

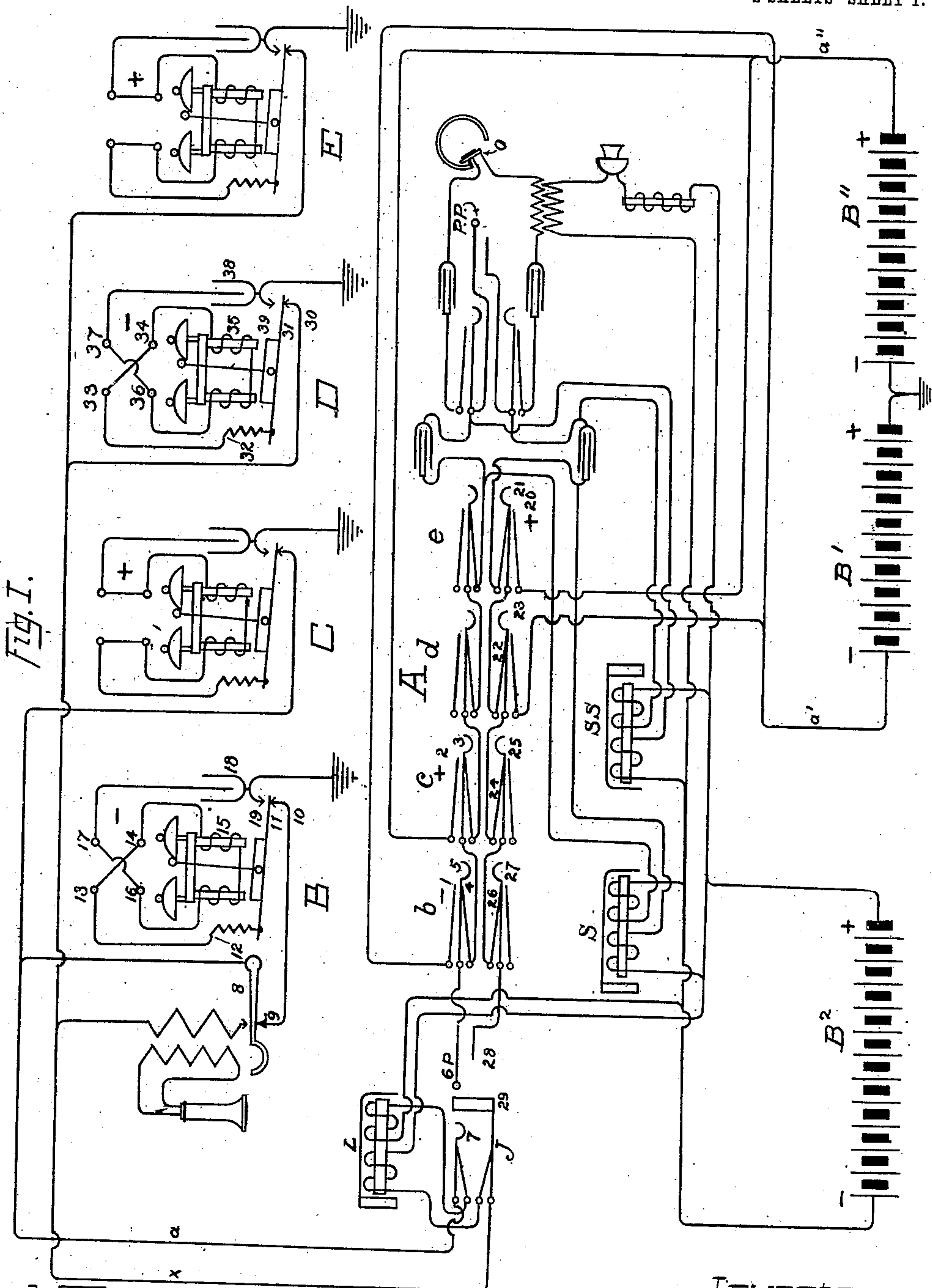
No. 863,924.

PATENTED AUG. 20, 1907.

W. W. KIDNEY.
SELECTIVE SIGNALING SYSTEM.

APPLICATION FILED MAY 28, 1907.

