G. L. ANDERS.

Electric Call-Bells.

No. 219,059. Patented Sept. 2, 1879.

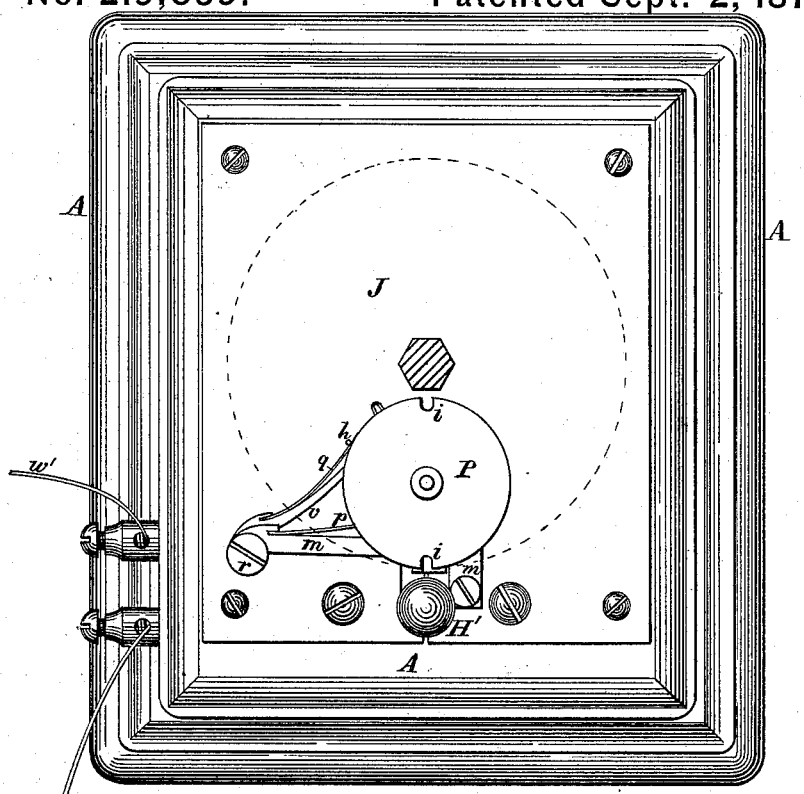

FIG. 1.

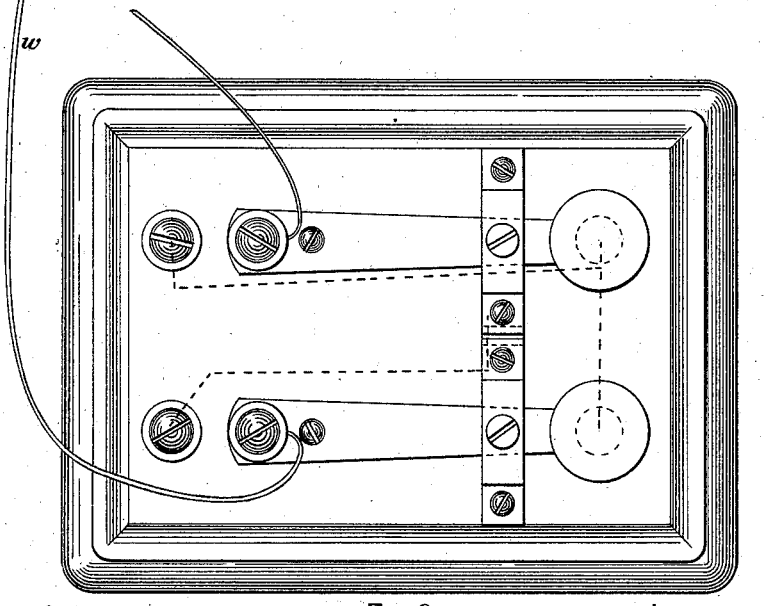

FIG. 2.

WITNESSES.

