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(54) **SOUND WARNING DEVICE**

(57) An audible alarm device (100) comprises an arrangement (110) for producing an alarm conveyed by means of sound. Furthermore, the audible alarm device comprises a power source (120) connected to said arrangement (110). The audible alarm device additionally comprises a receiver (130) for receiving an alarm signal

transmitted by radio, which receiver (130) is connected to the power source (120) and said arrangement (110). Said arrangement (110) is further configured to produce the alarm when the receiver (130) receives the alarm signal.

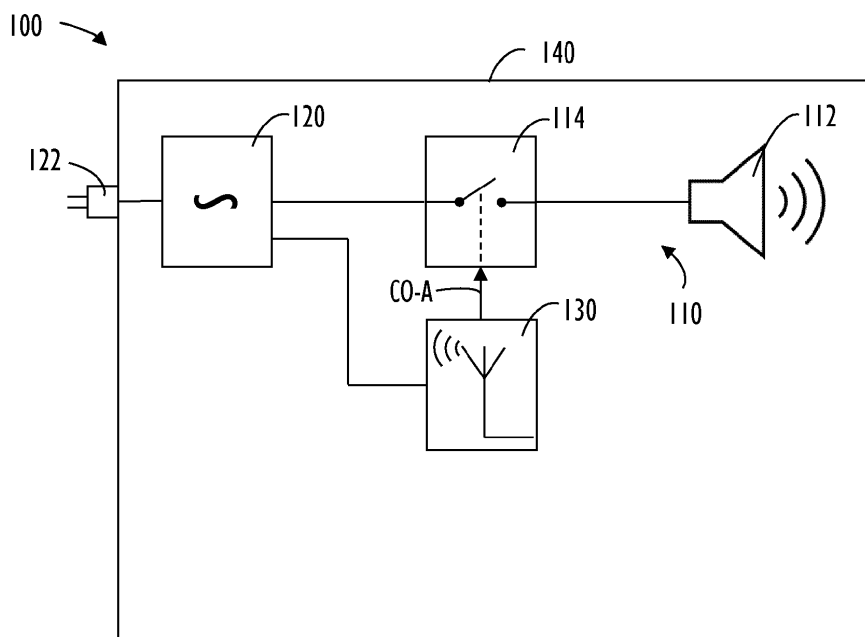


FIG. I

Description

Background of the invention

[0001] The invention relates to an audible alarm device for sounding an alarm.

[0002] Examples of audible alarm devices are public warning sirens used outdoors that authorities use to warn people about e.g. imminent danger, whereby there might be a need to shelter as soon as possible. In this case, it is particularly important that the sound of the public warning siren is extensively audible in the required area with a high enough volume. Typically, the public warning sirens are thus at least partially located outside in order to be able to convey the sound into an area as extensive as possible. The public warning sirens located outside are large of their physical dimensions and they produce the public warning sound with high volume, whereby they also consume more power. The public warning sound is typically produced by the volume of over 100 dB.

[0003] However, a problem with the public warning sound is that a person cannot necessarily hear said public warning sound. The person does not necessarily hear the public warning sound because the public warning sound might be too faint in the point of observation.

Brief description of the invention

[0004] It is an object of the invention to provide a novel kind of an audible alarm device for sounding an alarm.

[0005] The solution according to the invention is characterised by what is stated in the independent claim.

[0006] The basic idea of the invention is that the audible alarm device produces an alarm when it receives an alarm signal transmitted by radio.

[0007] An advantage of the arrangement according to the invention is that the alarm, such as e.g. a public warning, can be transmitted via the audible alarm device into an area, where the alarm, such as e.g. said public warning, would not be otherwise audible.

[0008] Some embodiments of the invention are presented in the dependent claims.

Brief description of the drawings

[0009] The invention will now be described in closer detail in connection with some embodiments and with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of an audible alarm device,

Figure 2 is a schematic view of a second audible alarm device,

Figure 3 is a schematic view of a third audible alarm device, and

Figure 4 is a schematic view of a fourth audible alarm device.

[0010] For reasons of clarity, some embodiments of the invention are illustrated in the figures in a simplified form. In the figures, like reference numerals identify like elements.

