Aug. 11, 1925. 1,549,196

R. E. HALL

METHOD OF AND MEANS FOR TRANSLATING SOUNDS

Original Filed Nov. 14, 1918 2 Sheets-Sheet 1

Fig. 1.

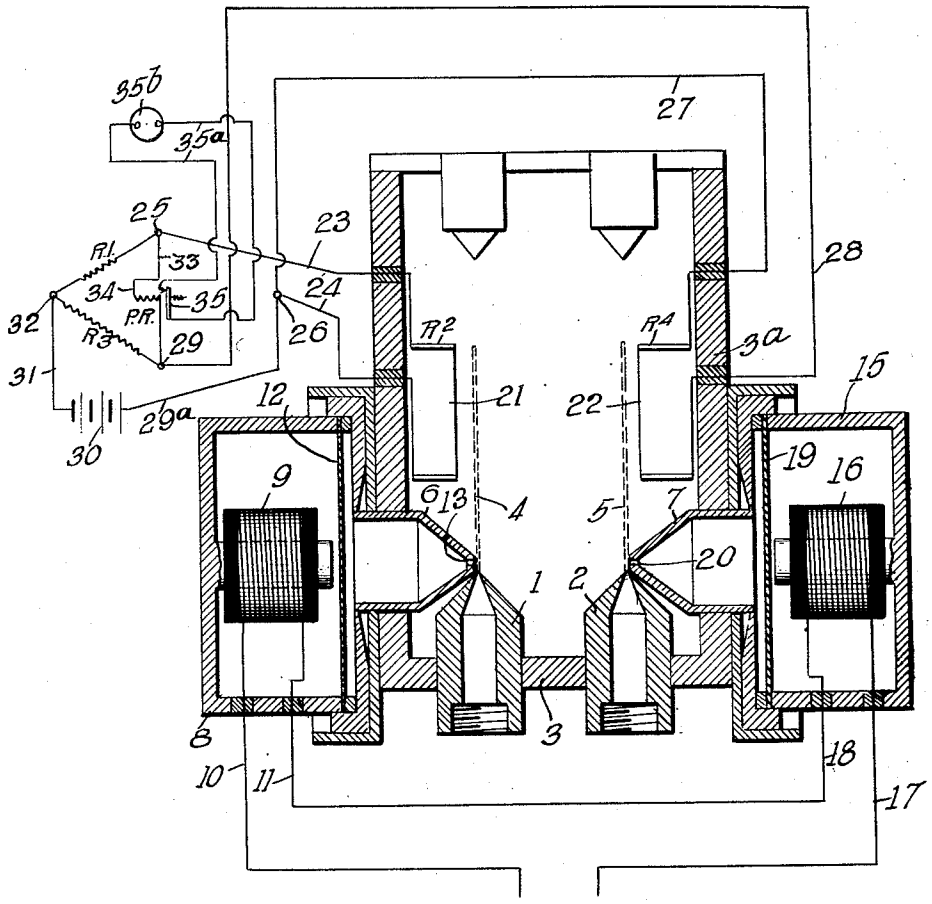
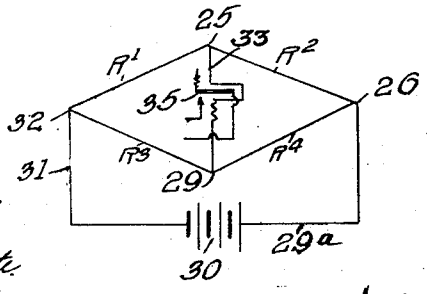


Fig. 2.