2 SHEETS—SHEET 1.



Witnesses
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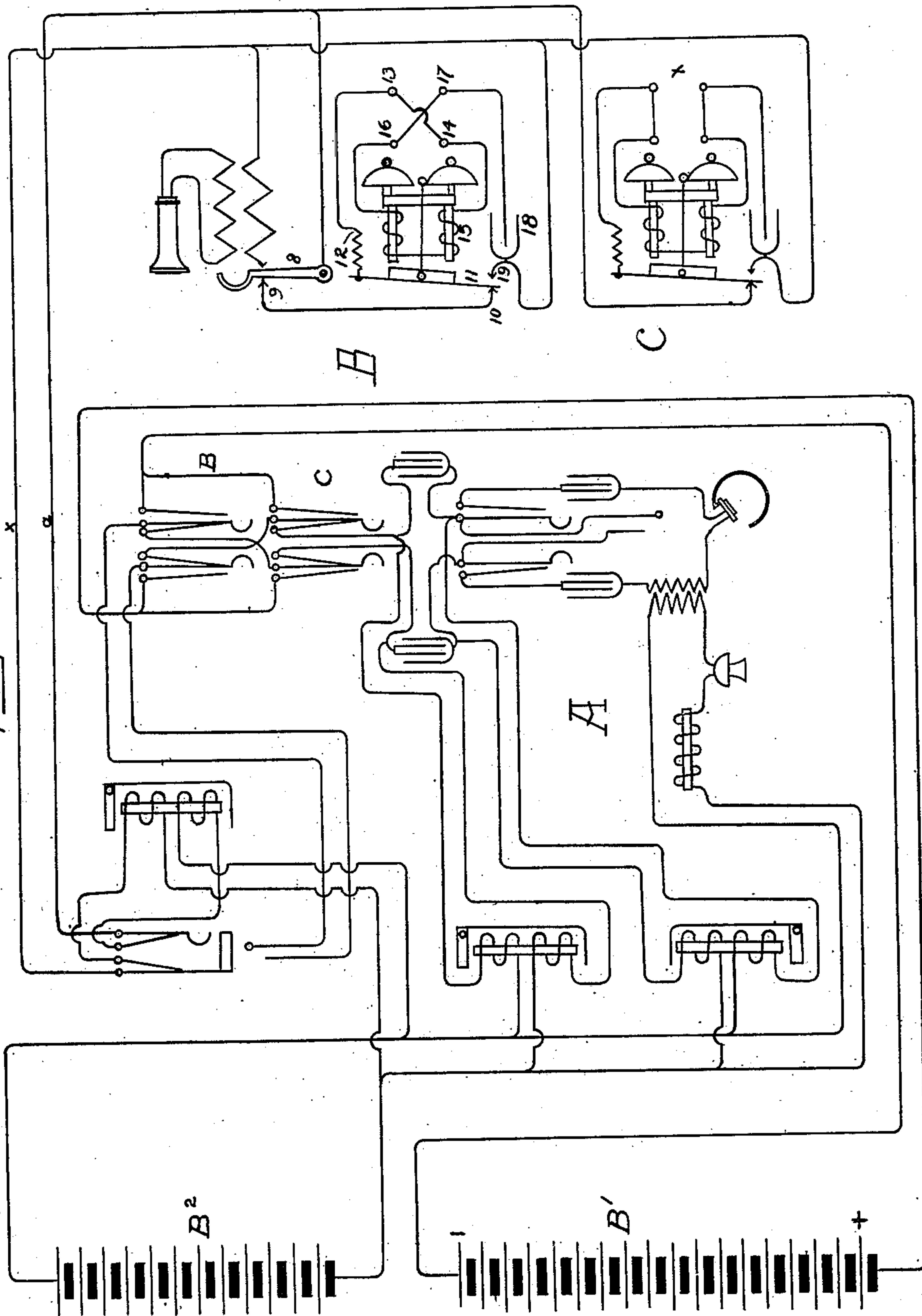
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Fig. II.



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UNITED STATES PATENT OFFICE.

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SELECTIVE SIGNALING SYSTEM.

No. 863,924.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed May 28, 1907. Serial No. 376,055.

To all whom it may concern:

Be it known that I, WILLIAM W. KIDNEY, a citizen of the United States of America, and a resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Selective Signaling Systems, of which the following is a specification.

My invention relates to improvements in selective signaling systems for telephone lines, and has for its object the provision of apparatus, whereby an effective and economical selection of any of a plurality of party line stations is effected without the attendant expense and engineering problem presented by harmonic selection. Consequently, exchanges equipped in accordance with my invention may well be of relatively small size, may be installed at a low initial cost and may be maintained very cheaply.

In accordance with the preferred embodiment of my invention, the improvements are applied to a signaling system, wherein a battery or batteries at the central office are employed for directing current over the limbs of the telephone line to actuate suitable polarized bells. These bells are of a type containing a vibratory make-and-break appliance for the signaling circuit, in association with a condenser interposed in the said signaling circuit and adapted to assist or augment the selective effect.

Further features of my improvements will be better understood by making reference to the accompanying drawings illustrating systems of telephone signaling embodying my invention, wherein:—

Figure I is a diagrammatic view of one of such systems containing my invention, wherein some four stations are adapted to be selectively signaled from the main or central office; and Fig. II is a small or two-party line employing an all-metallic circuit both for a talking and signaling currents.

