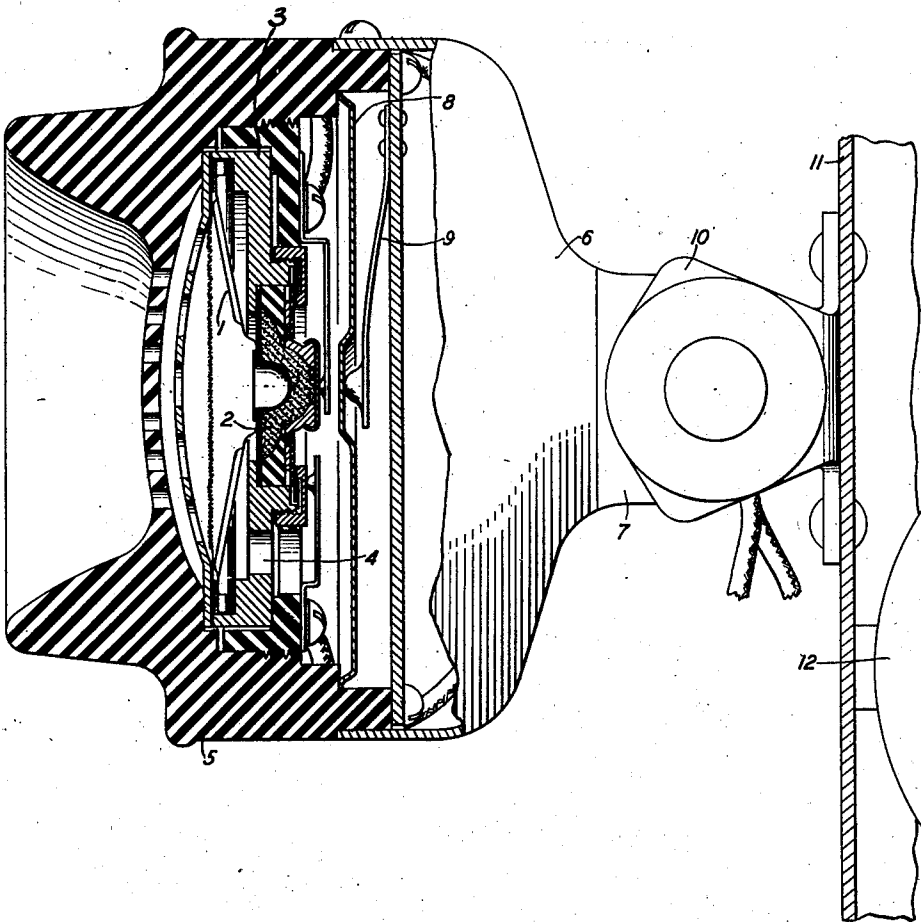


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A. HERCKMANS
TELEPHONE TRANSMITTER
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INVENTOR
A. HERCKMANS
BY
Walter C. Kiesel
ATTORNEY

UNITED STATES PATENT OFFICE

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TELEPHONE TRANSMITTER

Alfred Herckmans, Caldwell, N. J., assignor to
Bell Telephone Laboratories, Incorporated, New
York, N. Y., a corporation of New York

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This invention relates to telephone transmitters and more particularly to such transmitters especially suitable for use in installations where the transmitter, in addition to transmitting speech, serves to pick up and to translate certain special signals.

More specifically this invention relates to telephone transmitters particularly adapted for use in a coin collector set, for example of the type shown in O. F. Forsberg Patent 1,043,219, November 5, 1912, wherein the transmitter is mounted on the front of the casing of the set. As is known, in such a set the coins when deposited strike bells or gongs which are mounted in the casing and, as a result, mechanical vibrations are set up in the casing. These vibrations are conveyed to the transmitter which translates them into current variations producing characteristic sounds in the telephone receiver of an operator controlling the connection to the set.

