Jan. 13, 1931. O. L. RICHARDS 1,789,192

STATIC ELIMINATOR

Original Filed Nov. 3, 1926 2 Sheets-Sheet 1

Fig. 1.

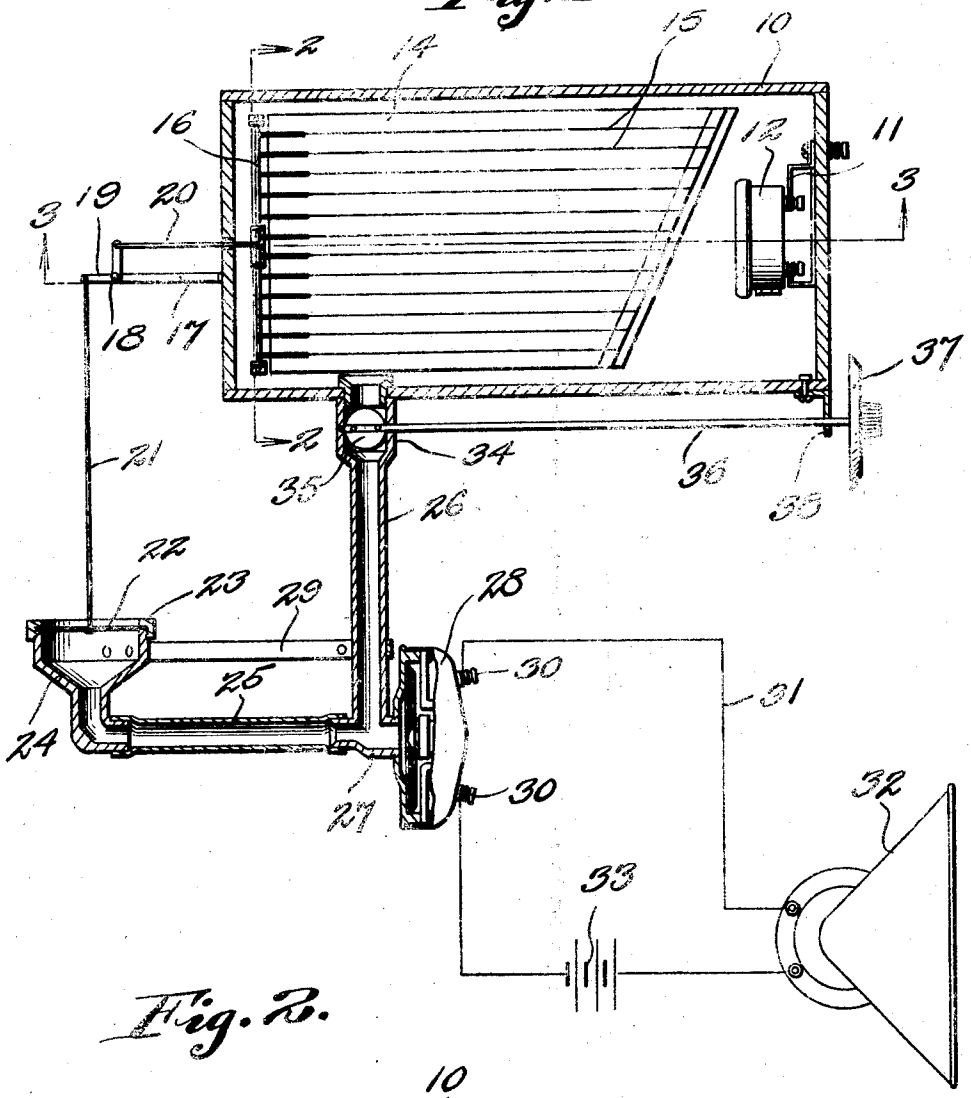
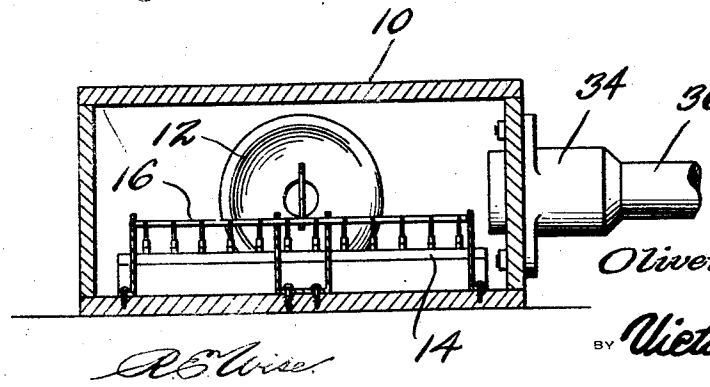


Fig. 2.



