(No Model.) 2 Sheets—Sheet 1.

N. PARKS & F. J. CALLANEN.

TELEPHONE.

No. 301,749. Patented July 8, 1884.

Fig. 1.

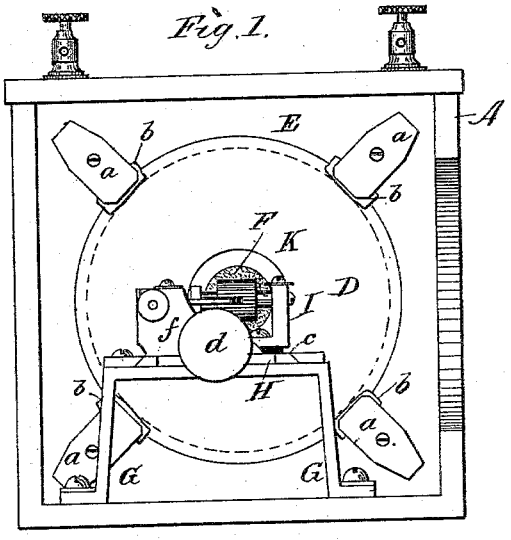
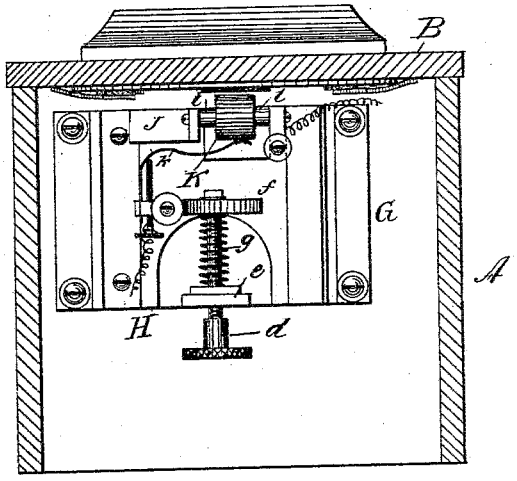


Fig. 2.



Witnesses
C. C. Allen
John F. Hinkel

Inventor:
Nathaniel Parks
Francis J. Callanen
by Foster & Freeman
attys

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

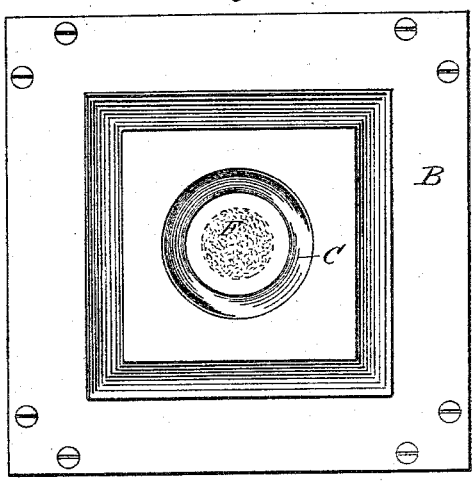
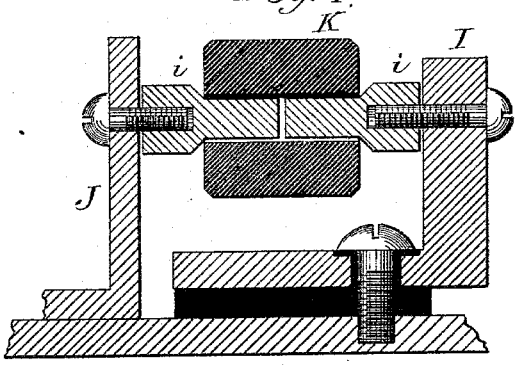


Fig. 4.



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Nathaniel Parks

Frank J. Callanen

by Foster & Freeman

attys

UNITED STATES PATENT OFFICE.

NATHANIEL PARKS, OF DEANSVILLE, AND FRANK J. CALLANEN, OF UTICA, NEW YORK.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 301,749, dated July 8, 1884.

Application filed February 18, 1884. (No model.)

To all whom it may concern:

Be it known that we, NATHANIEL PARKS and FRANK J. CALLANEN, citizens of the United States, and residents, respectively, of Deansville and Utica, both in the county of Oneida and State of New York, have invented certain new and useful Improvements in Telephones, of which the following is a specification.

Our invention relates to microphonic transmitters, and has for its object to construct a simple and delicate microphone that is especially adapted for transmitting electric variations produced by sound-vibrations over long lines of wire, and at the same time to avoid the "spark-bridge" common to many telephonic transmitters, especially when heavy currents are used.

To this end our invention consists in a suitable box or case, the front side of which has the usual flaring mouth-piece projecting forward, and a circular recess or resonating-chamber formed in the rear side thereof. Over this chamber is secured by spring-clips, the under sides of which are padded by chamois or other elastic material, the diaphragm, preferably of glass or similar material. To the center of this diaphragm is preferably secured by some suitable adhesive substance a circular disk of chamois or other like material. Upon the bottom of the box or case, and in rear of the diaphragm, is a frame or support, upon which is an adjustable carrier of metal moving in ways upon the frame and adjusted by means of a suitable thumb-screw passing through a screw-threaded lug or nut upon the frame and engaging with a projection upon the carrier. A spring may surround the screw and press the carrier in one direction, it being adjusted in the other by the screw. Upon this carrier are secured two standards, one of which is insulated therefrom in the usual manner, and between these standards is placed a hollow cylinder of hard carbon or similar material, said cylinder being loosely supported upon two trunnions of brass or other conducting material, each of which is secured to one of the supports in such a manner as to be diametrically opposite each other and to extend into the hollow cylinder, but not to touch each other. To a projection upon the carrier is secured a thin flexible spring, the end of which is covered or padded with some soft insulating material, and bears upon the carbon-cylinder, suitable means being provided for adjusting the pressure of the spring upon the carbon. Circuit-connecting screws are attached one to the insulated standard and the other to some other part of the carrier or frame.

