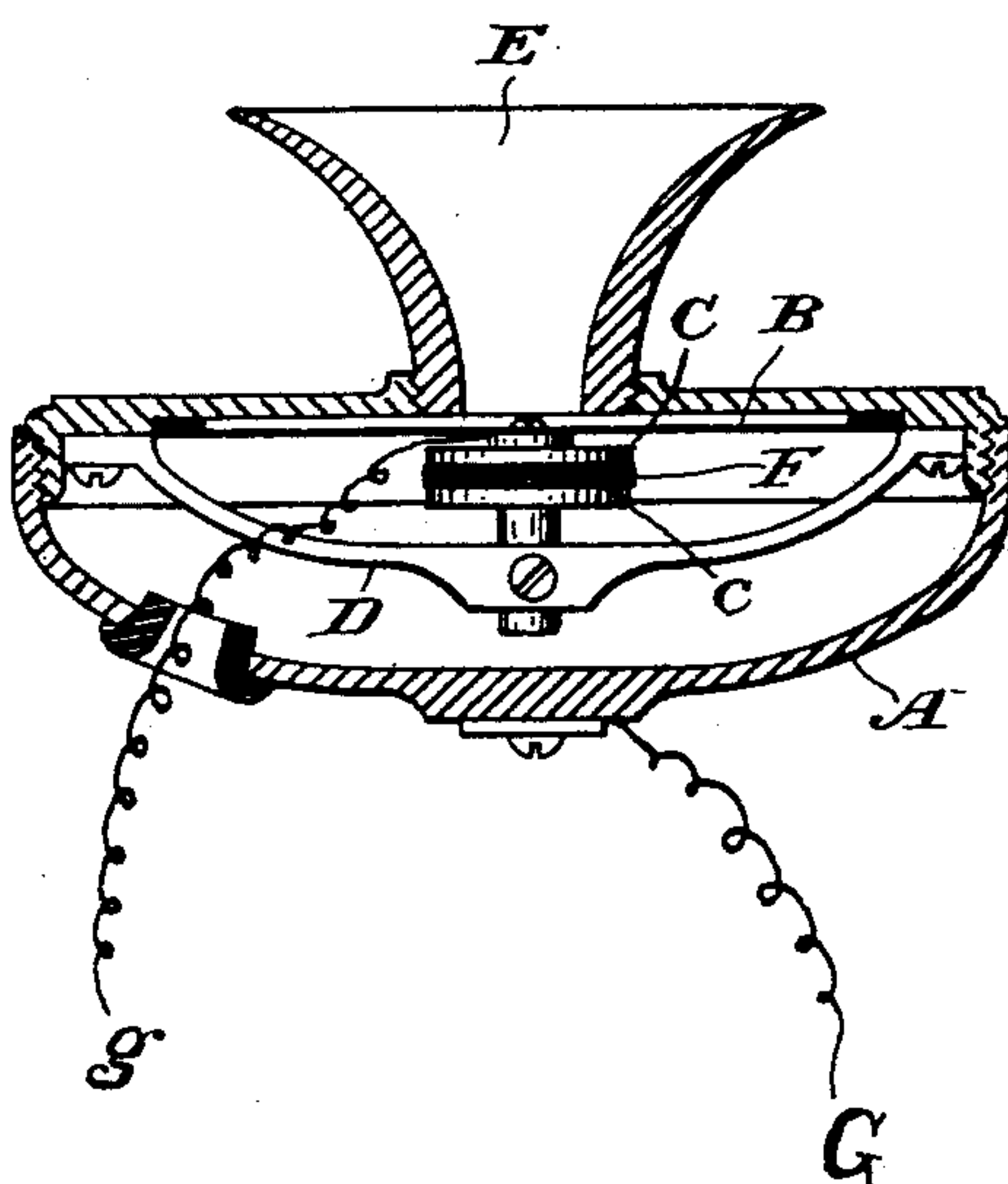


(No Model.)

O. A. ENHOLM.
TELEPHONE TRANSMITTER.

No. 587,654.

Patented Aug. 3, 1897.



Inventor:

Oscar A. Enholm

Witnesses:

George A. Ryan
Charles H. Harns

By Lawyer, Edwards & Ryan
his Attorneys.

UNITED STATES PATENT OFFICE.

OSCAR A. ENHOLM, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
FREDERICK W. LOHR, OF SAME PLACE.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 587,654, dated August 3, 1897.

Application filed November 17, 1896. Serial No. 612,415. (No model.)

To all whom it may concern:

Be it known that I, OSCAR A. ENHOLM, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a full, clear, and exact specification.

My invention relates to telephone-transmitters, and particularly to that part of a transmitter which produces the undulations or variations of electric current coinciding with the sound vibrations.

The object of the invention is to provide a construction for such part which shall be of high efficiency in operation.

