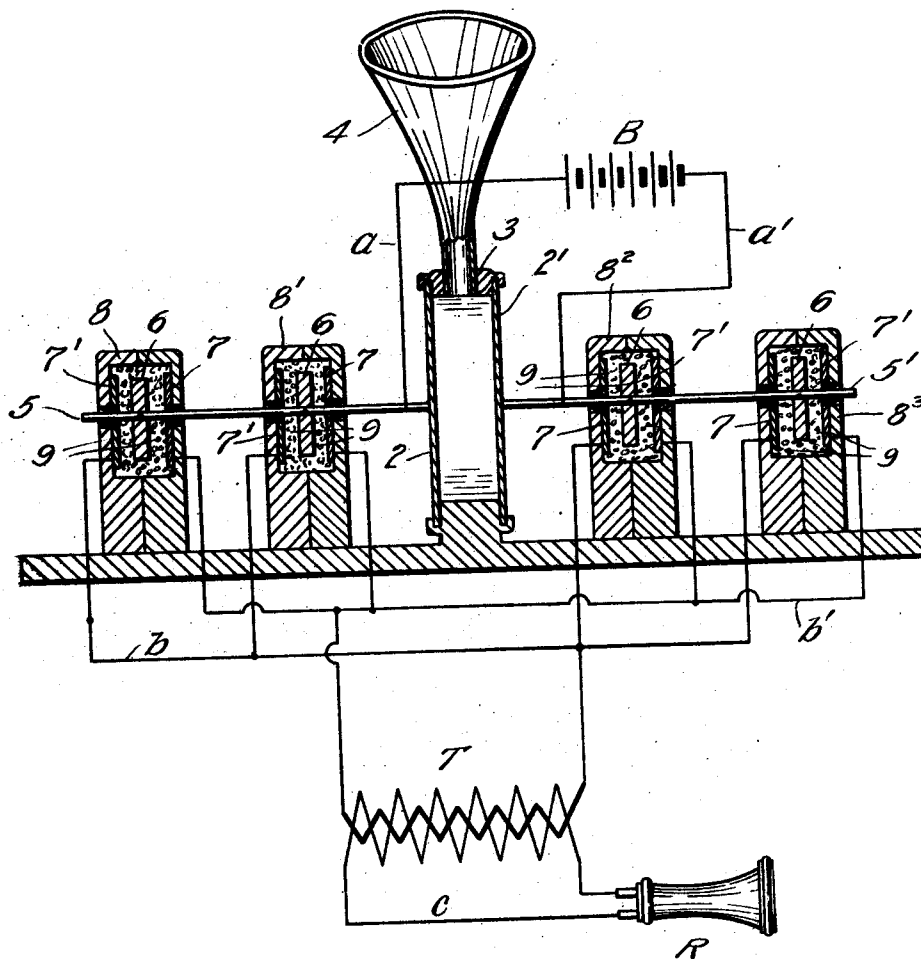


C. W. McGONIGLE.
SOUND TRANSMITTING APPARATUS.
APPLICATION FILED FEB. 5, 1912.

Patented Dec. 31, 1912.

1,049,253.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES W. MCGONIGLE, OF ALGONA, WASHINGTON, ASSIGNOR TO THE GLOBE TELEPHONE COMPANY, OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

SOUND-TRANSMITTING APPARATUS.

1,049,253.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed February 5, 1912. Serial No. 675,520.

To all whom it may concern:

Be it known that I, CHARLES W. MCGONIGLE, a citizen of the United States, residing at Algona, in the county of King and State of Washington, have invented certain new and useful Improvements in Sound-Transmitting Apparatus, of which the following is a specification.

This invention relates to sound-transmitting apparatus, and, among other applications, is especially designed for use with the receiver of an ordinary telephone system, or with a wireless telephone by connecting the instrument with the sending appliances of the wireless system.

The object of the invention is the perfecting of devices of this character whereby the transmission of sound is rendered peculiarly effective.

The invention is illustrated by the accompanying drawing, which shows in section a sound transmitter with the electrical circuits therefor shown diagrammatically.

