(No Model.)

2 Sheets—Sheet 1.

D. DRAWBAUGH.

SPEAKING TRUMPET FOR RECEIVING TELEPHONES.

No. 272,866. Patented Feb. 27, 1883.

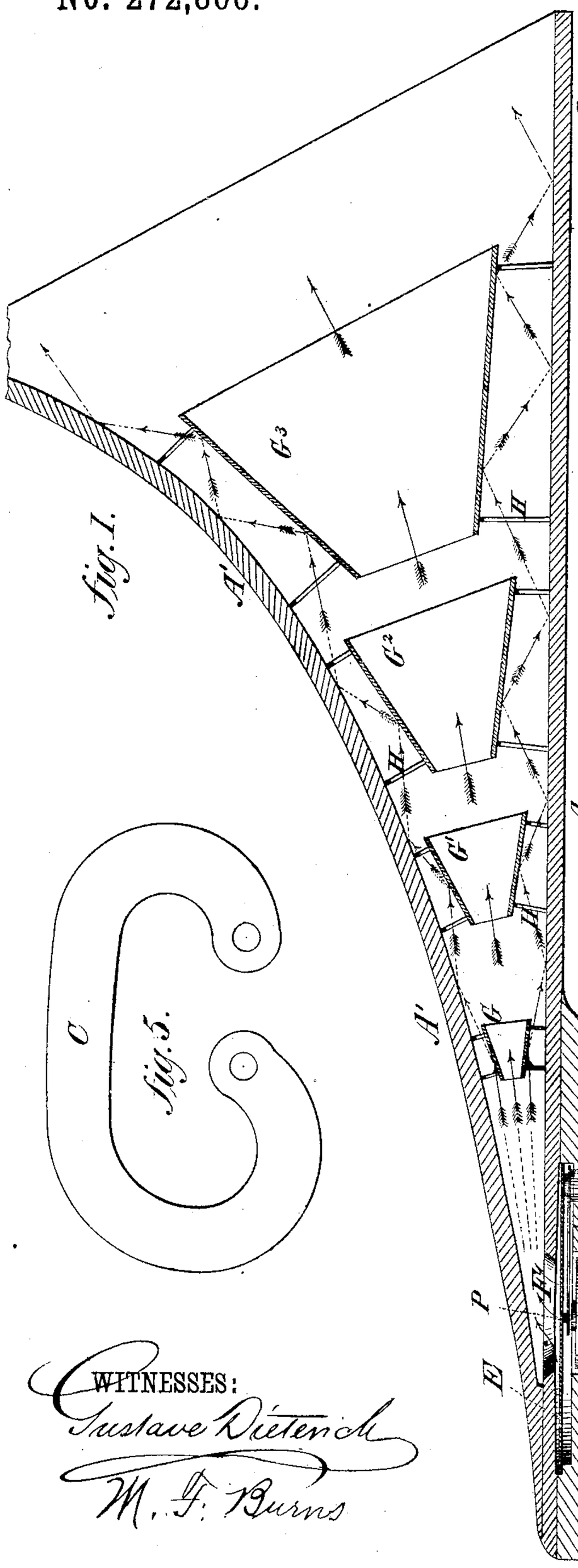

Fig. 1.

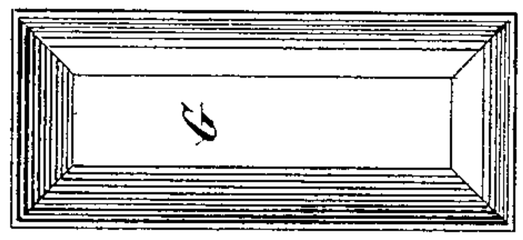

Fig. 4.

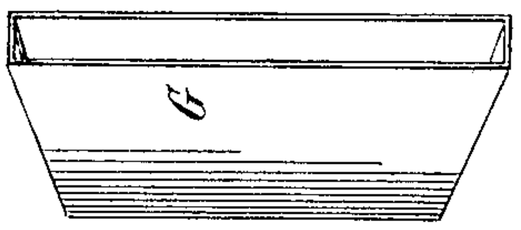

Fig. 3

Fig. 5.

