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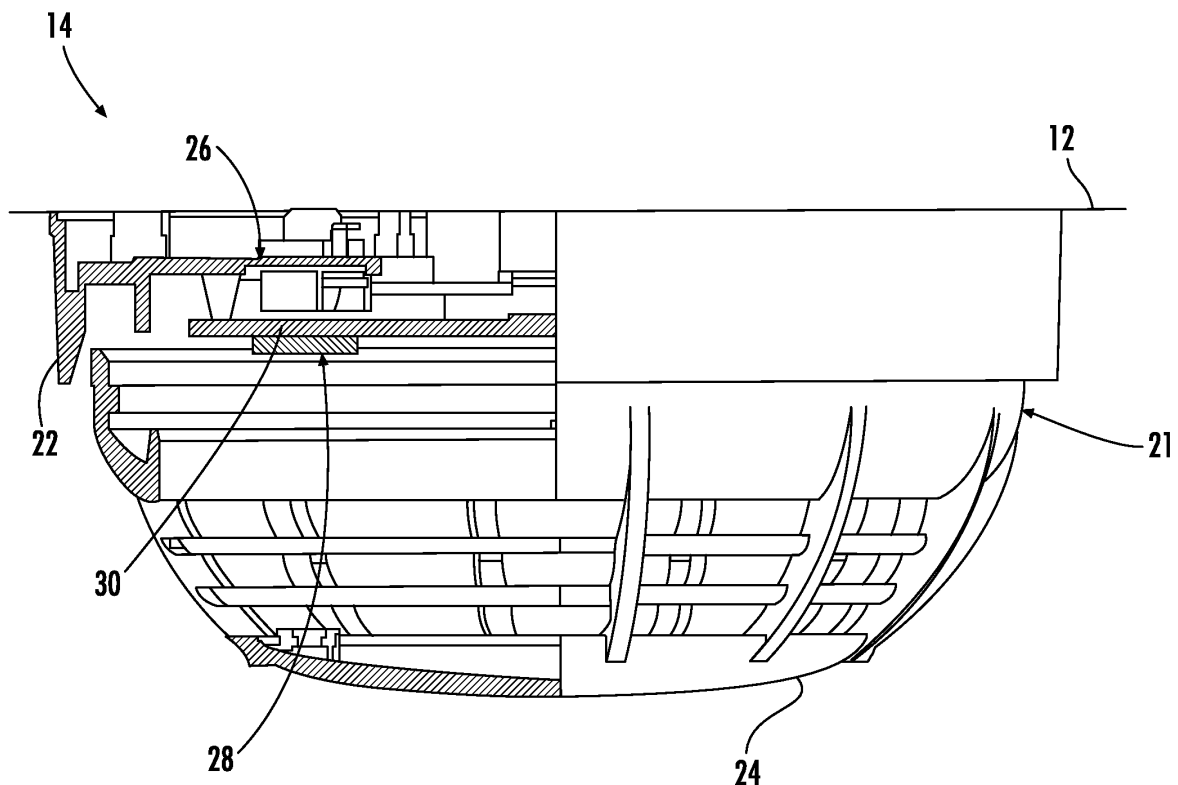
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(54) LIFE SAFETY DEVICE WITH CARBON MONOXIDE MONITORING

(57) A device (14) for detecting a hazardous condition in an area includes a housing (21), and a controller (28) contained within an interior of the housing. A carbon monoxide device (30) for detecting carbon monoxide is

associated with the device. The carbon monoxide device is embedded within a portion of the housing and is operably coupled to the controller.

**FIG. 2**

Description

BACKGROUND

[0001] The disclosure relates to a life safety device for detecting one or more conditions, such as smoke and carbon monoxide for example. More specifically, the disclosure relates to a life safety device having an easily accessible and replaceable carbon monoxide sensor.

[0002] The threat of carbon monoxide poisoning has increase dramatically in recent years. Carbon monoxide is a colorless, odorless, tasteless gas, making it virtually undetectable to a human. Carbon monoxide can be produced by various fuel burning appliances, such as, fuel fired furnaces, gas hot water heaters, gas stoves, gas dryers, space heaters, charcoal grills, fireplaces, vehicles, lawn mowers, or snow blowers. Once present, this gas circulates freely throughout a building, such as a home. If this gas is not ventilated properly, carbon monoxide poisoning may result.

