(No Model.)

A. C. WHITE.

TELEPHONE.

No. 485,311. Patented Nov. 1, 1892.

Fig. 1.

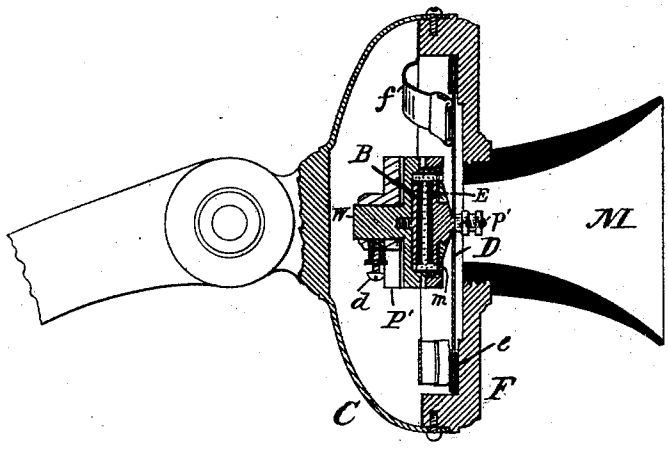


Fig. 2.

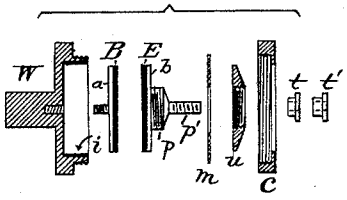


Fig. 3.

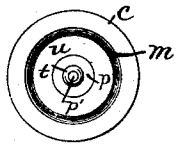


Fig. 5

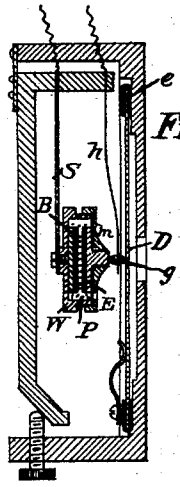
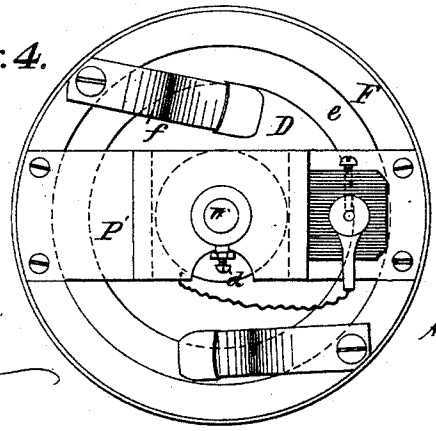


Fig. 4.



Witnesses.

Geo. B. Parsons

Granville Pierce

Inventor.

Anthony C. White

UNITED STATES PATENT OFFICE.

ANTHONY C. WHITE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF SAME PLACE.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 485,311, dated November 1, 1892.

Application filed March 24, 1892. Serial No. 426,271. (No model.)

To all whom it may concern:

Be it known that I, ANTHONY C. WHITE, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Telephones, of which the following is a specification.

The invention relates to variable-contact transmitters employing finely-divided conducting material as a variable-resistance medium between two electrodes, and more especially to the type of instrument known as the granular-button transmitter.

The invention consists in details of construction whereby the tendency to pack of the finely-divided conducting material is reduced or overcome and undue heating of essential parts of the instrument prevented.

In the drawings, Figure 1 is a sectional elevation of a transmitter of the granular-button type embodying my invention as used for long-distance work. Figs. 2 and 3 illustrate the construction of the button in detail. Fig. 4 is a rear view of the long-distance instrument shown at Fig. 1 with the outer casing removed. Fig. 5 is a sectional elevation representing the well-known Blake transmitter as modified to embrace my invention.

The same letters, as far as may be, represent the same parts in all the figures; but, except when otherwise stated, the description relates more particularly to the transmitting-instrument shown as a whole at Fig. 1.

D is the sound-receiving disk or diaphragm.

E is a disk constituting the front or working electrode.

B is a disk constituting the heavy back electrode, and P is the finely-divided conducting material between the electrodes.