Detailed description of the invention

[0011] Figure 1 is a schematic view of an audible alarm device 100. Figures 2, 3 and 4 are also schematic views of audible alarm devices 100. The audible alarm device 100 is intended to be used particularly indoors. An advantage of using the audible alarm device 100 indoors is that the alarm conveyed by means of sound of the audible alarm device 100 is more reliably heard by the persons residing indoors. However, the use of the audible alarm device 100 is not necessarily limited only to indoors, but it can also be used outdoors within the limitations set by the properties of the device. When the audible alarm device 100 is intended to be located indoors, such as e.g. to an office space, an interior of an industrial facility or an interior of a private residential building, the alarm conveyed by means of the sound it produces is intended to be heard at least in the interior space in question or in its part where said audible alarm device 100 is located. The audible alarm device 100 can produce sound indoors with the volume of e.g. 85 dB, which is generally a sufficient volume for sounding an alarm indoors. The volume of the sound can also be lower than 85 dB. Furthermore, the audible alarm device 100 is dimensioned such that the components are small of their size, low of their costs and suitable for indoors of their features.

[0012] The audible alarm device 100 is intended to produce an alarm conveyed by means of sound. In the embodiment of Figures 1, 2 and 3, the alarm produced by the audible alarm device 100 is an alarm sound which is sound produced with a specific volume and frequency or frequencies. In the embodiment of Figure 4, the sound produced by the audible alarm device 100 is a voice instruction or an alarm sound, wherein the voice instruction comprises such frequencies and their combination by means of which the sound can be comprehensible speech.

[0013] The audible alarm device 100 according to the figures comprises a power source 120. The power source 120 produces required power, thus voltage and current, for the operations of the audible alarm device 100. The power source 120 in the figures is a mains power source. The power source 120 of Figure 1 and 2 comprises a plug 122 being connectable to a socket. In an alternative embodiment, the audible alarm device 100 can comprise a plug 122 with its accessories, wherein the plug 122 with its accessories is arranged connectable of its one end to the power source 120 of the audible alarm device 100 and of its other end to a socket. For example in Finland, the mains current received from the sockets is alternating current with the voltage of 230 volts and the frequency of 50 Hz. The mains power source may comprise required components, such as e.g. a transformer, for transforming

the voltage into a specific direct voltage. The advantage of using the mains power source is that the mains power source is connectable in a versatile manner to an extensive range of indoors sockets in order to receive power where the power is required for producing an alarm sound or a voice instruction by means of the audible alarm device 100. In the embodiment of Figs. 3 and 4, the audible alarm device 100 comprises a power source 120 which is connected to a separate wiring for receiving power in connection with the installation. This has such an advantage that the audible alarm device 100 can be located e.g. inside a fire-proof structure such that there is no absolute need to arrange a space-consuming socket inside the fire-proof structure. Alternatively in the embodiment of Figs. 3 and 4, the power source 120 can also comprise a plug 122.

[0014] The audible alarm device 100 of the figures further comprises an arrangement 110 for producing an alarm conveyed by means of sound, such as e.g. an alarm sound or a voice instruction. The arrangement 110 is connected at least to the power source 120. The arrangement 110 comprises at least a sound-producing device 112. The sound-producing device 112 may be e.g. a speaker or a siren. The sound-producing device 112 produces sound at a specific volume and frequency or frequencies when it is supplied power by a power source 120 or via a power source 120. Said sound is intended to be heard particularly in interior spaces, whereby the sound does not have to be equally intense as the alarm sound produced outside for a large area.

[0015] Because the volume of the alarm sound or the speech instruction can be lower indoors than outdoors, the sound-producing device 112 of the arrangement 110 in an audible alarm device intended for use indoors can be physically smaller and consume less power, whereby the power source 120 also needs to produce less power to the sound-producing device 112. Then, the physical dimensions of the power source 120 can also be smaller.

[0016] In the embodiments of Figures 1, 2 and 3, the arrangement 110 further comprises a switch 114 which is connected between the sound-producing device 112 and the power source 120. The switch 114 is configured in its opened operating mode to prevent the power connection from the power source 120 to the sound-producing device 112. In said opened operating mode of the switch 114, the sound-producing device 112 is thus not intended to produce an alarm. Additionally, the switch 114 is configured for being directed to a closed operating mode to form the power connection from the power source 120 to the sound-producing device 112 for producing the alarm conveyed by means of sound. The switch 114 may comprise e.g. a relay or a semiconductor switch which can prevent the power connection from the power source 120 to the sound-producing device 112 and to form the power connection from the power source 120 to the sound-producing device 112 for producing the alarm. When the switch 114 is directed to its closed operating mode, the sound-producing device 112 receives

power from the power source 120 or via the power source 120, whereby the sound-producing device 112 produces the alarm. The switch 114 may comprise required components in order for the power to convey to the sound-producing device 112 such that the sound-producing device 112 produces alarm sound with a specific volume and frequency or frequencies.