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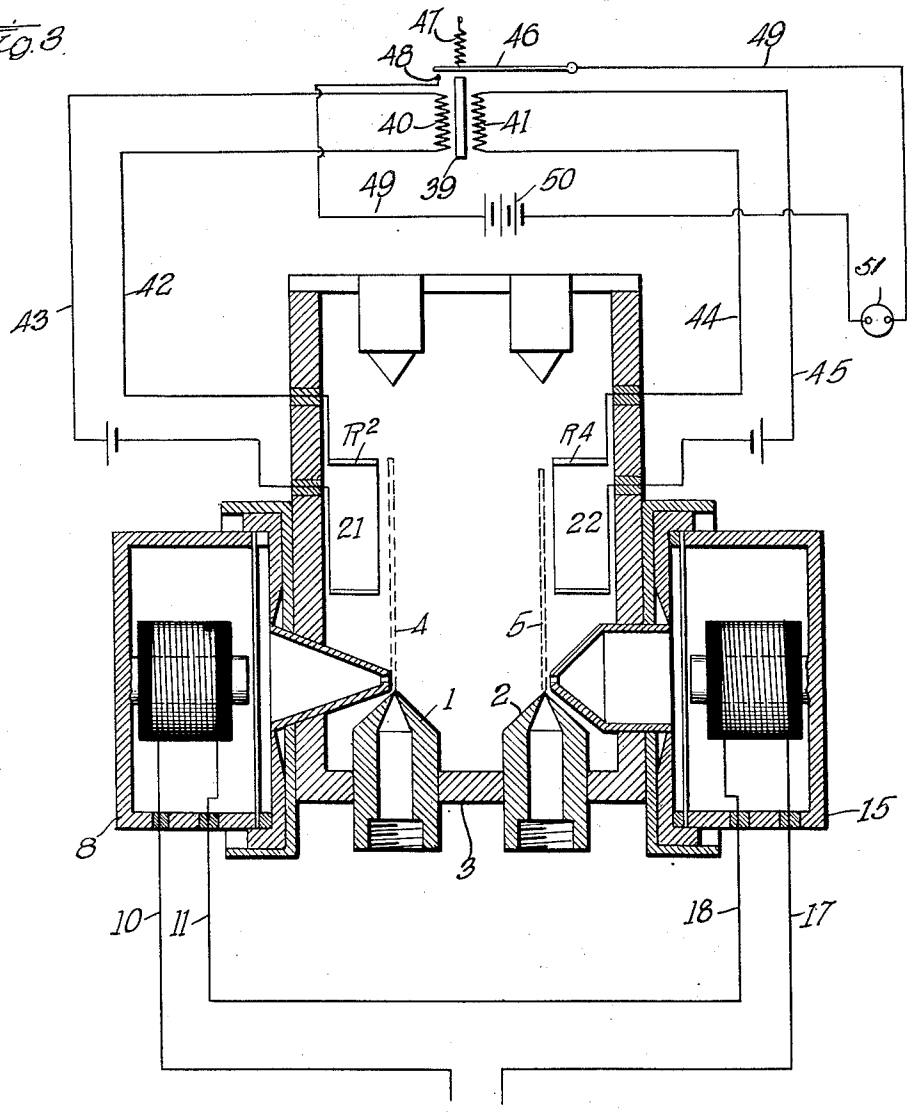
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METHOD OF AND MEANS FOR TRANSLATING SOUNDS

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Fig. 3.



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Patented Aug. 11, 1925. 1,549,196

UNITED STATES PATENT OFFICE.

RAY E. HALL, OF CHICAGO, ILLINOIS, ASSIGNOR TO HALL RADIO CORPORATION, OF DOVER, DELAWARE, A CORPORATION OF DELAWARE.

METHOD OF AND MEANS FOR TRANSLATING SOUNDS.

Application filed November 14, 1918, Serial No. 262,445. Renewed June 14, 1924.

To all whom it may concern:

Be it known that I, RAY E. HALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Methods of and Means for Translating Sounds, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to method of and means for translating sounds, particularly those produced in the receiving apparatus of wireless signaling devices.

One of the objects of the invention is to provide a practical and highly efficient method and means of the character specified.

Another object of the invention is to obtain quickness, sensitiveness and accuracy of operation.

Another object of the invention is to prevent interference with the tones desired to be translated (and preferably recorded), as for example by tones or noises in the receiving set of a wireless signaling apparatus, commonly known as static.

Another object of the invention is to accomplish the foregoing and other desirable results in a simple and expeditious manner.