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Fig. 3.

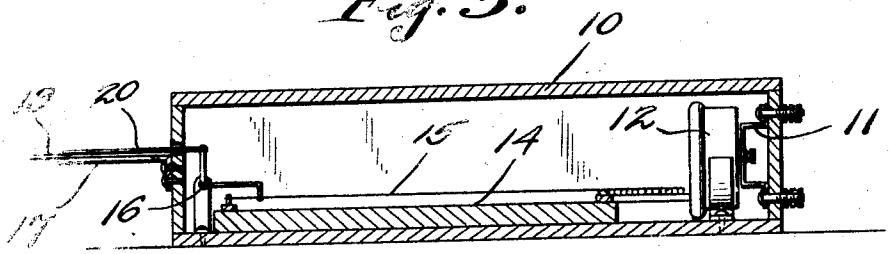


Fig. 4.

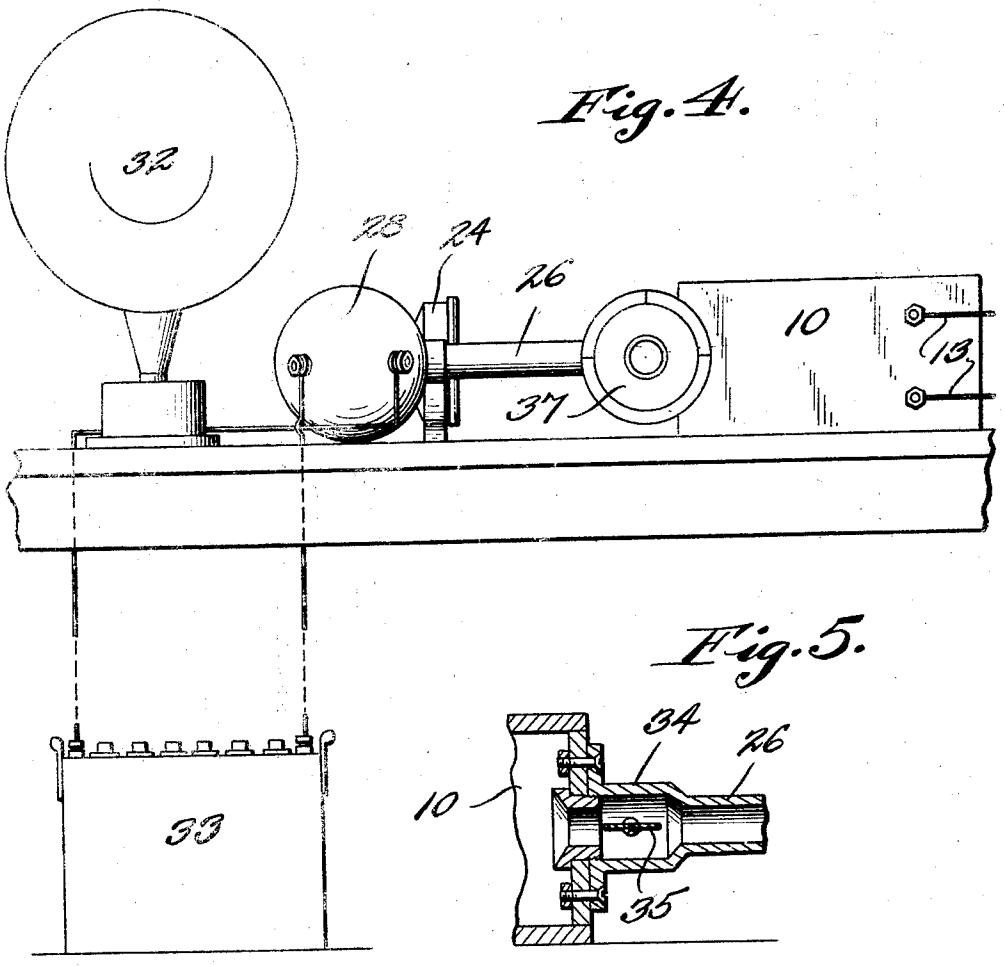


Fig. 5.

