

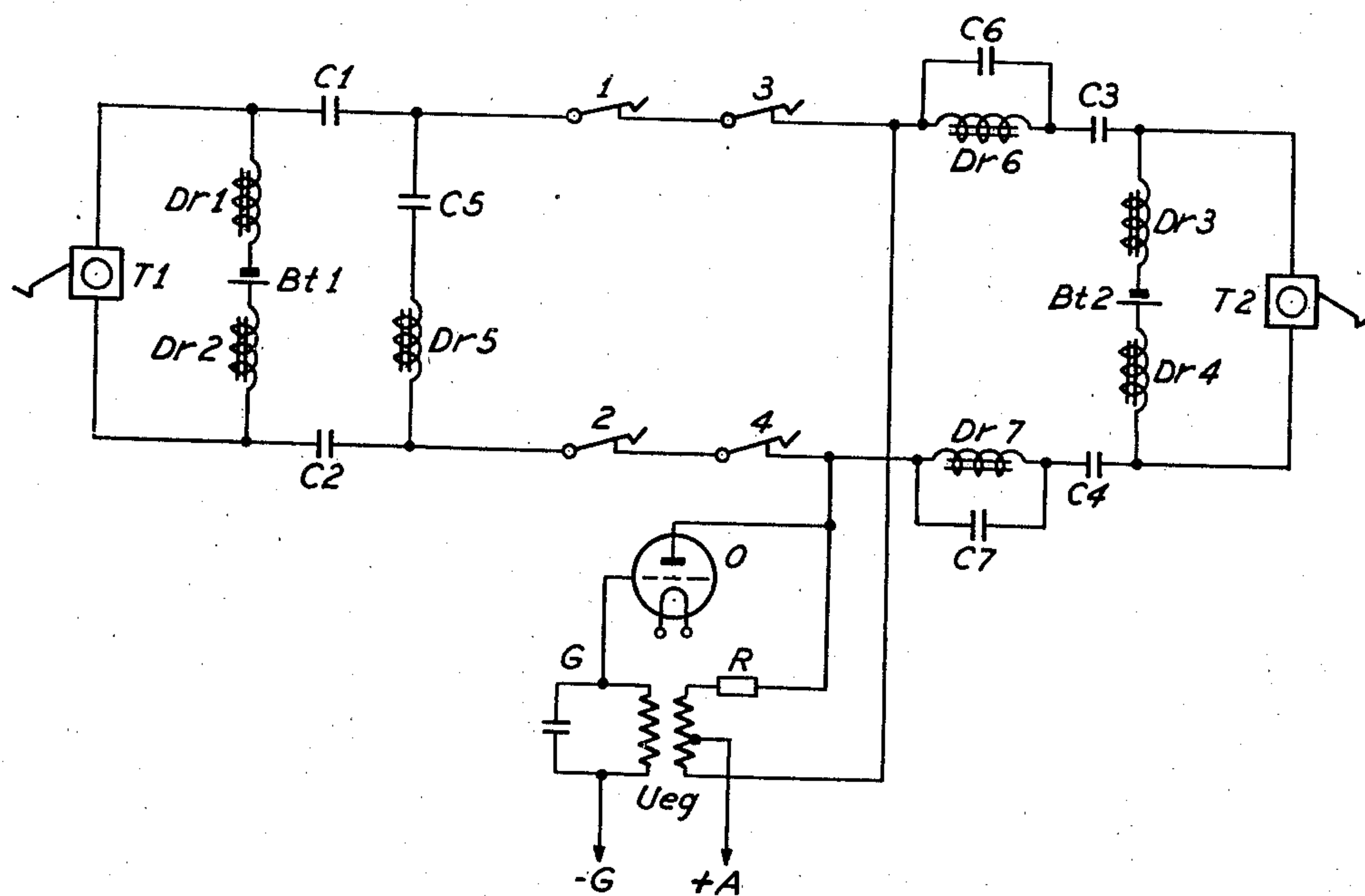
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TELEPHONE SYSTEM

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TELEPHONE SYSTEM

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6 Claims. (Cl. 179—78)

The invention relates to an arrangement for remote communication systems and more particularly telephone systems for electrically cleaning contacts. Arrangements for cleaning contacts are already known. In these known arrangements a direct current, for example, flows permanently over the contacts for the time during which these contacts are in use. In other arrangements a direct current or an alternating current is applied to the contacts for a definite period, i. e., temporarily.

The cleaning of contacts has the following purposes: Through the action of dust, moisture, oxidation, and also through polishing action on the loop contacts, high resistances arise at the points of contact. At the contacts there is formed an exceptionally thin insulating layer which, however, suffices to prevent the passage of weak currents, for example, speech currents. If the contacts lie, for example, in a telephone line, the phenomenon referred to as "fading" occurs, whereby the sound intensity is considerably diminished i. e., the intelligibility is reduced, and even quite destroyed. In order to prevent this one clears the contacts by sending a weak current of the particular potential over the contacts which strikes across the insulating layer formed by the above-mentioned influences and thus re-establishes the uninterrupted current path.

