No. 711,640. Patented Oct. 21, 1902.

W. M. MINER.

TELEPHONE RECEIVER.

(Application filed Mar. 7, 1901.)

(No Model.)

Fig. 1.

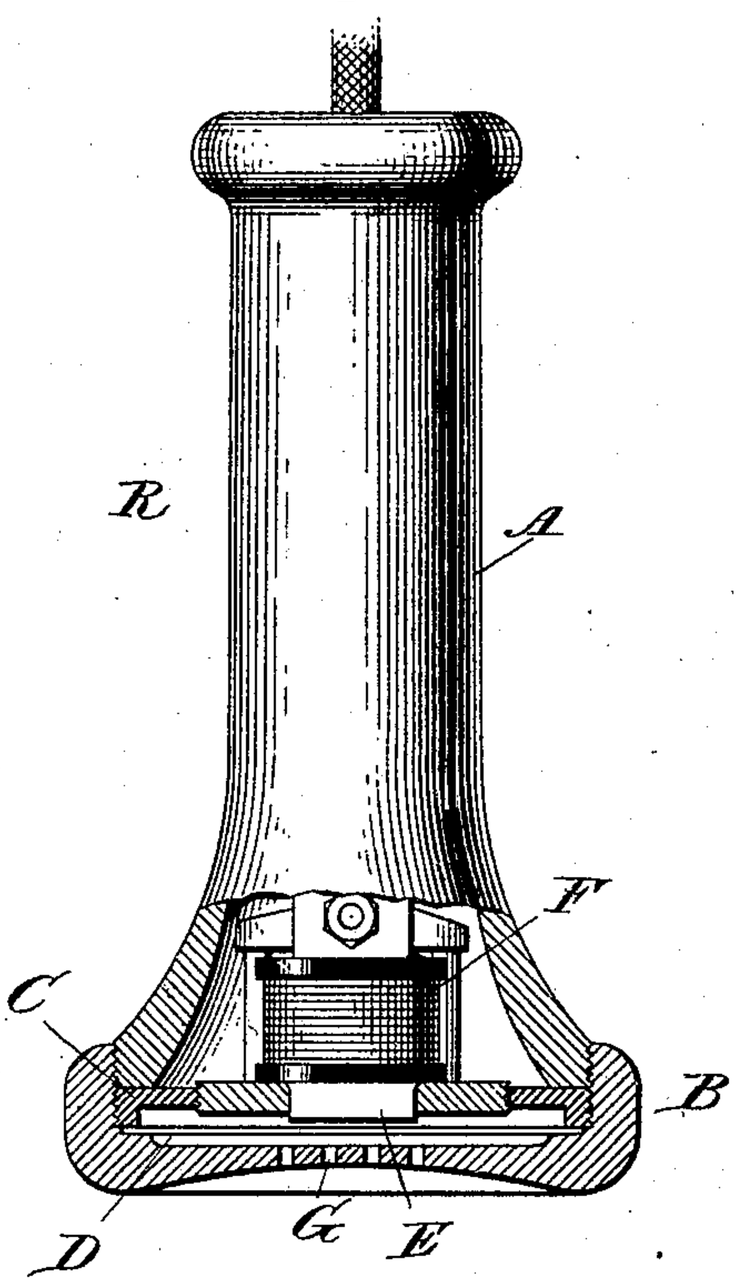
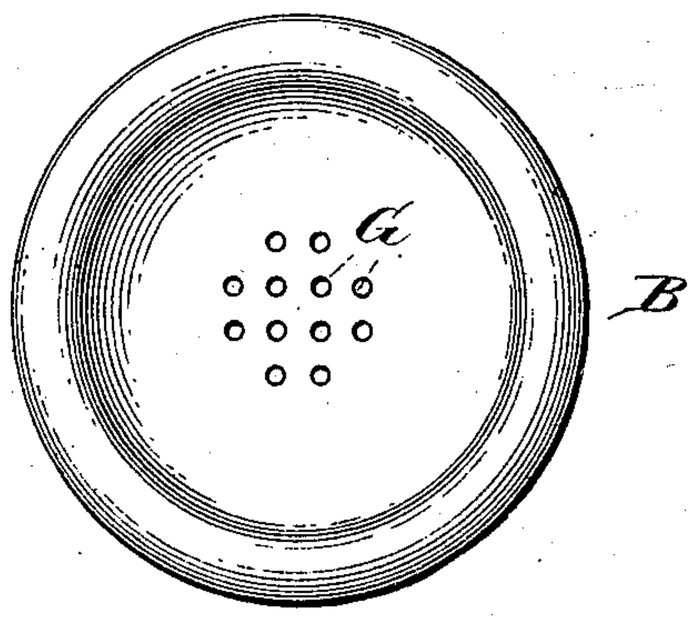


Fig. 2.