In order that the coin signals may be recognized easily by the operator, it is necessary that the transmitter be sensitive to the mechanical vibrations produced by the impact of the coin with the bell or gong. However, present-day high quality transmitters are highly damped and consequently are relatively insensitive to such mechanical vibrations. When such a high quality transmitter designed particularly for speech transmission is placed upon a coin collector, the operator may have difficulty in hearing or distinguishing the coin signals.

One object of this invention is to obtain both high quality speech transmission and sensitive pick-up of certain desired signals with a single telephone transmitter. More specifically, one object of this invention is to improve the sensitivity of a highly damped telephone transmitter to vibrations such as result from the impact of a coin with the gongs or bells in coin collector sets, without materially affecting the speech transmitting characteristics of the transmitter.

In accordance with a feature of this invention, a transmitter suitable for voice transmission is provided with a vibratory body, which may be an auxiliary diaphragm, resonant to the frequencies of the signals to be picked up and transmitted, the vibratory body or auxiliary diaphragm being arranged to be acoustically closely coupled to the main diaphragm of the transmitter by acoustic means of suitable characteristics.

In one illustrative embodiment of this invention, a telephone transmitter comprises a highly damped transmitter unit normally insensitive to mechanical vibrations conveyed to it through its mounting and a supplementary diaphragm or vibrating element which is lightly damped and highly sensitive to mechanical vibrations characteristic of the coin gong signals to be picked

up. The supplementary diaphragm or vibrating element is acoustically coupled to the main diaphragm of the transmitter unit through an air chamber so that the auxiliary diaphragm or vibrating element serves to enhance the response of the main diaphragm to the mechanical vibrations.

The centrally damped diaphragm which has been used heretofore in transmitters on coin collector sets has been found to be highly sensitive to the mechanical vibrations produced by actuation of the signal gongs or bells. Such a diaphragm may be used advantageously as the auxiliary vibratory element or diaphragm in transmitters constructed in accordance with this invention although it will be understood, of course, that other suitable vibration responsive elements may be employed.

In apparatus constructed in accordance with the present invention, therefore, it is not necessary to sacrifice the advantages of a highly damped uniform response transmitter for speech transmission purposes in order to obtain an adequate response to the coin signals nor is it necessary to provide two transmitter units, one for speech transmission and the other for transmission of the coin signals.

The invention and the features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing in which the single figure is a view mainly in section of a telephone transmitter constructed in accordance with this invention, the transmitter being shown mounted upon the casing of a coin collector.

Referring to the drawing, the transmitter there shown comprises a transmitter unit of the construction shown in Patent 2,042,822, granted June 2, 1936 to A. F. Bennett and W. L. Tuffnell which is a high quality highly damped telephone transmitter unit. It will not be necessary to describe this unit in detail inasmuch as it is described adequately in the patent, except to point out the dished diaphragm 1, the carbon chamber 2 and the casing or back-plate 3. The back plate 3 of the unit is provided with an aperture or passageway 4. As shown in the drawing, the transmitter unit as a whole is mounted on a mouthpiece or casing of insulating material 5 which is carried in turn by a mounting 6 provided with lugs 7 engaging the transmitter bracket 10 on the casing 11 of a coin collector. Mounted within the casing 11 are one or more signal gongs or bells, one of which is illustrated at 12, the gongs or bells preferably being mounted directly upon a wall of the casing whereby mechanical vibrations produced when they are impacted by a coin are transmitted to the casing. A supplementary diaphragm 8 is mounted to the

rear of the transmitter unit above described and is centrally damped by a spring 9. This diaphragm and central damping arrangement has been found to be particularly efficient in the transmission of coin signals in coin collectors.

The signals produced when the signal gongs or bells are actuated by impact of a coin therewith comprise a dominant frequency in the neighborhood of 1100 cycles and the supplementary diaphragm 8, therefore, preferably is so designed and mounted that it is resonant at about this frequency. Under ordinary conditions, that is, when the transmitter is being used to transmit speech, the diaphragm 8 acts merely as a rear closure for the transmitter unit and for ordinary conversation has little or no effect upon the response or operation of the transmitter unit as a speech transmitting device. However, when mechanical vibrations are conveyed to the diaphragm 8 in the range to which it is resonant it vibrates and, because of the coupling to the diaphragm 1 through the chamber including the aperture 4, causes an increased response of the diaphragm 1. Thus there is provided in a unitary structure a device that functions efficiently both as a high quality speech transmitter and as a vibration responsive device to produce easily recognizable signals in the receiver of the operator controlling the connection to the coin collector set.