[0003] Smoke detectors have found widespread use in residences and in commercial buildings. However, not all fire detectors include a sensor capable of detecting the presence of carbon monoxide. Further, detectors that do include carbon monoxide detection commonly position the carbon monoxide sensor at a location that is not accessible for maintenance. As a result, the entire detector must be replaced upon determining that a failure of the carbon monoxide sensor has occurred.

BRIEF DESCRIPTION

[0004] According to one embodiment, a device for detecting a hazardous condition in an area includes a housing, and a controller contained within an interior of the housing. A carbon monoxide device for detecting carbon monoxide is associated with the device. The carbon monoxide device is embedded within a portion of the housing and is operably coupled to the controller.

[0005] In addition to one or more of the features described above, or as an alternative, in further embodiments the carbon monoxide sensor is arranged in fluid communication with an environment external to the housing.

[0006] In addition to one or more of the features described above, or as an alternative, in further embodiments the device for detecting a hazardous condition is mounted to a surface within the area, the carbon monoxide device being accessible from the area without unmounting the device from the surface.

[0007] In addition to one or more of the features described above, or as an alternative, in further embodiments the housing further comprises a base portion fixed in a location and a replaceable portion installed to the base portion, the carbon monoxide device being embedded within the base portion.

[0008] In addition to one or more of the features described above, or as an alternative, in further embodi-

ments the carbon monoxide device is accessible when the replaceable portion is coupled to the base.

[0009] In addition to one or more of the features described above, or as an alternative, in further embodiments the carbon monoxide device is accessible when the replaceable portion is not coupled to the base.

[0010] In addition to one or more of the features described above, or as an alternative, in further embodiments the carbon monoxide device is embedded within a cavity in the housing.

[0011] In addition to one or more of the features described above, or as an alternative, in further embodiments the portion of the housing is contoured to position the carbon monoxide device at a desired orientation.

[0012] In addition to one or more of the features described above, or as an alternative, in further embodiments the housing includes a movable portion for selectively accessing the carbon monoxide device.

[0013] In addition to one or more of the features described above, or as an alternative, in further embodiments the movable portion is an access panel formed at an exterior of the housing.

[0014] In addition to one or more of the features described above, or as an alternative, in further embodiments the carbon monoxide device is removably coupled to the housing.

[0015] In addition to one or more of the features described above, or as an alternative, in further embodiments the life safety device is a fire detector.

[0016] In addition to one or more of the features described above, or as an alternative, in further embodiments the life safety device is a remote indicator.

[0017] These and other advantages and features will become more apparent from the following description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The subject matter, which is regarded as the disclosure, is particularly pointed out and distinctly claimed in the claims at the conclusion of the specification. The foregoing and other features, and advantages of the disclosure are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic diagram of a fire detection system according to an embodiment;

FIG. 2 is a partially cut away side view of a device of the fire detection system FIG. 1 according to an embodiment;

FIG. 4 is a perspective view of a portion of a housing of a life safety device according to an embodiment;

FIG. 4 is a front view of a portion of a housing of another life safety device according to an embodi-

ment;

FIG. 5 is a cross-sectional view of a portion of the housing of a life safety device according to an embodiment; and

FIG. 6 is a schematic diagram of a control system of the device according to an embodiment.

[0019] The detailed description explains embodiments of the disclosure, together with advantages and features, by way of example with reference to the drawings.

DETAILED DESCRIPTION

[0020] With reference now to FIG. 1, a schematic view an embodiment of a fire detection system 10 is illustrated. The fire detection system 10 maybe part of a fire loop 12, such as located within a building or a portion of a building for example. As shown, the system 10 includes a plurality of devices 14 arranged in an array 16 in the building 12. All or a portion of the devices 14 are configured to detect fire, smoke and/or other properties in the area near the fire device's location within the array 16. Examples of suitable fire devices include but are not limited to detectors, sounders, beacons, remote indicators, and input/output modules for example. The devices 14 are connected to a central control panel 18, such as a fire alarm control panel (FACP). In some embodiments, the fire detection system 10 is connected with, for example, a fire alarm control panel network 20 to communicate a status of the fire detection system 10 and/or sound an alarm in the case of a fire. Although system 10 is described with reference to detection of a fire, it should be understood that the system 10 and the device 14s therein may be adapted for detection of a variety of hazardous conditions, including but not limited to smoke, carbon monoxide, explosive gas, and heat for example.

