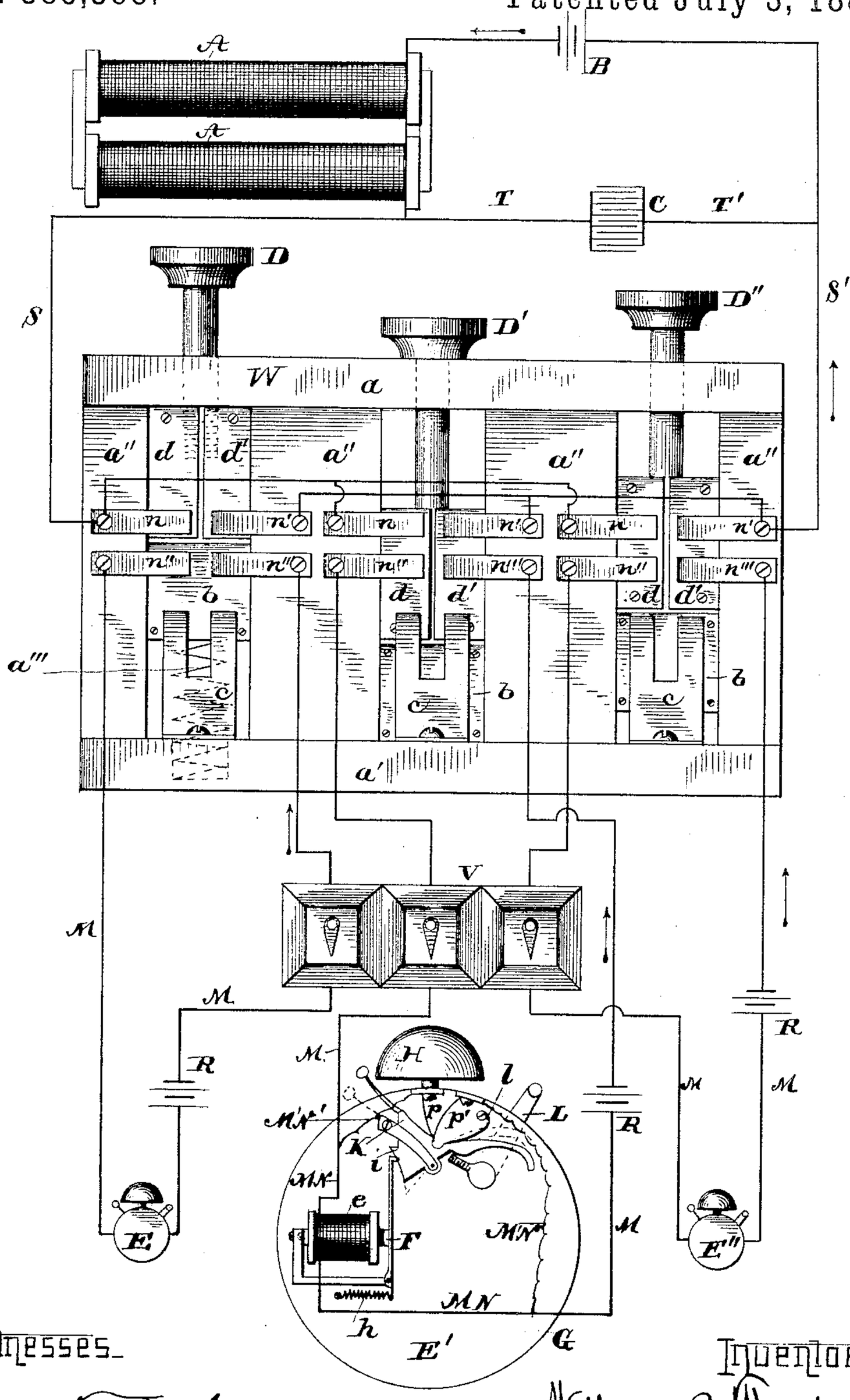
(No Model.)

# W. C. THOMPSON.

## ELECTRIC SIGNAL TRANSMITTER.

No. 385,388. Patented July 3, 1888.




Witnesses.

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SIGNAL-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 385,338, dated July 3, 1888.

Application filed April 19, 1887. Serial No. 235,418. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. THOMPSON, a citizen of the United States, and a resident of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented a certain new and useful Improvement in Electric Signal-Transmitters, of which the following is a specification, reference being had to the accompanying drawing.

My invention was designed for use in connection with the well-known "American District Telegraph" system; and it has for its object to improve the means of answering back signals turned in from call-boxes.

To this end my invention consists of the construction hereinafter fully described, and particularly pointed out in the claims.

The drawing represents the switch for controlling the electric circuits, with diagrams showing the course of said circuits.