Referring to the accompanying drawings for a more particular description, Figure 1 is a rear elevation of our improved microphone. Fig. 2 is a plan view with the top of the box or case removed. Fig. 3 is a front elevation, and Fig. 4 a sectional view of details of the operating parts.

The box or case A has a removable front, B, which is provided with a projecting flaring mouth-piece, C, formed in one piece therewith or otherwise suitably constructed. In the rear side of the front B is a circular recess or resonating-chamber, E, over which the diaphragm D, of any material, but preferably of glass, is secured by the spring-clips *a*, having a pad or cushion, *b*, of some elastic material—such as chamois, felt, rubber, and the like—between their ends and the diaphragm.

To the center of the diaphragm D is preferably secured, by any suitable means, a disk, F, of chamois, felt, or other similar material, which serves as a damper to the diaphragm.

A frame, G, is secured to the bottom of the box, and is provided with inclined or beveled ways *c c*, in which moves a carrier, H. An adjusting thumb-screw, *d*, works in a lug, *e*, projecting from the frame, and engages with a projection, *f*, upon the carrier, and a spring, *g*, surrounds the screw and serves to hold the carrier forward by spring-pressure, it being adjusted rearwardly positively by the turning of the thumb-screw.

Fixed upon the carrier H are the standards I J, the former being insulated therefrom by the usual means, and fixed to each standard by screws or other suitable means is a trunnion, *i*, of brass or other conducting material, which project toward each other, but do not make contact, and upon these trunnions is loosely supported a hollow cylinder of hard carbon, K. A spring, *k*, fixed to a projection

on the carrier, and provided at its end with some soft insulating material, bears upon the carbon cylinder K, its pressure being regulated by an adjusting-screw. One terminal of the circuit is secured to the insulating-standard I, and the other to the carrier or frame at any convenient point. If an induction-coil is used with the instrument, these terminals are in the local circuit; but if no induction-coil is used they are in the main line, which is connected to the outside of the box by suitable binding-posts. Sound-vibrations impinging upon the diaphragm produce corresponding vibrations in the air in the box, and these vibrations, impinging upon the carbon cylinder loosely supported upon the trunnions, cause the relations or degree of pressure between the carbon and trunnions to vary, and thereby vary the resistance to the electric current passing through them. The initial pressure between the carbon and the metal trunnions is varied by the spring bearing upon the carbon. By this arrangement we are enabled to avoid the spark-bridge, so common to many transmitters, and to use a strong current without materially interfering with perfect articulation, which is a great advantage in transmitting long distances.

In the drawings we have shown the electrodes as being adjusted out of contact with the diaphragm, and the instrument may be used in transmitting in this manner; but it is evident that the electrodes could be so adjusted that the carbon cylinder would be in contact with the diaphragm or the elastic pad thereon, and so be directly moved by the action of the diaphragm, instead of by the air-vibrations.

In using the instrument for long-distance telephony we prefer to have the elastic pad on the diaphragm in slight contact with the electrodes, as this is found to produce better results; but in short-distance telephony the pad need not be in contact, as the air-vibrations are found to sufficiently and properly affect the electrodes to produce good results. When the diaphragm is not in contact with the electrodes, the elastic pad may be dispensed with; but we prefer to retain it in its position, as it tends to modify the molecular or extraneous vibrations of the diaphragm, and to soften or temper the "timbre" of the sounds.

We prefer to use the glass diaphragm, in order to take advantage of its sonorous qualities, which, when modified by the pad, we have found to produce good results, but do not limit our invention to that.

By the use of the carbon electrode supported on the metal electrodes we are enabled to avoid the harshness and scraping sounds due to the contact of the usual carbon electrodes, and for long-distance telephony we find this to be a great advantage; and, again, there is not so much wear between the surfaces as between two carbon surfaces.

In some instances the diaphragm may be dispensed with altogether, and the sound-vibrations caused to impinge directly upon the electrodes.

Without confining ourselves to the precise details above described, what we claim is—

1. In a microphone-transmitter, electrodes consisting of a hollow cylinder of carbon supported upon metal trunnions, substantially as set forth.

2. In a microphone-transmitter, the combination, with metal trunnions, of a hollow cylinder of carbon supported thereon, and a spring for regulating the initial pressure of the carbon on the trunnions, substantially as described.

3. In a microphone-transmitter, the combination, with a diaphragm, of electrodes adjustably supported in rear thereof and out of contact therewith, substantially as described.

4. In a microphone-transmitter, the combination, with a diaphragm of glass or similar material having an elastic pad upon its rear face, of electrodes adjustable to and from said diaphragm, as set forth.

5. The combination, with a frame, of an adjustable carrier movable thereon, standards on the carrier supporting trunnions, and a hollow cylinder of carbon loosely supported upon the trunnions, substantially as described.

6. The combination, with a diaphragm, of a frame, an adjustable carrier movable thereon, standards attached to the carrier, trunnions of brass or similar material secured to the standards, a carbon cylinder loosely bearing on the trunnions, and an insulated spring bearing upon the carbon, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

NATHANIEL PARKS.
FRANK J. CALLANEN.

Witnesses:
T. G. FINETTE,
HENRY A. DAVIS.