

SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LV.—No. 20.]
[NEW SERIES.]

NEW YORK, NOVEMBER 13, 1886.

[Price 10 Cents.
\$3.00 per Year.]

ROYAL E. HOUSE'S TELEPHONE OF 1868.

We illustrate in the cuts accompanying this article an object of much interest at the present day, when the telephone controversy has reached such proportions. It is an "electro-phonetic receiver," for use in telegraphy, invented by Royal E. House, and patented by him in letters patent No. 77,882, of 1868. This name was given it by the inventor. It is really a telephone.

A box of generally cubical form has one end closed with a diaphragm. Two slender bars of metal are attached to the diaphragm, one near the center, the other below it. These bars the inventor terms "limiters." The upper limiter limits the motion of an armature working over a magnet, so that it cannot come in contact with the poles. The other limiter prevents the armature from receding too far from the poles. The armature is pivoted at one end. Its inner and free end strikes the lower limiter; it is provided with an extension at the pivoted end that extends upward at right angles to the armature. The end of this arm bears against the upper limiter. An electro-magnet operates this armature, and is situated below it in the bottom of the box, and is connected to binding posts. A tension spring is used to adjust the pull of the pivoted armature away from the magnet.

The box has attached to it an ear trumpet or reflector that surrounds and extends outward from the diaphragm. Both limiters have adjusting screws. By these their freedom of movement may be varied. They can be adjusted so that they will be in contact one at a time only with the armature and arm. In this case a make and subsequent break, or corresponding and considerable changes in intensity of current, will produce two blows, the first on the upper limiter and the second on the lower. On the other hand, by screwing out the limiter screws to a fuller extent, this oscillation will be gradually reduced until no break is possible. Then makes and breaks of the current, or variations in intensity, will no longer produce blows, but a true telephonic sound on the diaphragm. If connected in circuit with a microphone transmitter, it will talk; and if two are connected having closed or ground circuit with battery, or if steel or cast iron magnet cores are used without any battery, they will act as receivers or transmitters, and form a complete telephonic system.

The apparatus is a perfect telephone, immeasurably superior to anything shown in the Bell patents of 1876 or 1877. The subject of Figs. 1 and 3 of our drawing is a reproduction of the model accompanying the patent, which model was destroyed in the Patent Office fire. Its sides in the elevation are broken away to show the interior construction. In the section it is shown in use as a receiver. The inventor's idea of his ear

trumpet was that it should operate as a reflector of sound waves. He gives directions for constructing the interior surface of such form as to reflect the sound waves to a focus to be occupied by the listener's ear. For this end he directs the use of mirrors to reflect light, thus to determine experimentally the proper curve.

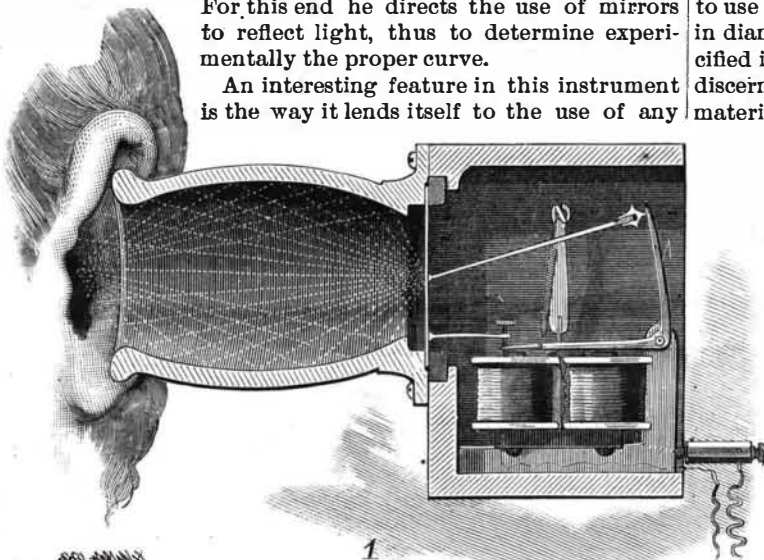
An interesting feature in this instrument is the way it lends itself to the use of any

material for the diaphragm. In this respect it resembles strikingly Bell's instrument of the 1876 patent. In both of the systems, the armature is distinct from the sounding part. The inventor's idea was, if desired, to use large diaphragms. Some as large as eight inches in diameter have been constructed, this size being specified in the patent, and work very well. It is easy to discern in the instrument a great flexibility as to size, material, and other modifications, its system of adjustment is so complete.