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Patented Jan. 13, 1931 1,789,192

UNITED STATES PATENT OFFICE

OLIVER LEE RICHARDS, OF CUSHING, TEXAS

STATIC ELIMINATOR

Application filed November 3, 1926, Serial No. 146,004. Renewed May 31, 1930.

This invention relates to static eliminating devices for use in radio reception and has for its object the provision of a novel device by means of which the various objectionable noises incidental to static disturbances and various varieties of local interference may be entirely eliminated from the reception of broadcast music and the like.

It is well known that various attempts have been made, with rather indifferent success, to eliminate from radio receiving apparatus the undesired impulses of current which, when amplified, create the characteristic rattling, rapping, and otherwise objectionable sounds emitted from loud speakers. However, thus far it has seemed to be practically impossible to filter such impulses out of the circuit and it is for this reason that I have designed the present invention, which has for its principal object a mode and means operating in conjunction with a sensitive receiving instrument as a telephone receiver, capable of reproducing only the desirable sounds of transmission. My system depends on the well known principle that strings or other sharply tuned harmonic resonators will respond only to the frequency or pitch characteristic of certain notes, the theory, as applied to the present invention, being that as there are no harmonic devices capable of producing sound corresponding to static interferences and the like, there will be no reproduction in sound of such interference, the undesirable vibrations being consequently filtered out of the receiving system, or loud speaker.

An important object of the invention is to provide a static eliminating device of this character adapted to be interposed between the responding output, namely, a telephone, of a radio receiving set and a suitable loud speaker with microphone and battery to amplify the weak currents delivered by the receiving antenna.

Another object is the provision of a device of this character provided with means whereby all of the sounds emitted from the output of the radio receiving set may be listened to by the operator in tuning, means being provided where only the filtered vibrations will be operative on the final receiver after a certain selected station has been tuned in.

Another object is the provision of a structure or apparatus of this character which will be simple and inexpensive to manufacture, easy to control and operate, positive in action, efficient and durable in service, and will be a much needed improvement in the art.

With the above and other objects and advantages in view, the invention consists in a novel mode of operation and instrumental association, to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which:

Figure 1 is a sectional view through the complete apparatus, the diagram of the circuit also being disclosed.

Figure 2 is a cross section taken on the line 2—2 of Figure 1.

Figure 3 is a longitudinal section taken on the line 3—3 of Figure 1.

Figure 4 is an elevation showing the complete apparatus.

Figure 5 is a detail section taken through the valve device.

Referring more particularly to the drawings, I have shown the device as comprising a suitable casing 10 which is best hermetically sealed and rendered sound proof. Mounted within one end of this casing, as for instance upon a bracket 11 or the like, is a telephone receiver 12 constituting the output of a radio receiving set, containing tuning means and rectifying devices as crystals or vacuum lamps. Mounted within the box or casing 10 is a frame or sounding board 14 along which are stretched strings 15 of different lengths so as to be capable of being tuned to different pitches. Obviously, any ordinary or preferred type of tuning pins may be employed though such are not shown in detail as they really constitute no part of the present invention and can be anything desired, nor need the harmonic elements necessarily be stretched strings as any type of resonator might be used; strings, however, have an advantage in compactness and are preferred.

At one end the strings 15 are connected with

a bar 16 capable of compounding all the harmonic vibrations of the several strings and reproducing the composite effect thereof.

Suitably mounted upon the end of the casing opposite that where the telephone receiver is located is a bracket 17 upon which is pivoted, at 18, an angle lever 19, having one arm connected by a link 20 with the bar 16 and having its other end connected by a link 21 with the center of a diaphragm 22 suitably secured, as by a cap 23, across the open end of a sound box 24 with which is connected a conduit 25.

The numeral 26 designates a conduit which is connected with one side of the casing 10 in any suitable manner and which is shown as terminating in a T 27 having one branch connected with the conduit 25 and having its other branch connected with a microphone 28 of any ordinary or preferred type. The element 25 is very similar to the swinging arm of an ordinary commercial phonograph. For mechanical supporting purposes, use may be made of a brace 29 connected with the conduit member 26 and with the sound box 24, though obviously, it should be understood that any or all of the details of construction of these parts may be varied within wide limit.

As mentioned above, the type of microphone is immaterial and it is shown as equipped with binding posts or other terminal members 30 with which are connected conductors 31 in turn connected with a loud speaker 32 of any desired type, a suitable source of current 33 being interposed for effecting amplification.

