

Jan. 30, 1923.

R. A. ENGLER.
TELEPHONE TRANSMITTER.
FILED JUNE 23, 1919.

1,443,620.

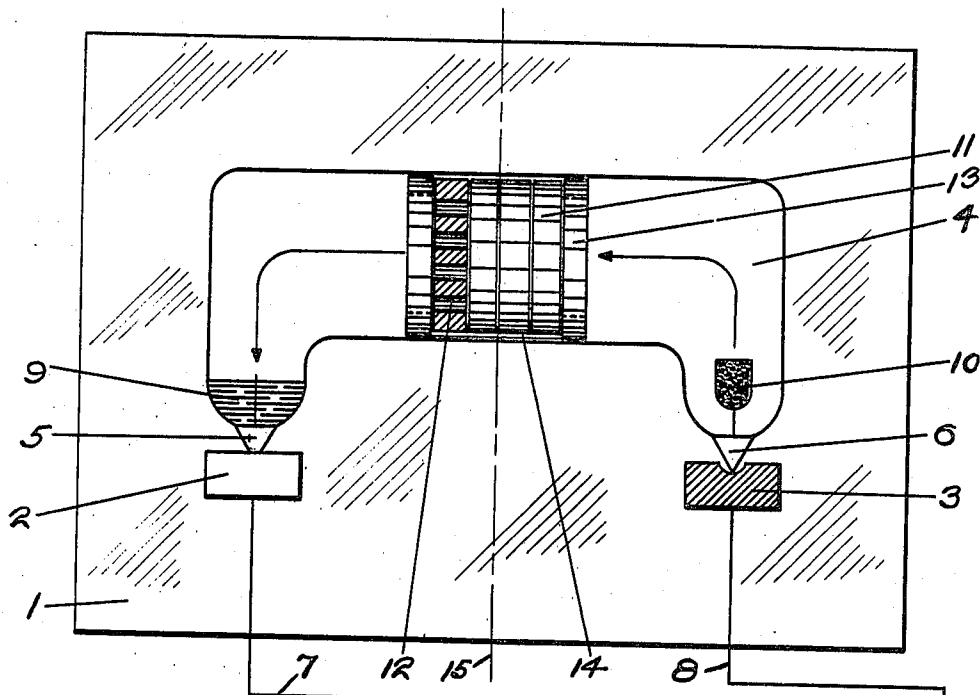


Fig. 1.

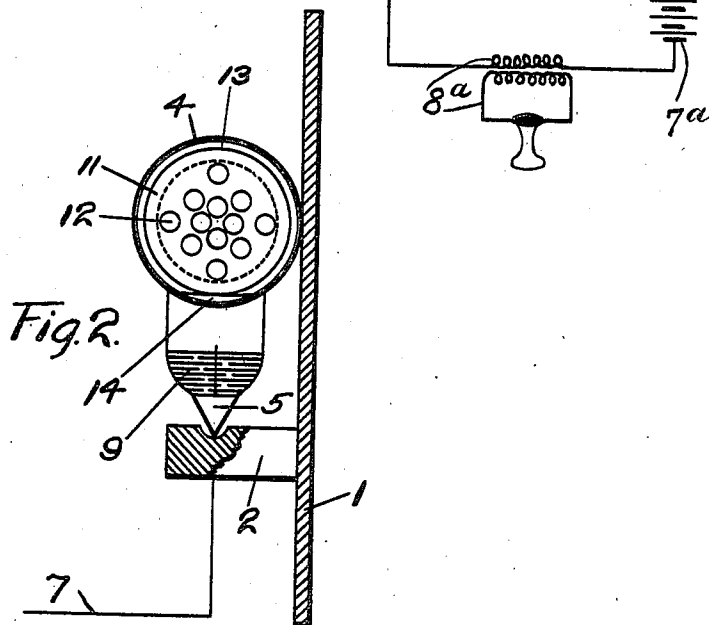


Fig. 2.

Inventor.
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UNITED STATES PATENT OFFICE.

RICHARD A. ENGLER, OF EVANSTON, ILLINOIS.

TELEPHONE TRANSMITTER.

Application filed June 23, 1919. Serial No. 306,265.

To all whom it may concern:

Be it known that I, RICHARD A. ENGLER, a citizen of the United States, and resident of Evanston, in the county of Cook and State of Illinois, have made a certain new and useful Improvement in Telephone Transmitters, of which the following is a specification.

My invention relates to telephone transmitters which can be used in both wire and wireless telephony.

The object of my invention is to produce a simple yet more nearly perfect and more powerful transmitter than has hitherto been possible; one which can be used with large as well as with small currents and reproduce nearly perfect articulation.

These transmitters employ subtle, mobile gases as the variable or translating means and any medium known in the art as a gas or vapor or as an ionic discharge may be used as the variable means. This medium may be produced by the mercury arc, by carbon arcs, by cathode and X-rays, by radio-active agencies, by ionic emissions from hot bodies through which a current is passing, by the "Edison effect", or any other suitable and known way; and furthermore, these various ways of producing ions are spoken of synonymously herein, for instance, when I show and describe a most simple mercury arc device, I do so merely to illustrate how ions produced by what ever way can be utilized in my transmitters as the medium to be varied, impeded, obstructed or throttled. Any kind of current can be used in the transmitters; large, small, alternating and direct currents.