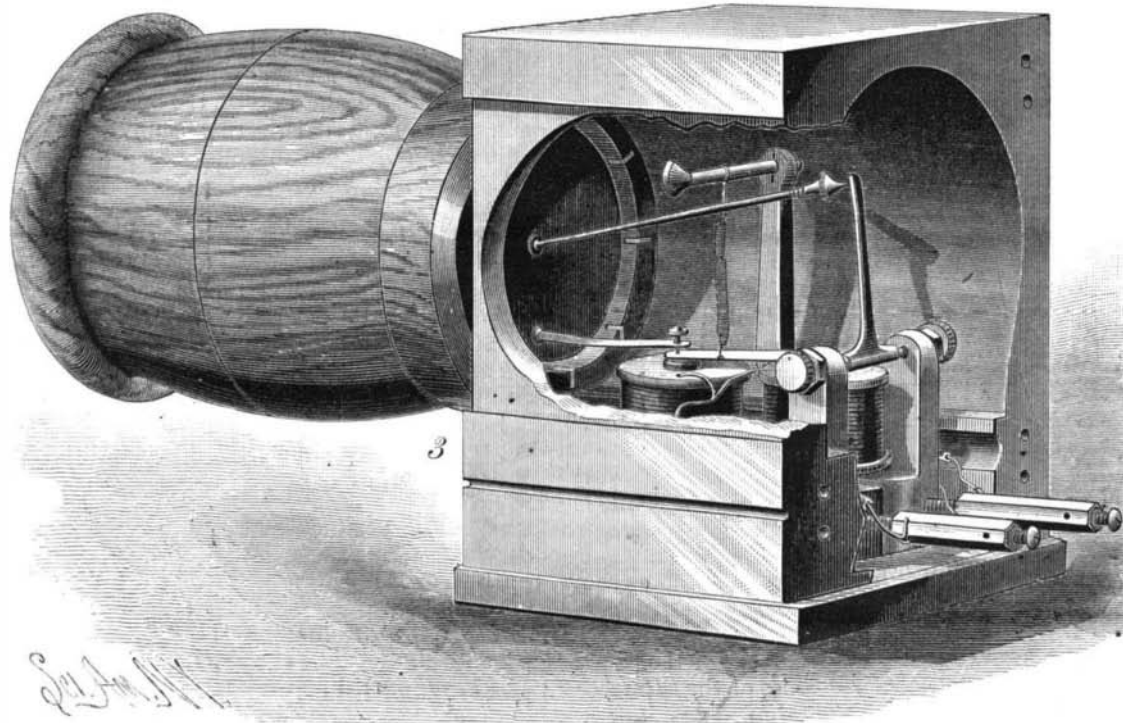
The two figures described above are exact copies of the patent drawings. To adapt it to modern use some minor changes in proportions and material have been introduced, which are illustrated in Fig. 2. The frame or body is constructed of cast iron. The magnet cores are screwed into one arm of this frame, and bobbins are placed around them. An ebonite ear or mouth piece screws on the open end of the frame, and clamps the metallic diaphragm in position. This ear piece is made shorter than was the corresponding part of the model of the patent. A two branched limiter is substituted for the pair of separate limiters of the original. The result is a more compact instrument. A cover of brass or German silver incloses the principal working parts. Binding posts are attached to one of the arms of the frame opposite to the magnets. Thus the frame forms the back piece of the magnet. The double limiter is provided with adjusting screws. This instrument is a serviceable, distinct telephone. We very recently were present at a trial of its capacity over a fair length of line. Four Leclanche cells were in circuit. The same instruments were used for receivers and transmitters. The action was perfect. There was no choice of sounds. Sibilants were as clearly transmitted as any other utterances. The writer in listening to them had several standards. He had listened to one of the first of the Bell telephones in 1877 or thereabouts, at the Stevens Institute in Hoboken. The other standards were reproductions of the Reis telephones, which he had also experimented with. The House telephone was far superior to either of these. Its work was fully as good as that of the Bell telephone and Blake transmitter of to-day. The modern instruments, it will be noticed, do not differ except in constructive detail from the device of the patent. They are a true reproduction of it. It is most interesting to place the name of the inventor of the first printing telegraph by the side of Reis, Edison, Bell, and Gray, as the inventor and constructor of one of the early telephones.