In the arrangement herein shown for carrying out the invention I provide means by which the undesired tones or noises are counterbalanced or offset so that they will not affect the apparatus. The apparatus shown for accomplishing this will be best understood by reference to the accompanying drawings, in which—

Fig. 1 is a view partially in vertical section and partially diagrammatic of an apparatus embodying my invention;

Fig. 2 is a diagrammatic view of the circuit arrangement for the same; and

Fig. 3 is a view of a modified form of apparatus.

In the accompanying drawings I show two nozzles, 1 and 2, conveniently mounted in the lower end 3 of a casing 3^a. These nozzles are capable of projecting and are arranged and connected so as to project jets or streams 4 and 5 respectively of suitable gas, preferably air.

Associated with these nozzles 1 and 2 and their jets, I show telephone receivers of a receiving set of a wireless signaling apparatus, as one arrangement producing tones to be translated. This comprises funnels 6 and 7 conveniently mounted in the side walls of said casing 3^a. The funnel 6 is associated with a receiver 8 containing an electro magnet 9 which is connected with circuit wires 10 and 11 which are understood to be included in the receiving circuit of the wireless signaling apparatus. The magnet 9 acts upon a diaphragm 12 which is located at the flaring end of the funnel 6 so that sound vibrations of the diaphragm 12 are transmitted through the funnel 6 to the orifice 13 thereof, which latter is adjacent to the jet 4, whereby said jet 4 is affected by said vibrations on the diaphragm 12, so as to have its physical properties or qualities changed, as for example by flaring.

In a similar way the funnel 7 is associated with another receiver 15 containing an electromagnet 16 connected with circuit conductors 17 and 18, said magnet 16 being arranged to actuate a diaphragm 19 which in turn transmits sound vibrations through the funnel 7 and the orifice 20 thereof so as to affect the jet 5. The conductors 11 and 18 are connected together, and the conductors 10 and 17 are connected with the sides of the receiving circuit.

A suitable device, such for example, as a very fine platinum wire 21 is associated with the jet 4 so that when said jet is affected by sounds from the diaphragm 12 and becomes flared or otherwise changed, said jet will strike and act against the wire 21, whereas when said jet is passing normally in a straight line and of a substantially uniform thickness, said wire 21 will not be acted upon by said jet 4. In a similar way a fine platinum wire 22 is associated with the jet 5. Conductors 23 and 24 run from the first mentioned wire 21 to points 25 and 26, respectively, which may be regarded as corners of a Wheatstone bridge. A conductor 27 runs from one end of the other wire 22 to the point 26 and another conductor 28 runs from the other end of the wire 22 to a point 29 which may be regarded as another corner of the Wheatstone bridge located opposite the point 25. A conductor 29^a runs from the point 26 to a battery 30 whose other pole is connected by a conductor 31 with a point 32 which may be regarded as the other corner of the Wheatstone bridge. A conductor 33 extends between the points 25 and 29 and in-

cludes a suitable electrical instrument, as for example, a polarized relay 34 which has an armature 35. This armature 35 controls contacts included in a local circuit 35^a which also includes some suitable form of magnetic recorder 35^b.

The telephone jet system 8 is tuned to sounds, tones or pitches which it is desired to translate and preferably record, and consequently such sounds, tones or pitches will affect the jet 4. On the other hand, the telephone jet system 15 is tuned to sounds, tones or pitches which it is not desired to translate or record, or to a compensating tone or pitch. This tuning of the instrument 15 may be accomplished by the shape of the funnel 7 and also by changes in the resonance of the jet 5 and of the pressure operating the same.

As a result the apparatus will operate as follows: When a tone, sound or pitch to be translated and recorded comes in over the circuit, the instrument 8 is actuated by the same, thereby affecting the jet 4 and causing the same to act upon and vary the resistance of the wire or resistance 21. This causes a difference in the ratio of the resistance 21 as compared with the resistance 22, or the resistances R^2 and R^4;—and the Wheatstone bridge being normally in balance, is unbalanced by this change in the relative resistance of its sides R^2 and R^4, so that a current will flow through the polarized relay 34, thereby closing the local circuit 35^a controlled by this relay and actuating the recorder 35^b. Thus a sound to be translated will be recorded.