[0017] In the embodiments of the Figures, the audible alarm device 100 further comprises a receiver 130 for receiving an alarm signal transmitted by radio, such as e.g. a public alarm signal. The receiver 130 is connected to the power source 120 and said arrangement 110, in more detail, to the switch 114 of the arrangement 110 in Figs. 1-3. Alternatively, the switch 114 of the arrangement 110 comprises the receiver 130. The receiver 130 comprises all that is required, such as e.g. an antenna, for receiving the alarm signal and components for conveying the alarm signal as a control signal CO-A to the switch 114 of the arrangement 110, whereby the receiver 130 can convey the control signal CO-A to the switch 114 of the arrangement 110 e.g. by forming the control signal CO-A based on the alarm signal received by the receiver 130. The unnamed components in question possibly required and obvious to those skilled in the art are not shown in the Figures for reasons of clarity. The receiver 130 of the audible alarm device 100 can also be programmed to receive specific alarm signals directed at a certain area, such as warnings related to a specific city or municipality. A register database can be kept of audible alarm device, in which database, the audible alarm device comprises a serial number and an address information related to it e.g. at city level.

[0018] The switch 114 of the arrangement 110 prevents and forms the power connection from the power source 120 to the sound-producing device 112 based on at least said control signal CO-A. The switch 114 of the arrangement 110 comprises components required to be able to receive the control signal CO-A. When the receiver 130 of the audible alarm device 100 receives an alarm signal, the receiver 130 conveys the alarm signal as the control signal CO-A to the switch 114 to control the switch 114 to the closed operating mode, whereby the receiver 130 may convey the control signal CO-A to the switch 114 e.g. by forming the control signal CO-A based on the alarm signal received by the receiver 130, whereby the switch 114 of the arrangement 110 is directed to the closed operating mode in order to produce an alarm sound. The switch 114 may comprise required components in order for the closed operating mode being on for a specified time after the switch 114 has received the control signal CO-A. An advantage of the closed operating mode being on for a specified time is that the alarm sound can be heard by the people as long as necessary, even though the alarm signal would not be conveyed to the receiver 130 for some reason. In an alternative embodiment, the switch 114 can be in the closed operating mode only for the time that the receiver 130 receives the alarm signal and conveys to the switch 114 the control

signal CO-A in order to control the switch 114 to the closed operating mode.

[0019] In the embodiment of Figure 2, the audible alarm device 100 comprises a detector 200 for detecting a fire. The operation of the detector 200 can be based on detecting fire gases, coal gases, smoke, heat and/or a flame. The detector 200 may comprise e.g. an ionisation detector the operation of which is based on a change in the voltage between a measuring chamber and a comparison chamber. In a second alternative, the detector 200 may be e.g. an optical detector which detects a fire based on a change in light scattering going through a measuring chamber. In a third alternative, the detector 200 can be a temperature sensor which is configured to measure the temperature of the environment in order to detect a fire.

[0020] The audible alarm device 100 of Figure 2 further comprises a transmitter 202 to which the detector 200 is connected. The transmitter 202 is configured to receive an indication of a fire detected by the detector 200, wherein said indication of the detected fire is transmitted from the detector 200 to the transmitter 202 by forming a control signal CO-TA when the detector 200 detects the fire. The transmitter 202 is configured to transmit a fire alarm signal when the detector 200 has detected the fire. The transmitter 202 is connected to a power source to generate power which is required e.g. for transmitting the fire alarm signal from the transmitter 202. The fire alarm signal can be conveyed to e.g. a user of the audible alarm device 100 or an emergency response centre or some other public authority or a supplier of security services in order to be able to react to the fire as soon as possible to extinguish the fire. The transmitter 202 can comprise all that is required for forming e.g. a GSM or WiFi connection in order to be able to convey e.g. the address information of the location of the audible alarm device 100 along with the fire alarm signal. The address information can be the precise address of the audible alarm device, such as e.g. the address information of an apartment or a building. The fire alarm signal sent by the audible alarm device can comprise e.g. a serial number, whereby the address information can be found out based on the serial number when a connection between the serial number and the address information of the audible alarm device has been added to the register database.

[0021] In the embodiment of Figure 2, the detector 200 is further connected to the switch 114 of the arrangement 110. The detector 200 comprises all that is required to form a control signal CO-TB to the switch 114. The switch 114 comprises all that is required to receive a control signal CO-TB. When the detector 200 detects a fire, the detector 200 forms the control signal CO-TB to the switch 114, whereby the switch 114 forms a power connection from the power source 120 to the sound-producing device 112 to produce an alarm conveyed by means of sound. Hence, the audible alarm device 100 is also configured to produce said alarm conveyed by means of sound when the detector 200 detects a fire.