I may call this transmitter an "ionophone" or "phonion" because one signifies "ion-speaker" and the other "speaking-ion"; and ions are used in all its forms.

Referring to the drawings which accompany this specification and in which like reference characters are applied to parts having like function in the several views,

Fig. 1 is a rear view of one form of my transmitter.

Fig. 2 is a cross section end view of Fig. 1 along the line 15.

In Fig. 1, upon a sounding board 1 are mounted two metal projections 2 and 3. Of course, any equivalent of the sounding board can be employed. Metal projection 3 is shown in cross section at a point where it has a small cavity. Both projections have

such cavities. A mercury arc tube 4, constructed as shown, rests loosely with its cathode end on projection 2 while the anode end rests loosely on projection 3. The body of the tube rests loosely against the sounding board. The cathode and anode are each provided with a cone shaped terminal 5 and 6 respectively and which terminals rest with their apexes in the cavities of projections 2 and 3 respectively. Two wires 7 and 8 are connected with the projections 2 and 3 respectively and these wires supply current from battery 7^a to the tube and this is the current which is to be varied by sound waves.

The mercury arc in the tube is started, operated and kept quiet like any other mercury arc for whatever use. The cathode of the arc is mercury 9 while the anode is carbon 10, but both cathode and anode may be of mercury.

In the center of the tube, internally, an obstruction is provided in the path of the mercury vapor. This obstruction consists, in this instance, of four perforated insulating discs such as 11 of light weight material. When the discs are perfectly aligned, the perforations should preferably also be perfectly aligned, thereby allowing a full and free path for the mercury vapor and current. The discs need not necessarily be perfectly aligned, but they must never in this case completely stop up the vapor path.

One of the discs is shown in cross section to illustrate the perforations 12. Two rings 13 of insulating material, one on each side of the four discs 11, are provided to hold the discs in place. The rings fit snugly in the tube but hold the discs between them somewhat loosely so that the latter can move freely. The discs are smaller in diameter than the tube is internally, so that they can move to and fro transversely to the tube. The discs rest on an insulating piece 14 which allows them to move as above stated.

When the sounding board is vibrated by the voice or otherwise vibrated, the tube vibrates and consequently the four discs 11 with the result that the perforations in the discs become out of alignment more or less and the vapor path becomes throttled more or less with the final result that the current flow through the tube and in the circuit of which it forms a part is altered more or less exactly in accordance with the vibrations of the sounding board. The sup-

ply of current together with suitable translating devices such as the induction coil and telephone receiver 8^a for example are connected to wires 7 and 8 just as would be the case if a carbon or microphone transmitter were substituted for the mercury arc device.

Any other suitable means of obstructing the vapor path can be employed as well as any other construction of the arc tube.

Magnetism and electricity, for instance, may be used as the obstructing, impeding, throttling or varying means or where ionized air is used, the sound waves themselves may constitute such operating means, but these methods of and means for operating are fully described and claimed in my co-pending application for "gaseous telephone transmitters" Serial #321,195, filed September 2, 1919.

This form of transmitter does away with the troublesome packing met with in carbon transmitters and the gas or vapor is such a subtle medium and dependent on heat that harshness and frying are not possible when heavy currents are used as is the case with carbon transmitters; and in all cases the articulation of my transmitters is far more perfect than with the present known forms as is most evident.

The resistance of the gas or vapor path and circuit should be kept as small as possible for the same reasons that the resistance of a carbon transmitter and circuit is kept low.

When air and some other gases are ionized by X rays they become conductive and stay so for a time after passing from under the influence of the rays. Hence if ionized air for instance is used in the tube in place of the mercury vapor, the action of the device remains the same.

I do not limit myself to the precise arrangements and equipments shown and described because the principle of my inven-

tion may be employed in a great variety of forms of apparatus without departing from the spirit of my invention or calling forth the exercise of the inventive faculty because the fundamental conditions are so simple that an almost infinite variety of detail is possible; and I show the vapor devices and circuits in the most elementary fashion for the sake of simplicity and ease of understanding and drawing.

I claim as follows:—

1. A telephone transmitter comprising a diaphragm, a gas or vapor path, a source of current and a mechanical shutter located in said path, said shutter being vibrated by the vibrations of said diaphragm, whereby the gas or vapor and current are varied in accordance with said vibrations.

2. In a telephone transmitter, the combination of a conducting gas or vapor path, a mechanical valve located in said path and vibratory means for causing said valve and said gas or vapor to vibrate.

3. In a telephone transmitter, the combination of a conducting gas or vapor path, a mechanical valve located in said path and vibratory means for causing said valve to vibrate and thereby vary the resistance of said gas or vapor path.

4. In a telephone transmitter, the combination of a conducting gas or vapor path, a mechanical obstruction located in said path and vibratory means for causing said obstruction to vibrate, whereby the quantity of said gas or vapor is varied.

5. In a telephone transmitter, the combination of a conducting gas or vapor path, a mechanical throttler located in said path and vibratory means for causing said throttler to vibrate, whereby said gas or vapor is throttled.

Signed at Evanston, in the county of Cook and State of Illinois, this 30th day of October, 1918.

RICHARD A. ENGLER.