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The title of the invention has been amended (Guidelines for Examination in the EPO, A-III, 7.3).

⑤④ **Periodically variable multitone generator.**

⑤⑦ The invention has the aim to personalize better the sounds of a siren or of any other emitter used as an anti-thief device.

Personalization is achieved by means of emissions of pure multi-tonal sounds which are periodically transformed by varying the frequency.

Other aims of the invention are the elimination of problems due to auditive adaptation and the difficulty of distinguishing the origin of the sounds.

The enclosed circuit diagram represents an example of the realization of such an emitter; the diagram also permits the visualization of the sounds by means of an optic transducer.

Description

Siren able to supply different periodically variable multi-tonal sounds.

The aim of the invention is a siren or rather a horn or an acoustic alarm that emits sounds caused by vibrations due to the application of variable frequency voltage.

At present, apparatus such as sirens, acoustic alarms and speakers which emit multi-tonal sounds obtained by means of periodic and rapid variations of the voltage frequency, while they give a periodically variable sound, are unable to avoid auditive adaptation or the phenomenon of the reduction of the sensation of sound due to a stationary sound-noise during the emission of the alarm.

Consequently, when the siren is applied to an alarm device and, in particular to a car, it is very difficult to distinguish its sound and its origin if the sirens of other cars are working at the same time, even if this sound is personalized by a multi-tonality.

The main object of the present invention is the elimination of the above-mentioned drawbacks, that is, auditive adaption and the difficulty of distinguishing the origin of the sounds emitted by the alarm.

With this end the invention solves the following problems:

- 1) greater personalization of the sounds emitted by the alarm;
- 2) distinguishing the location of their origin.

As regards the first problem, greater personalization is obtained by changing suddenly and periodically the frequency of a series of multi-tonal sounds, so as to obtain further series of different multi-tonal sounds.

As regards the problem of distinguishing the location of the alarm, it is necessary to premise the following.

Localization is partly a mono-aural phenomenon interpreted in bi-aural terms on the bases of physical factors, as a consequence of the difference between two stimuli that reach the two ears, that is the different intensity, the different phase (for pure sounds) and the instant of arrival.

The invention solves the problem of the spatial location of the alarm by means of a continual and periodic change of the characteristics of the sounds, or rather by means of the emission of more series of pure multi-tonal sounds, without harmonics, obtained by periodic frequency changes in each wave series so as to exploit periodically, or rather repeatedly, the following phenomena every time these changes occur:

a) Bi-aural reception of the new sounds, in slightly different times and with different intensity for each ear, that is, sound reception by one ear in different times and with different intensity from that of the other ear, even if the sounds are emitted from the same source;

b) phase difference in the sounds coming to the ears due to the fact that they are pure sounds without harmonics: the person perceives that the sound source is on the side of the ear to which the sound arrives out of phase in advance.

In the enclosed circuit diagrams an example of a system is illustrated which allows the periodic changing of the frequency of a series of bitonal sounds obtained with an electrodynamic device (sound transducer).

In this diagram, 1 indicates a timer realised with an integrated circuit, for example a NE555 type which activates a transistor 2 (T9), for example a BC 237B NPN, that, through condensers, feeds the integrated circuits 3 which produce the frequencies that feed the sound transducer, piloting the transistors 4 of BC 237B NPN type (T1, T3), and BC 557B PNP type (T2, T4).

The power transistors 5 of BD 433 NPN type (T5, T7), and BD 434 PNP (T8, T6) type, amplify the signals produced by the integrated circuits 3 and directly feed the siren.

The integrated 3 is a trigger, for example CD 4093 B, quadruple, National® type.

In this system the condenser 6 has the function of filter to level, the Zener diode and the R1 resistance is the tension stabilizer, the resistors and the capacity 9 vary the times of the timer 1.

The components 10 are used to vary the obtainable multi-tonal base frequencies; the diode 11 serves to prevent the inversion of polarity.

The sound frequencies may vary periodically with different times also to infinity, without repeating the same frequencies.

The number of the sound transducer may be more than one.

The invention also allows the realization of sirens and acoustic alarms with other diagrams which personalize the emitter of sounds with more series of pure multi-tonal sounds the frequencies of which change periodically, or rather with more series of multi-tonal sounds with different tonalities.

