March 3, 1942. O. SCHMIDT 2,275,161

ELECTROACOUSTIC SIGNALING DEVICE

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Fig. 1

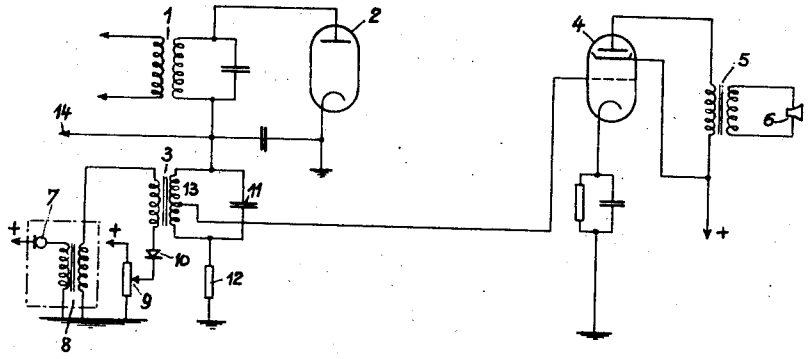
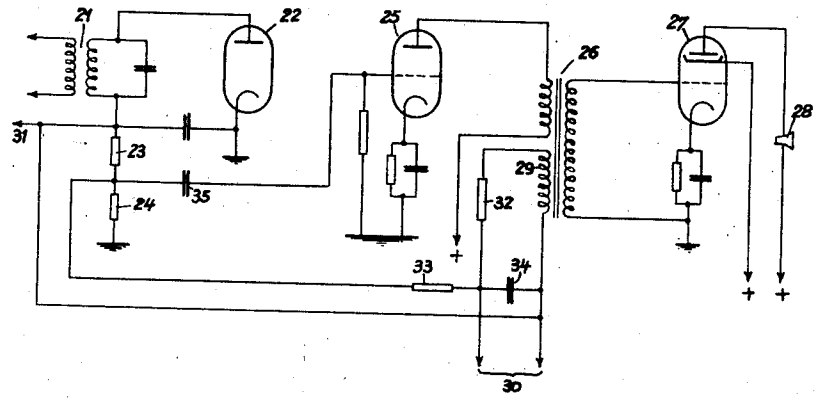


Fig. 2



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ELECTROACOUSTIC SIGNALING DEVICE

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6 Claims. (Cl. 179—2)

This invention relates to an electro-acoustic signaling device for use by vehicles prior to overtaking one another.

Various types of acoustic, optical, electro-acoustic, and electro-optical signaling devices of this class are known all of which are, however, open to some objections. The strictly acoustic devices are hardly audible, the optical methods fail to give the driver the customary horn signal, the electro-optical ones suffer from a similar drawback, and existing electro-acoustic systems frequently respond already to louder street noises and thus lack reliability.

According to the invention, the defects of existing devices are eliminated by providing in a system of connections a threshold or network for excluding the transmission of interfering noises outside a predetermined limit and by arranging for selective reception of a frequency range characteristic of all horn signals with the aid of resonance transformers and/or a resonance microphone.

An object of the invention is also the combination of an electro-acoustic signaling device of this type with a radio apparatus in such manner that radio reception is suppressed during signaling and the signaling device may be operated also when the radio apparatus is not in use.

The invention insures good audibility of the horn signal given. The provision of a threshold and of selective reception prevents other sounds than horn signals from reaching the driver. In case of a combined signaling device and radio apparatus the horn signal is powerfully enhanced due to the suppression of radio reception, and confusion is avoided.

Two forms of a signaling device according to the invention in combination with radio apparatus are diagrammatically shown in the accompanying drawing, in which

Figure 1 illustrates a method of supressing reception in the manner of fading regulation and

Fig. 2 illustrates suppression of reception in the low-frequency section.

In the system shown in Fig. 1 the radio energy received passes through an aerial, a high-frequency stage, and possibly also through an intermediate frequency stage, and a high-frequency transformer 1 to a demodulation tube 2. The low frequency produced during demodulation passes through a tapping of the secondary winding 13 of a transformer 3 to the grid of a low-frequency amplifier 4 and finally through a low-frequency transformer 5 to a loud-speaker 6.