[0022] According to an alternative embodiment, the audible alarm device 100 may comprise a battery set or device. The battery set or device can be a reserve power source being a part of the power source 120 in order for the audible alarm device 100 to be able to operate for a specific time without mains power, whereby the advantage is the reliability of operation of the battery set or device in a situation where there is an interruption in the mains power supply. Alternatively, the battery set or device can constitute the power source 120 of the audible alarm device 100, whereby the audible alarm device 100 gets its power only from the battery set or device.

[0023] Fires might form smoke indoors which weakens the visibility. A problem may then be that emergency exit signs above doors in interior spaces are not clearly visible during the fire because fire and/or flue gases can cover the signs. The fire and/or flue gases descending down-right might burn at e.g. about 800 degrees and combust into a fire, whereby the fire gases might melt the emergency exit signs out of commission. The emergency exit signs are usually illuminated but they do not produce sound or flashing. The solutions of Figs. 3 and 4 to be described next in more detail aim at making a situation like that depicted above easier such that the audible alarm device 100 is arranged to facilitate the finding of the emergency exit during a fire. The finding of the emergency exit during a fire is facilitated e.g. by producing sound and/or light. It is also possible to facilitate the finding of the emergency exit by locating the audible alarm device 100 close to the floor level, whereby the flue and fire gases do not cover its visibility e.g. in the starting stage of the fire. Additionally, the finding of the emergency exit during the fire can be facilitated by coating the audible alarm device 100 at least partially by fire-proof R-2 class reflective coating tape, whereby the audible alarm device 100 is easily observable by sight.

[0024] In the embodiment of Figures 3 and 4, the audible alarm device 100 comprises an alerting lamp 300 connected to the receiver 130 and the power source 120. Said alerting lamp 300 is configured to produce light when the receiver 130 receives an alarm signal. When the receiver 130 receives the alarm signal, the receiver 130 forms a control signal CO-L to the alerting lamp 300, whereby the alerting lamp 300 forms a power connection to the power source 120 and the alerting lamp 300 produces light. The power connection can be formed e.g. by means of a switch or relay being inside the alerting lamp 300. The produced light can be e.g. flashing and/or bright light the purpose of which is to attract the attention of the people and which can also guide people to walk outside along the emergency exits in a fire situation when the audible alarm device 100 is located at the emergency exit. The purpose of the light produced by the audible alarm device 100 is to enhance the visibility of the audible alarm device in the environment that it is located, which can help people to find the emergency exit if the audible alarm device is located at the emergency exit.

[0025] In the embodiment of Figure 4, the alarm con-

veyed by means of sound by the audible alarm device 100 is an alarm sound or a voice instruction, wherein the voice instruction can be e.g. comprehensible speech. In the embodiment of Figure 4, the arrangement 110 comprises a microcontroller 400 connected to the power source 120 and the receiver 130. Furthermore, the arrangement 110 comprises a sound-producing device 112 to which the microcontroller 400 is connected. The microcontroller 400 comprises a digital to analog converter (D/A converter) which converts a digital signal formed by the microcontroller 400 to an analog signal to the sound-producing device 112. The formed digital signal is thus an alarm sound or a voice instruction in the digital format. When the receiver 130 receives an alarm signal, the receiver 130 conveys the alarm signal as a control signal CO-A to the microcontroller 400 where the receiver 130 may convey the alarm signal as the control signal CO-A e.g. by forming the control signal CO-A to the microcontroller 400 based on the received alarm signal. Based on the received control signal CO-A, the microcontroller 400 conveys e.g. a specific digital-format alarm signal or voice instruction to the D/A converter which converts the digital alarm signal or voice instruction to an analog alarm signal or voice instruction to the sound-producing device 112. Alternatively, the microcontroller 400 can be a computer unit or a processing unit.

[0026] Furthermore, the microcontroller 400 of Figure 4 can comprises e.g. memory locations for forming various voice instructions for different dangerous situations. The control signal CO-A conveyed by the receiver 130 can include information on the type of the alarm in question. The alarm signal can be e.g. a warning of a fire, smoke or some other danger. Because the control signal contains the information on the type of the alarm in question, the microcontroller 400 can send a specific voice instruction from a specific memory location to the sound-producing device 112. The voice instruction can thus contain comprehensible speech which can mention e.g. "common danger", "gas risk" or "radiation risk", which can help people to take into account the possible special characteristics related to the dangerous situation. The comprehensible speech can also be produced with many different languages. Various dangerous situation can also be identified by means of dedicated alarm sounds, wherein the dedicated alarm sounds differ identifiably from each other. In the embodiments of Figures 1-3, it is also possible to replace the switch 114 by the microcontroller 400 to produce dedicated alarm sounds or voice instructions.

