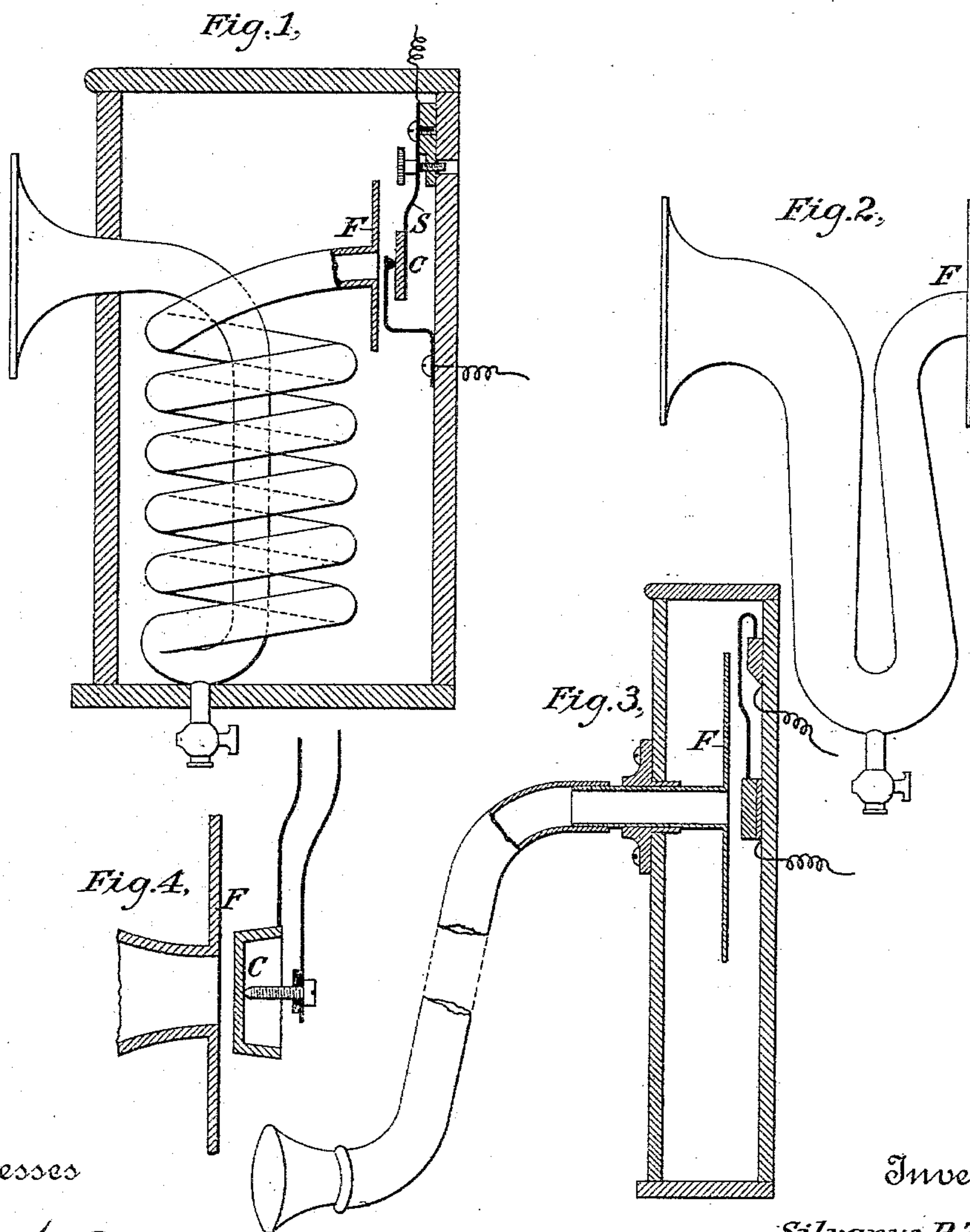


(No Model.)

S. P. THOMPSON.
TELEPHONE TRANSMITTER.

No. 339,501.

Patented Apr. 6, 1886.



Witnesses

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SILVANUS PHILLIPS THOMPSON, OF LONDON, COUNTY OF MIDDLESEX,
ENGLAND.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 339,501, dated April 6, 1886.

Application filed August 15, 1885. Serial No. 174,492. (No model.) Patented in England August 9, 1882, No. 3,803.

To all whom it may concern:

Be it known that I, SILVANUS PHILLIPS THOMPSON, a subject of the Queen of Great Britain, residing in London, county of Middlesex, England, have invented certain new and useful Improvements in Telephone-Transmitters, (for which I have obtained English Letters Patent numbered 3,803 of 1882,) of which the following is a specification.

My invention relates to that class of telephonic transmitters in which a normally constant electric current traverses electrodes interposed in the circuit, and movable with reference to each other, and which electrodes are physically acted upon by sonorous air-waves produced by the voice of a speaker. Devices of this general character wherein a loose contact between two electrodes included in the circuit offers a greater or less resistance to the flow of the electric current, according to the degree of intimacy of contact between the electrodes, may be termed "current regulators." The action of the air-vibrations or sound-waves upon the current-regulator may be either direct or indirect. In most of the transmitters in practical use—such, for example, as those of Reis, Edison, and Blake—the action is indirect, a stretched membrane or tympanum, or a resilient metallic diaphragm being employed to respond to the vibrations of the voice, and to impart the peculiar vibratory motion thus taken up from the air-waves to the movable electrode or electrodes that regulate or control the strength of the electric current. In another form of transmitter, of which the well-known Hughes microphone is an example, the mode of action is direct. The sonorous air-waves impinge directly upon a movable electrode, or upon electrodes which are loosely in contact with each other, without the intervention of a tympanum, diaphragm, or other equivalent device.