Witnesses.
Spencer B. Prentiss.
Elbert Williamson

Inventor,
Willard M. Miner
by Clement & Clarke
Attorneys.

UNITED STATES PATENT OFFICE.

WILLARD M. MINER, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO SUN ELECTRIC MANUFACTURING COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 711,640, dated October 21, 1902.

Application filed March 7, 1901. Serial No. 50,255. (No model.)

To all whom it may concern:

Be it known that I, WILLARD M. MINER, a citizen of the United States, residing at Plainfield, New Jersey, (post-office address 422 Broome street, New York city, in the county of New York and State of New York,) have invented new and useful Improvements in Telephone-Receivers, of which the following is a specification.

My invention relates to telephone-receivers, and has for its object the provision of means for protecting the diaphragms of such instruments from injury.

Heretofore and before my invention it has been the practice to provide a single aperture in the central portion of the receiver-cap or that part of the shell which overlies the diaphragm and is intended to be placed to the ear of the user, this aperture allowing the sound-waves set up by the vibrations of the diaphragm to reach the ear. In order to enable it to emit a sufficient volume of sound, this aperture must be of considerable size, so large, in fact, as to admit a tool or instrument of such size that serious injury may be done to the diaphragm. This has been a fruitful source of trouble and annoyance to those in charge of telephone-exchanges, as subscribers or others having access to the instruments will frequently tap upon the diaphragm with a key, penknife, &c., and by denting the metal of the diaphragm so injure the vibratory quality thereof as to greatly impair the efficiency of the instrument and sometimes render it practically inoperative. Then, again, the telephone user frequently will allow a prong of the switch-hook to enter the hole in the receiver-cap with a similar result, and for this reason some manufacturers are now tipping each end of the hook with a ring of such a diameter that it will not touch the diaphragm through said hole.

In attaining my object and obviating these difficulties I replace the large aperture usually employed in the receiver-cap by smaller perforations of such number, size, and grouping as to attain a maximum of efficiency of the instrument and at the same time leave a sufficient portion of the shell to adequately protect the diaphragm from injury.

My invention is illustrated in the accompanying drawings, wherein like letters of reference indicate the same parts throughout, and wherein—

Figure 1 is a telephone-receiver, showing the cap in section, the same being made according to my invention and part of the shell broken away to expose the diaphragm and part of the magnet structure to view. Fig. 2 is a plan view of the cap, showing my construction.

Referring to the drawings, A is the main portion of the shell of a receiver R, and B is the cap or earpiece, both being screw-threaded in the usual manner to engage one another. Securely held between these is a disk C, which is externally threaded and screwed into the cap, where it secures the diaphragm D. This disk also carries the magnet structure, of which a pole-piece E and its winding F are shown.

In the central portion of the cap or earpiece B, I provide a number of small perforations G, having a sufficient aggregate area to allow the sound caused by the vibrations of the diaphragm to pass through the cap without materially diminishing its volume. The number of perforations is of course immaterial for the purposes of the invention; but it is desirable to have them sufficiently small to prevent tampering with the diaphragm, and when of this size they must be sufficiently numerous so that the egress of the sound-waves will not be obstructed or deadened.

While I have shown and described a particular form of receiver to which my invention is applied, I do not wish to be understood as limiting myself to that type, as obviously the invention is equally well adapted for use with any other form, the only change necessary being to alter, or rather reconstruct, the cap.

A very important additional function performed by the number of small perforations is their equalizing and refining effect upon the sound-waves caused by the vibrations of the diaphragm. While the waves of ordinary amplitude pass through without encountering obstruction, those of greater amplitude, which would cause unpleasantly loud sounds in the

ear, are impeded to a certain extent and are softened and divided, so as to greatly lessen their unpleasant effects.

Many variations of form and arrangement of the perforations heretofore described may be made without materially affecting their action, and all these I wish it to be understood are clearly within the scope of my invention.

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

In a telephone-receiver, a magnet structure, a supporting-ring therefor, a diaphragm resting on said ring in proximity to the magnet-poles, a shell inclosing the magnet structure, and a cap of insulating material over the diaphragm and secured to the ring and shell, said cap being flattened and smooth externally, and centrally pierced with a group of small apertures, whereby sound-waves may pass but accidental contact with the diaphragm is prevented, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLARD M. MINER.

Witnesses:
ELIAS R. PECK,
JOS. H. HOLMES.