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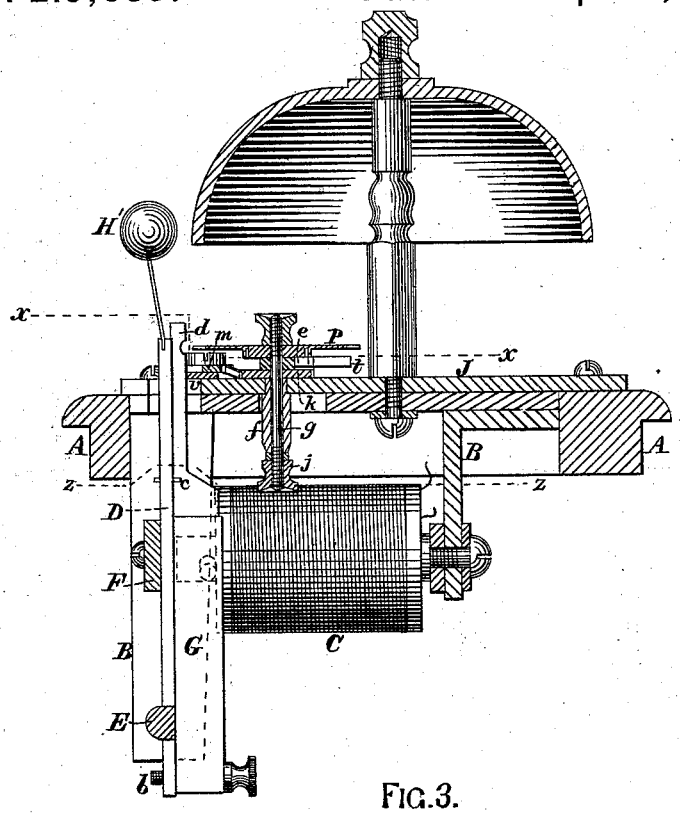

FIG. 3.

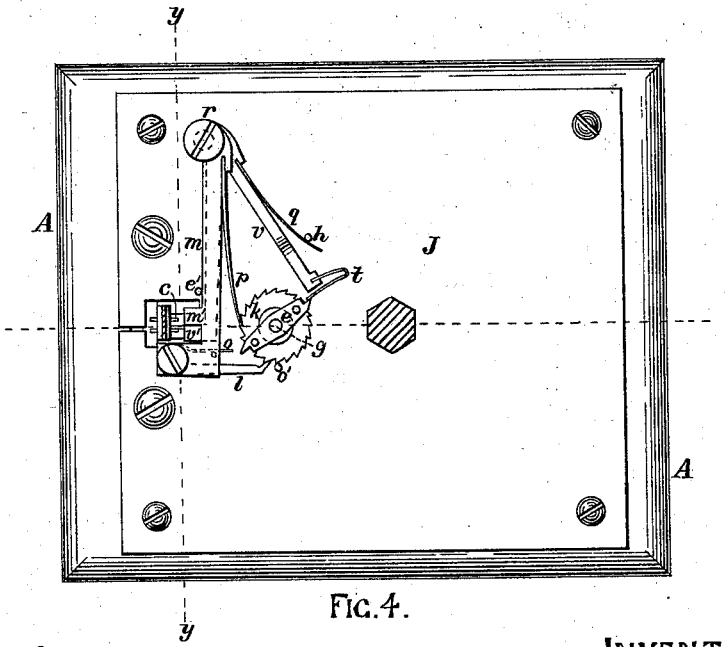

FIG. 4.

WITNESSES.

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No. 219,059. Patented Sept. 2, 1879.