W is a heavy metallic block, serving as a casing or frame for the electrodes and the finely-divided conducting material, being chambered to receive them, as shown. The finely-divided material, as in other instruments of the button type, is anthracite carbon, and the two electrodes E and B are disks of carbon; but it is not necessary that the electrodes, both or either of them, be made of that material. Satisfactory results are obtained when granulated carbon is used between electrodes of brass. The electrodes, however, of whatever material made, should be highly polished for best results. As stated above, the shell or casing W is metallic. For satisfactory results the metal of which it is made should have substantially the same coefficient of expansion as the two electrodes and the finely-divided material between them. Brass fully answers the purpose of the invention, and so, also, would carbon; but it would not answer the purpose to use for the shell or casing W either wood, ebonite, or any similar material whose coefficient of expansion is very much larger than that of anthracite carbon and the metals ordinarily used for the electrodes of transmitting-telephones

The walls of the chamber in the block W are lined with gummed paper *i* to prevent the short-circuiting of the instrument. It will be observed that there is a considerable space around the periphery of the two electrodes E and B to receive the finely-divided conducting material out of the direct path of the electric current. The finely-divided material in this part of the chamber not becoming so much heated in the operation of the instrument as the portion between the electrodes, the latter portion is permitted to expand into the former and so offer less disturbance to the electrodes, due to its change in temperature. Moreover, this construction prevents the clogging of the finely-divided material between the working electrode E and the walls of the chamber W that takes place when that electrode substantially fills the chamber, thereby interfering with the proper movement of the electrode. The carbon disk or electrode B is secured to the back on bottom of the chambered block W by means of a brass disk *a*, soldered to the electrode and secured into the block. The front electrode E is soldered to a similar disk of brass *b*, which by a threaded boss or pin *p* and nut *u* is secured to the inner face of a mica disk *m*, that in turn is clamped to the sides or rim of the chambered block W by a threaded sleeve *c*, secured upon the block as shown, and serves to confine the finely-divided conducting material within the chamber of the block. The flexibility of the mica permits the front electrode E to have a piston-like movement in said chamber.

In the long-distance instrument shown at

Fig. 1 the block W, or, it may be said, the entire button, which has now been fully described, is secured by a set-screw *d* to a heavy brass bridge-piece P′, whose ends in turn are set into the metallic frame F of the receiving-diaphragm D, which with its dampening and insulating ring *e* is held in place by means of padded springs *f* in the ordinary manner. The frame F is set in a metallic cup-shaped outer casing C, which may be mounted in any convenient manner. M is the mouth-piece, set in the front of the frame F.

In the long-distance instrument shown at Fig. 1 the front electrode E and the parts immediately connected with it, the mica disk *m*, the brass disk *b*, and nut *u* are rigidly secured to the diaphragm D, as shown, by a threaded projection *p′* from boss or pin *p* and the nut *t* and jam-nut *t′*. Thus in the operation of the instrument the working electrode E follows accurately the vibrations of the diaphragm.

A brief description only will suffice for the modification shown at Fig. 5. It will at once be seen that the construction follows closely that of the Blake transmitter, the heavy chambered block W being supported on the outer electrode-spring S of the Blake transmitter, which is adjusted to maintain a yielding pressure between the back electrode E and the diaphragm D through intervening members of the instrument. In the modification the front electrode E is not clamped or in any way fastened to the diaphragm D. It constantly presses toward the said diaphragm, however, and is compelled to follow the movements of the said diaphragm by virtue of the spring S and the elasticity of the mica disk *m*. For convenience of construction, more especially in altering old Blake instruments, mechanical connection between the inner electrode E and the diaphragm is made by the interposition of a pin *g*, supported by a spring *h*.

The construction of the button in the two instruments is substantially the same; but in operation the two instruments differ slightly in that while in the instrument shown at Fig. 1 but one of the electrodes moves and little or no advantage is gained from the elastic nature of the mica disk and any suitable flexible material might be substituted—for instance, a thin cloth—the elastic feature in the modification shown at Fig. 5, as will presently be seen, becomes important over and above the flexible feature, since the disk acts as a spring, tending to draw the electrode E from the electrode B and make the former follow the movements of the diaphragm independently of the movements of the electrode B.

I claim—

1. The combination, with the sound-receiving diaphragm D and a supporting-frame therefor, of the independently-supported heavy chambered block W and electrode B, secured thereto, the flexible disk *m*, and piston-electrode E, carried thereby, and the finely-divided conducting material within the chamber in said block and extending about the periphery of said piston-electrode E, substantially as described.

2. In a granular button for a transmitting-telephone, the combination, with the heavy chambered block W, electrodes B and E, and finely-divided conducting material P, of the mica spring-disk *m*, carrying the electrode E and confining said granulated material within the chamber in said block W, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 22d day of March, 1892.

ANTHONY C. WHITE.

Witnesses:
GEO. WILLIS PIERCE,
GEO. E. PARSONS.