An important advantage of the preferred diagram of drawing 1 is the fact that it supplies the sound of two different sirens, with a limited number of parts and, consequently, virtually for the cost of a single siren.

Another advantage of the invention consists in the possibility to connect parallel to the acoustic transducer 8, i.e. on its feed terminals, an optic transducer to reproduce optically, by means of the headlights or the direction indicators of a vehicle, the sound effect supplied by the siren.

The optic transducer is formed by an integrated circuit, for example SIEMENS® IL/CT6 type, to the input circuits of which, on the same terminals connected in parallel to the acoustic transmitter, two leds are connected in series to an electrolytic condenser.

On the opposite side, on the output terminals of the integrator, connected to the amplification circuit which inserts the headlights or direction indicators, two phototransistors are connected.

When alternating tension feeds the acoustic transducer, it inserts immediately the two leds at the same frequency and periodicity so that the photo-

transistors, illuminated by the above mentioned leds, can insert at the same frequency and periodicity of feeding of the multitonal siren, the amplifier circuit which inserts the headlights or direction indicators of the vehicle.

With this application the functioning of the anti-thief device becomes unique of its type also as regards the reproduction of the optic signals.

Claims

1)" A siren able to supply different periodically variable multi-tonal sounds", characterized by more series of pure multi-tonal sounds, the frequency of the sounds of each series being different from those of the multi-tonal sounds of the other series, the changing tonality of the multi-tonal sounds being sudden and periodic, so that the ear suddenly receives a new sound sensation produced with a multi-tonal series of different sounds.

2) A siren as claimed in claim 1, characterized in that the periodical frequency changes of the multitonal sounds can be carried out one or more times periodically.

3) A siren as claimed in claim 1, characterized by the fact that the personalization of the sounds involves:

a) a series of sounds of different tonality obtained with rapid variations of frequency;

b) equal or different periodic changes of the tonality of the sounds of each series of multi-tonal sounds, obtained with an equal frequency change in the frequency of each sound or with different changes of each of those sounds.

4) A siren as claimed in claim 1, characterized by components to obtain multi-tonal sounds and by components that cause sudden periodic changes of all the tonalities of the sounds of each series of multi-tonal sounds.

5) A siren as claimed in claim 1, characterized in that it prevents auditive adaptation by changing the frequency of the sounds or more series of pure multitonal sounds.

6) A siren as claimed in claim 1, characterized by components intended to provoke repeatedly the effects of mono-aural or bi-aural reception for the spatial localization of the sound emitter.

7) A circuit diagram to realize the siren as claimed in the preceding claims, characterized by:

a) components (1) consisting in integrated circuits, for example NE555, to temporize the periodic frequency changes of the multi-tonal sounds;

b) components (2), i.e. transistors to exchange the polarities of integrater (1), for example BC 237 NPN;

c) integrated circuits (3) to produce a series of pure multitonal sounds of the desired frequency, for example a CD 4093 B;

d) piloted transistors (4) of the inte-

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grated circuits described in point c, for example of BC 237B NPN (T1, T3) and BC 557B PNP;

e) power transistors (5) to amplify the signals emitted by the the integrated circuits described in point C and for the feeding of an electro-dynamic transducer (8), for example BD 433 NPN (T5, T7) and BD 434 PNP (T8, T6);

f) filter condenser (6);

g) resistors and capacitor (9) to vary the times of the timer attained by the integrated circuits (1);

h) resistors and capacitors to vary the frequencies (10);

i) diodes to prevent polarity inversion.

8) Utilization of the circuit diagram as claimed in claim 7 to visualize the sounds emitted by the siren by means of the direction indicators or the headlights of a car or any other luminous apparatus, characterized in that the same tension and frequency variations applied to the connecting terminals of the acoustic transducer (8) connect the input terminals of an electronic circuit that permits the visualization of the sounds by means of a luminous device, the electronic circuit including an integrated circuit, for example IL/CT6 SIEMENS®, connected, with the input terminals connected to those of the acoustic transmitter (8), to leds connected in series through a condenser, and with the output terminals to some photo-transistors excited by the same leds and to an amplification circuit that switch on the luminous device with the same periodicity and frequency with which the above mentioned acoustic transducer (8) is inserted.