The Wallace Telephone Co., of 150 Broadway, N. Y., will soon be prepared to supply these instruments.

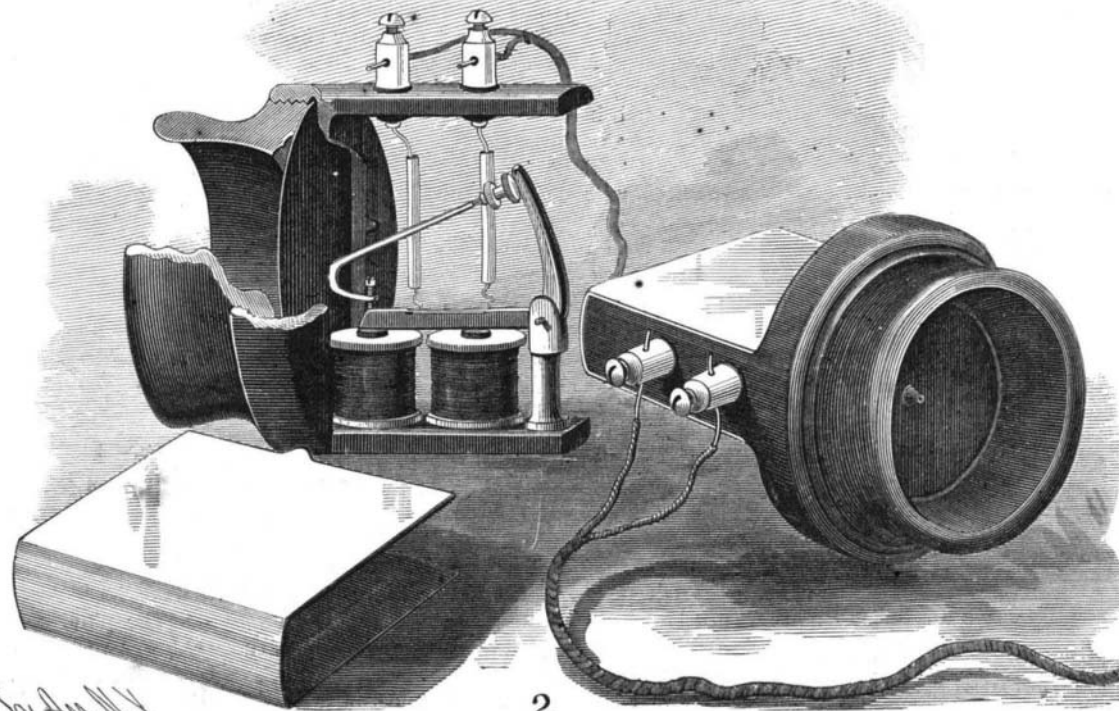
THE Japanese Government manufacturing paper mill is manufacturing pocket handkerchiefs and clothing of paper pulp containing a mixture of linen threads.



ROYAL E. HOUSE'S TELEPHONE OF 1868.



ROYAL E. HOUSE'S TELEPHONE OF 1868.



HOUSE'S MODERN PHONETIC TELEGRAPH.