It has been shown that in the known arrangements in which the cleaning current only operates temporarily, i. e., for short periods, on the contacts, this does not suffice to give an effective cleaning. In particular does this occur in the case of contacts which, as for example the contacts of automatic telephone switches, are permanently exposed to violent shocks whereby the contact resistance continually varies. In this case not only the "fading" phenomenon above described occurs, but undesirable contact noises arise through the influence of the cleaning current flowing over the contact and the continual variation in the value of the resistance across the contacts. The invention aims at avoiding this difficulty. This is realized in that an alternating current is applied to the contacts to be cleaned automatically in dependence upon the occurrence of a variation, i. e., an increase in the resistance across the contacts and is disconnected after the re-establishment of the normal resistance value.

The invention will now be described by way of an embodiment for telephone systems with reference to the drawing.

As the source of alternating current used for the cleaning, a thermionic generator G is used

in the embodiment, this generating an inaudible high frequency alternating current potential. The thermionic tube O is back-coupled over a transformer Ueg. One branch of the transformer circuit is formed by a resistance R while the other branch is formed by the line F with the contacts 1 to 4 which are to be cleaned, in series. The resistance R is balanced against the normal resistance of the line F and the contacts 1 to 4. If the resistance of the line varies for example on account of the resistance across the contacts 1 to 4 increasing the balance in the branches of the transformer is disturbed and the back coupling sets in, i. e., the generator G commences oscillating and transmits the alternating current to the line thereby immediately cleaning the contacts. When the normal contact resistance and thus the balance in the transformer circuit is re-established the oscillations cease.

In the portion of the telephone line limited by the condensers C1 to C4 there normally flows only the alternating speech current over the selector contacts 1, 3 and 2, 4. This portion of the line is cut off from the portion of the line fed with direct current from the batteries Bt1 and Bt2 by the condensers 1 to 4 the cleaning circuit flows from the generator G over the contacts 4, 2, the resonating circuit comprising the choke coil Dr5 and the condenser C5 and over the contacts 1, 3 back to the generator G. For preventing the cleaning potential from passing into the portion of the line leading to subscriber T1, the resonance circuit Dr5, C5, which is tuned to the frequency of the alternating current transmitted by the generator G is used, while the resonance circuits Dr6, C6 and Dr7, C7 prevent the alternating current passing over the portion of the line to subscriber T2. Since the resonance circuits prevent the cleaning potential from passing into the part of the lines leading to the subscribers it is possible to use voice frequency, i. e., audible alternating currents for the cleaning without there being any fear of disturbing the subscribers or the conversation.

Instead of transmitting the alternating current generated by the generator G direct to the line one can use the equipment to connect a common cleaning potential produced by a separate source of current for the whole exchange to the line or to the contacts to be cleaned for example by means of relays.

The arrangement according to the invention does not only present the advantage of an effective cleaning when the resistance across the contacts varies, but also the advantage of noise-

less cleaning because the freshly forming contact resistances as a result of the shocks to which they are exposed are immediately nullified and the occurrence of contact noises is prevented at the same time.

What is claimed is:

1. An arrangement for cleaning the contacts in an electric circuit, comprising an alternating current generating circuit connected to the contacts in the first circuit and normally ineffective, together with means in the generating circuit responsive to a variation in resistance of said first circuit due to poor contacts to supply alternating current to said first circuit momentarily to clean the contacts.

2. In a communication circuit, a plurality of contacts normally having low resistance, a test circuit connected to the communication circuit, means in the test circuit responsive to a variation of the resistance of said contacts for applying an alternating current to the contacts in said first circuit to clean the same, said means responsive to a return to normal of said contact resistance to remove said alternating current.

3. In a communication circuit, a series of con-

tacts, an oscillator circuit coupled to said first circuit, said oscillation circuit normally inoperative but responsive to an increase in the contact resistance of said series of contacts to start oscillating and supply current to said first circuit to clean said contacts.

4. A communication circuit as claimed in claim 3 in which said oscillation circuit is again rendered inoperative responsive to a return to normal of the contact resistance in said first circuit.

5. A communication circuit having a plurality of contacts included therein, a branch for said circuit containing a circuit balanced to the normal contact resistance of said circuit, and means in the branch circuit responsive to an unbalanced condition due to defective contacts for connecting an alternating current from the branch circuit to the communication circuit to break down the resistance of said defective contacts and restore the balance condition of the circuit.

6. A communication circuit as claimed in claim 5 wherein there are blocking resonant circuits for confining said alternating current to a particular part of said communication circuit.

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