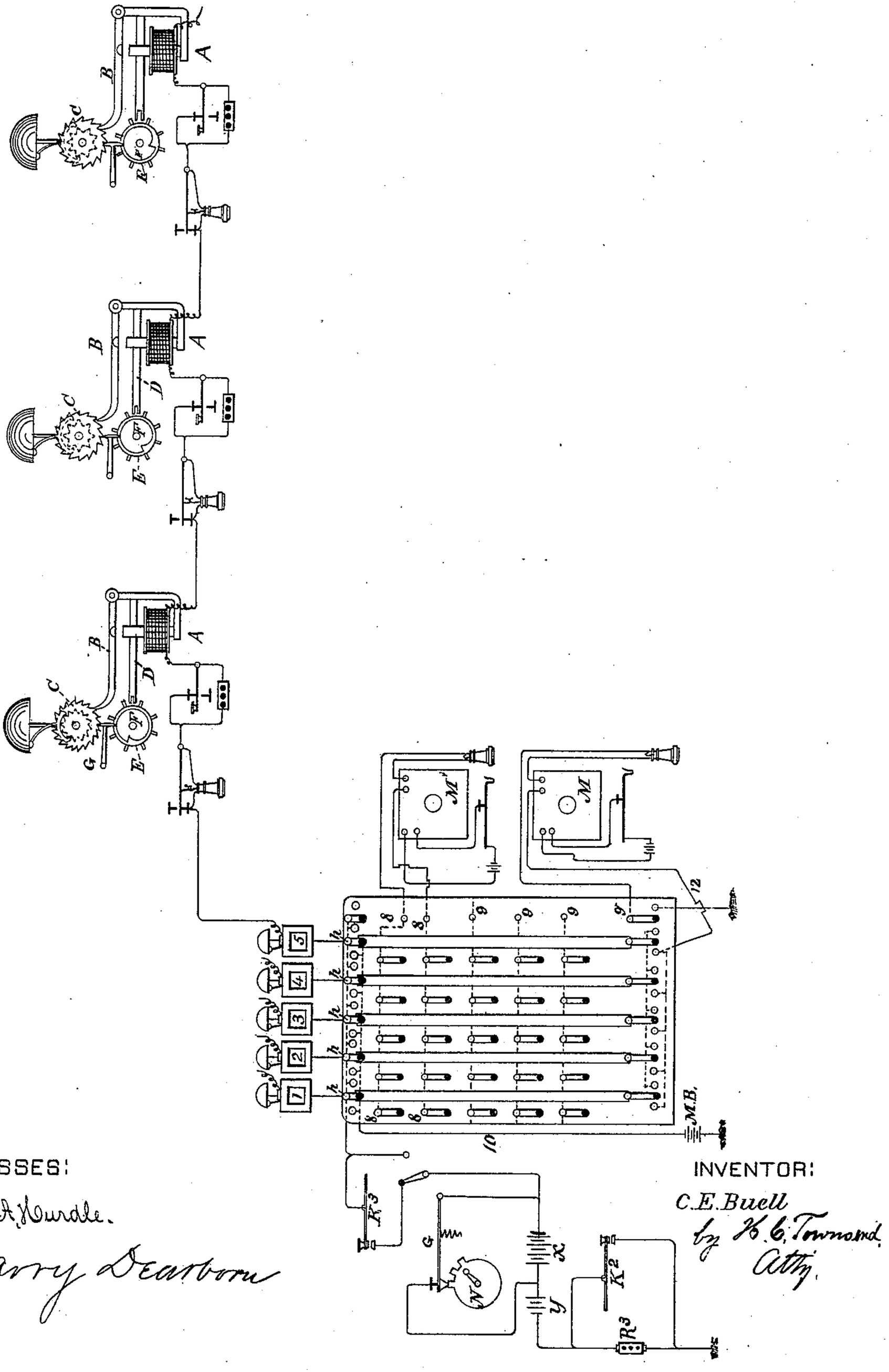
(No Model.)

C. E. BUELL.

ELECTRIC INDIVIDUAL SIGNAL APPARATUS.

No. 258,627. Patented May 30, 1882.



WITNESSES:

Julian A. Hurdle.

Harry Dearborn

INVENTOR:

C. E. Buell

by H. G. Townsend.

Atty.

UNITED STATES PATENT OFFICE.

CHARLES E. BUELL, OF NEW HAVEN, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED STATES TELEPHONE MANUFACTURING COMPANY, OF NEW YORK, N. Y.

ELECTRIC INDIVIDUAL SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 258,627, dated May 30, 1882.

Application filed July 6, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHAS. E. BUELL, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Individual Signaling Apparatus, of which the following is a specification.

My invention relates to that class of signaling apparatus in which step-by-step mechanism is employed at the various stations for setting the apparatus controlling the bell-ringing devices into a position in which the signal may be given, the bell being struck or the signal being given through the intervention of a current different from that used for the step-by-step mechanism.

The object of my invention is to simplify the construction and improve the operation of devices of this nature, the immediate object being to do away with the use of circuit closing and breaking devices for derived or shunt circuits, and to also produce the desired operations by the employment of a single electro-magnet.

The accompanying drawing shows three stations of a telephone or telegraph line provided with my improved apparatus, and also the central-office apparatus used in signaling to the various stations and for placing any two telephone-lines into electrical connection.

A represents a polarized electro-magnetic receiving-instrument of any preferred construction, provided with a supplemental armature, B, which serves, when drawn down by the action of the electro-magnet, to release a wheel, C, of a train which imparts vibrating movement to a bell-hammer in a well-known manner.

The polarized armature D carries detent-teeth, which allow a step-by-step movement to a wheel, E, driven by a clock-train.

