(No Model.)

N. DOWLING.

DIAPHRAGM FOR TELEPHONE RECEIVERS.

No. 337,753. Patented Mar. 9, 1886.

Fig. 1

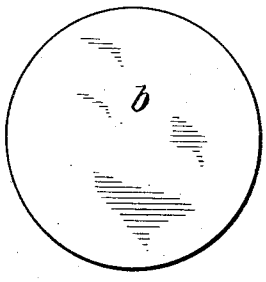


Fig. 2.

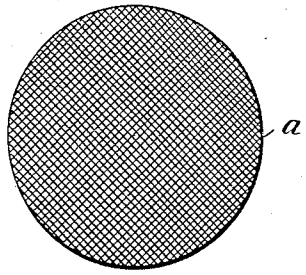


Fig. 3.

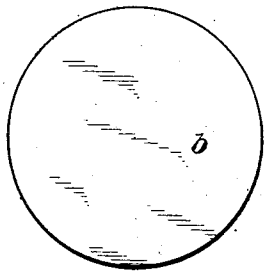
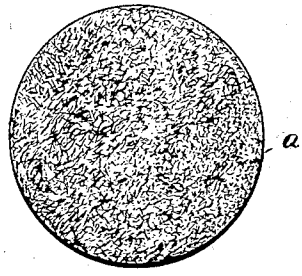


Fig. 4.



WITNESSES:

John Nolan,
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per Joshua Pusey Atty.

UNITED STATES PATENT OFFICE.

NORTH DOWLING, OF PHILADELPHIA, PENNSYLVANIA.

DIAPHRAGM FOR TELEPHONE-RECEIVERS.

SPECIFICATION forming part of Letters Patent No. 337,753, dated March 9, 1886.

Application filed February 14, 1885. Serial No. 155,927. (No model.)

To all whom it may concern:

Be it known that I, NORTH DOWLING, a citizen of the United States, residing at the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Diaphragms for Telephone-Receivers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of my invention is to provide an improved diaphragm or armature plate for electrical telephone-receivers. I attain this object by means of a compound plate in which are combined a substance—such as iron—adapted to be attracted by the usual magnets of telephone-receivers, and material—such as vulcanized rubber—possessing a high vibratory or resonant quality.

What I believe to be the best mode of carrying out my invention is as follows, reference being had to the annexed illustrations, of which Figure 1 is an exterior or face view of the plate. Fig. 2 is a section in a plane at right angles to the minor axis, and Figs. 3 and 4 are views corresponding, respectively, to Figs. 1 and 2 of a modification of the invention.

I take a foraminous disk, preferably of fine iron wire cloth *a*—say, No. 28 wire and one sixty-fourth inch mesh—which constitutes the metallic plate armature of the usual receiver-magnet. This iron cloth disk I embed within a body of vulcanized rubber, *b*, by first sufficiently heating a sheet or sheets of the latter in order to soften it, and then compressing the wires together until the meshes of the wire-cloth are filled up, and an integrally solid plate of about the thickness of the telephone-receiver diaphragms in general use is produced. The plate is mounted in the usual manner. A like result is attained by combining with the hard rubber iron in comminuted form—such as filings *a'*, Fig. 4—the latter being embedded in the rubber *b* in any suitable manner.

In lieu of hard rubber, there may be employed shellac, celluloid, chorolithion, or other suitable vibratory or resonant substance in which the iron in foraminated or comminuted form may be embedded or combined so as to constitute a practically solid or integral vibratory plate, hard rubber, however, being preferred.

I have demonstrated by practical experiment that a telephonic-receiver diaphragm constructed as hereinbefore described produces better results than the iron plates in vogue, the sounds and articulations being reproduced rounder and clearer and without the quavering metallic quality given out by the usual sheet-iron or ferrotype plates. In other words, my improved diaphragm has a greater ability to reproduce or give out all forms of vibratory motion than any with which I am acquainted.

I may state that with the use of the present invention in connection with certain other improvements in telephonic receivers and in transmitters (for which I shall file applications for patents simultaneously herewith) conversations have been carried on in an ordinary whisper over actual lines between points several miles apart and with perfect clearness in ordinary tones with the speakers at a distance of twenty feet and more from the transmitter, every vocal wave being distinctly reproduced to the ear at the receiver.

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

1. A diaphragm for telephone-receivers, composed of a body of iron embedded in a body of resonant material, substantially as specified.

2. A diaphragm for telephone-receivers, consisting of a body of comminuted iron embedded in a body of hard rubber, substantially as specified.

In testimony whereof I have hereunto affixed my signature this 17th day of January, A. D. 1885.

NORTH DOWLING.

Witnesses:
JOHN NOLAN,
FRANCIS S. BROWN.