

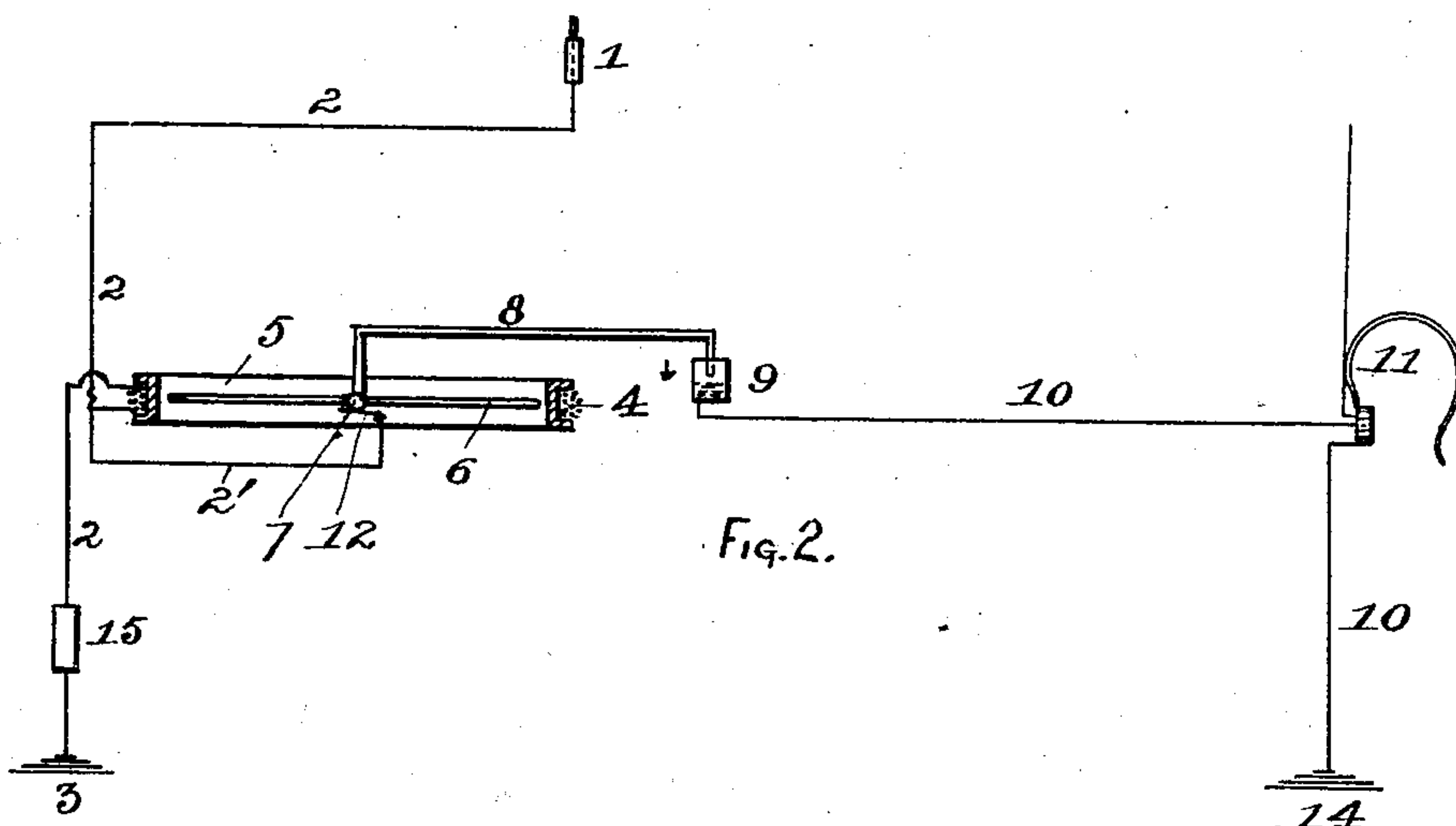
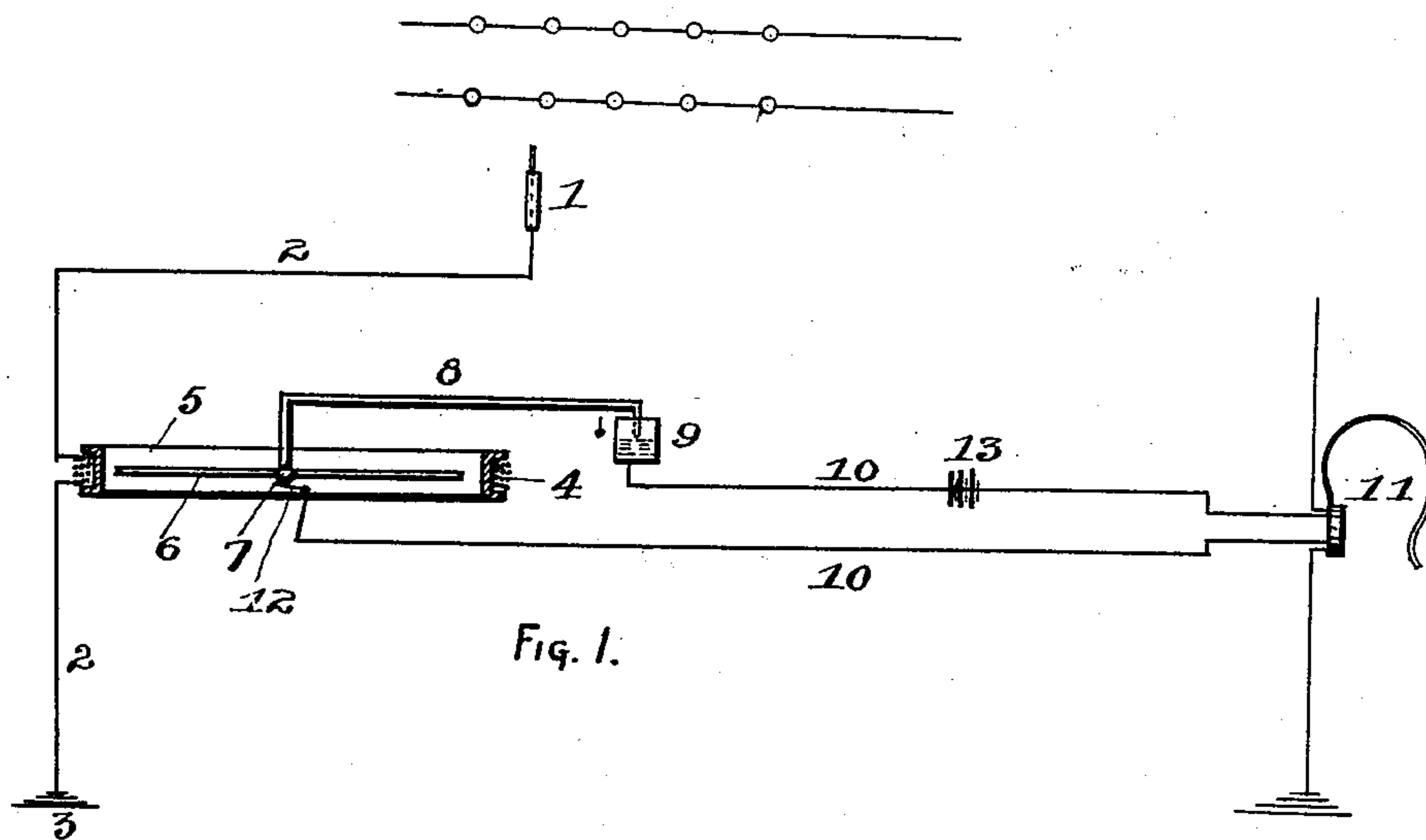
(No Model.)