The escapement device here shown is what is known as a "Breguet" escapement. Other forms of escapement device may be, however, used, and I contemplate employing a star or impelling escapement of any desired construction so that the wheel may be moved by the action of the electro-magnet and a driving-train dispensed with.

Upon the face of the wheel is a flange, F, notched or stepped at one point in its periphery, and serving as a support for the locking-toe upon the lever G, which engages with the wheel C and locks it from rotation. The lever G and toe are held against the flange by a spring or weight. When the wheel F has been rotated to a point where the toe drops into the notch the wheel C may be entirely released and the bell rung by the depression of the armature-lever B. The notches at the different stations are differently disposed, and the retractor of the armature-lever B is adjusted above the tension of the currents used in rotating the unlocking-wheel E.

Each station is provided, as shown, with a spring gravity-switch for the telephone, and with a signaling-key which normally short-circuits a resistance and gives a signal at the central office by throwing the resistance into the main circuit.

At the central office the devices for producing the desired changes in the polarity and tension of the currents consist of a toothed wheel, N, which is turned by a crank-handle, and which vibrates a lever, G, so as to make and break the short circuit of a battery, *x*, and of a key, K^2, which increases the tension of the current by short-circuiting the resistance R^3. Batteries *x* and *y* are placed with the same poles opposed to one another, and *x* is of approximately twice the number of cells of *y*. When *x* is short-circuited *y* sends, for instance, a positive current to line. When the short circuit of *x* is broken by the dropping of lever G battery *x* overcomes battery *y* and sends a current to line of the opposite polarity and of the same strength.

At the top of each line-strip on the switch-board is a switch-lever, *h*, connected to line, and capable of being turned to connect the line either to one of a series of buttons which are shown as connected through a wire, 10, to main-line or charging battery M B and to earth or to one of a similar series of buttons connected to a wire which leads to a key, K^3, and to the signaling apparatus through a switch, S^6, or directly through said switch to the same apparatus.

At the bottom of each line-strip is a switch-lever adapted to connect said strip to a series of buttons connected through wire 12 to the telephone apparatus M, whose other terminal is connected with switch *g*, through which a connection may be made with ground or with the terminal button of a series, with any one of which the lower series of switches may be thrown into contact. By these means any line may be connected directly with the telephone apparatus at the central station and to earth, or any two lines may be connected together through said apparatus. Similar telephone apparatus, M′, may be interposed between any two lines by means of the two upper longitudinal series of connecting buttons and wires, 8 8.

The terminals 9 9 are trunk-line connections, to which any subscriber's line may be connected by throwing the appropriate switch of the longitudinal series to which 9 is connected. M and M′ are provided with the usual gravity-switches and local batteries, as shown. The longitudinal series of buttons 9 may be used for connecting two lines directly with one another without passing through the telephone apparatus.

Signals are given to the central office in the usual way, either by a circuit-breaking key, which breaks the circuit of the main battery M B, to which every line should be normally connected by its appropriate switch-lever, or by increasing the resistance in the line, or by diminishing it.

The general operation is as follows: Normally the notches at the various stations occupy different positions with relation to the unlocking-toe upon the lever G, and the wheels are locked from rotation both by G and the armature-lever B. To call any particular station the central-office operator turns the wheel N, and thus produces a series of reversed impulses upon the line, so as to rotate the wheels E at all the stations. When the wheel at the station which he desires to call has been rotated to the point where the notch coincides with the toe upon G he depresses the key K^2, thus increasing the tension of the line-current sufficiently to operate armature-lever B at all stations and complete the release of the bell-ringing devices at the station to be called. The bells do not ring at the other stations, because in them the wheel is locked by the toe and the flange.

I do not limit myself to any particular device for locking and unlocking the wheel C by the action of the escapement mechanism; nor do I desire to limit myself to the employment of an electro-magnet with a supplemental armature, as I may under some circumstances deem it desirable to employ a separate electro-magnet for the armature B.

Other tension and polarity changes may be used in place of that herein described without departing from the spirit of the invention.

The particular tension and polarity changers herein described form the subject of another application, and no claim is therefore made to them.

If desired, the escapement-wheel may be controlled by the currents of increased tension, and the bell rung by a current of reversed polarity and diminished tension.

What I claim as my invention is—

1. At two or more stations on a telephone or telegraph line, the combination of step-by-step mechanism operated by an electro-magnet in the main-line circuit, mechanism controlled by the step-by-step devices, serving to unlock the bell-ringing devices from operation at a point in the movement of the step-by-step devices different for the different stations, and a second armature for operating the bell-ringing devices, actuated by a current differing from that used in operating the step-by-step mechanism, substantially as described.

2. In a step-by-step signal mechanism, a polarized electro-magnetic receiving-instrument, which controls through the step-by-step devices mechanism for the bell devices, in combination with a neutral armature adjusted above the tension of the current used for operating the step-by-step mechanism, and serving, when operated, to ring the bell.

3. In combination with bell devices and step-by-step mechanism which locks the bell devices from operation excepting at a predetermined point, a polarized electro-magnet provided with a supplemental neutral armature.

4. The combination, with step-by-step mechanism controlled by a polarized electro-magnetic receiving-instrument and reversals of current, of locking mechanism for locking the bell-ringing devices from operation, and a second neutral armature controlled by the electro-magnet, and adapted to be operated by an increased current for ringing the bell after the step-by-step mechanism and the locking mechanism have been placed in the proper position, substantially as described.

5. The combination of the escapement-wheel and its notched flange, the locking-toe resting upon the flange, and the bell-ringing devices.

CHAS. E. BUELL.

Witnesses:
EMMA M. GILLETT,
WATSON J. NEWTON.