If now there should be received in the instruments a compensating tone or other tone or sound to which the other jet 15 was tuned, this tone would not affect the instrument 8, but would affect the instrument 15 and through the instrumentality of the jet 5 and resistance 22 would tend to produce an effect opposite in direction to the tone or sound to be recorded operating upon the instrument 8 and jet 4. During the cessation of the tone to be recorded the compensating or other tone or sound would unbalance the Wheatstone bridge in the opposite manner and thereby operate or tend to operate the relay 34, in the opposite manner, thereby quickening the return movement of the armature 35, whereby the compensating or other sound, tone or pitch would assist in the operation of the apparatus.

If, now, one or more of the undesired untuned tones, sounds or pitches, such as those commonly known as the static, should be received by the apparatus, it or they would actuate both the instrument 8 and the instrument 15, and would actuate these instruments equally, whereby although there would be an operation of the jets 4 and 5, the changes in the resistances 21 and 22 would be the same and the opposite sides of the Wheatstone bridge would remain in balance, whereby no effect would be produced by such undesirable sounds, tones or pitches. This is of great advantage because of the presence of the static in wireless signaling apparatus and the great discomfort and annoyance caused by the same. In this way while such static is not prevented from passing in over the line,—and it seems practically impossible to prevent it so passing,—the effect on the receiving and recording instruments is nullified, and the translating and recording of the sound or tone to be recorded may proceed unmolested, even though such static is present, inasmuch as the instrument 8 will be affected also by the desired tone or sound so as to cause the resistance 21 to be further affected and thereby unbalance the Wheatstone bridge and cause the operation of the recording instrument.

Referring to Fig. 3 of the drawings I show an arrangement having the two nozzles 1 and 2 with the two jets 4 and 5 controlled by receiving instruments 8 and 15, as in the preceding arrangement. There are also present fine wires 21 and 22 arranged to be affected by the jets 4 and 5, as in the preceding arrangement. These wires 21 and 22 are not connected to a Wheatstone bridge, however, but to another form of apparatus. This is a differential relay 39 having coils 40 and 41, the conductors 42 and 43 running between the wire 21 and coil 40 and conductors 44 and 45 between the wire 22 and coil 41. This differential relay 39 is provided with an armature 46 controlled by a spring 47 and arranged to make connection with a contact 48 in a local circuit 49. This local circuit 49 may include a battery 50 and also include any recording instrument, as for example, a magnetic recorder 51 which is only shown diagrammatically, as the same is known on the market and forms no part of the present invention.

The operation of the apparatus of Fig. 3 is the same as that of Fig. 1, in so far as the receiving instruments, jets and resistances 21 and 22 are concerned. Instead, however, of the variations in the resistances 21 and 22 affecting the balance of a Wheatstone bridge, such variations will control the operation of the relay 39 and this relay will be operated so as to affect the recording of the normal or desired tones, sounds or pitches and will be assisted in the same by other tones, sounds or pitches including compensating ones. The static will be counterbalanced by the like energization of the two coils 40 and 41, thereby preventing any operation of the relay 39 by such static.

It will be understood that changes and modifications may be made without departing from the spirit of the invention.

What I claim is:

1. The method of translating sounds or tones which consists in causing desired sounds or tones to operate a sensitive cooling jet translating mechanism and in also causing undesirable sounds or tones to operate a second sensitive jet translating mechanism and prevent the operation of said first mentioned mechanism by such undesirable sounds or tones.

2. Apparatus of the class specified comprising a pair of telephone receivers, sensitive cooling jets associated with and controlled by said receivers, electrical resistance wires associated with and variably cooled by said sensitive jets, electrically operated devices controlled by said resistance wires, and recording mechanism controlled by said last mentioned electrically operated devices.

In witness whereof, I hereunto subscribe my name this 20th day of September, A. D., 1918.

RAY E. HALL.