J. A. WOTTON.

BUSY TEST FOR MULTIPLE SWITCHBOARDS.

No. 521,303.

Patented June 12, 1894.



WITNESSES:

*S. M. Wood.*  
*S. M. Johnson.*

INVENTOR:

*James A. Wotton*  
*by Alexander*  
*Attys.*

# UNITED STATES PATENT OFFICE.

JAMES A. WOTTON, OF ATLANTA, GEORGIA.

## BUSY-TEST FOR MULTIPLE SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 521,303, dated June 12, 1894.

Application filed April 20, 1894. Serial No. 508,356. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES A. WOTTON, a citizen of the United States of America, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Busy-Tests for Multiple Switchboards; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This device is for use in making busy-tests on a multiple switch-board in exchanges in such cities as there is considerable induction from exterior electric conductors, such as, for example, electric street railways, in which the ground return circuits interfere with conduit telephone systems.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows the device with a local battery in the head-phone circuit, and Fig. 2 is a modification of the device wherein the current to make the tick in the head-phone is shunted from the test-plug circuit, both figures being somewhat diagrammatically arranged.

In the figures like reference marks are uniformly employed in the designation of corresponding elements of construction.

1 is the test-plug, 2 the circuit thereof, grounded in earth at 3.

4 is the coil of a galvanometer and 5 is the core whereon said coil is wound, 6 being the vibrating needle thereof mounted on a shaft or pivot 7. An arm 8 of sufficiently light metal is secured to said vibrating needle or its pivot in such a manner as to vibrate in unison with the said needle, its end being projected downwardly into a mercury-cup 9.

10 is a metallic circuit extending from said mercury cup to the coil of the electro-magnet in the head-phone 11, passing from said coil to the pivot 7 in order to connect with arm 8. In the construction shown the wire 10 is connected with a brush 12 bearing on the shaft 7 lightly. A local battery 13 is included in the circuit 10.

The operation of this device is as follows:

The busy test at this time most commonly in use is affected by induced currents from exterior sources to an extent which renders it inoperative in cities where there are extensive street railway systems, and particularly where the currents from the car motors are grounded in the rail and telephone conduit systems are employed. The coil 4 is of sufficiently high resistance to not be affected operatively by the comparatively small induced currents, but as soon as the test-plug 1 is connected with a busy line, the current passing to ground through the metallic circuit 2 and coil 4 included therein, energizes the latter which causes a deflection of the needle 6 depressing the lever 8 so as to bring its point into contact with the liquid metal in the mercury cup and so complete the circuit 10 and cause a tick in the head-phone, indicating "busy."

In the modification shown in Fig. 2, the circuit 10 is grounded at 14 and a portion of the current on the circuit 2 is shunted by a wire 2' to the pivot 7, whereby the local battery 13 is dispensed with and the current for the circuit 10 is obtained through the test-plug 1.

15 is a retardation coil which may be inserted in the circuit 2 if desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A head-phone circuit, a circuit-maker included therein, a test-plug, a circuit therefor, a galvanometer included therein, the needle of said galvanometer being connected operatively with the circuit-maker, substantially as and for the purpose specified.

2. A head-phone and a mercury cup electrically connected, a test-plug and circuit therefor including a galvanometer, an arm connected with the needle of said galvanometer and adapted to be dipped by the deflection thereof, into the said mercury-cup, and means for supplying a current to the said arm, substantially as and for the purpose specified.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JAS. A. WOTTON.

Witnesses:

A. P. WOOD,  
CLARA JOHNSON.