

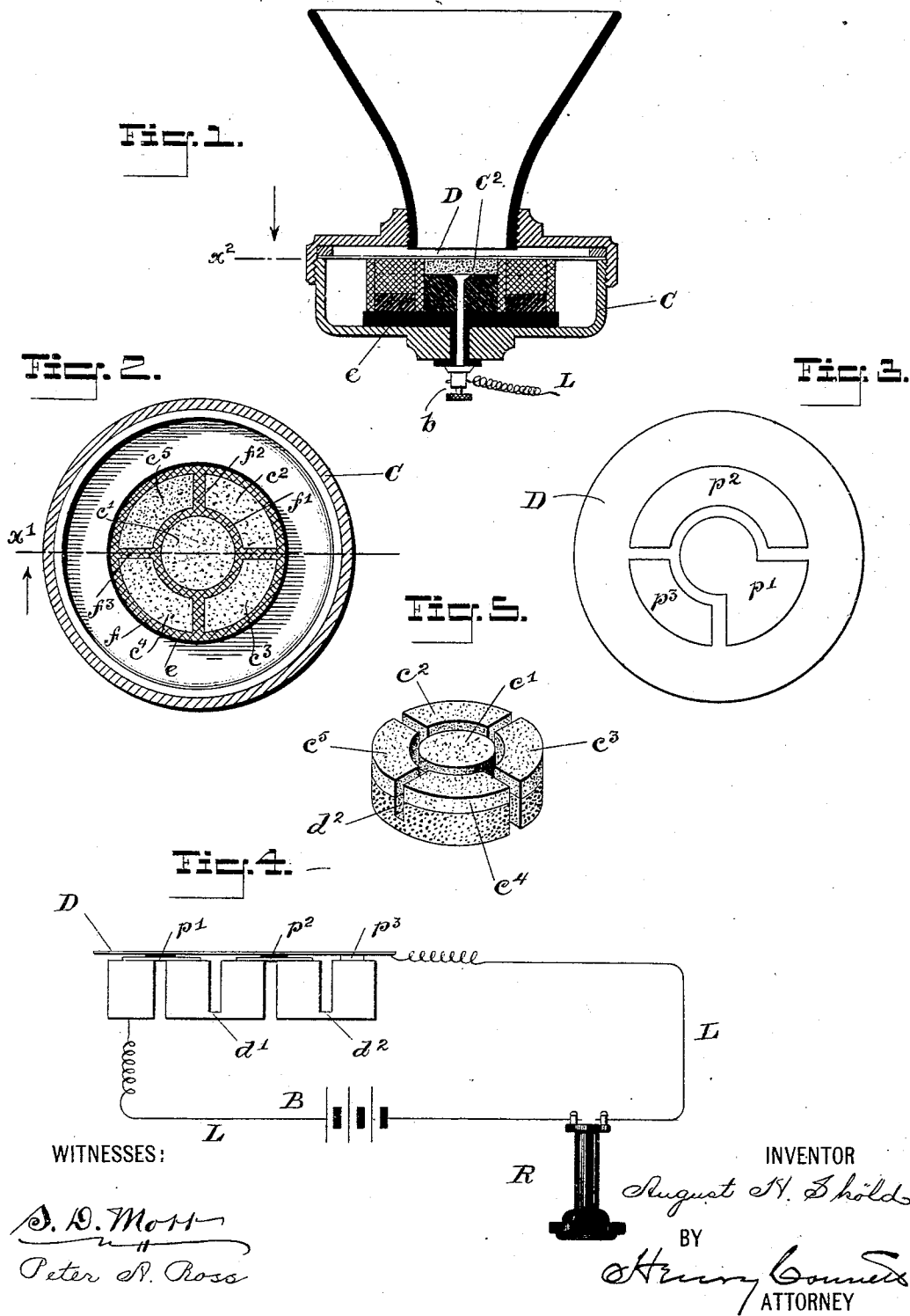
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A. H. SKÖLD.
MICROPHONE.

(Application filed Dec. 22, 1897.)

(No Model.)