[0027] In an embodiment not shown in the Figures, the microcontroller 400 is additionally connected with a detector 200 for detecting a fire, whereby the microcontroller 400 comprises all that is required for receiving the control signal formed by the detector 200. Based on this, the microcontroller 400 of the audible alarm device 100 can form an alarm when the detector 200 detects the fire.

[0028] In an embodiment, the audible alarm device 100 of Figure 4 additionally comprises a modem in the micro-

controller 400. The modem in the microcontroller 400 is configured to form an Internet connection, by means of which, the microcontroller 400 can receive and transmit information. The microcontroller 400 comprises software which saves operations performed by the audible alarm device 100, such as e.g. alarms given by the audible alarm device 100 and faulty states created in the audible alarm device 100, e.g. for statistics or processing. Via the Internet connection, the microcontroller 400 can communicate with e.g. a cloud service to which said alarms and faulty states can be conveyed for processing. Via the cloud service, the microcontroller 400 can also receive e.g. software updates to e.g. develop the operations of the audible alarm device 100. The cloud service can also maintain said register database from which the connection between the serial number of the audible alarm device and the address information can be forwarded.

[0029] In the embodiments of the Figures, the audible alarm device 100 comprises an enclosure 140 manufactured of e.g. plastic and/or metal, to which the arrangement 110, the power source 120 and the receiver 130 are arranged. It was previously mentioned that, in the embodiment of Figures 1 and 2, the power source 120 of the audible alarm device 100 comprises a plug 122 that is configured to be connectable to a socket. It should be now mentioned regards to the plug 122, that the plug 122 is additionally arranged to the enclosure 140. When e.g. the plug 122 of the power source 120 of an audible alarm device 100 of Figs. 1 and 2 is connected to the socket, the plug 122 essentially supports the enclosure 140 which, again, supports the arrangement 110, the power source 120 and the receiver 130. The above enables the easy set-up, handling and location of the audible alarm device 100 indoors. For example, the audible alarm device 100 is easy to be located in a socket in a wall or a ceiling such that it does not take space from the floor or some other surface. In the embodiment of Figure 2, the enclosure is also arranged with the receiver 202 and the detector 200 in addition to the above-mentioned. In the embodiments of Figures 3 and 4, the enclosure 140 is arranged with an alerting lamp 300 in addition to the arrangement 110, the power source 120 and the receiver 130.

[0030] The protection of the enclosure 140 of the audible alarm device 100 can be different of its protection properties in different embodiments. If the audible alarm device 100 is intended to be located to e.g. a production facility, the enclosure 140 can be dimensioned such that it better endures the conditions prevailing in production facilities and/or e.g. collisions by a forklift, which also ensures the operation of the components inside in emergency situations. Furthermore, an audible alarm device 100 to be located in a production facility can comprise an elastic element in the enclosure 140 which is elastic, which moves and/or turns when a force conveys to the elastic element as a result of an impact, whereby the elastic elements yields before the enclosure deforms

substantially, which can thus prevent the audible alarm breaking up in connection with the impact. If the audible alarm device 100 is intended to be located e.g. to the interior of a house in private use, there is no need for the enclosure 140 to endure the conditions of a production facility described above and impacts, which enables lower manufacturing costs for the enclosure 140.

[0031] The embodiments of Figures 1 and 2 are examples of audible alarm devices 100 particularly suitable for office spaces or indoors of houses in private use. The audible alarm device 100 includes then typically a plug to facilitate forming the connection.

[0032] The embodiments of Figures 3 and 4 are examples of audible alarm devices to be located to productions facilities. Then, the audible alarm device 100 does not necessarily include a plug but power wires supplying power to the audible alarm device 100 are connected directly to the power source 120. Also in this embodiment, the audible alarm device 100 can be located close to the floor at an emergency exit, whereby the light produced by the audible alarm device 100 is visible to people even though there were smoke in the room, and said light can guide the people to get out through the emergency exits.

[0033] Because the components located inside the enclosure 140 of the audible alarm device 100 are small, the enclosure 140 can also be small within the limits allowed by the components. The physically smaller enclosure 140 enables the physically smaller size of the audible alarm device 100 and lower production costs of the enclosure 140. The indoor use of the audible alarm device 100 enables a cost-effective enclosure arrangement because the enclosure 140 does not have to endure varying weather conditions.

