Title
Smoke detector assembly

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ABSTRACT

A smoke detector assembly having a body, means whereby mains power can be connected to the body to maintain the detector's connection to power at all times when there is power available, and electrical connection means within the body to enable connection of a light fitting thereto and to provide switched power to the fitting.
COMPLETE SPECIFICATION

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Invention Title: SMOKE DETECTOR ASSEMBLY

The following statement is a full description of this invention, including the best method of performing it known to me:
This invention relates to a smoke detector assembly and, in particular to such an assembly which incorporates not only a smoke detector but means whereby an electrically powered light can be associated therewith.

There is substantial pressure to install smoke detectors, both in dwellings and offices and other premises and, conventionally, two separate approaches have been taken. In fact in some Australian States and Territories, the installation of smoke detectors in new buildings, particularly new homes, has become compulsory.

The first, and the one most used in dwellings is the provision of a low voltage, usually battery powered unit. These units are quick and easy to install and are effective in operation. They do have the disadvantage that for reliable operation it is necessary to check the battery regularly and as the units are located at high points, normally on the ceiling, it can often be difficult to do this and there is a tendency to leave the units untested.

On occasions, these units can be connected to a separate DC supply, which overcomes the above disadvantage, however, this solution to the problem, necessitates connection to a source of power and this is often not readily available at the position at which the unit is intended to be
located.

The second is to provide a power operated unit, normally connected to an alarm system. This arrangement is satisfactory from most points of view, the unit is efficient, it does not need to be checked at the position of the unit and it is aesthetically not unpleasant.

In respect of commercial buildings it is the arrangement of choice but it is often not practical for residential buildings. Reference to power operated units refers to units which normally obtain their power direct from the electrical mains but such units are normally provided with a battery back-up, which can be a Ni-Cd cell or the like so that under normal operating conditions the cell is held under charge and should there be any interruption to the power supply, the smoke detector is operated by the back-up battery.

It is the object of the invention to provide a smoke alarm assembly which is mains power operated and which can be readily fitted without great expense.

The invention includes a smoke detector assembly having a body, means whereby mains power can be connected to the body to maintain the detector’s connection to power at all times when there is power available, and electrical connection means within the body to enable connection of a light fitting thereto and to provide switched power to the fitting.
It is preferred that the smoke detector assembly has an alternative power supply which automatically maintains operation of the smoke detector if there is a break in mains power.

In order that the invention may be more readily understood, we shall describe one particular form of the smoke detector assembly with reference to the accompanying drawings, in which:

Fig 1. Is a perspective of the smoke detector assembly.

Fig 2. Is a front elevation of the lower portion of the smoke detector assembly.

Fig 3. Is a front elevation of the upper portion of the smoke detector assembly.

Fig 4. Is a front view of the smoke detector assembly, incorporating a globe.

In the preferred embodiment, the smoke detector assembly(1) has a body(2) which is preferably moulded from a plastics material and the smoke detector(3) is located in this body(2). The body(2) may include a base(4) which is adapted to be located against a ceiling and this can have a first aperture(5), normally centrally located through which the power cables(7) can pass and other apertures(6) by means of which the body(2) can be located to the ceiling. These may include apertures(6) at conventional positions so that a large number of previous fittings can be directly replaced without the necessity of providing further apertures in the ceiling.

Located in the body(2) is the smoke detector(3) and required slots(8) pass through the body(2) to ensure that any smoke in the area can enter the body(2) and impinge on the sensor of the...
detector(9). Also, if provided, a back-up battery(10) can be located in the body(2).

Electrically, the body(2) is provided with means whereby power cables(7) which pass through the aperture(6) in the base(4) can be connected, either by screw, clip or other connections.

The body(2), away from the base(4) may be in one of several forms. In the preferred embodiment, there may be a standard bayonet socket(11), in a further embodiment, a standard ceiling rose arrangement and in yet a further embodiment, an arrangement whereby connection can be made to the input power cables.

If the arrangement includes a bayonet socket(11), this can be formed extending from the underside of the body(12), a ceiling rose type arrangement can be provided with a connector and a screwed cover with a central aperture through which a flexible cable can pass and another arrangement can be the provision of connectors accessible from the underside.

A normal ceiling connector(13) is normally adapted to receive and make connections to 2, 3 or 4 wires. All such connectors(13) have at least 2 wires, a neutral(14) and an active(15), the active(15) normally being switched. Most have 3 wires, a neutral(14), a switched active(15) and a looped active(16). The looped active(16) is normally the active supply for the electrical fitting and passes to the switch from which the switched active(15) returns to the fitting. It is this type of arrangement which is necessary for the invention.
If a further wire is used, this is an earth wire(17) and earth wires are not required for some fittings.

