

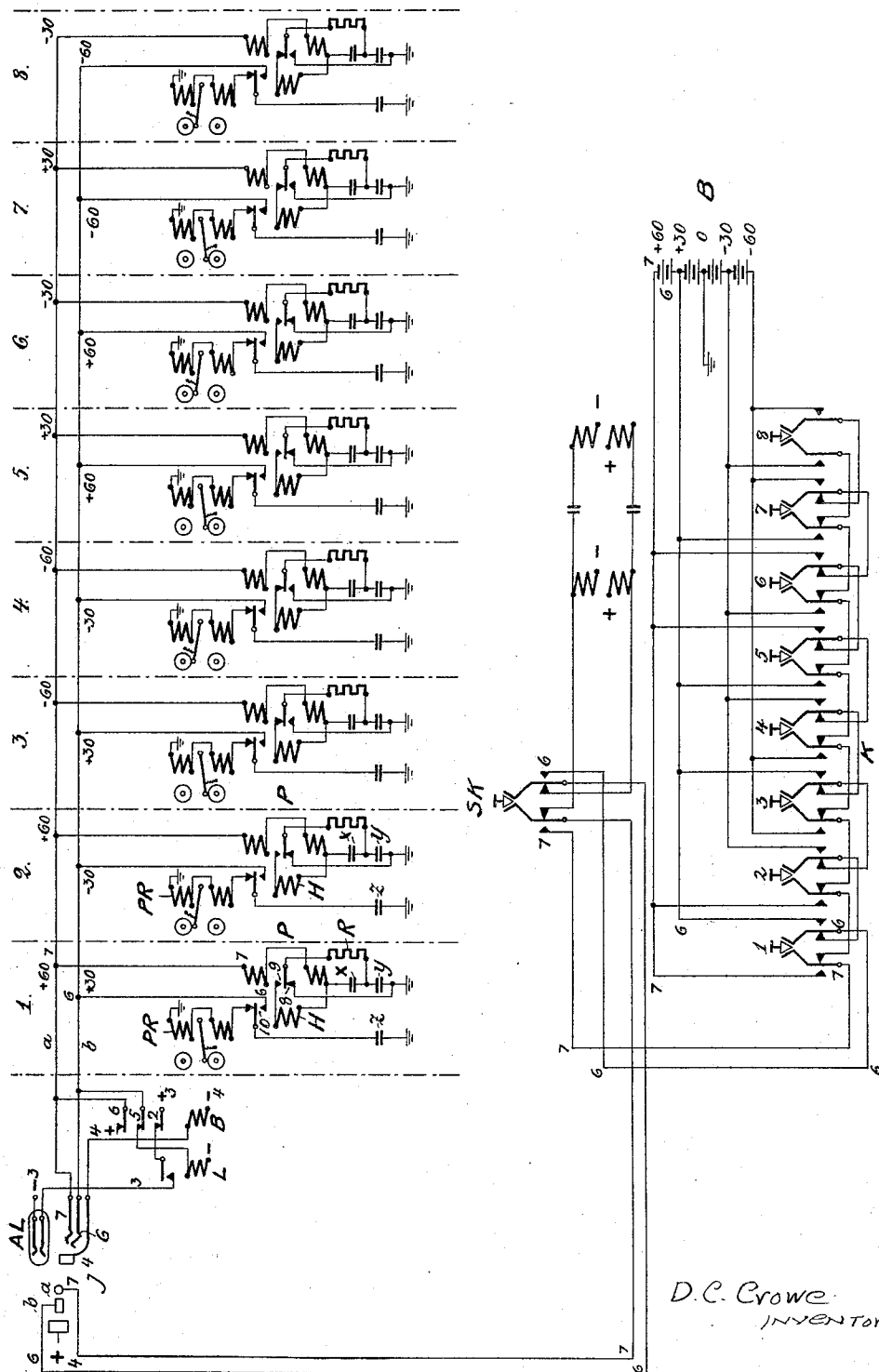
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TELEPHONE PLANT

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TELEPHONE PLANT

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The present invention refers to arrange-
ments for selective actuation of switching ap-
paratus connected to a common line and is
particularly applicable to telephone plants in
which it is desired selectively to actuate cer-
tain apparatus in a group of switching appa-
ratus over a single line by means of current
impulses of different magnitudes and direc-
tions. The invention may also advantageously
be applied to systems with so called party
lines, the different subscriber's sets being
then provided with switching elements in ac-
cordance with the invention. In known sys-
tems of this kind it has been very difficult to
increase the number of subscribers to the de-
sired degree while maintaining simplicity of
circuit arrangements and construction in the
telephone exchange as well as at the sub-
scriber's positions. The desirability of cen-
tral battery operation has then led to differ-
ent circuit arrangements with condensers at
the subscriber's positions. Said known cir-
cuit arrangements, however, require ringing
current generators for a plurality of frequen-
cies and do not meet modern requirements
with regard to the number of apparatus that
can be connected to a certain line.

The present invention has for its object to
eliminate inconveniences of the above kind
and consists substantially therein that each
switching apparatus is provided with a polar-
ized relay which is adapted to react only for
current impulses of a certain kind and which
over two series-connected condensers is con-
nected to earth, said polarized relay being
arranged to shunt the one condenser over its
resting contact and to cause the other con-
denser to be connected in parallel with the re-
sistance over its operating contact. In this
manner a circuit arrangement is obtained in
which the condensers are charged over cer-
tain circuits and discharged over other cir-
cuits.

The invention will be more closely de-
scribed with reference to the accompanying
drawing which shows as an example a tele-
phone plant having eight subscriber's sets
connected to a party line.