Of these two general types of telephonic transmitters—those in which the current-regulator is combined with or actuated by a tympanum or diaphragm, and those in which the current-regulator is acted upon directly by the sonorous air-waves—my invention relates exclusively to the latter. I do not make use of a tympanum, diaphragm, or equivalent partition of any description whatever between the current-

regulator and the air-waves produced by the voice. In my improved transmitter the air-waves produced by the voice of the speaker impinge directly upon the movable electrode or pair of electrodes which constitute the current-regulator. By reason of this direct action I am able to obtain a more accurate correspondence between what is technically termed the "form" of the atmospheric vibrations produced by the voice and the "form" of electrical undulations or waves produced thereby than is practicable when a tympanum, diaphragm, or other equivalent partition is used. As a result of this construction, I am able to obtain a more clear and distinct articulation in the receiving-instrument than has hitherto been possible. This is especially the case with certain consonantal sounds, which it is found by experience are transmitted imperfectly and with difficulty by means of apparatus in which the current-regulator is actuated indirectly through a tympanum, diaphragm, or other partition.

It has been found by practical experience that the particular class of telephonic transmitters to which my improvements relate are liable to two defects—first, the articulation is less loud than that of transmitters in which there is a tympanum or diaphragm exposing a considerable surface to the air to collect and magnify the vibrations; and, second, if, in order to obviate this difficulty, the speaker places his mouth in close proximity to the movable electrodes which constitute the current-regulator, the moisture of his breath condenses upon the contact points or surfaces and upon adjacent parts of the current-regulator, impeding its proper action and seriously injuring the articulation.

To obviate and remedy these two defects is the principal object of my invention.

In the accompanying drawings several different forms of telephone-transmitters are shown to which my invention has been applied.

Figure 1 is a side elevation, partly in section, of one form of transmitter. Fig. 2 illustrates a modified form of sound-collector or extended mouth-piece. Figs. 3 and 4 illustrate modified forms of transmitters.

For the purpose of increasing the loudness

of the articulation, which is desirable when the tympanum or diaphragm is dispensed with, I prefer to employ mirrors, sound-reflectors, or reverberators formed of glass, metal, wood, or other suitable material, by which the sound-waves are deflected or thrown aside from their direct path, and are made to converge directly upon the movable electrode or electrodes of the current-regulator in the same manner that rays of light are reflected or made to converge upon a given point by means of a polished or reflecting surface. Such a reflector or reverberator serves to collect the sound-waves proceeding from the speaker's mouth, and to so deflect these waves that they will converge and impinge directly upon the current-regulator, while at the same time the parts may be so constructed and arranged that the moisture from the speaker's breath is intercepted. Actual mirrors of polished metal or silvered glass may be employed for this purpose, and it may be remarked that these possess the additional advantage of revealing to the speakers the presence of moisture. The reflector or reverberator is preferably made in the form of an extended mouth-piece. A curved or crooked mouth-piece—such, for example, as I have shown in Figs. 1 and 2, which is so constructed as to retain, intercept, or dissipate the moisture of the breath at the same time that it deflects the sound-waves directly upon the current-regulator—serves these purposes very well.

In Fig. 3 I have shown a flexible speaking-tube of considerable length in combination with a current-regulator, but without any tympanum, diaphragm, or other partition by which the current-regulator is protected from the deposition of moisture by the breath. I prefer to form upon the end of such mouth piece or tube an annular flange, as shown at F in Figs. 1, 2, 3, and 4, as the character of the articulation is thereby improved.

The reflector, reverberator, mouth-piece, or mouth-tube may be constructed of material which freely absorb moisture, and which will thereby prevent such moisture from being

deposited upon the electrodes of the current-regulator. Such absorbent or porous material may, if desired, be used for the case of the instrument. The same result may be attained in still another way, by placing chemical substances capable of absorbing moisture within the case of the instrument or mouth-tube.

The current-regulator may consist of two electrodes formed of two pieces of metal or of carbon, or of one piece of metal and one of carbon or other conductor of electricity. These electrodes are maintained in contact with each other under slight pressure, produced either by gravity, the resiliency of a light spring, S, or by both these agencies in conjunction with each other. Such current-regulators are illustrated in Figs. 1, 2, 3, 4, 5, and 6.

In Fig. 4 I have illustrated a form of current-regulator in which the contact-points C are protected from the moisture of the breath by forming one of the electrodes into a cup, against the concave hollow face of which the other electrode bears.

I am aware that a mouth-tube similar to that hereinbefore described, consisting of a flexible tube or of rigid tubes of various forms, either curved or straight, has been employed in combination with telephone-transmitters of various kinds.

I claim as my invention—

In a telephone-transmitter, the combination, with an electric circuit, of electrodes interposed in said circuit, movable with reference to each other, a tube for causing the air-waves to impinge directly upon one or both of said electrodes, and a flat flange attached to or formed upon the inner end of said tube and extending immediately above the electrodes, substantially as described.

In testimony whereof I have hereunto subscribed my name this 11th day of April, A. D. 1885.

SILVANUS PHILLIPS THOMPSON.

Witnesses:

BERNARD MERVYN DRAKE,
JAMES WILLIAM BARNARD.