WITNESSES:

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M. F. Burns

INVENTOR

Daniel Drawbaugh

BY Lark Benjamin & Bo

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

D. DRAWBAUGH.

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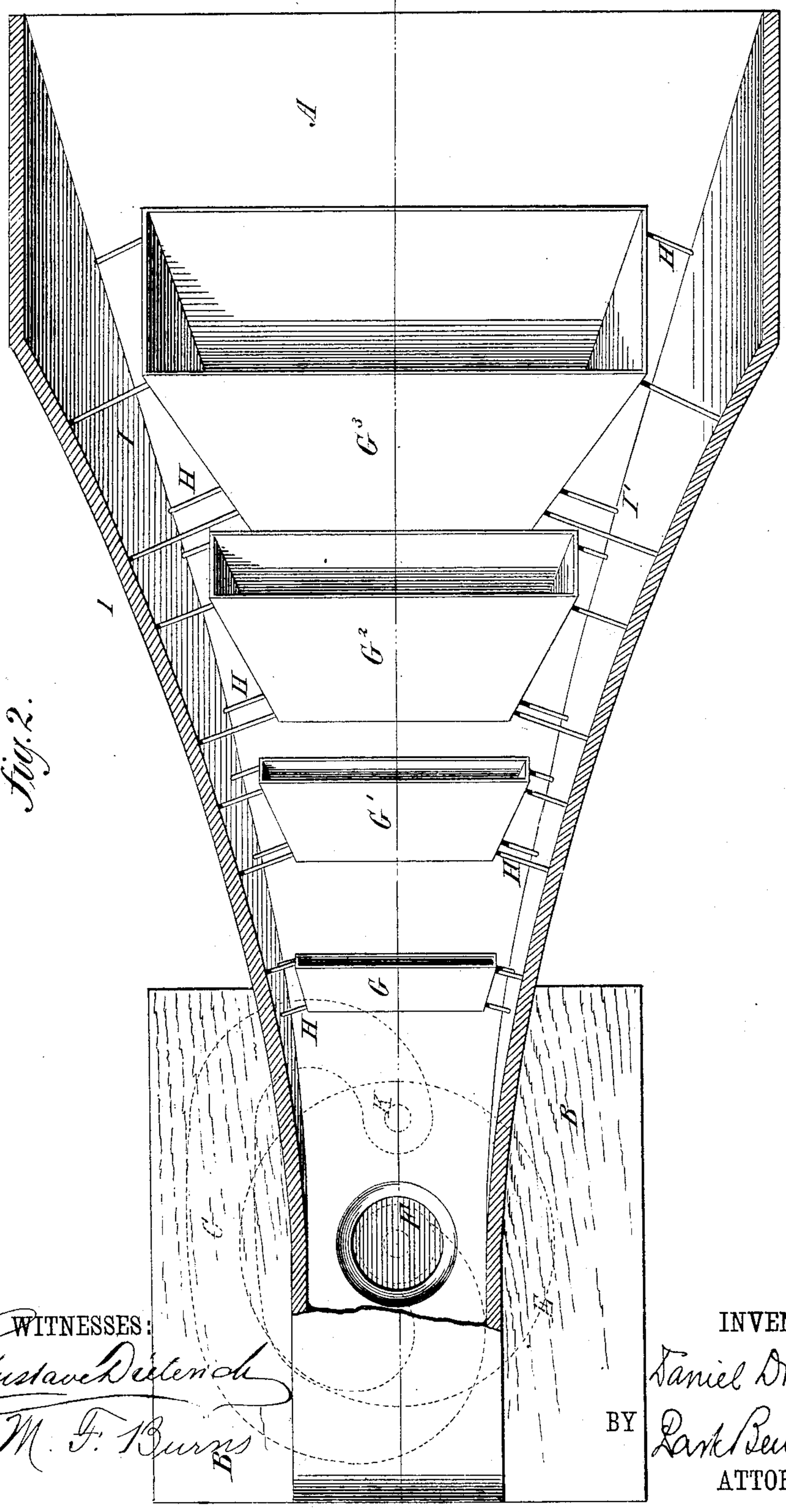

Fig. 2.

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UNITED STATES PATENT OFFICE.

DANIEL DRAWBAUGH, OF EBERLY'S MILL, PENNSYLVANIA.

SPEAKING-TRUMPET FOR RECEIVING-TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 272,866, dated February 27, 1883.

Application filed December 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, DANIEL DRAWBAUGH, of Eberly's Mill, Cumberland county, Pennsylvania, have invented a new and useful Improvement in Speaking-Trumpets for Receiving-Telephones, of which the following is a specification.

The invention relates to a device for increasing the intensity of the sounds emitted by a receiving-telephone, so as to render said sounds audible at a considerable distance from the instrument; and it consists in the novel construction of a speaking-trumpet, tube, or chamber, and in the combination of the same with a receiving-telephone.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the apparatus. Fig. 2 is a plan view of the same with one wall removed. Fig. 3 represents one of the sound-reflectors detached and shown in perspective. Fig. 4 is a front view of one of said reflectors. Fig. 5 is a plan view of the curled permanent magnet of the telephone.

Similar letters of reference indicate like parts.

A and A′ are respectively the bottom and top walls of the speaking trumpet, tube, or chamber, and I and I′ are the side walls. The bottom wall, A, I make preferably flat. The top wall, A′, has an outward curve, and the side walls, I I′, also flare outward, so that the tube at one end is considerably larger in area of cross-section than at the other. Sound is received into the tube at or near its small end, and is emitted at its large end.