WITNESSES:

S. D. Mott
Peter A. Ross

INVENTOR

August H. Sköld

BY

Henry Bonner
ATTORNEY

UNITED STATES PATENT OFFICE.

AUGUST HERMAN SKÖLD, OF STOCKHOLM, SWEDEN.

MICROPHONE.

SPECIFICATION forming part of Letters Patent No. 664,904, dated January 1, 1901.

Application filed December 22, 1897. Serial No. 663,065. (No model.)

To all whom it may concern:

Be it known that I, AUGUST HERMAN SKÖLD, electrician, a subject of the King of Sweden and Norway, and a resident of Ostgotagatan 32, Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Microphones, (for which patents have been granted as follows: in Sweden October 27, 1896, No. 8,998; in Germany November 20, 1897, No. 105,002; in France March 4, 1898, No. 275,579; in Belgium March 4, 1898, No. 134,161; in Austria February 7, 1899, No. 49/1,311; in Hungary March 7, 1898, No. 12,633; in Great Britain March 7, 1898, No. 5,590; in Switzerland April 2, 1898, No. 16,478; in Norway April 27, 1898, No. 6,686; in Spain July 13, 1898, No. 22,735; in Italy June 30, 1898, Vol. XXXV, 48,441, XCVII, 229; in Portugal March 11, 1899, No. 2,841; in Denmark February 3, 1898, No. 2,039, and in Finland May 20, 1898, No. 840,) of which the following is a specification.

As the telephone finds a more extensive use the need is more keenly felt of obtaining telephones which in their action are perfect and as nearly independent of the length of the line-circuit as possible. The telephones ordinarily employed are influenced by the resistance of the line between the respective apparatuses to the current passed through it, and the magnitude of this resistance has led to the introduction of an induction-coil for increasing the tension of the current, and thereby overcoming said resistance. It has also been proposed to employ two spring-actuated contacts bearing upon the telephone-diaphragm and located in series in the circuit for the purpose of forming several closing arcs, and thus increasing the intensity of the current fluctuations and the distinctness of the speech transmitted, and it has also been proposed to provide a microphone having two diaphragms with two contacts at each diaphragm connected in series. My invention relates to this general class of microphones provided with contacts of granulated carbon, having in view the overcoming of the resistance in long line-circuits without the aid of an induction-coil.

To this end the invention consists in providing an instrument having a single diaphragm with a plurality of carbon contacts sit-

uated adjacent to one face of said diaphragm. Now it is understood that the greater the pressure of the microphone-diaphragm against a carbon contact the less will be the resistance to the passage of the current and the greater will be the flow of the current through the circuit, which current causes the attraction of the diaphragm of the receiver to its magnet. As the resistance in a long circuit may equal or even exceed that of a single contact the resistance of the circuit will decrease, the influence exerted on the electromagnet of the receiver by the current impulses passing at the point of contact in the microphone, there being therefore but a slight difference in the influence of successive impulses, whereby the sounds become indistinct or even inaudible. My invention obviates this difficulty by increasing the difference between the maximum and minimum resistance of the contact in the microphone, thereby decreasing the influence of the resistance in the line-circuit. As stated above, this object is attained by providing a plurality of places of contact in the microphone arranged in series in the circuit with the receiver and at one face of the same diaphragm. No local battery and induction-coil is needed with my microphone, the current being sent from a battery or generator common to the entire set of lines to the electromagnets of the receivers. As the several places of contact are in series and situated at the same face of the diaphragm, the resistance will be decreased or increased over a single contact as many times as there are contacts in the series—that is to say, the influence of the motion of the diaphragm will be increased as many times as there are contacts in the series. The differences in the strength of the current impulses transmitted will be correspondingly increased and the effect produced on the diaphragm of the receiver will consequently be much more powerful.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is an axial section of the microphone, taken at line x' in Fig. 2. Fig. 2 is a section at line x^2 in Fig. 1, showing the grouping of the contacts. Fig. 3 is a view of the inner or contact side of the diaphragm. Fig. 4 is a diagrammatic view illustrating the principle of construction and the line connections.