The conduit 26 is provided, at a point preferably near the casing, with an enlarged portion 34 which of course communicates with the interior of the casing and within which is mounted a disk valve, or vane 35, or equivalent type carried by a rod 36 equipped with a dial and knob 37 and preferably journaled through a suitable bearing or bracket 38. The valve acts to shut off entirely or only partly the air communication through the sound duct 26.

In the operation of the device, it will of course be apparent that the sound emitted from the telephone receiver 12 will produce sympathetic vibration of the strings 15, the composite or combined vibrations being transmitted to the bar 16 and thence through the link 20, angle lever 19, and link 21 to the diaphragm 22, which of course corresponds with the vibration. The strings are of a large enough number to respond harmonically to all musical frequencies necessary to effect a resultant tone of characteristic timbre in the gamut of the voice or music. The sound waves set up by the diaphragm impinging against the diaphragm of the microphone 28 will operate to vary the resistance to the flow of current from the source 33 to the conductors 31 and loud speaker 32. The variations in the current passing through the loud speaker will of course operate to reproduce the sounds transmitted to the microphone.

When it is desired to tune in a station or to reproduce all the sounds emitted from the telephone receiver 12 it is merely necessary that the operator grasp and turn the knob and dial 37 to open the valve 35, whereupon the total ensemble of sounds generated within the casing 10 will pass directly through the conduit 26 to the microphone and be reproduced at the loud speaker. When, however, it is not desired to listen to announcements, and when it is desired to filter out static disturbances, the valve 35 should be closed, whereupon the only sounds reproduced will be those set up by the sympathetic vibrations of the strings 15 and which will be a pure reproduction.

Thus, it will be apparent that I have provided a simply constructed device for the purpose specified and one which will efficiently perform all the functions for which it is intended. Obviously, the device will be a great benefit to the public inasmuch as the quality of the reproduction of broadcast music and the like will be greatly improved. It is really believed that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiment of the invention, it should be understood that I reserve the right to make such changes in the form, construction and arrangement of parts, as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. In combination, a telephone receiver adapted to be connected with the output from a radio receiving apparatus, a series of vibratory elements adapted to vibrate sympathetically with the sound vibrations emitted from the telephone receiver, a microphone and a loud speaker connected in series therewith, and means for transmitting the composite vibrations of said vibratory elements to the microphone, said means comprising a casing, a conduit connected with the casing and leading to the microphone, a diaphragm mounted within the casing, and mechanical connections between the dipahragm and said vibration producing elements.

2. In a device of the character described, a casing, a telephone receiver mounted therein and adapted to be connected with the output from a radio receiving apparatus, a sounding board within the casing, a plurality of strings stretched along the sounding board, a bar to which one end of all the strings are connected, whereby to vibrate in accordance with the composite vibrations of the strings,

said strings vibrating sympathetically with the sound vibrations emitted from the telephone receiver, a microphone, a sound box connected with the microphone and having a diaphragm, and mechanical connections between said bar and the diaphragm for vibrating the latter.

3. In a device of the character described, a casing, a telephone receiver mounted therein and adapted to be connected with the output from a radio receiving apparatus, a sounding board within the casing, a plurality of strings stretched along the sounding board, a bar to which one end of all the strings are connected, whereby to vibrate in accordance with the composite vibrations of the strings, said strings vibrating sympathetically with the sound vibrations emitted from the telephone receiver, a microphone, a sound box connected with the microphone and having a diaphragm, and mechanical connections between said bar and the diaphragm for vibrating the latter, a conduit communicating with the casing and leading directly to the microphone, and means for opening and closing said last named conduit at will.

4. In a device of the character described, a casing, a telephone receiver mounted therein and adapted to be connected with the output from a radio receiving apparatus, a sounding board within the casing, a plurality of strings stretched along the sounding board, a bar to which one end of all the strings are connected, whereby to vibrate in accordance with the composite vibrations of the strings, said strings vibrating sympathetically with the sound vibrations emitted from the telephone receiver, a microphone, a sound box connected with the microphone and having a diaphragm, and mechanical connections between said bar and diaphragm for vibrating the latter, a conduit communicating with the casing and leading directly to the microphone, and means for opening and closing said last named conduit at will, comprising a valve interposed therein, and means for controlling the valve.

In testimony whereof I affix my signature.

OLIVER LEE RICHARDS.