In the smoke detector assembly,(1) of the invention, the neutral(14) and active(15) are, at all times, connected to the smoke detector(3) so that it is active and its back-up battery(10) remains charged. The neutral(14) and the switched active(15), and the earth(17) if required, are connected to the fitting.

It will be seen that in the preferred embodiment the smoke detector assembly(1) can simply be substituted for the fitting already in position so it is only necessary that the power cables(7) are disconnected from the fitting and it be removed from the ceiling, the smoke detector assembly is connected to the power and is placed against and connected to the ceiling, often through the same apertures as the previous fitting.

If the original fitting was, say a batten mount having a bayonet socket, this is provided on the unit, if it were a ceiling rose or other connector these can effectively be duplicated by the unit. The remainder of the fitting can then be connected as it had previously been connected.

It is estimated that the total time taken to replace a standard fitting with the unit of the invention would be of the order of 15 minutes and, on completion, there is a wired-in smoke detector as well as the previous light fitting.
In a further form of the invention, a light fitting could be an integral part of the smoke detector assembly. In this case, the lower portion of the base could have, say the body of a fluorescent light fitting connected to the underside thereof, this being connected electrically to the input power leads by means of wires passing through tubes in the body of the unit which terminate close to the input connectors. Porcelain tubes can satisfactorily be used as they can conduct heat. If required, the tubes may have internal connectors to which wires can be connected.

Electrically, this arrangement of the invention can be identical to the previous embodiment.

The arrangement can also incorporate an emergency light which is activated on activation of the smoke detector or when mains power is broken.

In such an arrangement, a solid state switch or a relay is actuated when the permanent active is broken to cause the emergency light to operate. This same switch can be used to provide a notification to a remote point that there has been an interruption of the power supply.

This form of arrangement can be particularly useful in commercial buildings where a secondary supply can be provided to the unit to ensure that the smoke detector remains active where there is any power break. Such a supply could be provided by, say, a 24 volt accumulator bank which is automatically switched on if there is a power break. This can also, if required, be connected to an emergency light.
A not dissimilar arrangement can be used in marine and other mobile applications. In these, if there is a remote connection to power, say when a ship is berthed, then the internal power of the ship can be by-passed and the smoke detectors are operated by mains power. As soon as the mains connection is broken, as, say when the ship leaves its berth, then the internal power supply of the ship automatically powers the smoke detector.

In a further form of the invention, the smoke detector assembly may be comprised of a standard fitting, which fitting for example may include, bayonet or screw, the body of the unit which houses the detector is located below this fitting and below the body of the unit is located a standard light socket which receives a light globe.

This form of the invention is easily installed and does not require a qualified electrician for installation. To install the smoke detector assembly, one would remove the light bulb from the ceiling, connect the detector unit and then replace the light bulb into the bottom of the detector unit. An advantage of this style of installation is that the unit can be easy disconnected, and has safety features such as a safety switch to avoid electrification and which aids disconnection for cleaning, maintenance or back up battery replacement. Furthermore, if the need arose to move the smoke detector assembly to another room, or if the occupants are moving house, the assembly can be easily removed and relocated.

In a further embodiment of the invention it may be desirable that the activation of any of the
smoke detector assemblies, also activates all assemblies in the building. This function could be
achieved by the smoke detector assembly emitting a FM signal or by rewiring and linking all of
the assemblies. It is also possible to connect the smoke detector assemblies to the switchboard,
so that in the event of activation the Fire Department is immediately notified.

It will be appreciated that the invention herein described can be used in many applications from
the most simple where it can provide a direct replacement to an existing fitting and provide the
benefit of a smoke detector to ones which are relatively sophisticated. There are many other
applications of the invention which are not specifically described herein and such applications
are deemed to be part of the invention.
The Claims defining the invention are as follows:

1. A smoke detector assembly including a body with a smoke detector therein, means whereby mains power can be connected to the body to maintain the detector assembly's connection to power at all times when there is power available, an alternative power supply which maintains operation of the smoke detector if there is a disruption to mains power and electrical connection means within the body to enable connection of a light fitting thereto and to provide switched power to the fitting.

2. A smoke detector assembly as claimed in claim 1 wherein the body of the smoke detector is made from a durable plastics material.

3. A smoke detector assembly as claimed in claim 2 wherein the body includes a base which is adapted to be located against a ceiling or other surface, said base, comprising a first aperture, centrally located to enable power leads to pass there through and other apertures spaced around the base to secure the base to the ceiling.