[0021] Referring now to FIG. 2, a partial cross-sectional view of an example of one of the devices 14 of the fire detection system 10 is illustrated. The device 14 includes a housing 21 formed from a base 22 fixed to a portion of the building 12 and a replaceable device 24 installed to and connected to the base 22. As previously described, the device 14 is arranged in communication with the control panel 18. In an embodiment, the device 14 includes a processor or controller 28 configured to send information to and receive information from the control panel 18. Further, unique information associated with each specific device 14, such as an address and/or other information, may be utilized by the control panel 18 to define the location of the device 14 in the array 16 and to facilitate communication between the control panel 18 and the device 14. In an embodiment, this unique information may be stored within a database accessible by the controller 28. Alternatively, the device 14 may include an identification tag 26 configured to transmit information to the control panel 18 independently of the controller.

[0022] Further, while the discussion herein refers to a controller 28, one skilled in the art will recognize that the functionality and intelligence associated with this element may be alternatively embodied in a microprocessor with associated input/output and buffering circuits, in a programmable logic device (PLD), in an application specific integrated circuit (ASIC), or other intelligent, programmable device. Therefore, the use of the term micro-controller herein shall be construed to cover all of these alternative structures as well.

[0023] With reference now to FIGS. 3 and 4, an example of a portion of various types of devices 14 is shown. In FIG. 3, an example of the base 22 of a first type of device 14, such as a fire detector for example, is shown. A second type of device 14 is illustrated in FIG. 4. In the illustrated, non-limiting embodiment, the second type of device 14 is a remote indicator. Within a system, such as fire detection system 10 for example, a remote indicator is configured to indicate to a nearby person the status of a non-visible device 14. The devices 14 illustrated herein are intended as an example only, and any suitable device 14 within a fire detection system 10 is contemplated herein.

[0024] A device or sensor for measuring a level of carbon monoxide 30 adjacent the device 14 may be integrated into a portion of the device 14. In the illustrated, non-limiting embodiment, the carbon monoxide device 30 is a carbon monoxide sensor; however it should be understood that any suitable device 30 is within the scope of the disclosure. Further, the device is shown as being integrated into the base 22 of the device 14. However, embodiments where the carbon monoxide sensor 30 is integrated into another portion of the fire device 14, such as within the replaceable portion 24 for example, are also contemplated herein.

[0025] Regardless of the type of fire device 14, the carbon monoxide device 30 may be positioned such that a sensing portion of the device 30 is exposed to or is arranged in fluid communication with the ambient air or the environment external to the device 14. In an embodiment, best shown in FIG. 5, the carbon monoxide device 30 is located within a pocket or cavity 32 formed in the base 22. The contours of the cavity 32 or area where the carbon monoxide device 30 is located may be designed to ensure that the carbon monoxide sensor 30 is correctly positioned for optimal sensing. A movable flap or panel 34 may be located at the exterior of the base 22 adjacent the cavity 32 to selectively provide a user with access to the carbon monoxide device 30 disposed therein.

[0026] A device 14 having a device for sensing the presence of carbon monoxide 30 integrated into or embedded within the base 22 functions in a manner similar to conventional devices where a carbon monoxide sensor is mounted to the circuit board or controller 28 of the device 14. With reference to FIG. 6, the carbon monoxide device 30 may be configured to provide an input to the processor 28. If the controller 28 determines that the input from the device 30 exceeds an allowable threshold, the

controller 28 will communicate this information with the FACP 18, which will then activate an alarm, illustrated schematically at 40, associated with the fire detection system 10 through the FACP network 20.

[0027] By positioning the carbon monoxide device 30 within the housing of the device 14, and more specifically within the base 22, the exposure to of the device 30 to the environment is increased, thereby enhancing the detection efficiency of the device 14. Further, because the carbon monoxide device 30 is mounted within the base 22, and not to another component buried within the interior of the device 14, the carbon monoxide device 30 may be easily accessed and replaced upon determination that the device 30 has malfunctioned. Accordingly, the functionality of detectors 14 that are commonly used for other types of monitoring may be increased.