For easy reference and in order that any confusion may be avoided, I have employed the same character of reference to designate similar or analogous parts in both figures of the drawings.

In each of these figures A is assumed to be the central office or station from which the signaling currents are transmitted by means of any well known type of signaling key. In Fig. II, B and C represent two party-line substations connected across the limbs of the telephone line *a*, *x*, while in Fig. I, the four stations, *b*, *c*, *d* and *e* are respectively connected two and two, between one of the limbs *a*, *x*, and a third conductor or ground return. Thus it will be understood that the stations are capable of selection by direct battery current of proper polarity, directed over either limb of the line for actuating suitable polarized signaling bells respectively positioned at the different stations.

Referring now to Fig. I for a more specific explanation of my invention, I may point out that the signaling battery is subdivided into two sections *B'* *B''*, respectively having their positive and negative poles grounded or connected with a third conductor. A single battery may be employed, as in Fig. II, instead of this arrangement, but only with attendant complication in the switching apparatus at the central office for reversing the polarity and connecting the proper selective current to the line. I have found that a signaling battery generating approximately 130 volts, is preferable in association with ordinary telephone lines. The battery extends by suitable leads *a'*, *a''*, to the spring contacts of the selective signaling keys *b*, *c*, *d*, *e*, corresponding to the several selective stations to be signaled. The usual accessories of a cord circuit are provided, of which *p* *p'* are respectively the calling and answering plugs, *s* *s'*, the supervisory signals, and *o*, the operator's telephone set. At *j* is shown the spring jack switch forming the terminal of the party line under consideration, of which *l* is the line signal.

At the several sub-stations is provided the usual telephone apparatus, in association with polarized signaling bells, adapted to respond either to currents of positive or negative polarity; said bells being provided with a circuit opening and closing device actuated by the armature, but normally biased to complete the signaling circuit to an associated condenser, one side of which is connected to a third conductor or ground. The windings of the bells should have sufficient ohmic resistance to insure the satisfactory operation of the talking circuit. Stations B and D are adapted to be selected by currents of negative polarity, while stations C and E are adapted to be signaled by currents of positive polarity, as indicated by the plus and minus signs applied thereto.

Assuming now that station B is to be selectively signaled, the key *b* is depressed, thereby directing current from battery *B'* over conductor *a'*, springs 1 and 5, which will be closed, to the tip 6 of plug *p*, now assumed to be inserted in the spring jack *j*, line spring 7, conductor *a*, through the contacts of the switch hook 8, 9, contacts 10, 11 upon the armature of the bell, conductor 12, transposition-contacts 13, 14, windings 15 of said bell, transposition-contacts 16, 17 to the condenser 18, which is immediately charged. The bell armature is thereby actuated in the charging of the condenser to open the contacts 10, 11 and close contacts 11, 19, thereby giving the first tap upon the bell. Upon the closure of said contacts 11, 19, the condenser is caused to discharge through the bell windings 15 now connected in short circuit therewith and with the ground, whereby the second impulse is given to the armature, and the contacts 10, 11 are again closed, while the second tap

is sounded upon the bell. This oscillation of the armature with the attendant signaling of station B and the discharging of the condenser, continues as long as key *b* is held depressed by the operator. The station C also connected with limb *a* of the line, is not actuated by these currents for the reason that it is responsive to positive currents, and its transposition contacts are connected between 13, 16 and 14, 17. Accordingly, upon the depression of key *c* instead, positive currents would have been directed over limb *a* of the line and actuated the bell at station C in precisely the same manner described above. Similarly the actuation of key *d* would have directed negative current over limb *x* of the line, thereby actuating the bell at station D charging the condenser 38, opening the contacts 30, 31, and closing the contacts 31, 39, whereby the signaling cycle is accomplished as before described.

Inasmuch as the condenser is momentarily disconnected from the line by the altered condition of the bell contacts, during the instant of discharge, and is short circuited through the bell windings, the system is freed from the difficulty which would arise by reason of the possibility otherwise of transmitting a false signal to the line. Said condenser is made of sufficiently large capacity to insure a charge which shall act upon the bell windings, as 15 or 35, and insure the immediate reversal of the armature's position with an attendant alteration of circuit conditions at the sub-station.

In both of the figures of the drawings, the arrangements are so similar as to require but little further description. Battery B² in both systems is here shown as a separate battery for the talking circuit, while battery B' alone is used in Fig. II for signaling, inasmuch as no complications are encountered rendering a reversing switch necessary. As before, we may assume that station B, which with station C is connected directly between the limbs of the metallic circuit *a x*, is adapted to be selected or rung by negative currents. Upon the depression of key *b* accordingly, current will be transmitted from battery B' through the cord circuit and over limb *a* of the line, through the switch hook and its contact 8, 9, closed contacts 10, 11, conductor 12, transposition contacts 13, 14, the bell windings 15, transposition contacts 16, 17 and to condenser 18, thereby charging the same. Contact 19 in this instance is connected to limb *x* of the line which during the insertion of the plug is in turn connected through the cord circuit to the positive pole of battery B'. The actuation of the contact 11 into engagement with contact 19, the discharge of the condenser and the actuation of the bell will all result as before described.