[0034] In an embodiment, the audible alarm device 100 of Figure 1, 2, 3 or 4 is configured to receive a test alarm signal which ensures the operation of the audible alarm device and, based on which, the audible alarm device forms a test alarm sound the volume of which can be lower than the alarm sound that warns about an actual danger. The test alarm sound can use a lower volume in order for the sound not to disturb people in the room where the audible alarm device is located. In the embodiment of Fig. 4, the microcontroller 400 can be programmed to convey from a memory location a test alarm sound or a test voice instruction the volume of which is lower than the one of the alarm sound or voice instruction that warns about an actual danger. Additionally, the test voice instruction can include a comprehensibly sounded instruction, such as e.g. "This is a test". For testing, the audible alarm device 100 can further comprise a test button which is not shown in the figures. In the embodiments of Figures 1-3, which still do not show the test button, the pushing of the test buttons makes the audible alarm device to form a power connection from the power source 120 to the sound-producing device 112, which can be used to ensure the operation of the sound-producing device. In the embodiment of Fig. 4, which still does not show the test button, the pushing of the test button makes

the microcontroller to give a command to the sound-producing device to form a test voice instruction. The volume of the test alarm sound formed by means of the test button can equal the one of the alarm sound warning of an actual danger, whereby it is possible to test how far the sound formed by the sound-producing device carries. The audible alarm device can also be specifically switched to a mode where the audible alarm device does not form a test alarm sound even though the audible alarm device receives a test alarm signal. Said mode can be switched on by means of e.g. a separate command sent to the receiver of the audible alarm device or by a separate button which is not shown in the figures.

[0035] In an embodiment not shown in the Figures, the audible alarm device 100 comprises a solar cell arranged to the power source 120 to create power for the operations of the audible alarm device.

[0036] Those skilled in the art will find it obvious that, as technology advances, the basic idea of the invention can be implemented in many different ways. The invention and its embodiments are thus not restricted to the examples described above but may vary within the scope of the claims.

Claims

1. An audible alarm device (100), **characterised in that** the audible alarm device (100) comprises:

an arrangement (110) for producing an alarm conveyed by means of sound,
a power source (120) connected to said arrangement (110),
a receiver (130) for receiving an alarm signal transmitted by radio, which receiver (130) is connected to the power source (120) and said arrangement (110), and that
said arrangement (110) is configured to produce an alarm when the receiver (130) receives the alarm signal.

2. An audible alarm device (100) according to claim 1, **characterised in that** the power source (120) is a mains power source and comprises a plug (122) being connectable to a socket.

3. An audible alarm device (100) according to claim 1 or 2, **characterised in that** said arrangement (110) for producing the alarm comprises:

a sound-producing device (112) that is configured, when in a power connection, to produce said alarm conveyed by means of sound, and
a switch (114) connected to the receiver (130) and connected between the power source (120) and the sound-producing device (112), wherein

the switch (114) is configured in its opened operation mode to prevent the power connection from the power source (120) to the sound-producing device (112) and wherein the switch (114) is configured for being directed to a closed operation mode to form the power connection from the power source (120) to the sound-producing device (112) for producing the alarm when the receiver (130) receives the alarm signal.

at least the arrangement (110), the power source (120) and the receiver (130) are arranged into the enclosure (140).

4. An audible alarm device (100) according to any one of claims 1-3, **characterised in that** the audible alarm device (100) further comprises:
 - a detector (200) for detecting a fire,
 - a transmitter (202) that is connected to the detector (200) and the power source (120) and configured to transmit a fire alarm signal when the detector (200) has detected the fire.
5. An audible alarm device (100) according to claim 4, **characterised in that** the detector (200) is additionally connected to the switch (114) and that said audible alarm device (100) is configured to produce an alarm sound when the detector (200) has detected the fire.
6. An audible alarm device (100) according to any one of claims 1-5, **characterised in that** the audible alarm device (100) further comprises
 - an alerting lamp (300) connected to the receiver (130) and the power source (120), wherein said alerting lamp (300) is configured to produce light when the receiver (130) receives the alarm signal.
7. An audible alarm device (100) according to any one of claims 1, 2, 4, 5 or 6, **characterised in that** the arrangement (110) comprises:
 - a sound-producing device (112) which is configured to produce a voice instruction or an alarm sound, and
 - a microcontroller (400) that is connected to said sound-producing device (112), power source (120) and receiver (130), and that the microcontroller (400) is configured to transmit a voice instruction or an alarm sound to the sound-producing device (112) for forming the alarm conveyed by means of sound when the receiver (130) receives the alarm signal.
8. An audible alarm device (100) according to any one of claims 1-7, **characterised in that** the audible alarm device (100) further comprises an enclosure (140), wherein