[0028] While the disclosure has been described in detail in connection with only a limited number of embodiments, it should be readily understood that the disclosure is not limited to such disclosed embodiments. Rather, the disclosure can be modified to incorporate any number of variations, alterations, substitutions or equivalent arrangements not heretofore described, but which are commensurate with the spirit and scope of the disclosure. Additionally, while various embodiments of the disclosure have been described, it is to be understood that aspects of the disclosure may include only some of the described embodiments. Accordingly, the disclosure is not to be seen as limited by the foregoing description, but is only limited by the scope of the appended claims.

Claims

1. A device for detecting a hazardous condition in an area, comprising:

a housing;
a controller contained within an interior of the housing; and
a carbon monoxide device for detecting carbon monoxide, the carbon monoxide device being embedded within a portion of the housing and operably coupled to the controller.

2. The device of claim 1, wherein the carbon monoxide sensor is arranged in fluid communication with an environment external to the housing.

3. The device of claim 1 or claim 2, wherein the device for detecting a hazardous condition is mounted to a surface within the area, the carbon monoxide device being accessible from the area without unmounting the device from the surface.

4. The device of any of the preceding claims, wherein the housing further comprises a base portion fixed in a location and a replaceable portion installed to

the base portion, the carbon monoxide device being embedded within the base portion.

5. The device of claim 4, wherein the carbon monoxide device is accessible when the replaceable portion is coupled to the base.
6. The device of claim 4, wherein the carbon monoxide device is accessible when the replaceable portion is not coupled to the base.
7. The device of any of the preceding claims, wherein the carbon monoxide device is embedded within a cavity in the housing.
8. The device of any of the preceding claims, wherein the portion of the housing is contoured to position the carbon monoxide device at a desired orientation.
9. The device of any of the preceding claims, wherein the housing includes a movable portion for selectively accessing the carbon monoxide device.
10. The device of claim 9, wherein the movable portion is an access panel formed at an exterior of the housing.
11. The device of any of the preceding claims, wherein the carbon monoxide device is removably coupled to the housing.
12. The device of any of the preceding claims, wherein the life safety device is a fire detector.
13. The device of any of the preceding claims, wherein the life safety device is a remote indicator.

