(No Model.) 2 Sheets—Sheet 1.

# J. D. HUSBANDS.

## TELEPHONIC TRANSMITTER.

No. 299,073. Patented May 20, 1884.

*Fig. 1.*

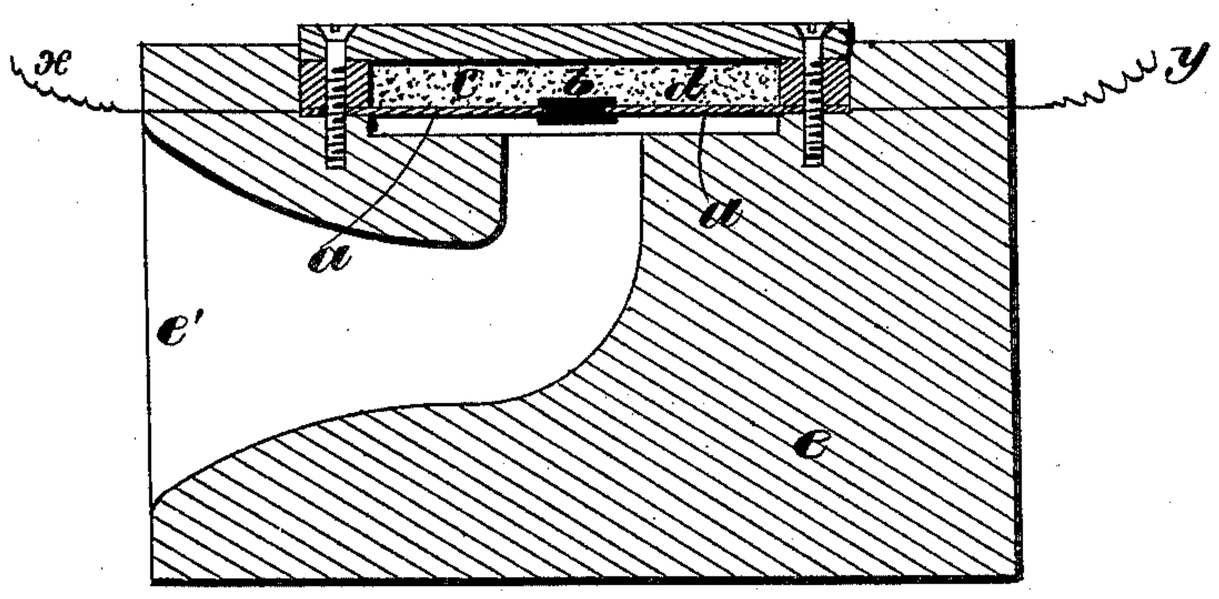
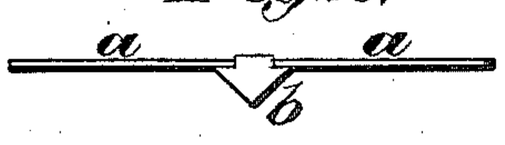



*Fig. 2.*



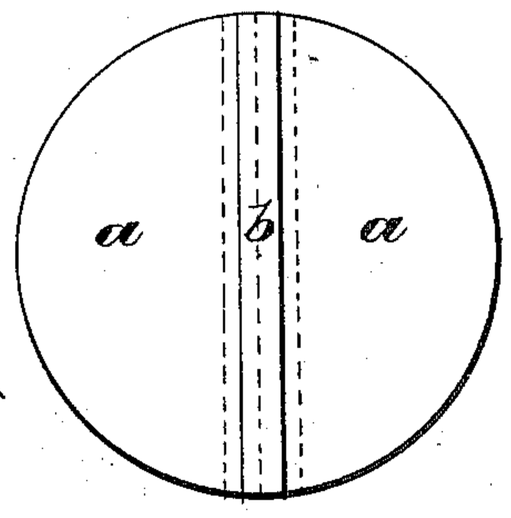
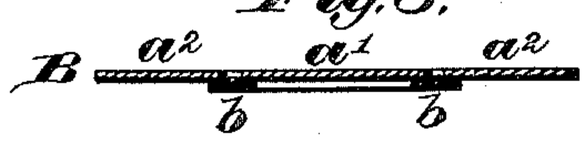




