*, *g*, *j*, and *l*, and as plate *l* in the instruments at B and C is plugged to ring 48, when the circuit of the battery 8 is finally closed by energizing all of the switch-magnets and rocking their levers, the rock-shaft of each of the other instruments is operated to release the levers held thereby. Thus the bell at A will be sounded and will continue to sound until the key is raised or the main-line circuit is otherwise broken. When B is to be called, the main line is closed in the same manner when the fingers are over the plates, which in the relay at B are connected to the switch-magnets, it being understood that the motors in the several instruments are such as to cause the fingers to move in unison.

The most simple form of the device would be that in which only one electromagnet is employed at each station and connected to one of the contact-plates of the selecting device; but such a construction would limit the number of stations to the number of plates employed. Thus, in the present case, where fourteen plates are employed, the system could be used for only fourteen stations, but where a combination of two magnets are used nearly one hundred different stations could be called on the same line and a correspondingly greater number with three or four or more magnets, as the case may be.

After a station is called telegraph or telephone instruments may be shifted into the main line and the calling mechanisms cut out, as will be understood. It is not necessary, however, that the telephone or telegraph instruments be cut out during the operation of the calling instruments.

What is claimed is—

1. A call system including a main line and its battery, instruments each including an

alarm, an electrically-operated switch for closing the circuit of the alarm, and a selecting device for closing the circuit of the switch, the selecting devices being connected in series in the main line and the switches being responsive to differently-timed electrical impulses in the main line.

2. A call system including a main line and its battery, instruments each including an alarm, an electrically-operated switch for closing the alarm-circuit, and including a series of electromagnets, and a selecting device having individual circuits for the separate magnets, contact-plates included therein and a contact-finger adapted to traverse the plates, the selecting devices being included in series in the main line, and having different plates connected with the switch-magnets.

3. A call system including a main line and its battery, a plurality of selecting devices connected in the main line and each comprising a movable contact and a series of fixed contacts for successive engagement thereby, a signal-circuit at each selecting device including a signal and battery, a switch for each signal-circuit including sections movable into and out of series relation to close and open the signal-circuit, an electromagnet for actuating each switch-section, each magnet having one terminal connected with the movable contact of the selecting device through a source of electricity, and its opposite terminal connected with a fixed contact of the selecting device, the different selecting devices having different groups of fixed contacts thus connected.

4. A call system including a main line and its battery, a plurality of selecting devices connected in the main line and each comprising relatively fixed and movable contacts for engagement one by the other, a signal-circuit at each selecting device including a signal and source of electricity, a switch for each signal-circuit including sections movable into and out of coöperative relation to close and open the signal-circuit, an electromagnet for actuating each switch-section, each magnet having one terminal connected with the movable contact through a source of electricity and its opposite terminal connected with a fixed contact of the selecting device, means for holding the switch-sections in positions to close the signal-circuit, and releasing mechanism including an electromagnet connected between the movable contact and all of the fixed contacts that are not connected with the switch-magnets, the different selecting devices having different groups of fixed contacts connected with the magnets of their respective switches.

5. A call system including a main line and battery, a plurality of selecting devices connected in the main line and each including an annular series of fixed contacts and a rotatable contact adapted for movement against each of the contacts when correspondingly moved, an electromagnet for moving the hand

against each contact when positioned adjacent thereto, said magnets being connected in series in the main line, means for rotating the hand, a signal-circuit at each selecting
5 device including a signal and source of electricity, a switch for each signal-circuit including sections movable into and out of co-operative relation to close and open the signal-circuit, an electromagnet for moving each
10 switch-section into closed position, each magnet having one terminal connected with the contact-finger of its selecting device through a source of electricity and its opposite terminal connected with a fixed contact thereof,
15 means for holding the switch-sections in

closed positions, and releasing mechanism including an electromagnet connected between the contact-finger and the fixed contacts that are not connected with the switch-magnets, the selecting devices having different groups
20 of fixed contacts connected with the switch-magnets.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANK EMER HUGGINS.

Witnesses:

BELA D. MOORE,
C. T. SHIPPS.