E E′ E″ represent call-boxes of the ordinary well-known kind in common use by the American District Telegraph Company, supposed to be located at points remote from the central office. In the central box, E′, are shown such features of the mechanism of one of these call-boxes and their electric connections as are necessary to illustrate the application of my invention, the other parts being omitted.

G is a part of the box-case.

H is a bell fixed to the case.

K is a bell-hammer lever pivoted within the case G, provided on one side of its pivotal connection with the projecting lug or notch *i*.

L is the operative or bell crank call-lever pivoted to the case, and having one arm under and in proximity to the arm of the bell-hammer lever.

*l* is a retraction-spring fixed to the case and bearing against the upper side of the lever K.

*p p′* are metallic spring contact-strips secured to the case, which are normally held together by the bell-hammer lever, but which spring apart the instant the call-lever is drawn down for turning in a signal.

*e* is an electro-magnet suitably supported within the case G and provided with an armature-lever, F, pivoted to a suitable point of support, and having its free end extended into proximity to the notch *i* on the bell-hammer lever K, and provided with a hook for engagement therewith. The spring *h* serves to withdraw the lever F, overcoming the normal attraction of the magnet *e*.

R is a main-line battery.

M M is a main-line wire through said battery, said call-box, and an alarm apparatus located in the central office.

The connections through the call-box are in two branches—one branch, M N, passing through the magnet *e* and the call mechanism, (not shown,) and the other, M′ N′, passing through contact-points *p p*. The normal course of the main current is through the branch M′ N′. When one of these call-boxes is supplied with a full set of mechanism and the electric connections properly made, an alarm may be sounded in the central office by turning down the lever L. The suitable motor-spring (not shown) restores the call-lever after use to its normal position.

With the construction shown, when the call-lever is drawn down, the hook on the armature-lever F will engage with the notch *i* on the bell-hammer lever K, preventing the hammer from striking the bell. If the armature-lever F be drawn to its magnet *e*, the hammer-lever K will be released, and in virtue of spring *l* will fly back and strike the bell. If this can be done from the central office, it will serve to indicate that the call has been received. To accomplish this result with economy of electro-motive force and by a simple construction is the object of my invention, and I do it as follows: The normal current through the magnet *e* is not sufficient to actuate the armature-lever F against the retraction-spring *h*. I re-enforce it at the instant required by the discharge from a pair of self-inductive coils on a local circuit in the central office, making the connections through a specially-constructed switch-board.

In the drawing, W represents such a switch-board. It is made of wood, and consists of top and bottom parallel longitudinal bars, *a a′*, and a series of vertical pieces, *a″*, placed between the longitudinal pieces and rigidly connected to the same, with a suitable space left between each pair of the vertical pieces for vertically-movable switch-blocks D D′ D″. These switch-blocks are rectangular oblong pieces of wood provided with stems projecting above the bar *a* through holes in the same, and having finger-disks or push-buttons on their upper ends.

[redacted]

Under each switch-block, resting on the top of the bar *a'* and bearing against the bottom of the block, is placed a spiral spring, *a'''*. On the lower part of the face of these blocks is placed a single metallic plate, *b*, and on the upper face and on the opposite sides are placed a pair of metallic plates, *d d'*, separated from each other. The lower plate, *b*, and the upper plates, *d d'*, do not touch, so that the three are all insulated from each other by the wooden switch-block to which they are attached. To the lower bar, *a'*, is attached a spring metallic bifurcated plate, *c*, in proper position to cause its upper ends or fingers to bear against the plate *b* in all of its positions.

To the faces of the vertical wooden pieces *a'''*, on the opposite sides of the intervening switch-block, and projecting toward each other, are placed two pairs of metallic contact-strips, *n n'* and *n'' n'''*. These are placed in such relative positions that *n n'* make metallic contact with *d d'*, respectively, and both *n''* and *n'''* make contact with the plate *b* when the switch-block is in the position shown by D in the drawing.

The two parts of the main line wire M M connect, respectively, with the contact-strips *n''* and *n'''*.

B is a local battery.

A A are a pair of self-inductive coils provided with soft-metal armatures.

C is a condenser.

S S' are the two wires of a local circuit through said local battery and said induction-coils and the electric connections on said switch-board, the wire S being connected to the contact-strip *n* and the wire S' to the contact-strip *n'*, respectively.

T T' are branch wires from S and S', respectively, through the condenser C.

The currents move in the direction of the arrows.