The main diaphragm 1, the auxiliary diaphragm 8 and the two chambers between the diaphragms 1 and 8 and the back plate 3, together with the aperture 4 constitute an acoustic network. Upon application of well-known principles this network can be made resonant at any desired frequency or over a desired frequency range depending upon the purpose in view. The natural frequency of the diaphragms, the damping of such diaphragms and the impedances of the acoustic coupling are factors entering into the over-all characteristics of this network. Preferably, the various parameters involved in the specific embodiment shown are so correlated, that this acoustic network is resonant at the frequency or frequencies of the dominating frequencies of the coin bells or gongs. Although the drawing is not to exact scale the relative proportions of the elements follow rather closely those of an actual device found suitable for use in connection with coin operated telephone sets.

Although the specific embodiment of this invention shown and described is particularly designed for use in connection with coin collector sets in order to pick up and transmit with clarity and efficiency the coin signals, it will be understood that this invention may be applied also in other situations where a transmitter having good response to speech frequencies may also be required to respond in a different manner to other types of vibrations. It will be understood also that the specific embodiment disclosed and described is but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. A telephone transmitter comprising a vibration responsive element highly sensitive to sound waves and relatively insensitive to mechanical

vibrations, and means for rendering said element responsive to mechanical vibrations of a restricted range of frequencies comprising an auxiliary vibration responsive element coupled to said first element.

2. A telephone transmitter comprising a mounting, a variable impedance element carried by said mounting, a diaphragm associated with said element for varying the impedance thereof in accordance with sound waves impinging on said diaphragm, means supporting said diaphragm on said mounting so that it is relatively insensitive to mechanical vibrations of said mounting, a second diaphragm connected to said mounting and responsive to mechanical vibrations thereof, and means acoustically coupling said second diaphragm to said first diaphragm.

3. A telephone transmitter comprising a mounting, a transmitter unit carried by said mounting and including a variable impedance element and a highly damped vibratory member cooperatively associated with said element to vary the impedance thereof in accordance with sound waves impinging upon said member, a lightly damped auxiliary vibratory member carried by said mounting and having a predetermined resonant period, and means acoustically coupling said auxiliary member to said first vibratory member.

4. Telephone substation apparatus comprising a mounting, a signal gong carried by said mounting, and a transmitter carried by said mounting, said transmitter comprising a variable resistance element, a diaphragm having one surface exposed to the atmosphere and associated with said element to vary the resistance thereof in accordance with sound waves impinging on said diaphragm, a second diaphragm mounted outside of the sound path between the atmosphere and said one surface of said first diaphragm and having a natural period substantially equal to the resonant frequency of said signal gong, and means defining an acoustic network substantially resonant at said frequency acoustically coupling said second diaphragm to said first diaphragm.

5. A telephone transmitter comprising a mounting, a transmitter unit carried by said mounting and including a plate member having an aperture therein, a variable impedance element and a highly damped main diaphragm mounted opposite one face of said plate member and defining a chamber therewith, means defining a sound wave path between the atmosphere and the face of said diaphragm remote from said plate, said diaphragm being cooperatively associated with said element to vary the impedance thereof in accordance with sound waves impinging upon said diaphragm, and an auxiliary diaphragm mounted in said mounting and responsive to mechanical vibrations thereof, said auxiliary diaphragm being positioned opposite the other face of said plate member, defining a chamber therewith and having a predetermined resonance frequency, said chambers and said aperture being constructed and arranged to constitute with said diaphragms an acoustic network substantially resonant at said frequency.

ALFRED HERCKMANS.