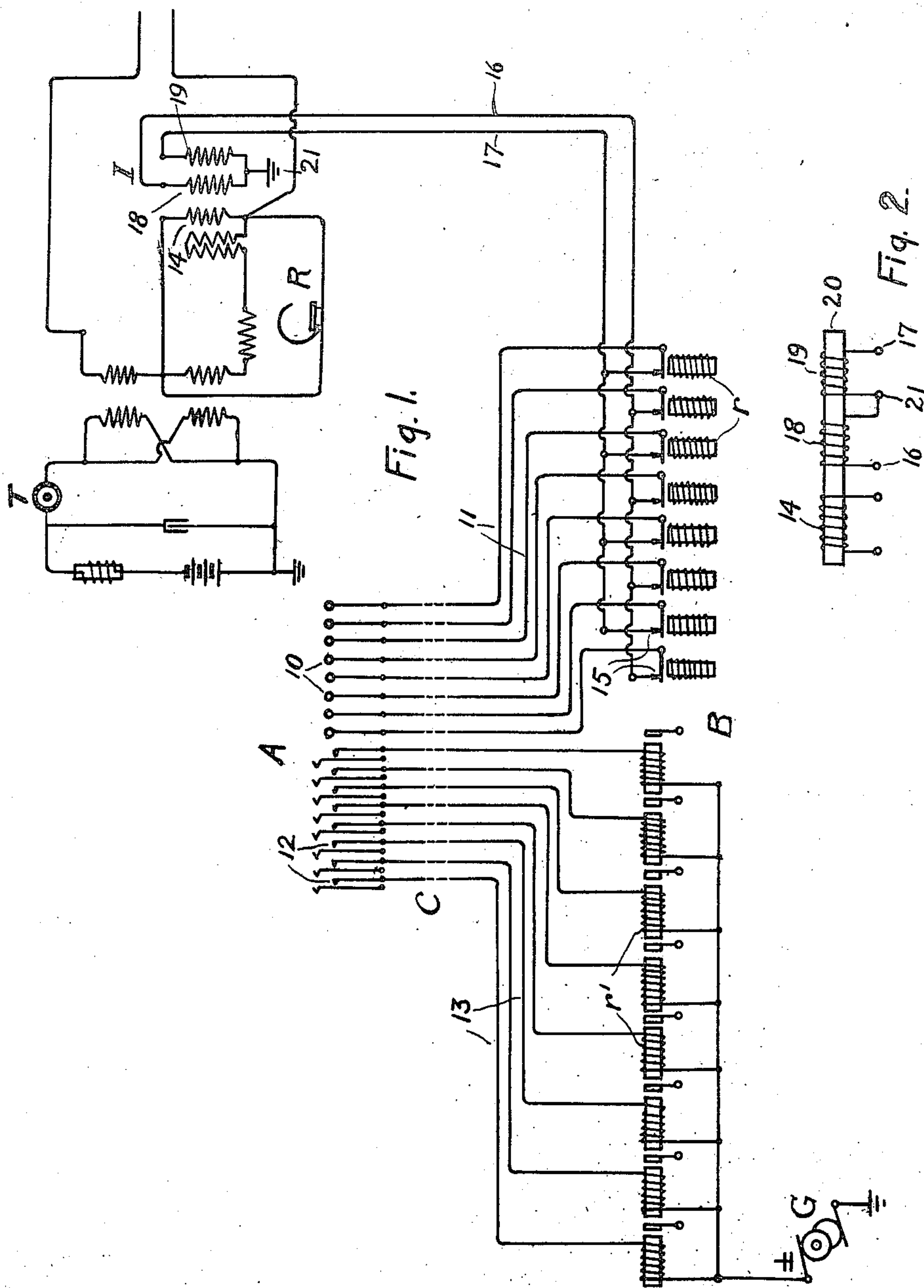


H. M. BASCOM.
 MEANS FOR PREVENTING INDUCTIVE DISTURBANCE IN THE TEST CIRCUITS OF
 TELEPHONE SWITCHBOARDS,
 APPLICATION FILED JUNE 21, 1915.

1,175,111.

Patented Mar. 14, 1916.



Witnesses:

Joseph A. Gately
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UNITED STATES PATENT OFFICE.