*Fig. 3.*



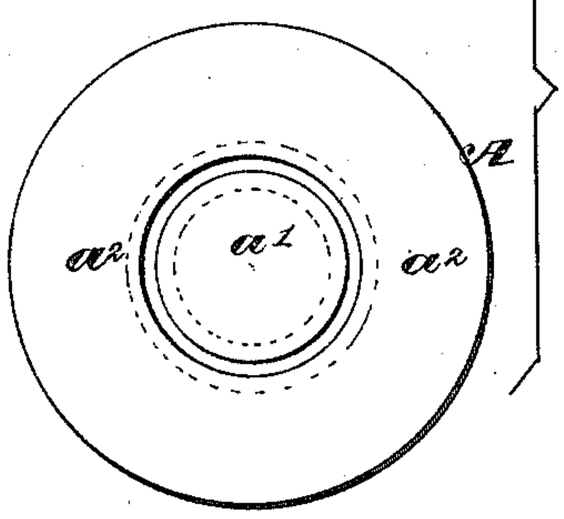
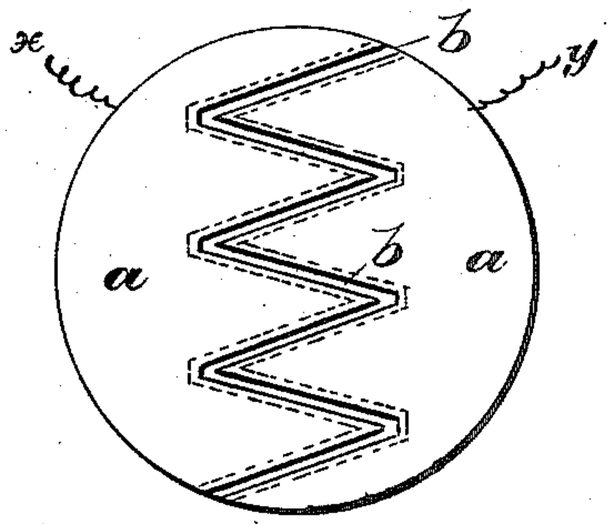
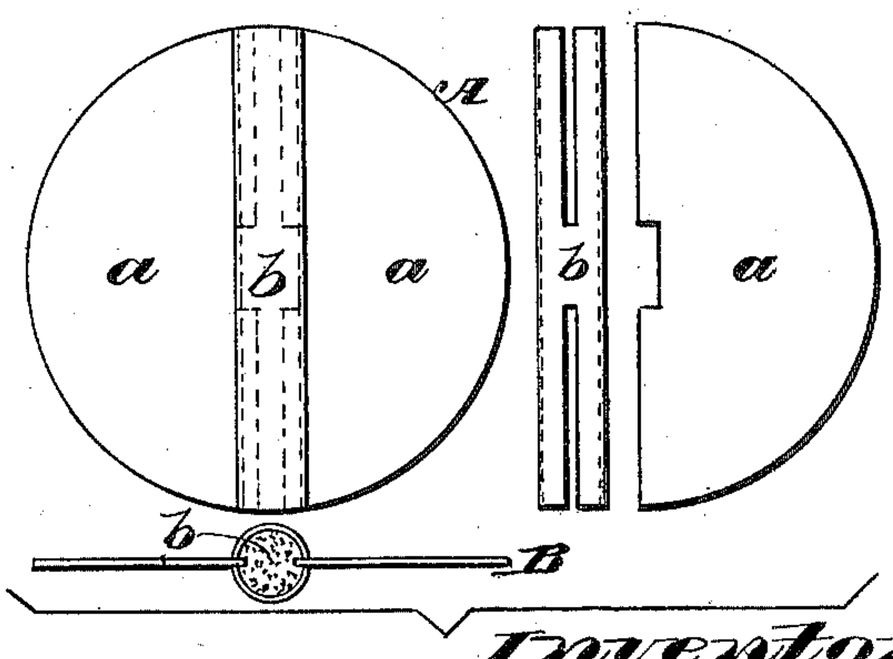




*Fig. 4.*




*Witnesses*
*Robert Everett,*
*Jos. L. Coombs*

*Fig. 5.*




*Inventor.*
*José D. Husbands.*
*By James L. Norris.*
*Atty*

(No Model.) 2 Sheets—Sheet 2.

# J. D. HUSBANDS.

## TELEPHONIC TRANSMITTER.

No. 299,073. Patented May 20, 1884.