It is well known that in existing telephones the vibratory movement of the electrodes produces the undulations of current by varying the resistance of the circuit, and this variation of resistance depends upon the surface or area of contact, the resistance to the current bearing a certain proportion to the area of contact. This variation of contact under certain conditions, especially where an electric current of considerable power is employed, produces sparks or miniature electric arcs at the point or points of contact. The more violent the variation or the more powerful the current the greater is the sparking. All of this has a destructive effect upon the instrument and limits the commercial range of the telephone, depending entirely upon the amount of current that can be carried with safety. I propose to obviate this objectionable feature by producing a button or disk, of composition such as will be hereinafter described, to be interposed between the electrodes of the transmitter, the conductivity of which disk shall vary with the pressure to which it is subjected and the material of which the disk is composed being such that the disk will possess sufficient elasticity to return to a normal condition when not under pressure without breaking the circuit.

In carrying out my invention I preferably employ a composition of matter comprising a conducting material in a finely-divided state mixed with a suitable gum or other adhesive elastic non-conducting material. This composition I prefer to make in the following way:

I mix a vegetable mucilage—such as boiled linseed-oil, gum, pure rubber gum, or similar adhesive material—with finely-divided gold-leaf or other suitable metal or finely-divided carbon in substantially equal proportions. The mass is thoroughly worked together and pressed or rolled into a thin sheet. When it has almost acquired its normal density, more metal or carbon, or both, may be worked into it, if desired, care being taken that the mass shall contain sufficient gum or rubber to bind it and retain its elasticity. Both metal and carbon may be used together as conducting material, if preferred. The use of both materials gives good results. The proportions of gum and conducting material may be varied according to judgment and to suit special conditions, electromotive force, &c., although I have found the above-mentioned proportions to produce a good, if not the best, result. Likewise the proportion of liquid in the gum, or consistency thereof, will be governed by special conditions, although usually it is only necessary that the gum or rubber shall possess sufficient fluidity to allow the non-conducting material to be worked into it.

From the sheet formed as above described a button or disk of suitable shape is cut and inserted between the electrodes of any form of transmitter.

It is to be understood that I do not herein limit myself to any particular form of transmitter for use in connection with my invention, although the employment of the invention will be more clearly understood by referring to the accompanying drawings, in which the figure conventionally represents a transmitter embodying my invention.

Referring more particularly to the drawing, A represents the shell of the transmitter; B, the diaphragm; C and c, the carbon electrodes; D, a bridge or support for electrode c; E, the mouthpiece; G g, the wires of the electric circuit, and F the button or disk interposed between the electrodes.

When the electric circuit is completed through the carbon disk electrodes, the button offers a certain normal resistance to the electric current by reason of the relative positions of the particles of conducting material

to each other. Now as sound vibrations strike the diaphragm to which one of the carbon electrodes is secured and are transferred to the button in the form of pressure the impact changes the relative positions of conducting particles to each other and to a certain extent to the carbon electrodes in such a manner that larger areas of contact are presented. This reduces the resistance to the electric current, and consequently at the instant of pressure there is a greater amount of electric current passing than when the pressure ceases. This gives rise to what is called an "impulse of current" representing a single impulse or vibration of sound.

I am well aware that buttons have been made of lampblack or finely-divided carbon and used for the same purpose for which I use my invention, and I do not intend that my claims shall be construed to cover any form of transmitter-button which is composed simply of a non-elastic conducting material.

It is to be understood that the term "conducting material" as used herein is intended to cover semiconducting material or material of any degree of conductivity. Likewise the term "gum" is intended to cover all forms of gum or other adhesive elastic substances.

Having thus described my invention, I claim—

1. In a telephone-transmitter, the combination of two electrodes, and a composition of an adhesive elastic substance intermixed with conducting material, interposed between the same, substantially as described.

2. In a telephone-transmitter, the combination of a diaphragm, an electrode secured to the same, a second electrode supported in-

dependently and separated from the diaphragm electrode by a composition of an adhesive elastic substance intermixed with conducting material, substantially as described.

3. In a telephone-transmitter, the combination of two or more electrodes in contact with a button composed of finely-divided metal, carbon, and an integral adhesive elastic substance into which the metal and carbon are intimately mixed, substantially as described.

4. In a telephone-transmitter, the combination with the electrodes of a button interposed therebetween composed of a conducting material and an elastic gum, substantially as described.

5. In a telephone-transmitter, the combination of two or more electrodes, and a button interposed therebetween composed of finely-divided conducting material and an integral adhesive elastic substance into which the conducting material is intimately mixed, substantially as described.

6. In a telephone-transmitter, the means for producing undulatory or vibratory electric currents, consisting of the combination with a rigidly-mounted electrode, of a vibratory electrode, and a button composed of finely-divided conducting material and elastic rubber interposed between said electrodes, substantially as described.

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

OSCAR A. ENHOLM.

Witnesses:

C. V. EDWARDS,
M. A. RYAN.