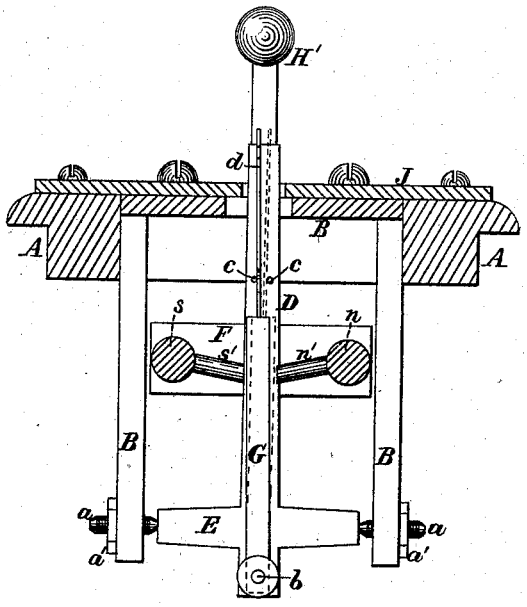

FIG. 5

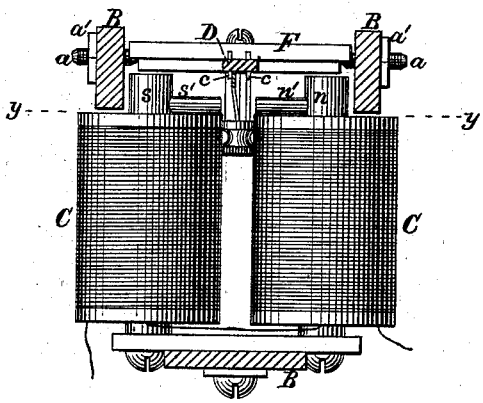

FIG. 6.

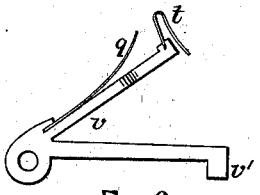

FIG. 9.

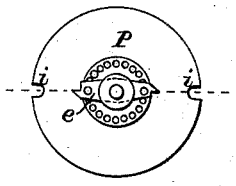

FIG. 7.

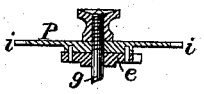

FIG. 8.

WITNESSES.

William W Swan

H. L. Olmsted

INVENTOR.

George Lee Anders

UNITED STATES PATENT OFFICE.

GEORGE L. ANDERS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ELECTRIC CALL-BELLS.

Specification forming part of Letters Patent No. **219,059**, dated September 2, 1879; application filed February 24, 1879.

To all whom it may concern:

Be it known that I, GEORGE L. ANDERS, of Boston, in the State of Massachusetts, have invented a new and useful Improvement in Call-Bells, of which the following is a specification.

The object of the invention is to ring a bell at one of the several stations on an electrical circuit at the will of the operator at the station from which the signal is given without ringing the bell at any other of the stations.

Hitherto, when there have been several stations in one circuit, all the alarm-instruments on that circuit have been duplicates each of every other, so that a signal sounded on one of them has been given by every other, and, so far as I am aware, it is still necessary that all the alarm-instruments on a circuit perform substantially the same mechanical movements when all the alarm-instruments are of substantially the same construction.

My invention consists in a contrivance by which, although all the hammers in the circuit are thrown forward toward their bells in precisely the same way at the same instant, only one hammer in the circuit, as the operator at the station from which the signal is given wills, can reach its bell.

The invention is fully shown in the accompanying drawings, in which—

Figure 1 is a plan of the instrument at the bell-station. Fig. 2 is a plan of a double key-board, of ordinary construction, used at the transmitting-station. Fig. 3 is a central vertical longitudinal section with portions of the outer casing removed. Fig. 4 is a horizontal section on line *x x* of Fig. 3. Fig. 5 is a vertical section on line *y y* of Figs. 4 and 6. Fig. 6 is a horizontal section on line *z z* of Fig. 3. Figs. 7 and 8 are, respectively, an inverted plan and central vertical section of lock-bar and disk; and Fig. 9 is a plan of elbow-lever.

A is the box or casing. B is a brass frame, consisting of a plate mortised into the lid of the box and projections downward therefrom, as shown. C is an electro-magnet secured to the frame, as shown. Its cores project a little in advance of the coils, and for the purposes of this description the one marked *n* is to be considered as the positive pole, and the one marked *s* the negative pole.