The reference numerals 2 and 2' designate two diaphragms secured about their peripheries to the ends of a hollow support 3 therefor. Communicating with the space within said support is a horn 4. Attached to the respective diaphragms and extending axially therefrom are metallic rods 5 and 5' which are connected by wires *a* and *a'* with a source of direct current electric supply, as indicated at B. Secured to said rods are disks 6 serving as electrodes for the circuit members comprised of the respective wires and rods. Associated with each of said disks are stationary metal plates 7 and 7' which serve as electrodes for circuit wires *b* and *b'*, respectively. The latter are connected in parallel with a telephone receiver R, or an equivalent, and desirably through the instrumentality of a transformer or an induction coil T, having a primary winding of relatively low resistance. The plates 7 and 7' are disposed in spaced relations at opposite sides of the respective disks and are inclosed in receptacles such as 8, 8', 8² and 8³. Granules of carbon, or an equivalent material, indicated by 9, are provided between the disks and the various associated plates.

In operation, the undulatory movements of the diaphragms generated by sound waves, cause the electrodes 6 to be moved toward or away from the electrodes 7 and 7'

resulting in the granular medium at opposite sides of the movable electrodes affording varying amounts of resistance to the flow of electric currents or impulses from the normally incomplete local circuit *a, a'* to the circuit connections *b, b'* of the electrodes 7 and 7'. The series of electrical impulses thus transmitted through the electrodes are of an alternating character and are thus applied through the medium of the induction coils T to the circuit wires of the receiver R. More particularly, when the diaphragms are pressed outwardly the electrodes 6 which are connected therewith are caused to approach the electrodes 7 whereupon the resistance afforded by the medium 9 is lessened between the referred to electrodes with a proportional increase in the resistance afforded by the said medium with respect to electrodes 6 and 7. Consequently, as the movable electrodes 6 are alternately brought into proximity of the stationary electrodes, it is evident that alternating currents are produced in the circuit wires *b, b'*. When the electrodes 6 are brought into neutral positions with respect to the other electrodes, as would be the condition when the diaphragms are uninfluenced by sound waves, the wires *b, b'* would be short-circuited between the various movable electrodes and all of the others and hence be ineffective at the receiver.

The number of groups of transmitting elements composed of an electrode 6 interposed between the granular matter and the adjacent fixed electrodes may be varied to suit the service or according to the amperage or current supplied.

By such devices a relatively strong current, as 400 volts for example, may be employed and that, too, from a circuit which is utilized for supplying power directly to electric motors and without injuring the certainty and definition of the sounds transmitted by the instrument.

What I claim as my invention, is—

1. In apparatus of the class described, the combination of two vibratile diaphragms, pairs of non-movable electrodes disposed at opposite sides of said diaphragms and constituting the terminals of the primary winding of an induction coil, a movable electrode positioned intermediate the afore-said electrodes of each pair, a granular medium disposed in the spaces between the movable elec-

trodes and the non-movable electrodes, positive connections between the movable electrodes and the respective diaphragms, and the complementary circuit wires of a direct current electric supply connected with the respective movable electrodes.

2. In apparatus of the class described, the combination of a pair of spaced diaphragms adapted to be vibrated in opposite directions when influenced by sound waves, resistance chambers disposed at opposite sides of the aforesaid pair of diaphragms, a non-movable electrode at each end of the respective resistance chambers, a primary winding of an induction coil, one of the terminals of said winding being connected to the electrodes adjacent to the diaphragms at one side of the latter and also with the electrodes

remote from the diaphragms at the opposite side, the other terminal of said winding being similarly connected with the remaining of said electrodes, a movable electrode interposed between the two electrodes of each of the resistance chambers, rods connecting the movable electrodes with the respective diaphragms and conducting wires extending from a direct current electric supply connected with said movable electrodes at opposite sides of the pair of diaphragms.

Signed at Seattle, Wash., this 30th day of Jan., 1912.

CHARLES W. McGONIGLE.

Witnesses:

PIERRE BARNES,
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