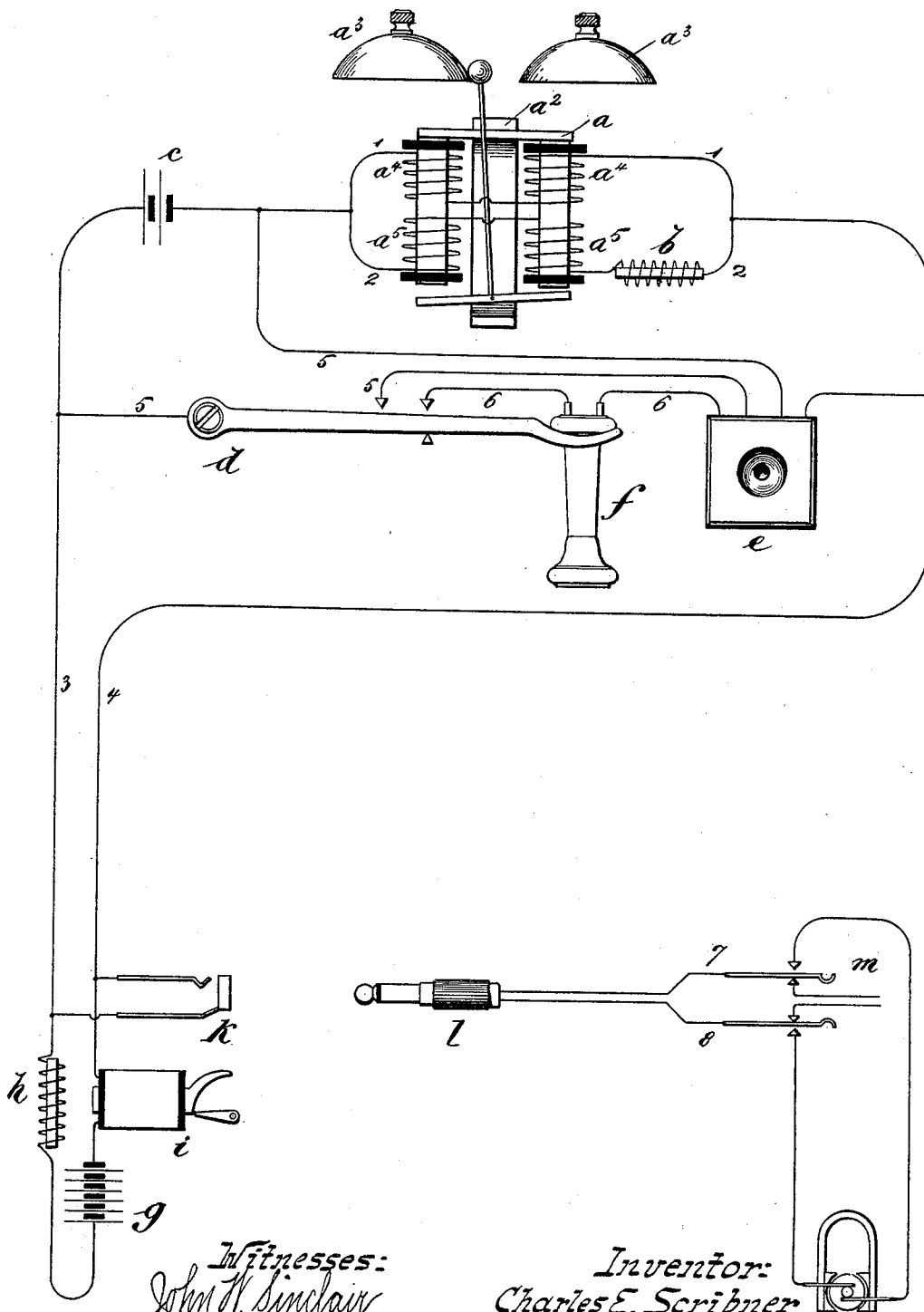


(No Model.)

C. E. SCRIBNER.
POLARIZED SIGNAL BELL.

No. 593,613.

Patented Nov. 16, 1897.



Witnesses:
John H. Sinclair.
Dr. H. E. Fanner.

Inventor:
Charles E. Scribner

by: Barton & Brown His Att'ys

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

POLARIZED SIGNAL-BELL.

SPECIFICATION forming part of Letters Patent No. 593,613, dated November 16, 1897.

Application filed November 25, 1895. Serial No. 570,059. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Polarized Signal-Bells, (Case No. 410,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention concerns polarized signal-bells for telephone-lines, in which the bells are subjected to continuous currents in the line tending to interfere with the ringing of the bell by alternating currents.

The invention aims to provide such an arrangement of circuits in the bell that continuous or unvarying currents circulating in its coils may leave its cores neutral, but that alternating currents may excite the magnet to operate the bell.