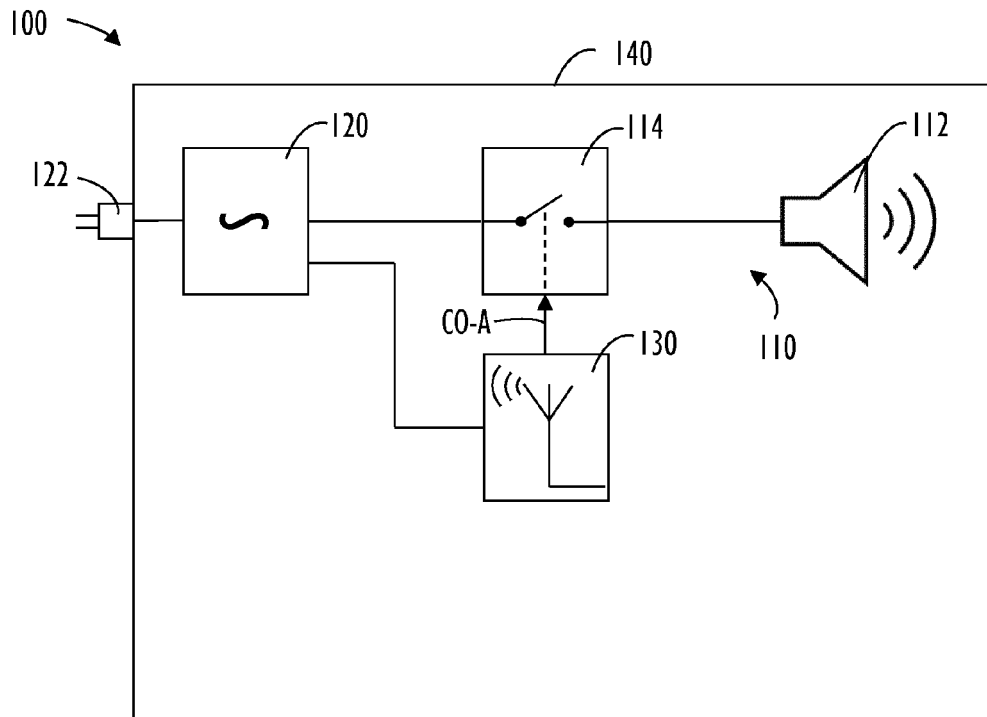


FIG. 1

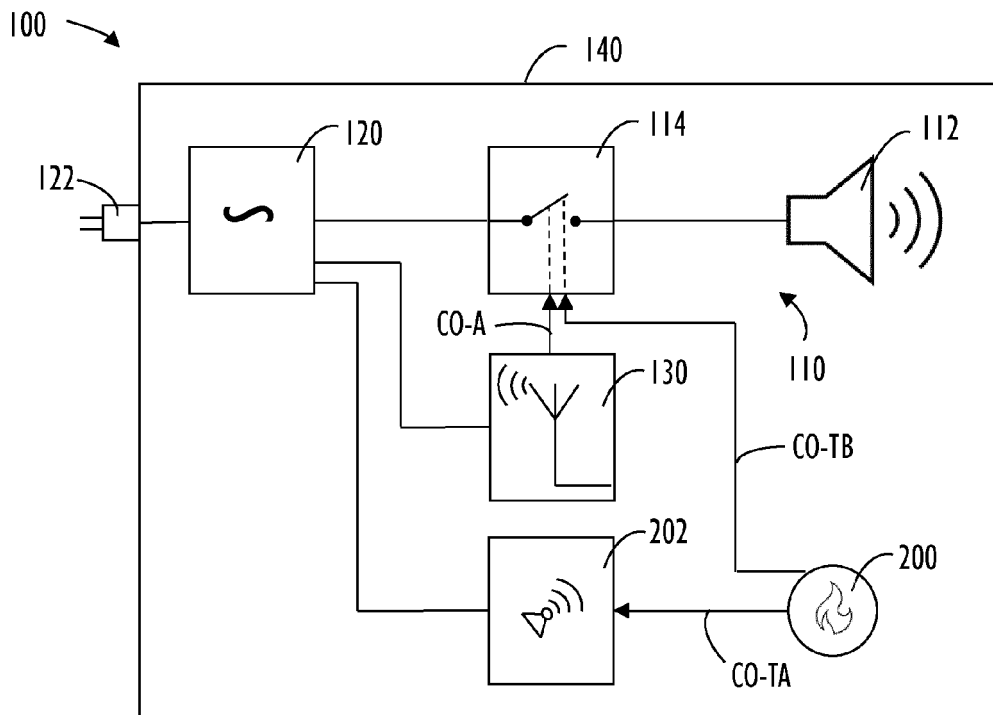


FIG. 2

