

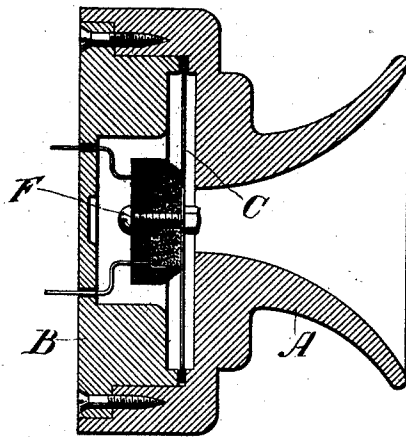
(No Model.)

F. R. COLVIN.  
TELEPHONE TRANSMITTER AND RESISTANCE VARYING  
MATERIAL THEREFOR.

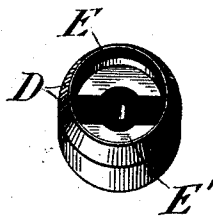
No. 524,524.

Patented Aug. 14, 1894.

*Fig. 1,*



*Fig. 2.*



Witnesses  
*C. E. Ashley*  
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Inventor  
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By his Attorneys  
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# UNITED STATES PATENT OFFICE.

FRANK R. COLVIN, OF NEW YORK, N. Y.

TELEPHONE-TRANSMITTER AND RESISTANCE-VARYING MATERIAL THEREFOR.

SPECIFICATION forming part of Letters Patent No. 524,524, dated August 14, 1894.

Application filed October 10, 1893. Serial No. 487,745. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK R. COLVIN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Telephone-Transmitters and Resistance-Varying Material Therefor, of which the following is a specification.

My invention relates to that type of telephone transmitters in which a mass of granules of imperfectly conducting material is interposed between conducting electrodes, and is traversed by an electric current which is made to pass from one of said electrodes to the other, while at the same time the mass of granules is agitated by the vibratory action of a diaphragm under the impact of sound waves traversing the atmosphere, whereby the resistance of said mass to the passage of the electric current is varied in correspondence and correlatively with the movements of the diaphragm by said sound waves.

In carrying out my invention, I make use of a peculiar form of carbon, which I have discovered to be free from many of the objections inherent in the forms of carbon which have heretofore been in general use for this purpose, in that it does not become consolidated, or as it is termed "packed," by long continued use.

My improved carbon is made from petroleum residuum, preferably the black, porous and cinder-like substance, with which the interior surfaces of the retorts become incrustated during the operation of distilling petroleum. This material is extremely tough and hard in its structure and having been carbonized is a comparatively good conductor of electricity. It is broken away from the retort in irregularly shaped masses of various sizes. The material after being carbonized is prepared for telephonic use by being cut into small granules, which are then preferably passed through screens having meshes of suitable size, so as to obtain a mass of granules of approximately uniform dimensions. A suitable quantity of these granules is placed within a containing cell, and in contact with the electrodes of a telephone transmitter of any suitable or usual construction.

The accompanying drawings illustrate one form of apparatus to which my invention is applicable, of which—

Figure 1 is a sectional view, and Fig. 2 is a perspective view of a cell containing the electrodes, and which is filled with the granular resistance-varying material.

A suitably formed shell A is provided with a mouth-piece and a recess in the rear, into which fits a back piece B provided with an annular shoulder co-operating with a corresponding shoulder on the shell to form an annular recess for a diaphragm C. The recess is made of sufficient width to permit the diaphragm to be loosely held in place when the parts are assembled. On the diaphragm is supported a shallow cylindrical cell D carrying two fixed semi-cylindrical electrodes E E', to which are connected circuit terminals, as illustrated. The cell is provided with a sharp edge or rim, so that when it is clamped to the diaphragm, as, for example, by a bolt F, the diaphragm and cell will engage at the sharp edge. The cell is filled with the granular conducting material, and drawn into close relation to the diaphragm, so as to compress the carbon and preserve it at all times in good conductive relation to the fixed electrodes. The joint between the diaphragm and cell is sealed by dipping in or coating with any suitable sealing compound to exclude moisture from the carbon.

The construction of transmitter herein described forms the basis of a separate application for Letters Patent, and is described herein for the reason that it forms the best construction for utilizing the semi conducting compound upon which the present application is based, though, as above stated, other forms of construction might be employed. When sound waves impinge upon the diaphragm the inter-granular conductivity of the carbon is varied. It will be observed that the circuit connections are such that the electric current traverses the mass of granules during its passage from one of the electrodes to the other.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A resistance-varying material for tele-  
phones, consisting of a mass of granules of  
carbonized petroleum residuum, substantially  
as set forth.
- 5 2. In combination with the diaphragm of a  
speaking telephone, a resistance-varying ma-  
terial, consisting of a mass of granules of  
carbonized petroleum residuum, traversed by  
an electric current, and subjected to the  
10 movements of said diaphragm to vary the re-  
sistance in accordance with said movements,  
substantially as set forth.
3. In combination with the diaphragm of a  
speaking telephone, a resistance-varying ma-  
15 terial, consisting of a mass of granules of  
carbonized petroleum residuum, interposed  
between conducting electrodes and subjected  
to the movements of said diaphragm, sub-  
stantially as and for the purpose set forth.
4. A telephonic electrode made from the car- 20  
bon residuum of an oil.
5. A telephonic electrode made from the car-  
bon residuum of petroleum.
6. A resistance varying material for tele-  
phones consisting of a mass of granules of car- 25  
bonized residuum of petroleum, the granules  
being of approximately uniform dimensions.

In testimony whereof I have hereunto sub-  
scribed my name this 9th day of October, A.  
D. 1893.

FRANK R. COLVIN.

Witnesses:

GEO. M. PHELPS,  
W. R. HUTCHINS.