The operation is as follows: The normal condition of the local circuit is open, the switch-block being in the position shown by D on the left, and the main-line circuit is closed through *n''' n''*. When an alarm has been turned in and it is desired to send back a signal, the switch-block is pushed down into the position shown by D'. In this position the local circuit is closed, S and S' being connected through *n d c d' n'*, and is connected with the main-line circuit, both currents passing through the local battery B and the self-inductive coils A, charging them with magnetism, the local current returning to its source through the short circuit and the main-line current passing out through *n d n''* to the main-line wire. On releasing the pressure from the switch-block, it is forced backward to its normal position by its retraction-spring *a'''*. In so doing, contacts are first broken between *d d'* and *c*, thus opening the local circuit at that point, while preserving the connection of the local battery and the coils A A with the main-line circuit. Both currents, together with the discharge from the coils, thus pass out through *n d n''* onto the main line, and as the contacts *p p'* are separated, the whole of it passes through the magnet *e*, highly magnetizing it and attracting the armature F, overcoming the spring *h*, and releasing the bell-hammer K. This all occurs while the strips *d d'* on the switch-block are moving from contact with *c* to a point above *n'' n'''*, or into its normal position, when the local circuit is disconnected from the main line and is opened at *n n'*.

The function of the condenser C is to reduce the spark when contact is broken between *c* and *d d'*.

By the use of the coils A A, I am enabled to get a strong current at the instant required, with a comparatively-small local battery.

For turning in the call, mechanism is operated by the call-lever L, and a motor-spring attached to the same, making and breaking an electric circuit through the magnet *e*, the branch M N of the main line M, the contacts *p p* on the branch M' N' being automatically opened when the call-lever is pulled down. The call is received at the central office through suitable receiving electric apparatus, V, having suitable electric connections with the main line. This call-sending and call-receiving mechanism it has not been deemed necessary to show in the drawing, as it is well known and in general use in the American District Telegraph system.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In an electric-call system, the combination, with the main electric circuit, of a local electric circuit, a call-box in said main electric circuit, having an answering device inoperative under the normal force of the main and local circuits, self-inductive coils in the local circuit, and switches for breaking said local circuit and closing said local and main circuits in series, substantially as described.

2. In an electric-call system, the combination, with a central station and switch-board thereat, of a main line provided with an electric circuit normally closed through said switch-board, a local circuit at the central station connected with the switch-board, normally open, self-inductive coils in said local circuit, a call-box in the main line having an electro-magnet operating an answering device, said magnet being inoperative under the normal power of the main and local circuits, and switches for closing the local circuit, then breaking the local circuit and throwing the local and main circuits in series, substantially as described.

3. In an electric-call system having a central and outlying stations, the combination, with a switch-board in the central office, of electric call-boxes at the outlying stations, provided with an electro-magnet and an armature-lever adapted to operate a bell or other signal device, a main battery, a main-line circuit normally closed through said battery, electro-magnet and switch-board, a local battery in the central office, a local circuit through said

local battery, and said switch-board normally open at said board, a resistance to the movement of the armature-levers in the call-boxes slightly exceeding the power of the magnet from the main and local circuits combined, and a switch for closing said local circuit at the board and then breaking the local circuit and throwing the main and local circuits in series, substantially as described.

4. In an electric-call system having a central and outlying stations, in combination, the switch-board W, provided with a suitable groove or seat for a movable switch-block, and having the contact-strips *n*, *n'*, *n''*, *n'''*, and *c* projecting over said switch-block seat, the movable spring-retracted switch-block D, provided with the contact-strips *d d' b*, insulated from each other, the main-line battery R, the main-line wire M through battery R and connecting with the contact-strips *n n'*, an electric call-box, E, on said main circuit, provided with the magnet *e* on the main circuit, the hooked armature-lever F, resistance spring *h*, bell H, spring-actuated bell-hammer K, provided with the notch *i*, self-inductive coils A A, local battery B, and the local wires S S' through said local battery and said coils, and connecting with the contacts *n n'*, respectively, substantially as and for the purpose set forth.

5. In an electric-call system having a central and outlying stations, in combination, the switch-board W, provided with a suitable seat for a movable switch-block, the contact-strips *n*, *n'*, *n''*, *n'''*, and *c*, attached to said board adjacent to said switch-block seat, the movable spring-retracted switch-block D, located in said seat and provided with contact-strips *d d' b*, insulated from each other, the main-line battery R, the main-line wire M through battery R and connecting with the contact-strips *n n'*, an electric call-box, E, on said main circuit and provided with an electric answer-back device, consisting of the magnet *e*, hooked armature-lever F, resistance-spring *h*, bell H, spring-actuated bell-hammer K, provided with the notch *i* for engagement with the hook on the lever F, self-inductive coils A A, local battery B, local wires S S' through said local battery and inductive coils, and connecting with the contacts *n n'*, respectively, the condenser C, and the branch wires T T', connecting the same with wires S S', respectively, all substantially as and for the purpose set forth.

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Witnesses:
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