From the foregoing it will be appreciated that a thoroughly satisfactory system is provided, whereby the various stations may be selectively signaled by means of a battery or other suitable source of current provided at the central office. By reason of the employment of a condenser with suitable make-and-break apparatus connected as shown, the selective actuation of the bells is materially augmented or improved and false signaling currents are prevented from being transmitted to the associated bells.

It will be well understood, of course, that the number of sub-stations may be varied or may be increased upon a given line by employing partial selection, and a code of signals. Other modifications than those herein re-

ferred to will occur to those skilled in the art, which I desire to secure for myself in accordance with the following claims.

1. In a selective signaling system, the combination with a source of signaling current, switching mechanism for applying such current of requisite polarity to the line, a line or signaling circuit, and a plurality of sub-stations connected thereto, each equipped with polarized signaling apparatus, a condenser and means for opening and closing the circuit to the condenser, substantially as set forth. 70

2. In a selective signaling system, the combination with a source of signaling current, switching mechanism for applying such current of requisite polarity to the line, a line or signaling circuit, and a plurality of sub-stations connected thereto, each equipped with polarized signaling apparatus normally connected to line, an associated condenser, and means for opening the circuit of the condenser and causing its discharge through the signaling apparatus, substantially as set forth. 80

3. In a selective signaling system, the combination with a source of signaling current, switching mechanism for applying such current of requisite polarity to the line, a line or signaling circuit, and a plurality of sub-stations connected thereto, each equipped with a polarized signaling bell normally connected to line and with one side of an associated condenser, the other side of said condenser being connected with a return conductor, and a switch actuated by the bell momentarily to open the circuit to the line and close the condenser circuit through the windings of said bell, substantially as set forth. 85

4. In a telephone signaling system, the combination with a signaling battery at the central office, switching mechanism adapted to connect the same to line in a manner to insure currents of definite polarity, a telephone line forming the signaling circuit, and a plurality of sub-stations normally connected to line; each of said stations being equipped with telephone apparatus, a polarized signaling bell normally connected to line and to one side of an associated condenser, the other side of said condenser being connected to a return conductor, and switch contacts respectively controlling the circuit to the bell and return conductor alternatively engaged to effect the actuation of said bell, substantially as set forth. 90

5. In a selective signaling circuit connecting a central station with a plurality of sub-stations, and comprising two main or line conductors and a third conductor, branch circuits extending from each of said line conductors to the third conductor, a polarized bell and a condenser normally connected serially in each of said branch conductors, and a make-and-break device controlling the circuit to each of said bells and automatically actuated upon the operation of the associated bell, a source of signaling current at the central office, and switching keys for applying currents of appropriate polarity to either of the main or line conductors, substantially as set forth. 100

6. In a telephone system, the combination with telephone line conductors extending from an exchange to a plurality of telephone sub-stations, of a plurality of positively and negatively polarized bells and associated condensers normally connected therewith at the several sub-stations, automatically actuated means controlled by the bells for respectively opening their circuits and effecting the discharge of their condensers, and means at the central office for applying current of positive or negative polarity to the line conductors, substantially as set forth. 105

7. In a selective signaling telephone system, the combination with a battery at the central office, switching mechanism controlling the same, a telephone circuit comprising two line conductors and a third conductor adapted temporarily to be associated with said battery, a plurality of telephone sub-stations respectively connected between the line conductors and the third conductor, and at each of said stations a polarized signaling bell normally connected to line, an automatic circuit controlling device actuated thereby, and a condenser connected between the polarized bell and the third conductor, whereby said bell is adapted for actuation by currents of appropriate polarity, substantially as set forth. 110

5 8. In a telephone signaling system, the combination with a source of direct current, switching mechanism adapted to apply the same to an associated telephone line, two telephone line conductors adapted temporarily to be connected therewith, and a plurality of telephone sub-stations connected with said line conductors; each of said sub-stations being equipped with a polarized bell normally connected to a line conductor, a serially connected condenser and a circuit controlling device actuated

by the bell and adapted to disconnect it from the line 10 and short circuit the condenser through the bell windings, substantially as set forth.

Signed at Buffalo, this 18th day of May, A. D., 1907
in the presence of two subscribing witnesses.

WILLIAM W. KIDNEY. [L. S.]

Witnesses:

HARRY A. HATHAWAY,
BURTON W. SWEET.