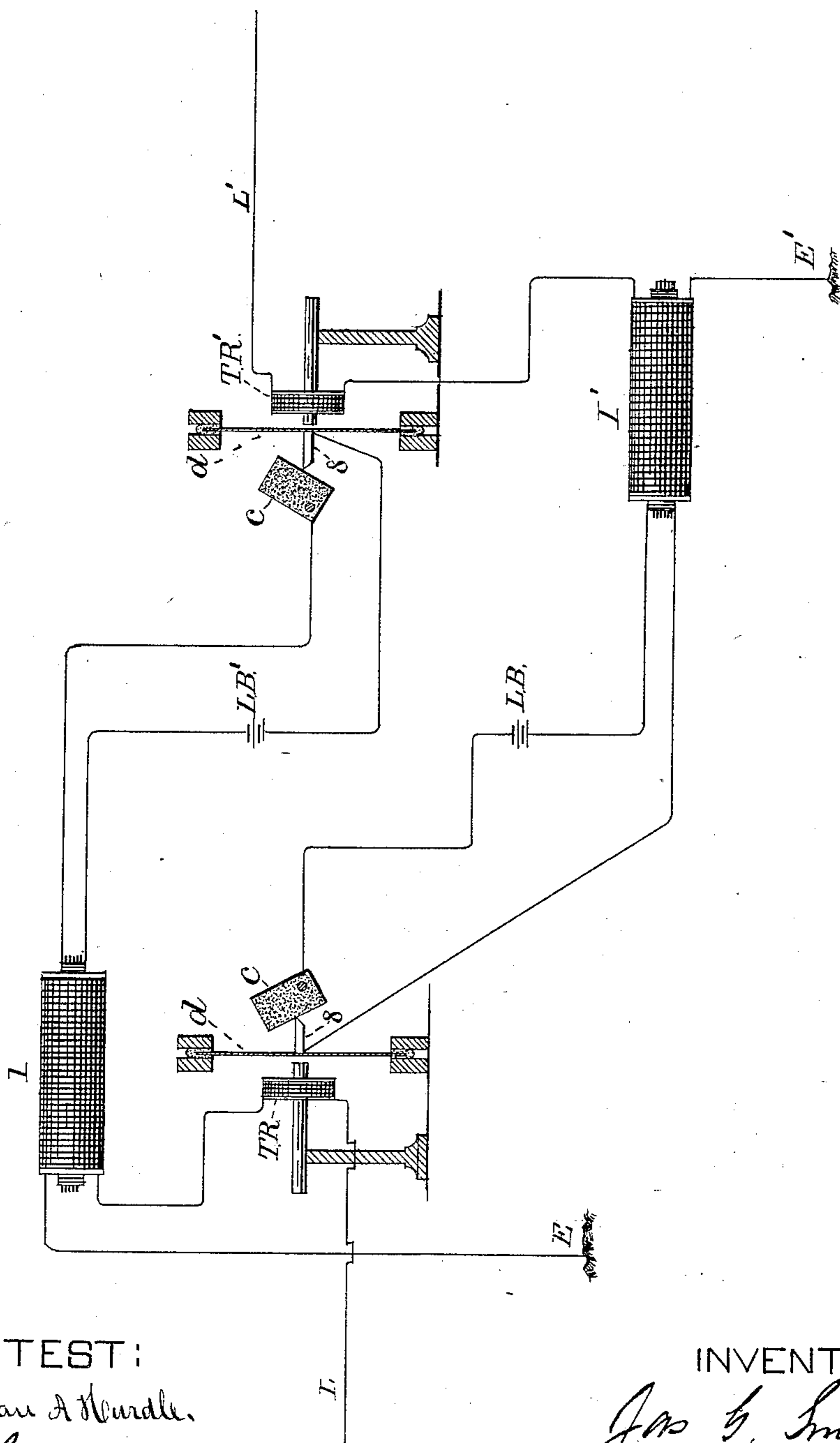


(No Model.)

J. G. SMITH.  
TELEPHONE REPEATER.

No. 256,753.

Patented Apr. 18, 1882.



ATTEST:

Julian A Hurdle.  
Thos. Toomey.

INVENTOR:

Jas G. Smith.  
by H. C. Townsend  
Att'y.

# UNITED STATES PATENT OFFICE.

JAMES G. SMITH, OF HACKENSACK, NEW JERSEY, ASSIGNOR OF TWO-THIRDS TO GEORGE W. COY, OF MILFORD, CONNECTICUT, AND CHARLES E. BUELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

## TELEPHONE-REPEATER.

SPECIFICATION forming part of Letters Patent No. 256,753, dated April 18, 1882.