HENRY M. BASCOM, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

MEANS FOR PREVENTING INDUCTIVE DISTURBANCE IN THE TEST-CIRCUITS OF TELEPHONE-SWITCHBOARDS.

1,175,111.

Specification of Letters Patent.

Patented Mar. 14, 1916.

Application filed June 21, 1915. Serial No. 35,328.

To all whom it may concern:

Be it known that I, HENRY M. BASCOM, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Means for Preventing Inductive Disturbance in the Test-Circuits of Telephone-Switchboards, of which the following is a specification.

In telephone central station equipment it is convenient to carry in proximity to one another, as in a common cable between the operators' positions and the relay rack, the test conductors which join the tips of the trunk operators' calling plugs with the back contacts of the busy test relays and the conductors which connect the mechanical locking keys of machine ringing systems with the windings of the tripping relays. By way of the capacities between these two groups of conductors alternating current flows from the ringing generator through the trunk operator's equipment to ground, producing noise in the receiver. To prevent this is the object of the present invention.

In the accompanying drawing, Figure 1 represents diagrammatically a telephone operator's equipment, and in much simplified or schematic form those elements of the system which might produce and transmit to the operator's receiver the disturbing current; and Fig. 2 is a diagrammatic detail of the repeating coil which I employ.

At an operator's position A are situated calling plugs in which trunks terminate these being here represented merely by tip contacts 10 of the group of plugs and test conductors 11 leading thereto. Mounted in the usual manner at the position are machine ringing keys, conventionally indicated by contacts 12 to which are joined conductors 13. Each operator has the customary telephone set, comprising the receiver R and transmitter T, the receiver being in circuit with the secondary winding 14 of a repeating induction coil or connecting device I. From the plugs and keys the conductors 11 and 13 pass through a cable C to the relay rack B, where are mounted the busy test relays r and the tripping relays r' . The conductors 13 receive alternating current through the windings of the tripping relays from a ringing generator G. The con-

ductors 11 are united to the armatures of the test relays. The back contacts 15 of these test relays, in accordance with this invention, are connected alternately in multiple by two conductors 16 and 17 to primary windings 18 and 19, respectively, of the repeating coil I. The windings of this coil are arranged upon the core 20 and differentially connected, as is particularly illustrated in Fig. 2 of the drawing, so that currents flowing at the same time in the primaries 18 and 19 produce equal and opposite effects upon the core 20, and thus neutralize one another as regards their action upon the secondary winding 14.

Considering alternating current flowing from the generator in one or more of the conductors 13, it will traverse the capacities between said conductors and the conductors 11 in the cable C, back contacts 15 of relays r which are not at this time energized as a result of the use of the trunks for connections, conductors 16 and 17 and primary windings 18 and 19 in parallel to ground at 21. The resulting currents in the two primaries from the alternate connections tend to be approximately equal; and, on account of their relation, the effect of the disturbing current upon the secondary winding is neutralized, and inductive disturbance in the operator's receiver R from this source is practically eliminated.

Save as above described the elements of the system act in a well known manner and will therefore not be considered further.

Having thus described my invention, I claim:

1. In a telephone switchboard, the combination with a plurality of test conductors exposed to inductive disturbance, of an operator's telephone, and a connecting device situated between said plural conductors and the telephone and including means whereby the inductive effects are neutralized.

2. In a telephone switchboard, the combination with a plurality of test conductors exposed to inductive disturbance, of an operator's telephone, and an inductive connection between said plural conductors and the telephone in which the induced disturbing currents oppose one another.

3. In a telephone switchboard, the combination with a plurality of test conductors

exposed to inductive disturbance, of a repeating coil having a plurality of differentially arranged primary windings to which the test conductors are connected, a secondary winding, and an operator's telephone in circuit with the secondary winding.

4. A switchboard cable containing a group of test conductors and a conductor carrying disturbing current, a repeating coil having two primary windings to which the test conductors are alternately connected in multiple and a secondary winding, the primary

windings being arranged to produce opposite inductive effects in the secondary winding, and a telephone connected to the secondary winding. 15

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this nineteenth day of June, 1915.

HENRY M. BASCOM.

Witnesses:

JOSEPH A. GATELY,
JOHN B. HYNES.