Within the tube I arrange a series of reflectors, G G′ G^2 G^3. Each reflector has four sides, and is in the shape of a pyramidal frustum, and each is secured in place in the tube by a number of braces or stays, H, said stays being fastened to the reflectors and to the tube in any convenient way. The reflectors G G′ G^2 G^3 are of different sizes, and increase in dimensions proportionately with the parts of the interior of the tube in which they are successively placed—that is to say, the largest reflector is placed in the largest part of the tube and the smallest reflector in the smallest part of the tube.

To the wall A of the tube I secure, in any convenient manner, a block, B, of wood or other suitable material, in which block I form recesses to receive the electro-magnet D, the curled permanent magnet C, and the diaphragm E. To the permanent magnet C, I attach an arm, K, of iron or steel, passing through the block B, and having secured to it a spring-steel pole-piece, L, which extends in front of the core of the electro-magnet, and carries a stud, P, which is held in contact with the diaphragm.

In the wall A, I form an aperture, F, through which the sound-waves from the diaphragm E, which is placed immediately in front of said aperture, enter the tube. The arrows in Fig. 1 show the path taken by the sound-rays in passing from the telephone into the chamber, and then through the latter.

It will be seen that some of the sound-rays are shown as passing directly through the series of reflectors G + + G^3, while other sound-rays, after meeting the inclined sides of the first reflector, G, are thence reflected to the walls of the tube, and from the walls are reflected to the sides of the next reflector, G′, thence to the walls again, to the next reflector, and so on until they emerge from the large end of the tube parallel, or nearly so, in direction to those rays which have passed through the reflectors.

It will also be observed in Fig. 1 that the arrows representing these last-mentioned rays make equal or very nearly equal angles of incidence and reflection with the reflectors and walls.

The mode of organization of the speaking-trumpet is therefore such as will secure this result—namely, that the relative angles of the sides of the reflectors and the inner surfaces of the walls shall be such that the sound-rays on emerging from the instrument shall be parallel in direction or as nearly parallel as may be practicable. A theoretically perfect instrument of this description would be one from which the sound-rays would emerge absolutely parallel; but such an instrument is not needed for all practical purposes, and hence some slight divergence of the emerging sound-rays will be both immaterial and probably unavoidable in any instrument constructed for ordinary use.

While a chamber constructed and arranged in conformity to the above-stated principle

can easily be designed geometrically, I have found that the accuracy of its construction can be simply and easily determined by placing a light so that its rays will be reflected into the aperture F, the telephone being previously removed. Then, if on looking into the large end of the tube reflected rays can be seen around as well as through the reflector G^3, the instrument will be properly adjusted for practical purposes. As the same laws govern the reflection of sound-rays as those which control the reflection of rays of light, it follows that where the light-rays are reflected in a certain path the sound-rays will proceed in the same way.

I do not claim, broadly, the combination of a speaking-trumpet with a telephone, inasmuch as that is old and well known. Neither do I limit myself to a speaking trumpet, tube, or chamber of the particular shape or relative dimensions of parts, or containing reflectors of the same form or in the same number, as herein shown. I have made chambers of different forms with different arrangements of reflectors, all, however, being constructed in accordance with the principle hereinbefore set forth, of which principle I consider the particular arrangement and construction of devices herein shown and described as the best embodiment I now know. Neither do I limit myself to the combination of my speaking trumpet, tube, or chamber with the particular form of receiving-telephone herein shown, although such combination I find to give excellent results in practice, the sounds emitted by the instrument being distinctly audible and recognizable, and speech being clearly heard and understood at a distance of several feet from the large end of the tube.

I claim as my invention—

1. A speaking trumpet or tube having four sides or walls, three of said walls being curved and one flat or plane, the said walls meeting at one end of the chamber formed by them, and the flat or plane wall having an orifice near said end, in combination with a receiving-telephone the diaphragm of which is adjusted in front of said orifice, substantially as described.

2. The combination of the speaking-trumpet A A′ I I′, having a sound-receiving aperture, F, and containing sound-reflecting bodies G G′ G^2 G^3, and means H of supporting the same, with a telephone containing the diaphragm E, pole-piece L, arm K, magnet C, electro-magnet D, and an inclosing block or case, substantially as described.

3. A speaking trumpet or tube having four sides or walls, three of said walls being curved and one flat or plane, the said walls meeting at one end of the chamber formed by them, and the flat or plane wall having an orifice near said end, and the said chamber containing a series of hollow sound-reflecting bodies arranged in succession and substantially as shown, in combination with the receiving-telephone, the diaphragm of which is adjusted in front of said orifice, substantially as described.

DANIEL DRAWBAUGH.

Witnesses:
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M. W. JACOBS.