Application filed February 23, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES G. SMITH, of Hackensack, New Jersey, have invented a certain novel Telephone-Repeater, of which the following is a specification.

The object of my invention is to provide a simple means whereby electric telephone pulsations or vibrations may be relayed from either of two line-circuits to the other simply and effectively and without the use of switches for changing the line and local circuits in the relay apparatus.

To this end my invention consists of a certain novel combination of telephone transmitters and receivers, local batteries, and induction-coils, which will be herein described, and specified in the claims.

The drawing is a diagram of the apparatus.

L and L' represent the two telephone line-wires between which the repeater is placed, and arranged so that telephonic currents representing articulate speech in line L may be relayed to line L', and, vice versa, current pulsations in line L' may be relayed to line L, without any change in the circuit of the relay apparatus.

TR represent the coil of a telephone-receiver of any desired construction, connected in a circuit from line L to and through the secondary of an induction-coil, I, and to earth at E, or to a return-wire. The magnet of T R acts upon a diaphragm, *d*, constructed after any preferred manner, which diaphragm in turn communicates its own vibrations to the contact-points of a telephone-transmitter in the ordinary way. The construction of transmitter here shown is that patented to Joseph Olmsted by Letters Patent of the United States No. 252,132, dated January 10, 1882, and consists of a contact, *s*, carried by the diaphragm and supporting a series of thin sheets of carbonized paper or cardboard or other conducting material, one of which is shown at *c*. Other constructions of transmitter may, however, be used in its place.

The contacts of the transmitter are included in the local circuit of the battery L B, which also includes the primary coil of an induction-coil, I', the secondary of which is included in the circuit from line L', passing through the

coils of a receiver, T R', and to earth, in the same way that the circuit of line L passes to earth through T R and I. Receiver T R' acts upon a transmitter placed in a local circuit with battery L B' and the primary coil of induction-coil I, whose secondary is included in the circuit to earth from line L, as before mentioned. The transmitter for T R' is here shown as constructed in the same manner as that which is acted upon by the pulsations from line L.

The operation will be readily understood: Telephonic pulsations from line L, passing through the receiver T R and the secondary of induction-coil I, the primary of which is connected to the receiver-transmitter of line L', cause vibrations of the diaphragm and corresponding variations of resistance in the contact-surfaces connected therewith, thus causing pulsation in the local circuit of L B and primary of the induction-coil I'. Corresponding electric pulsations are thereby produced in the secondary coil of I', which flow to line L' through T R', and act upon the receiver at the distant end of L' in the ordinary manner. So, also, telephonic currents transmitted from the distant end of line L', flowing to earth through the coils of T R' and secondary of induction-coil I', will by varying the current of local battery L B' set up induced currents in the secondary of coil I, which flow to line L.

As will be observed, the relaying may take place in either direction and without any manipulation of switches when the direction of relaying is changed. No disturbing effects are found to arise from the fact that the pulsations relayed into one line from the other pass through the coils of the receiver by which pulsations are relayed in the contrary direction, although it might be supposed that when, for instance, line L is relaying to L' the pulsations set up in L' would, through its receiver T R', battery L B', and induction-coil I, set up currents in L which would either oppose the currents coming from the distant end of L or would cause confusion of vibrations of the diaphragm *d*. In fact the arrangement described seems to be beneficial rather than otherwise, both in cutting down the sensible induction and in increasing the loudness of the articulate sounds.

What I claim as my invention is—

1. The combination, substantially as described, with the two line-wires L and L', each grounded through a telephone-receiver and  
5 the secondary of an induction-coil, of a telephone-transmitter, one for each line acted upon by the receivers, and local-battery circuits for said transmitters, connected, as described, to the primary of an induction-coil, the local circuit of the transmitter operated by incoming  
10 currents from each line and including the primary of the induction-coil, through whose secondary the line-currents of the other line pass to earth.

2. The combination, as described, of the two 15 induction-coils I I', the receivers T R T R', the lines L L', circuit-connections from each line through a receiver and the secondary of an induction-coil to earth, local battery L B' included in the circuit of the primary of induction- 20 coil I, and the transmitter operated by receiver T R' and local battery L B included in the local circuit of transmitter operated by receiver T R and the primary of induction-coil I'.

JAMES G. SMITH.

Witnesses:

H. C. TOWNSEND,  
THOS. TOOMEY.