*Fig. 6.*

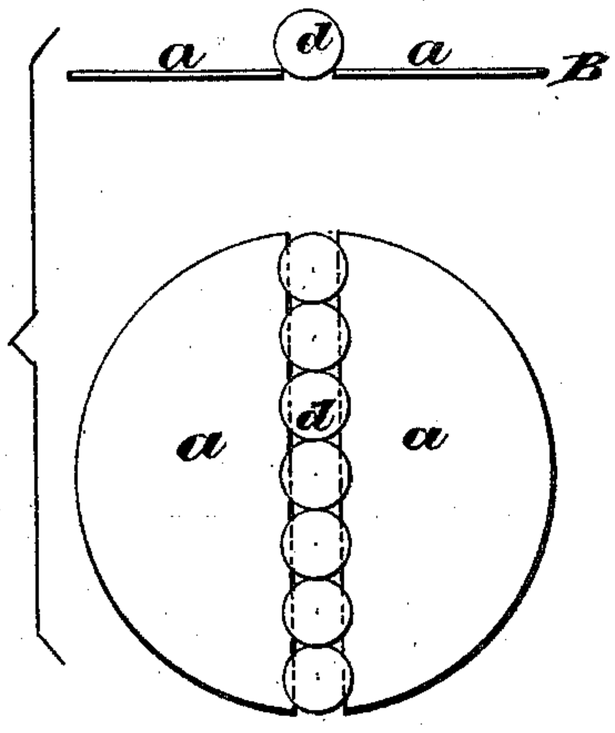



*Fig. 7.*

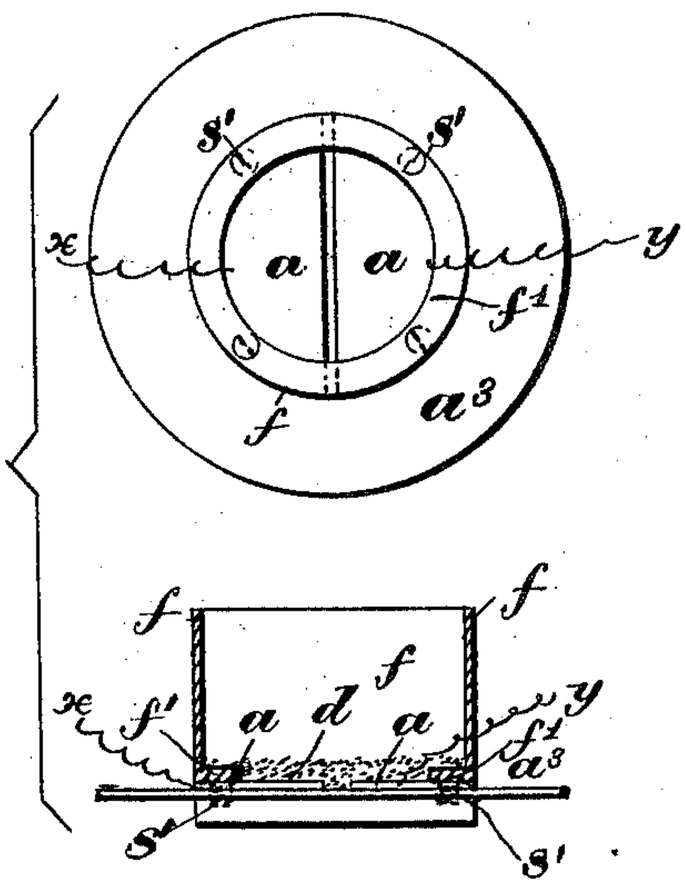
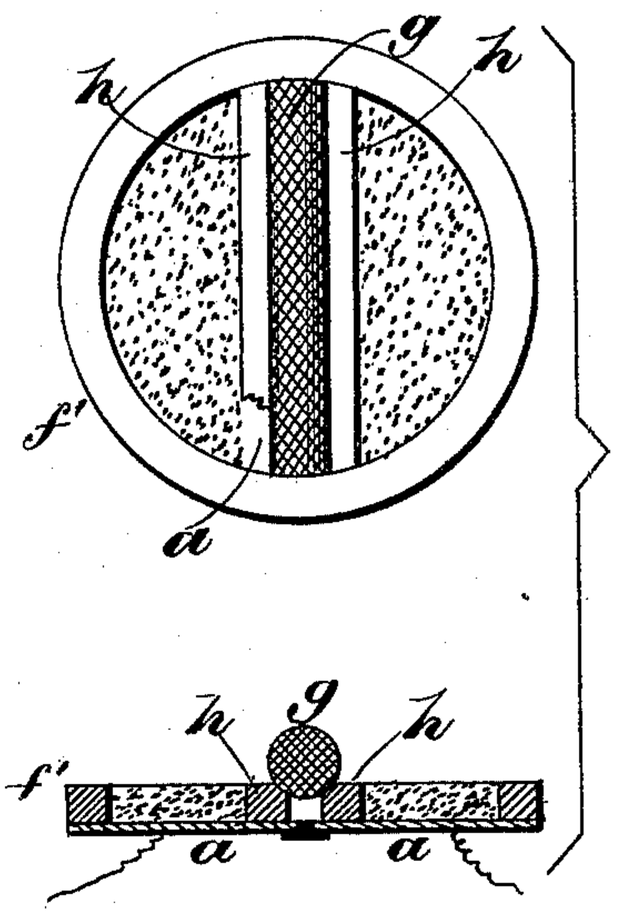