The invention consists in the use in a polarized signal-bell of ordinary type of two reverse windings upon the electromagnet connected in parallel, the circuit through one of the windings being characterized by high self-induction. The magnetic effects of the two windings upon the core are made equal, so that while a continuous current flows in the coil the cores remain neutral. When, however, an alternating current is produced in the circuit containing the bell, the passage of the current through the branch having the greater impedance is obstructed, nearly the entire current being diverted through the other branch. The magnetic effect of the winding in the latter branch is thus not balanced by a counter magnetizing effect of the other winding and acts to throw the armature into oscillation.

In some telephone-exchange systems each substation is furnished with a local storage battery which is continuously charged during the idleness of the line by a current in the line-circuit. It has been found in practice that the efficiency of operation of ordinary bells when placed in such a circuit is seriously impaired by this continuously-flowing current. The improved bell of this invention is particularly adapted for such use,

since the bell remains unaffected by the continuously-flowing charging-current, but is highly sensitive to alternating signaling-currents.

The invention is shown in the accompanying drawing in a telephone-line furnished with a local storage battery and means for charging the battery answering the conditions alluded to in the foregoing general description.

The polarized signal-bell at the substation may comprise the usual electromagnet *a*, a centrally-pivoted armature *a'* for the magnet, and a permanent magnet *a²* for imparting polarity to the armature. The pivoted armature *a'* is provided with a tongue carrying a hammer oscillating between gongs *a³*. The electromagnet *a* has wound upon it two coils *a⁴* and *a⁵*, the two serially-connected helices on the two limbs of the magnet being considered as one coil. The coils *a⁴* and *a⁵* are wound or connected reversely, so that each tends to neutralize the magnetizing effect of the other. These coils *a⁴* and *a⁵* are located in different parallel branches 1 and 2, respectively, of the circuit containing the bell. The branch 2 includes, in addition to the magnet-coil, an inductive resistance-coil *b* to impede variations of the current through the coil *a²*. The necessary high impedance or self-induction in this branch may of course be attained otherwise than by the use of a separate coil in the circuit, but this device is found to be a satisfactory expedient. The coil *a⁵* may have a greater number of turns than the coil *a⁴* or may have less resistance, in order that a continuous current flowing in the circuit may be divided equally between the coils or may have equal magnetizing effects in the two coils. Under that condition obviously the core of the magnet will remain neutral, and the armature *a'* will lie indifferently upon either side. When, however, an alternating current is produced in the circuit, its passage through winding *a⁵* is obstructed by the self-induction of the circuit, and the greater portion of the current is diverted through coil *a⁴*. The effect of this coil on the core is then not neutralized to any considerable extent by the current in winding *a⁵*, and

produces an alternating magnetization of the cores, which throws the armature *a'* into vibration and thus operates the bell.

This bell is shown in the circuit 3 4 of a
 5 telephone-line in series with a local storage
 battery *c* of two cells. At the substation the
 usual telephone-switch *d* is provided, which,
 when it is relieved of the weight of the tele-
 phone, rises and closes a local circuit 5 about
 10 battery *c* through the transmitting-telephone
e and the primary winding of an induction-
 coil, and also closes a bridge 6 of the line-cir-
 cuit, including the receiving-telephone *f*, to-
 15 gether with the secondary winding of the
 same induction-coil. At the central station
 this circuit is completed through a charging-
 battery or other source of current *g*, an im-
 pedance-coil *h* and an annunciator *i* being
 included in the two line conductors 3 and 4,
 20 respectively. The charging-battery *g* is sup-
 posed to be common to a number of telephone-
 lines, and the coils *h* and *i* act as inductive
 resistances to prevent the shunting of tele-
 phonic current from one line to another. The
 25 usual spring-jack *k* in the telephone-switch-
 board has its two contact-pieces connected
 with the two line conductors. A plug *l* is
 shown which may constitute one member of
 a pair for uniting lines, the plug-circuit 7 8
 30 being led to the switch-springs of a calling-
 key *m*, by means of which a generator *n* of
 signaling-current may be looped into circuit
 with the plug. During the idleness of the
 line a current flows continuously from bat-

tery *g* through the line, through the two 35
 branches 1 and 2, including the bell-windings,
 and through the local storage battery *c* at the
 substation, charging this battery at a suffi-
 cient rate to compensate for the use of cur-
 rent from the battery. As before stated, the 40
 bell remains inert as to this unvarying cur-
 rent. When connection is made with the line
 by means of plug *l* and a signaling-current
 from generator *n* is transmitted over the line,
 this alternating current is unequally divided 45
 between the two windings of the bell and
 rings the bell in the manner traced.

I claim as new and desire to secure by Let-
 ters Patent—

The combination with a telephone-line in- 50
 cluding a local storage battery in the line at
 a substation and a charging-battery therefor,
 and provided with means for producing al-
 ternating currents in the line, of an electric
 bell whose electromagnet is provided with 55
 two differential windings in different parallel
 branches of the line-circuit, one of which
 branches is constructed to have high impe-
 dance, whereby the bell remains neutral to
 the charging-current but may be operated 60
 by alternating current, substantially as de-
 scribed.

In witness whereof I hereunto subscribe my
 name this 17th day of October, A. D. 1895.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,

MYRTA F. GREEN.