4. A smoke detector assembly as claimed in any previous claim wherein the body of the smoke detector assembly has slots incorporated within it to allow any smoke in the air to enter the body and impinge on a sensor within the body of the smoke detector assembly.

5. A smoke detector assembly as claimed in claim 4 wherein a back-up battery is located
in the body of the smoke detector assembly.

6. A smoke detector assembly as claimed in claim 5 wherein the body is in the form of a bayonet socket.

7. A smoke detector assembly as claimed in claim 6 wherein the bayonet socket is formed and extends from the underside of the body.

8. A smoke detector assembly as claimed in any one of claims 1-7 wherein the body is in the form of a ceiling rose arrangement.

9. A smoke detector assembly as claimed in claim 8 wherein the ceiling rose type arrangement can be provided with a connector and a screwed cover, said cover having a central aperture through which a cable can pass.

10. A smoke detector assembly as claimed in any one of claims 1-7 wherein the body is in such a form so as to enable connection to be made to input power cables.

11. A smoke detector assembly as claimed in any previous claim wherein the connector is adapted to receive at least two wires.

12. A smoke detector assembly as claimed in claim 11 wherein the connector has at least two wires, a neutral and an active, said active wire normally being switched.
13. A smoke detector assembly as claimed in claim 12 wherein the connector has three wires, a neutral, a switched active and a looped active.

14. A smoke detector assembly as claimed in claim 13 wherein the looped active is predominantly the active supply for an electrical fitting and passes to the switch from which the switched active returns to the fitting.

15. A smoke detector assembly as claimed in any previous claim wherein one of the wires is an earth wire.

16. A smoke detector assembly as claimed in claim 15 wherein the neutral and switched active are at all times connected to the smoke detector so that the smoke detector is active and the back-up battery remains charged, the neutral, switched active and earth if present are connected to the electrical fitting.

17. A smoke detector assembly as claimed in any previous claim wherein the smoke detector assembly is connected to mains power and is positioned and connected to the ceiling through the same apertures as a previously positioned electrical fitting.

18. A smoke detector assembly as claimed in claim 17 wherein the smoke detector assembly makes provision for a fitting to be connected thereto, said fitting being either a light globe or fluorescent tube.
19. A smoke detector assembly as claimed in claim 18 wherein the fitting is connected to the under side of the lower portion of the base.

20. A smoke detector assembly as claimed in claim 19 wherein the smoke detector assembly can incorporate an emergency light, which is activated on activation of the smoke detector or when mains power is not operational.

21. A smoke detector assembly as claimed in claim 20 wherein a solid state switch or a relay is actuated when the permanent active is broken to cause the emergency light to operate.

22. A smoke detector as claimed in any previous claim wherein a secondary power supply is provided to the smoke detector assembly to ensure that the smoke detector remains active where there is any power break.

23. A smoke detector assembly as claimed in claim 22 wherein the secondary power supply is a 24 volt accumulator bank, which is automatically switched on if there is a power break, said secondary power supply can also be connected to the emergency light.

24. A smoke detector assembly as claimed in claim 23 wherein the smoke detector assembly is installed in a ship, boat, yacht or other form of water transport, so that when a ship or the like is berthed, the internal power supply of the ship can be by-
passed and the smoke detector assembly operated by mains power, but when the ship leaves its berth, then the internal power supply of the ship automatically powers the smoke detector assembly.

25. A smoke detector assembly as claimed in any previous claim wherein the smoke detector assembly comprises an electrical fitting, said fitting including a bayonet or screw, the body of the unit which houses the smoke detector being located below the fitting and below the body of the unit is located a standard light socket which receives a light globe.

26. A smoke detector assembly as claimed in claim 25 wherein the unit is installed without the need of the services of a qualified electrician, in that the unit is adapted to be installed into a bayonet socket in a ceiling.

27. A smoke detector assembly as claimed in claim 26 wherein the smoke detector is easily disconnected for cleaning, maintenance, relocation and back-up battery replacement.

28. A smoke detector assembly as claimed in claim 27 wherein the smoke detector assemblies are arranged in such a way so that the activation of any smoke detector assembly, also activates other assemblies within a building.

29. A smoke detector assembly as claimed in claim 28 wherein the smoke detector
assemblies are arranged in such a way so that the activation of any smoke detector assembly, activates a central switchboard, so that in the event of activation, the fire department is immediately notified.

30. A smoke detector assembly as claimed in claim 29 wherein the smoke detector assemblies are all linked by means of wiring.

33. A smoke detector assembly as hereinbefore described with reference to the accompanying drawings.

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