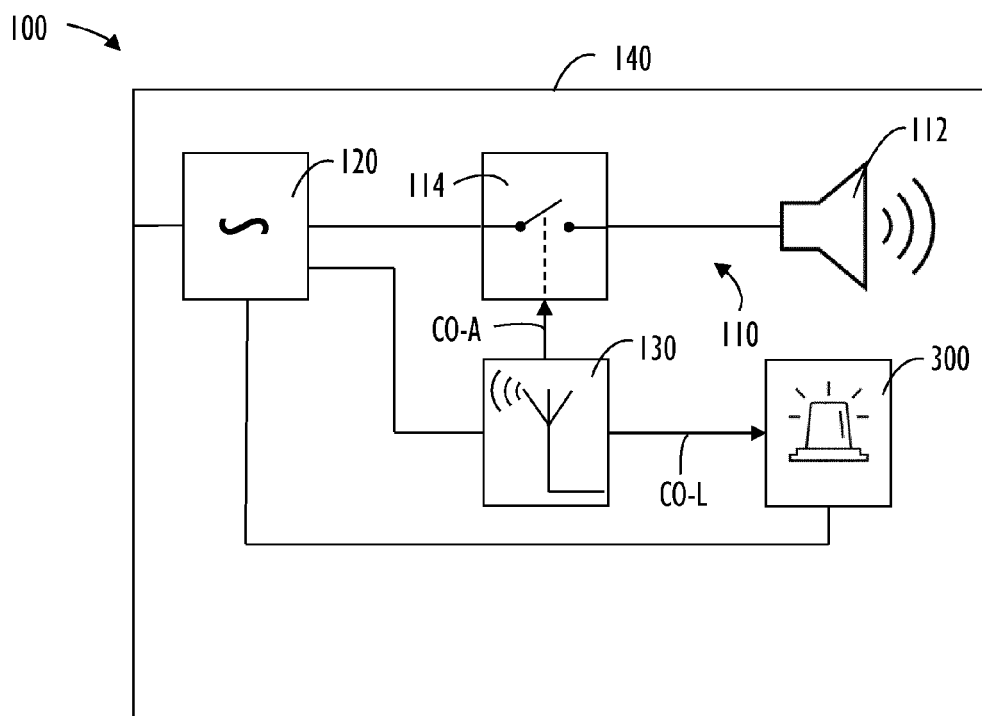


FIG. 3

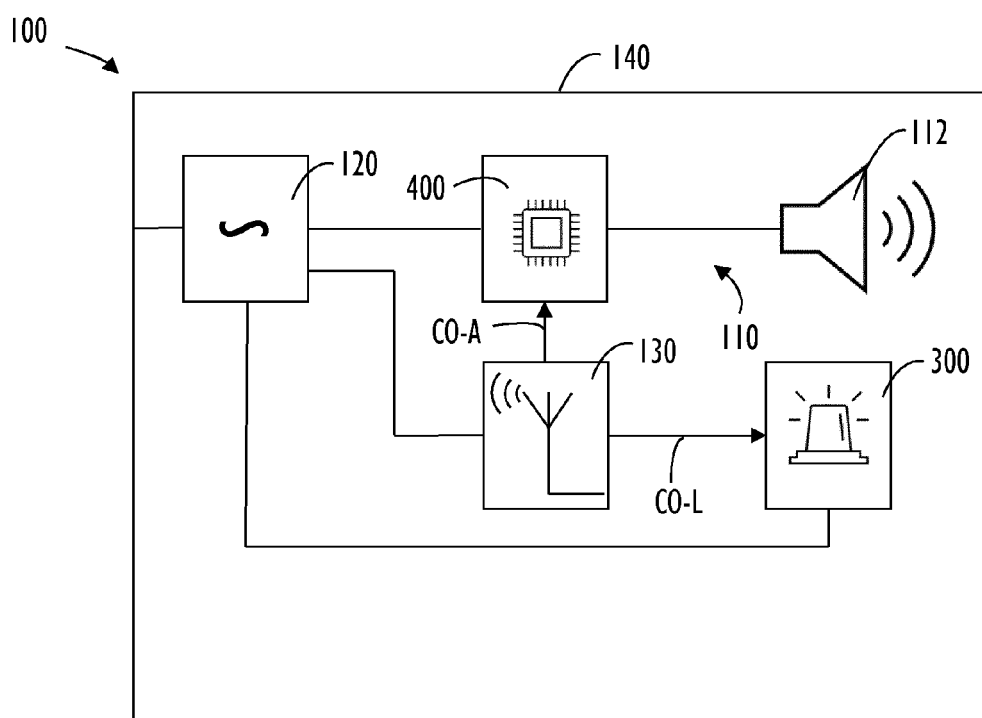


FIG. 4