Through a microphone 7 disposed at a suitable point in a motor vehicle the overtaking signal is transmitted to a transformer 8, preferably constructed as resonance transformer with its resonance point near 500 Hz., since it has been found that the maximum energy of the usual horns is in the spectrum around 500 Hz. Other noises do not reach the transformer 3 at all or only quite weakly. With the primary winding of the transformer 3 a rectifier 10 is connected in series and biased through a resistance 9 so that potentials below the threshold to be adjusted at the resistance 9 do not lead to a passage of current through the primary winding of the transformer 3 and to a release of a signal. The action of the rectifier 10 involves of course a distortion of the sound, but that does not detrimentally affect the value of the arrangement. From the secondary winding 13 of the transformer 3 the signal voltage for suppressing reception is applied by a connection 14 as displacing potential to the fading regulator and for reproduction of the signal to the grid of the low-frequency amplifier 4. Smoothing or choking of the regulating voltage may be omitted if the time constant of the fading regulation is chosen correspondingly high. The displacing potential at the fading regulator has to be, as a rule, appreciably higher than the signal potential to be supplied to the low-frequency amplifier 4, and the secondary winding of the transformer 3 is therefore provided with a corresponding tapping. The secondary impedance 13 of the transformer 3 should be perceptibly smaller than the resistance 12 for all frequencies to be transformed ($\omega L < R$) to prevent distortion of the low frequencies reaching the grid of the low frequency amplifier 4.

The transformer 3 could also be a resonance transformer to increase the filtering effect in favor of the horn signal. In this instance, it is advisable to connect an additional resistance directly in series with the secondary winding 13 of the transformer 3 and to tap this additional resistance, preferably formed as voltage divider, for the low frequency amplifier 4. This resistance prevents distortion of the low frequencies to be transformed which originate from radio reception. Dimensioning should be such that ωL of the secondary winding 13 or $1/\omega C$ of the condenser 11 is smaller than the additional resistance. In the arrangement shown in Fig. 1 the transformer 3 is not a resonance transformer.

In the system shown in Fig. 2 the receiver has for instance two low-frequency stages. The already amplified energy passes through a high-frequency transformer 21 to a demodulation tube

22. The low frequency produced during demodulation is transmitted through a resistance 23, a condenser 35, a low-frequency amplifier 25, a transformer 26, and a second low-frequency amplifier 27 to a speaker 28. The low-frequency transformer 26 is provided on the primary side with an additional winding 29 which transmits the signal supplied by a conductor 30 to the speaker 28 by means of the amplifier 27. The threshold connection, analogous to that illustrated in Fig. 1, is not shown. Regulation of the high frequency is effected by a conductor 31 leading to the fading regulator. The resistances 23, 24 are so dimensioned that back-coupling between the second and first low-frequency stages is avoided. In order to prevent transmission of the low frequency originating from radio reception through the winding 29 of the transformer 26 to the fading regulating stage, the resistances 23, 32, 33 and the resistances of the transformer winding 29 and of a condenser 34 are correspondingly dimensioned. The resistance 32 should be large compared with the impedance of the coupling winding 29 ($R>\omega L$), or the resistance of the condenser 34 must be small relative to the impedance of the winding 29 ($1/\omega C<\omega L$).

The two systems shown differ somewhat in their function, but the final result is the same: Complete suppression of radio reception and, simultaneously, clear audibility of the horn signal. By the suitable provision of switches the device can be operated without radio reception.

What is claimed is:

1. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising a biased rectifier, and means comprising a microphone having a resonant range for frequency ranges characteristic of a horn signal for obtaining selective reception of characteristic frequency ranges.

2. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising ia biased rectifier, and means comprising parts of the amplifier of an automobile radio for obtaining selective reception of characteristic frequency ranges.

3. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising a biased rectifier, means comprising parts of the amplifier of an automobile radio for obtaining selective reception of characteristic frequency ranges, and means for suppressing radio reception during selective signal reception.

4. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising a biased rectifier, means comprising parts of the amplifier of an automobile radio for obtaining selective reception of characteristic frequency ranges, and means formed along the lines of a fading regulator for suppressing radio reception during selective signal reception.

5. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising a biased rectifier, means comprising parts of the amplifier of an automobile radio for obtaining selective reception of characteristic frequency ranges, and means for suppressing radio reception during selective signal reception, said suppression being effected separately from the rectifier.

6. An electro-acoustic signaling device for use by vehicles prior to overtaking one another, comprising a system of electric connections, means for excluding the transmission of interfering noises outside a predetermined limit and comprising a biased rectifier, means comprising parts of the amplifier of an automobile radio for obtaining selective reception of characteristic frequency ranges, and means for operating the device separately from radio reception.

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