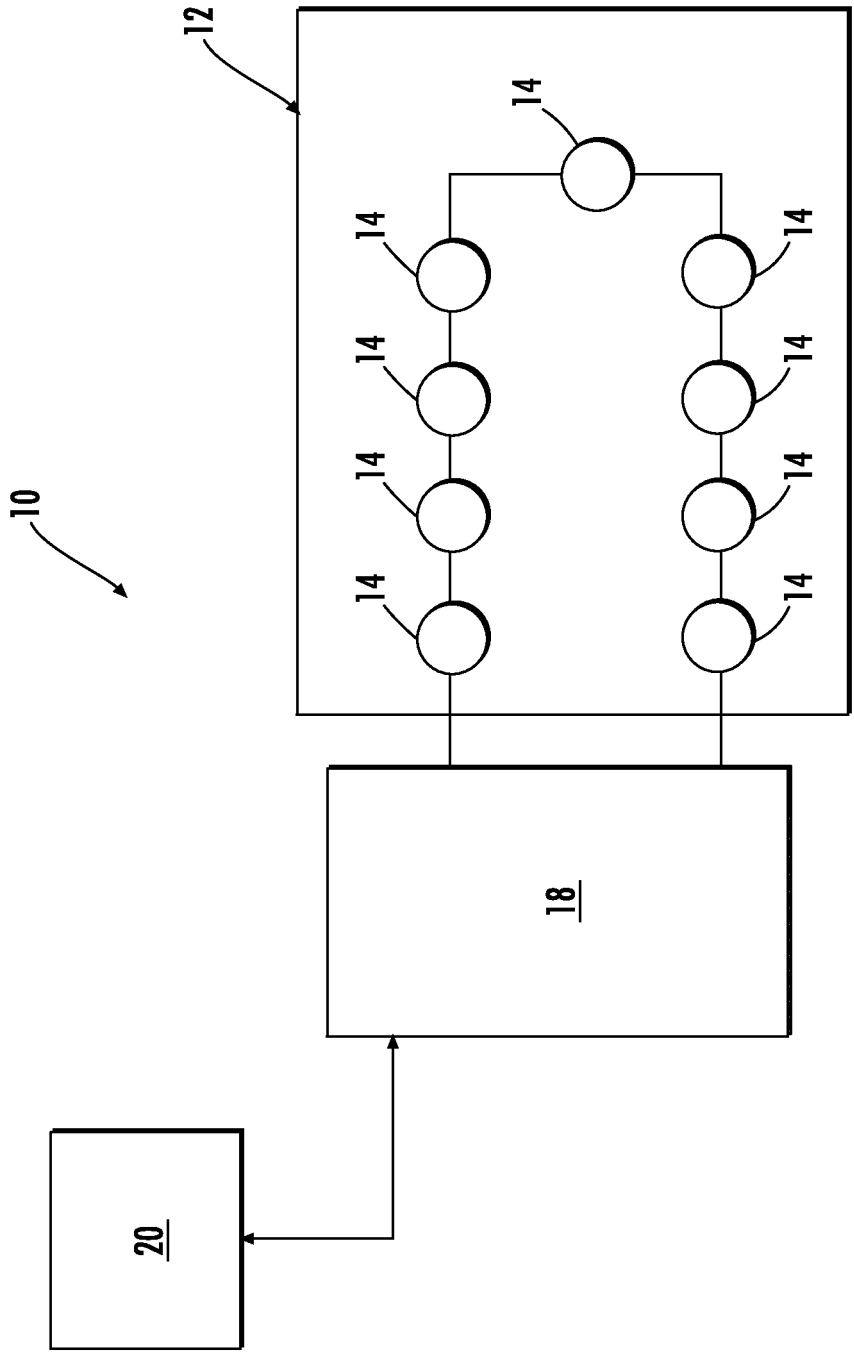


FIG. 1

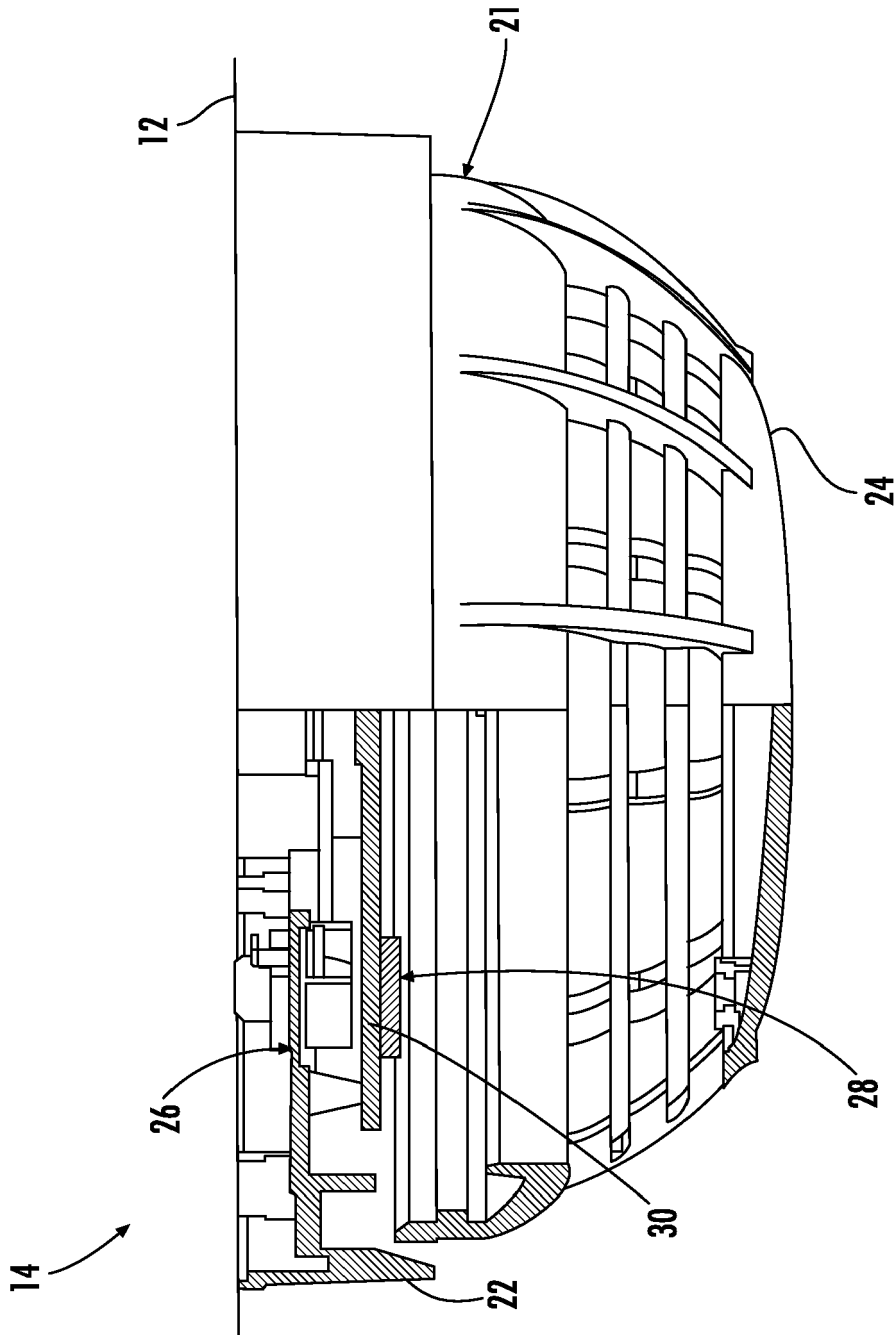


FIG. 2

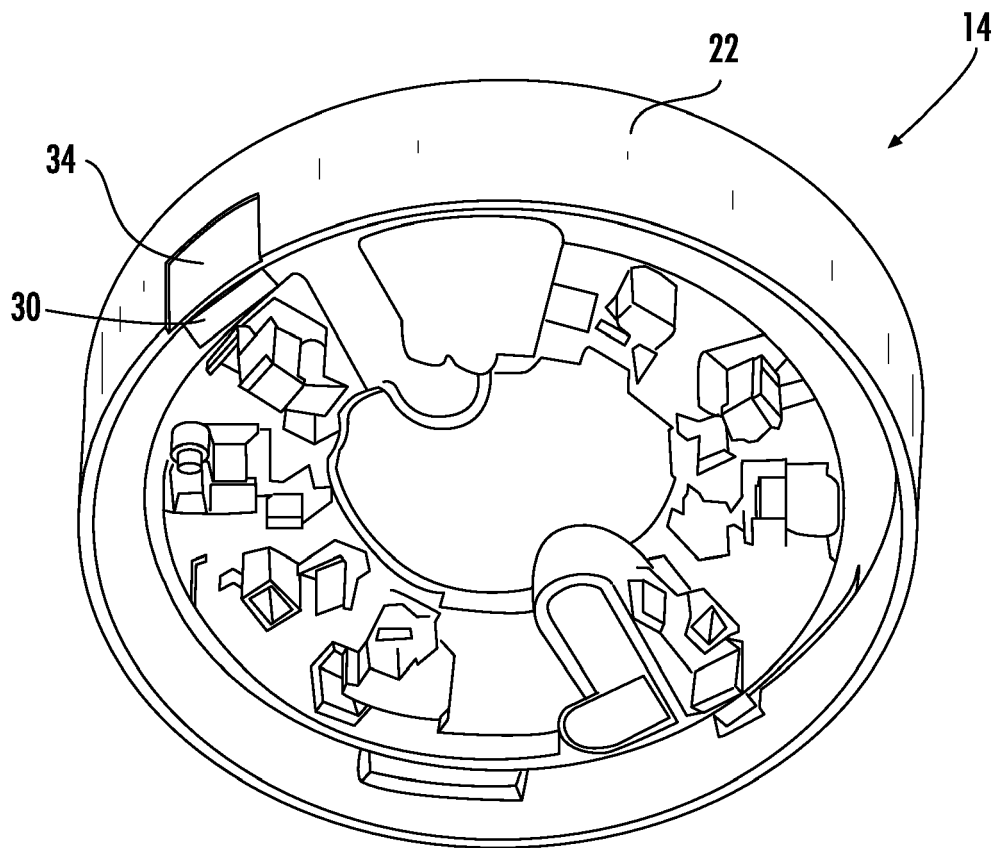


FIG. 3

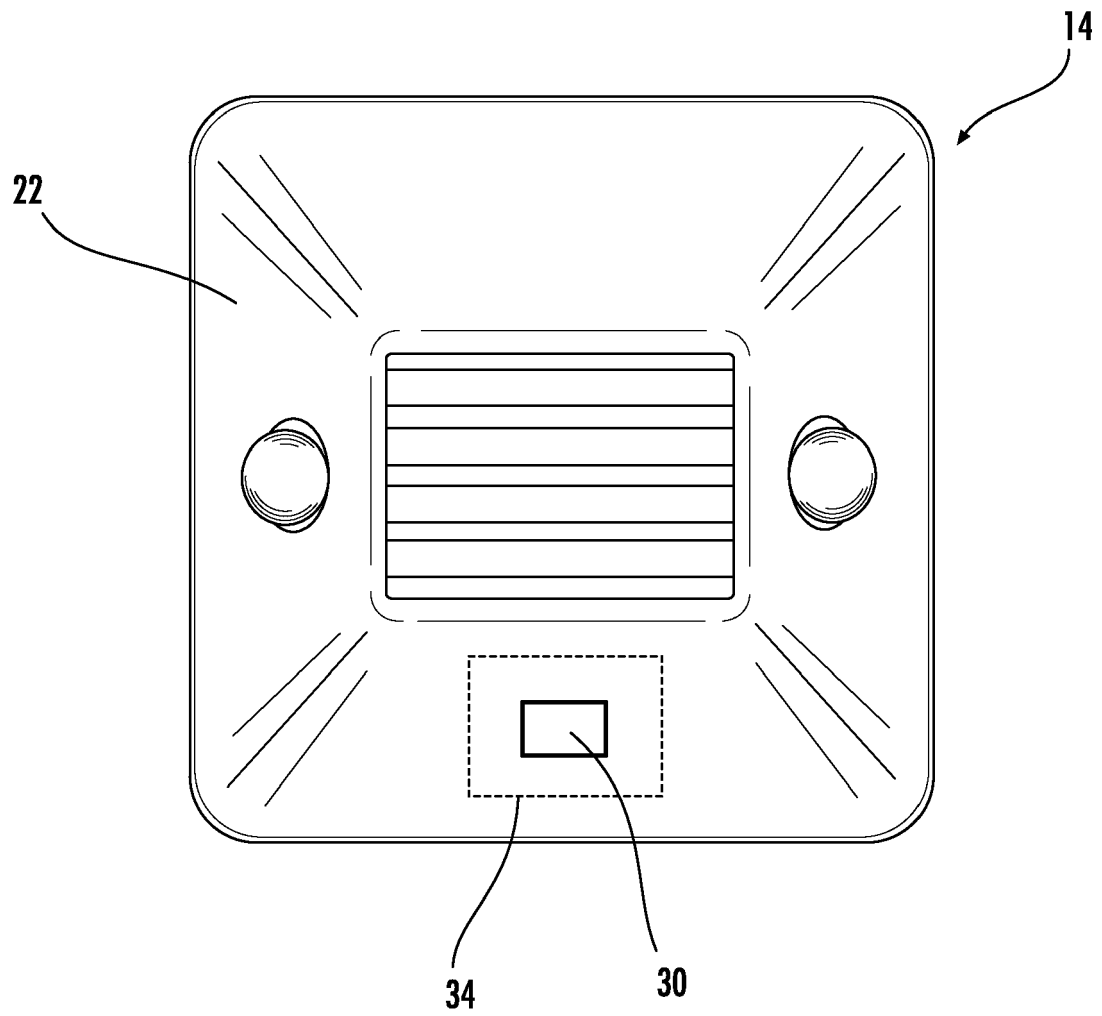


FIG. 4