Fig. 5 is a perspective view of the carbons detached, but grouped together.

The diagrammatic view, Fig. 4, is designed merely to illustrate the principle of construction and the line connections. D represents the diaphragm of the microphone; L, the line; B, the battery; R, a receiver, and c' , c^2 , c^3 , c^4 , and c^5 granular carbon contacts of the microphone. The contacts c^2 and c^3 are connected together at d' and the contacts c^4 and c^5 are connected together at d^2 . On the inner face of the diaphragm and insulated therefrom are two contact-plates p' and p^2 , which serve to connect, the former the carbons c' and c^2 and the latter the carbons c^3 and c^4 . A contact-plate p^3 on, but not insulated from, the diaphragm D connects the carbon c^5 with the line, the carbon c' being connected with the line at the other side of the generator or battery B.

It should be understood that the contact-plates p' , p^2 , and p^3 in Fig. 4 are in reality pieces of tin-foil secured to the diaphragm D. They are represented, for better illustration, quite thick in this diagrammatic view.

Referring now to Figs. 1, 2, and 3, which show a practical construction of the microphone, C is the casing of the instrument, within which is a disk e , of ebonite or the like, on which are mounted the several carbon contacts shaped so as to be grouped compactly. The central contact c' is circular and connected with the line through a suitable binding-post b . The contacts c^2 and c^3 are segmental and connected integrally by the tie d' . The contacts c^4 and c^5 are also segmental and connected integrally by the tie d^2 . The group of carbons is encircled by an insulating-band of felt f , the central contact c' is encircled by an insulating-partition of felt f' , and the segmental masses of granular carbon are separated by radial insulating-partitions of felt f^2 and f^3 , the latter of course only extending down to the integral ties which connect the adjacent carbons. These felt partitions also serve to box in or confine the segmental masses of carbon granules. The contact-plates on the diaphragm D are seen in Fig. 3. It will be understood that the insulated plate p' connects the carbons c' and c^2 , the insulated plate p^2 connects the carbons c^3 and c^4 , and the non-insulated plate p^3 connects the carbon c^5 with the diaphragm and line. Thus the series of five carbon contacts are connected in series with the line.

Obviously the number of the carbon contacts may be varied, and they may be differently arranged without departing from the spirit of my invention. To obtain practical results, however, the contacts must be of granular carbon. For the sake of clearness I have employed the same letters of reference in the diagrammatic view, Fig. 4, as in the other views, and from this diagrammatic view it will be seen that the current entering at the binding-post b passes through the elements c' , p' , c^2 , d' , c^3 , p^2 , c^4 , d^2 , c^5 , and d^3 to the diaphragm D, and thence to the line L.

Obviously the contact-plate p^3 may be considered as an integral part of the diaphragm D or the actual diaphragm itself.

Having thus described my invention, I claim—

1. A microphone having a single diaphragm and a plurality of contacts at one face of said diaphragm, said contacts being of granulated carbon and in series with the diaphragm and line, substantially as set forth.

2. A microphone having a single diaphragm bearing contact-plates on one face, and a plurality of granulated carbon contacts in series with the diaphragm and line and situated adjacent to said contact-plates, substantially as set forth.

3. In a microphone, the combination with the case of the instrument the diaphragm D therein, and the contact-plates p' , p^2 , and p^3 , of the central carbon contact c' , and the segmental carbon contacts c^2 , c^3 , c^4 and c^5 grouped around the contact c' and properly insulated, said carbon contacts being connected in series in the line, substantially as set forth.

4. The combination with the case of the microphone, of the diaphragm D mounted therein, the line, including a generator and the said diaphragm, the contact-plates p' and p^2 mounted on the inner face of the diaphragm and insulated therefrom, the contact-plate p^3 , mounted on but not insulated from the diaphragm, and the carbon contacts c' , c^2 , c^3 , c^4 and c^5 in the case and connected up in series with the diaphragm and generator, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

AUGUST HERMAN SKÖLD.

Witnesses:

ERNST SVANGVIST,
E. HERMANSSON.