*Fig. 8.*




Witnesses.
Robert Everett.
Jos. L. Coombs

Inventor.
José D. Husbands.
By James L. Norris.
Atty.

# UNITED STATES PATENT OFFICE.

JOSÉ DOTTIN HUSBANDS, OF LONDON, ENGLAND, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

## TELEPHONIC TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 299,073, dated May 20, 1884.

Application filed January 4, 1883. (No model.) Patented in England June 24, 1882, No. 3,008.

*To all whom it may concern:*

Be it known that I, JOSÉ DOTTIN HUSBANDS, of London, England, gentleman, have invented new and useful Improvements in Telephonic Transmitters, (for which I have obtained a patent in Great Britain, No. 3,008, bearing date June 24, 1882,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to telephonic transmitters, and comprises novel principles of construction, whereby I obtain a greater efficiency in the transmission of vocal and other sounds than is practicable with other known instruments.

One important feature of my transmitter is the employment of a divided disk or diaphragm—that is to say, a disk consisting of two plates or two halves or parts which form the electrodes or terminals of the conducting-wires. These electrodes are in some instances connected by a strip of vulcanite or other insulating material and forming one wall of chamber or recess, filled or partly filled with carbon, coke, or other suitable material in the form of fine or coarse powder, or in grains, lumps, or pieces of any convenient size and form. As an equivalent for this divided disk or diaphragm, I sometimes employ a diaphragm of insulating material with the electrodes or terminals suitably attached thereto, as hereinafter set forth.

In the following drawings, which illustrate my invention, the same letters indicate corresponding parts.

A indicates a plan, and B a view in section.

Figure 1 is a transverse section of a transmitter embodying my invention, while Figs. 2 to 8, inclusive, show plans and sections of modifications thereof.

My invention consists, essentially, in connecting two sections of the metal diaphragm, having the separate terminal of the line attached to each by a bridge of a material such as carbon or coke, the resistance of which varies in proportion to the vibrations of the sections of the disk in contact with which it is. This carbon or other bridge is supported in position by suitable contrivances, and the half-disks may or may not be held apart by an insulating material, the essential feature of the invention being that the passage of the current of electricity from one electrode to the other shall take place through the carbon or other bridge, and for this purpose the lips of the half-disks facing each other may be simply out of contact with each other.

In Fig. 1, *a a* are the two separate sections of the disk. *b* is the insulating-piece placed between the edges of the sections. *c* is a chamber or recess containing the carbon, which in this case is in the form of powder or fine grains *d*. *e* is the telephone-case; *e'*, the mouth-piece, and *x y* the respective terminals of the two electrodes.

Its operation is as follows: The air-waves produced by speaking or otherwise producing sound in front of or near to the said mouth-piece or block will impinge on the said half-disks or plates and cause their vibration. The carbon, coke, or other regulating material is placed in the said chamber or recess, and rests on the said plates *a a*, each of these plates being connected with one terminal of the circuit. Therefore the air-waves impinging on the said plates will, through the medium of the said carbon, coke, or other material, vary the resistance of the circuit, and thereby cause variations of the current in the line or circuit. The said plates or halves *a a* of the disk or diaphragm are formed of thin iron or other suitable material, and may be made in any convenient form which admits of the coke or other regulating material coming into proper contact with the vibrating parts of both sections, and they may be placed in any convenient position.

The intermediate strip of insulating material, *b*, may be attached to the sections of the electrode in any convenient position. It may be grooved to receive the edges of the half-disks, as in Fig. 1; it may be placed on one side or the other of the disk, as in Fig. 2; it may constitute the chamber for containing the carbon bridge, as in Fig. 5, or it may be entirely dispensed with, as in Fig. 6. Moreover, this insulating-piece may be of a rigid or flexible material, as is found most convenient.