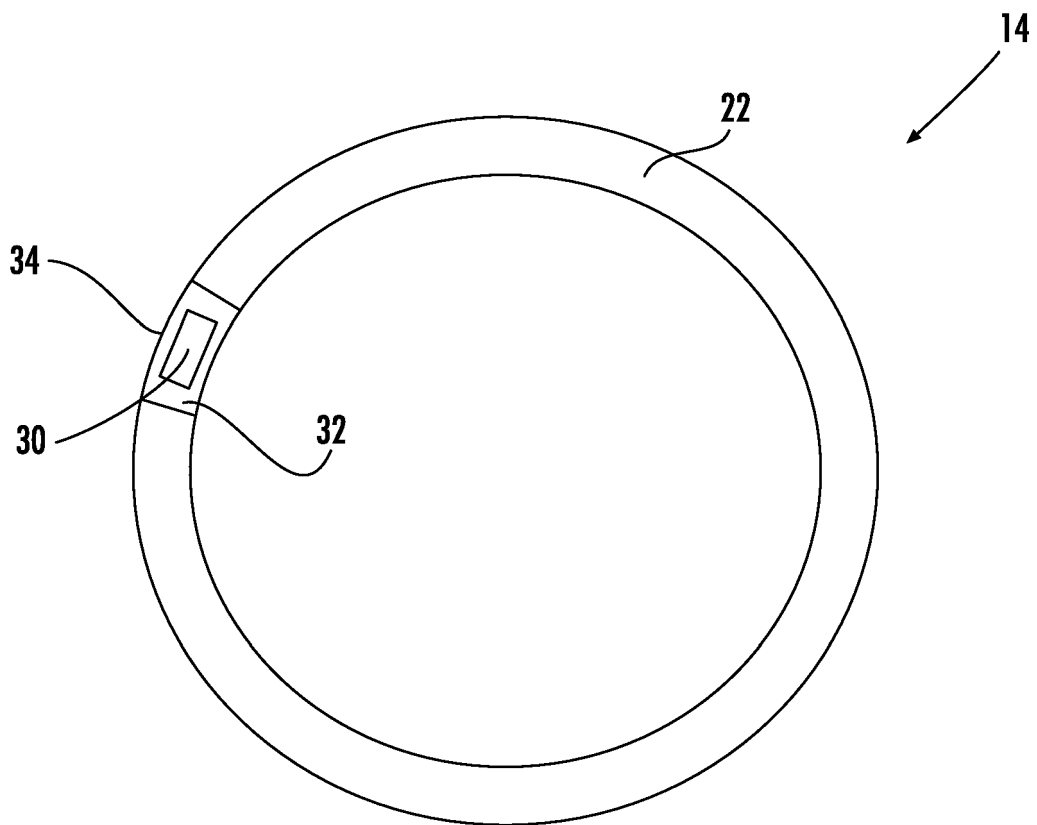


FIG. 5

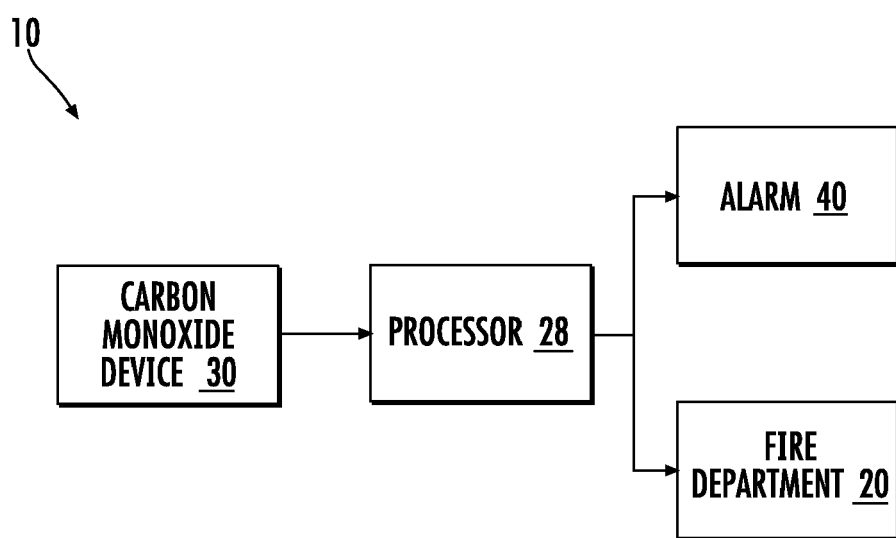


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2645

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X	US 5 280 273 A (GOLDSTEIN MARK K [US]) 18 January 1994 (1994-01-18) * column 2, line 64 - column 4, line 3; figures 1-3 * * column 1, line 13 - line 22 * * column 1, line 39 - line 45 *	1,3,4, 6-12	TECHNICAL FIELDS SEARCHED (IPC) G08B G01N
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 February 2018	Examiner Heß, Rüdiger
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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