D is a brass bar rigidly attached to a shaft, E, which rocks on two pins, *a a*, screwed into the frame and held by nuts *a' a'*, as shown. To the bar D is secured the soft-iron armature F, and also a polarized armature, G, the latter, however, vibrating on a pin, *b*, in the lower end of the bar, the vibrations being caused by two soft-iron pins, *n' s'*, respectively inserted in the poles *n* and *s* of the electro-magnet. Two pins, *c c*, limit these vibrations and prevent actual contact between the polarized armature and the soft-iron pins. The polarized armature carries at its upper extremity a metallic strip, *d*, for a purpose hereinafter explained.

The bar D carries also, at its upper end, the bell-hammer H', and is supported upon a post, as shown. J is a metallic plate screwed to the wooden lid of the box, as shown. It is slotted in three places, to admit of the passage of the screw by which the bell-post is secured to the frame, to receive a sleeve, *f*, and to permit the vibrations of the armature-bar D. The sleeve *f* serves as a bearing for the arbor *g*, which is secured thereto by a check-nut, *j*. The arbor *g* is revolved by a ratchet, *k*, and pawl *l*, the latter being pivoted to the under side of the lever *m*, which, in turn, is pivoted to the plate J at *r*.

The pawl *l* is made to press in toward the ratchet by a spring, *o*, which bears against a pin in the lever *m*, as shown. A pin, *o'*, limits the throw of the pawl and prevents it from slipping from the ratchet, while a spring, *p*, attached to the lever *m*, locks the ratchet after each successive movement of the pawl, and tends to throw the lever *m* back to its original position, thus releasing the pawl.

The arbor *g*, above the ratchet, carries a lock-bar, *e*, having ends shaped as shown, to be caught on a spring, *t*, on the end of an elbow-lever, *v*, thus locking the arbor at each half-revolution. This spring *t* not only serves as a lock, but it exerts a slight force backward upon the ratchet, the spring *p* allowing a slight lost motion in the latter. The elbow-lever *v*, which carries the spring *t*, is pivoted to the plate J at *r*, one arm lying on the plate J, underneath the lever *m*. A spring, *q*, attached to one arm of the elbow-lever, and pressing against a pin, *h*, tends to hold the other arm back against a pin, *e'*, and when the

elbow-lever is thus held the spring *t* is in the position to catch the lock-bar *e*, as before described. The pin *e'* also limits the backward movement of the lever *m*.

The lever *m* has a projection, *m'*, and the elbow-lever *v* has a projection, *v'*, and the strip *d*, before mentioned, strikes against one or the other of these projections whenever the soft-iron armature is swung toward its magnet, accordingly as the polarized armature is attracted toward the pin *n'* or the pin *s'*. When the strip *d* strikes the projection *m'* it feeds the ratchet forward and turns the arbor. When it strikes the projection *v'* it releases the lock-bar from the spring-catch *t*, and the arbor is free to be moved forward. Thus the operator at the other end of the line, by sending the current in the direction to cause the soft-iron pin *s'* to attract the polarized armature, and then making and breaking the circuit, can unlock the arbor, and by sending the current in the other direction, and making and breaking the circuit, can revolve the arbor.

The line-wire connecting with the electro-magnet is marked *w*, and the ground-wire *w'*.

P is a disk placed upon the arbor, as shown. Upon opposite sides of its periphery it has two slots, *i i*, and underneath it has a collar, in which are a number of holes equal to the number of teeth in the ratchet. Any two holes which are opposite each other may be made to receive two pins, one near either end of the lock-bar *e*, and by this connection the disk is made to revolve with the arbor. A check-nut holds the disk in place, as shown.

The ratchet, lock-bar, and disk are so placed upon the arbor and adjusted relatively to each other that once in each revolution of the arbor each slot *i* will come opposite the place occupied by the strip *d* when the latter is under the influence of the pin *s'*. The office of the disk P is to prevent the ringing of the bell excepting when the disk is in this last-named position, its periphery preventing the bell-hammer from reaching the bell excepting when the strip *d* can enter one of the slots *i*.