The carbon bridge *d* may also be of any convenient form, provided it maintains the

connection between the sections of the diaphragm. It may be powdered or granular, as in Fig. 1, or in very coarse grains or spheres, as in Fig. 6.

In Fig. 2 the half-disks *a a* are held apart by the pyramidal-shaped insulating material *b*, secured to the under side of the diaphragm.

In Fig. 3 the diaphragm is shown divided into sections consisting of the continuous exterior iron rim, $a^2$, and the interior plate, $a'$, separated one from the other by the circular plate or ring of insulating material *b*.

In Fig. 4 I have shown the half-disks *a a* cut with alternate recesses and projections fitting into each other, and held apart by a zigzag plate, *b*, of insulating material. In neither Figs. 2, 3, nor 4 have I shown any carbon bridge.

In Fig. 5 the half-disks *a a* have their edges inserted into the insulating material *b*, which in this instance is in the form of a tube containing the carbon *d* in a granulated or powdered form. The carbon is here held in contact with the edges of the plates *a a*, owing to the tubular form of the insulating material.

In Fig. 6 the carbon bridge *d* is formed of spherical grains of sufficient size to rest against the edges of the plates *a a*, and not to fall through. In this instance no insulating material will be used.

Fig. 7 shows a modification of my invention, which consists of a disk or diaphragm, $a^3$, of vulcanite or other insulating material, which corresponds to the insulating material interposed between the edges of the electrodes. At the edges of these electrodes, and upon them or upon the diaphragm $a^3$, is secured a tube, *f*, by a flange, *f'*, thereon, and fastenings *s'*, passing therethrough into the diaphragm $a^3$, in which is placed the granulated carbon *d*, which completes the variable connection between the electrodes *a a*. This tube may serve as a receptacle for the granulated carbon *d* and as a mouth-piece to convey the air-vibrations influencing $a^3$, *a a*, and *d*.

Fig. 8 shows a further modification of my invention, in which *g* is a ball or short rod of carbon resting upon pieces of carbon *h*. These pieces of carbon, which are out of contact with each other, consist of two carbon rods each electrically connected to the lip or edge of the half-disk on which it rests, so that the rod *g* forms the bridge-connection between each half-disk through the carbon edge pieces, *h*. The space between the carbons *h* and the semicircumference of each half-disk is filled with powdered or granulated carbon, as shown. *f'* is a ring or collar to hold the granulated carbon in place.

Having thus described my improvements in telephonic transmitters, I do not broadly claim the use of carbon or other material as a medium for varying the resistance in a telephonic circuit; but

What I do claim as my invention is—

1. The combination of the two parts *a a* of the divided disk of a conducting material with the insulating material *b*, uniting the said halves or parts and the bridge of carbon or other suitable material, substantially as described.

2. The combination of the parts *a a* of the divided metallic disk forming the diaphragm and the electrodes, the carbon bridge between the parts *a a*, and means for holding the carbon bridge in contact therewith, substantially as described.

3. In an electric transmitting-telephone, a compound diaphragm consisting of two segments of conducting material mechanically united by a non-conducting partition, but electrically insulated one from another, as described.

4. In an electrical transmitting-telephone, the combination of a diaphragm or vibrative disk, the said disk consisting of two segments of conducting material electrically separated but mechanically united by a non-conducting partition, a mass of carbon or other conducting material connected with both segments of the said disk and adapted to vary the resistance between them, and a suitable tube or mouth-piece leading to the said disk and adapted to concentrate sound-waves thereon for the purpose of vibrating the same.

5. The combination, substantially as hereinbefore described, in an electric transmitting-telephone, of a compound diaphragm consisting of two conducting-segments united by a non-conducting partition, carbon or other conducting material in a granulated or finely-divided condition disposed upon the said disk in contact with both segments and adapted to vary the resistance between them, leading-out wires—one for each segment—whereby the said disk may be connected in an electric circuit, and a mouth-piece or directing-tube leading to the said disk, whereby sound-waves may be directed thereon.

6. A transmitting-telephone consisting, substantially as hereinbefore described, of a compound diaphragm or vibrating disk composed of two metallic segments mechanically united by a non-conducting partition, a mass of granulated carbon or like conducting material placed on the said disk, and a containing-case perforated by a mouth-piece or directing-tube, whereby sound-waves may be directed to the under side of the said disk for the purpose of vibrating the same, and thus varying the resistance between the two segments thereof.

JOSÉ DOTTIN HUSBANDS.

Witnesses:
G. BUCKLEY,
EDWARD D. LANE.