The upper part of the drawing shows the
party line with its branches *a* and *b* and with

the subscriber's sets 1 to 8 connected thereto,
only those parts being indicated which are
necessary for illustrating the invention. The
lower part of the drawing is intended to show
those parts in the telephone exchange which
are of interest for the explanation of the in-
vention. For the sake of simplicity the sig-
nal device has been shown as a key set *K*
but it is of course also conceivable to build
the same of a number of relays which, for in-
stance, may be actuated by means of figure
impulse series from other subscribers of the
exchange or from the party subscribers them-
selves. The signal battery *B* is earthed at its
middle point and has in addition thereto four
terminals, namely +60 V, +30 V, -30 V,
-60 V. With these voltages eight different
combinations may be obtained as will be seen
from the following table.

No.	1	2	3	4	5	6	7	8	
<i>a</i> -----	+60	+60	-60	-60	+30	-30	+30	-30	volts
<i>b</i> -----	+30	-30	+30	-30	+60	+60	-60	-60	volts

For the sake of simplicity said voltages
have also been indicated on the drawing at
the points where the subscriber's sets are con-
nected to the party line. The switching ap-
paratus allotted to the different subscribers
may be of identically the same construction
although they must be connected in different
ways. The key set is built in accordance with
the above table.

It will now be assumed that somebody, for
instance the party subscriber No. 8, desires
connection with the subscriber No. 1. The
calling subscriber then connects himself in
known manner to the party line, a calling cir-
cuit being then closed through elements of
the apparatus 8 not shown on the drawing
and through the line relay *L*, the latter relay
then closing, over its operating contact land
the contact 2 of the relay *B*, a circuit 3 for
the calling lamp *AL* which is thereby lit.
The operator then connects herself to the
party line by means of the jack *J*, the relay
B being then energized over the circuit 4 and
cutting off the line relay and the plus-poten-
tial at its contacts 5 and 6 respectively. The

operator is now able to communicate with the calling subscriber without being disturbed by any of the other party subscribers. After having been informed that connection with the subscriber 1 is desired the operator first pushes down the key 1 of the key set and thereafter the signal key SK whereby the signal is sent out on the party line. The signal consists partly therein that the *b*-wire is connected to the +30 V terminal of the battery over the circuit 6 and partly therein that the *a*-wire is connected to the +60 V terminal of the signal battery over the circuit 7, a current impulse being thereby obtained through the polarized relay P, the condenser X, the resistance R and the resting contact 8 of the relay to earth. As at this instant the condenser Y is shunted the condenser X is charged and the relay P attracts its armature. The condenser X is then parallel-connected with an auxiliary relay H over the operating contact 9 of the relay P, whereas the condenser Y is charged by means of new power from the *a*-wire. At the same time the condenser X is discharged over the relay H which attracts its armature and over its operating contact 10 connects the condenser Z to the *b*-wire in order to be charged. As soon as the condenser Y has been charged the relay P cannot any longer hold its armature attracted wherefore the latter returns to its normal position, the condenser X being then charged anew. Simultaneously with the relay P also the relay H is de-energized and the condenser Z is discharged over the polarized alarm bell PR to earth. Said alarm bell is thereby brought to carry over its armature once whereafter the armature is restored by means of a spring controlling the same. The relay P is actuated again and the operation is repeated. The discharging circuit for the condenser X thus receives as many current impulses as the relay P wherefore the relay H vibrates in time with the relay P and consequently the same frequency of the toll of the alarm bell is obtained.

As will be seen from the drawing also the relays P and H of the subscriber 2 will vibrate and the appertaining condenser Z will be charged and discharged over the corresponding alarm bell PR. The alarm-bell of the subscriber 2 is, however, biased in the opposite direction to the alarm bell in the apparatus 1, and only the latter bell will therefore ring. It is, of course, also conceivable to use positively controlled relays in place of alarm bells, the arrangements being then preferably such that the whole switching operation is carried out only once whereafter the armatures of the relays are locked in a suitable manner. The switching arrangement may then be used for establishing certain selecting operations. After the desired subscriber has been called up a talking connection is established in known manner. It

is only necessary that the operator lifts the key SK whereafter the talking circuits of the subscriber's are fed from the exchange in known manner.

I claim:—

1. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, and means to connect the other condenser in parallel with a resistance when the said relay is energized. 70
2. A selective system as claimed in claim 1 the means to actuate the polarized relays selectively consisting of a signal battery having small capacity, earthed at its middle point and provided with a plurality of positive and negative voltage terminals. 75
3. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, and means to connect the other condenser in parallel with an auxiliary relay when the polarized relay is energized. 80
4. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, and means to connect the other condenser in parallel with an auxiliary relay when the polarized relay is energized, the said auxiliary relay being provided with a contact over which the one coating of a third condenser is connected to a current source of a certain potential, the other coating of the condenser being connected to earth. 85
5. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, means to connect the other condenser in parallel with an auxiliary relay when the polarized relay is energized, a third condenser the one coating of which is connected to earth while the other may be first connected to a current source of 90

certain potential by the auxiliary relay and then to a polarized relay.

6. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, means to connect the other condenser in parallel with an auxiliary relay when the polarized relay is energized, a third condenser the one coating of which is connected to earth while the other may be first connected to a current source of certain potential by the auxiliary relay and then to a polarized alarm bell.

7. In a selective system a line, a number of marginal adjusted polarized relays each being connected between any of the branches of said line and earth over two series-connected condensers, means to actuate the polarized relays selectively by current impulses of different magnitudes and directions, means to shunt one of the said two condensers when the polarized relay is at rest, means to connect the other condenser in parallel with an auxiliary relay when the polarized relay is energized, a third condenser the one coating of which is connected to earth while the other may be first connected to a current source of certain potential by the auxiliary relay and then to a polarized alarm bell which is positively controlled or biased by means of a spring.

In testimony whereof I affix my signature.

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