The operation of the signal mechanism above described, at the receiving end of the line, is as follows: Let the arbor at first be locked by the spring *t* and lock-bar *e*, and the disk P so set upon the arbor as to bring one of the slots *i* opposite the strip *d* at the instant the polarized armature is attracted toward the pin *s'*. The bell may now be rung at pleasure by making and breaking the circuit at the key end of the line. If, now, the current is reversed, the polarized armature is attracted to the soft-iron pin *n'*, and the strip *d* takes a position opposite the projection *m'*, when, by making and breaking the circuit, the bell cannot be rung, but the ratchet is fed forward by one notch at each pulsation of the circuit. There are twenty teeth on the ratchet, ten on either side, between the two ends of the lock-bar *e;* and since the two slots *i i* on the disk are opposite each other, it follows that when ten pulsations have been made in the reverse current the second slot *i* will be at the starting-point, opposite the original position of the strip *d*, and the bell may again be rung by shifting the current and making and breaking the circuit.

I have thus far supposed the disk P to be so placed on the arbor that the slot *i*, the projection *v'*, and the strip *d* are all in line; but since there are twenty holes in the collar of the disk, which, like the teeth of the ratchet, are equally spaced, it follows that the disk may be set upon the arbor in nine different positions back of the end of the lock-bar, which catches upon the catch-spring *t* when the ratchet revolves; and it is evident that when the disk is so set back of the locking end of the lock-bar the bell cannot be rung by the beat of the strip *d*, which unlocks the ratchet; but after unlocking the ratchet it will be necessary to reverse the current, thus sending the strip *d* to the position opposite the projection *m'*, and then, by making and breaking the circuit, necessary to feed the ratchet forward the requisite number of steps to bring the slot *i* in line with the original position of the strip *d*, when, by reversing the circuit and sending the strip *d* to that original position, the bell may be rung by making and breaking the circuit. Accordingly the operator at the key end of the line, knowing the position of the slots in the disk relatively to the lock-bar, will, after unlocking the ratchet, reverse the current and give the requisite number of pulsations to carry the disk a sufficient number of steps to bring the slot *i*, which is in advance, to the proper position, when, by shifting the current, he may ring the bell, as before.

It follows that if two slots are used in the disk, as shown, there may be as many instruments in the circuit as there are notches in half the ratchet, and that each instrument may have its disk so set as to require its own and a separate number of pulsations before its bell can be rung.

With slight modification of the lock-bar a disk with a single slot may be used and the number of instruments on the circuit doubled.

Where several instruments are used on one circuit they must all be adjusted to unlock their ratchets simultaneously. This gives an initial point from which the operator at the key-station may count the pulsations, to know the conditions of the different instruments on the circuit; and in practice it will be found convenient to bring all the instruments on the circuit to an initial point after the bell of one has been rung.

The ratchets unlocking simultaneously, it follows that they are fed forward simultaneously—that is, when the strip *d* strikes the projection *m'* in one instrument it strikes it in every instrument; and in like manner when the strip *d* strikes the projection *v'* in one instrument it strikes that projection in all the instruments; but although the slot *i* in the

disk P and the projection v' are in line when the bell is rung, they have no immediate connection with each other.

The bell may be rung in one instrument when the lock-bars of the several instruments are not in a position to be caught by the spring-catch *t*. When this happens the elbow-levers will vibrate to no purpose.

I claim—

1. The mechanism herein described for controlling the action of the bell-hammer, consisting of the electro-magnet C, with its soft-iron and polarized armatures, and the slotted disk P, with the mechanism to revolve and lock and unlock said disk, substantially as described.

2. The bell and hammer provided with the rotating slotted disk, substantially as described, for arresting the blow of the hammer when desired.

3. A series of signal-bells combined in a single electric circuit, each bell being provided with an electro-magnet, and mechanism, substantially as described, by which, although all the hammers in the circuit are thrown forward in the same way at the same instant, only one hammer in the circuit, as the operator at the station from which the signal is given wills, can reach its bell.

GEORGE LEE ANDERS.

Witnesses:

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H. G. OLMSTED.