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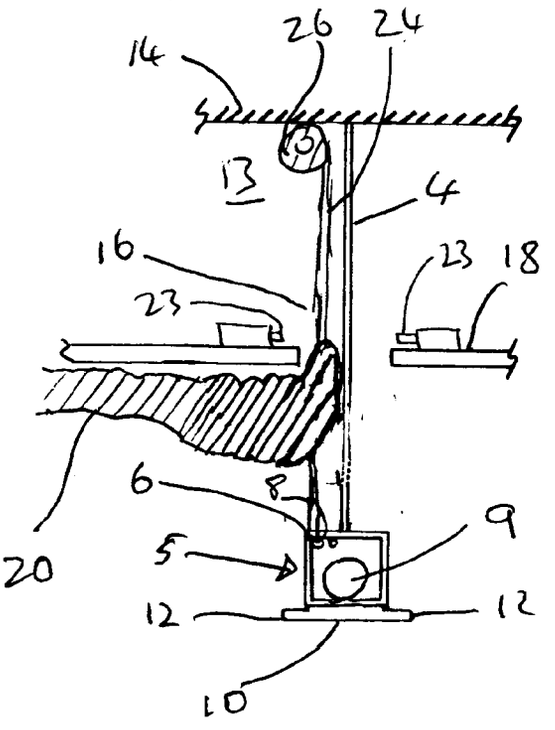
(54) Emergency lighting system.

(57) An emergency lighting system comprises a light and means for lowering the light in the event of a fire whereby in use the light under normal conditions is positioned on an elevated level, e.g. at ceiling level, while in the event of a fire the light is activated and lowered to assume a deployed position whereat it is positioned below ceiling level so that the illumination is not obscured by the smoke layer. The means for lowering the light may comprise a smoke curtain which is attached to the light and which is normally concealed behind a false ceiling in retracted (e.g. rolled-up or pleated) form and the light is exposed at the ceiling surface. In this arrangement, in the event of a fire the light is activated and the curtain assumes a deployed extended position whereby it suspends the light below the ceiling level. The lighting system may form part of an escape route marking system, and may include fire detection means and other fire management systems such as fire alarm, extinguishant sprinklers and smoke detectors. The lighting system may also function as a night light illumination system when in the undeployed state.

Fig 2b



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The present invention relates to emergency lighting systems which includes an emergency light and means for lowering the light below a ceiling level in the event of an emergency.

Emergency lighting systems are used to provide emergency lighting designed to illuminate rooms, corridors and other areas of buildings in the event of failure of a main lighting power supply and, in the case of certain emergencies such as fires, to direct escapees to emergency exits by providing route markers or illuminated signs to identify escape exits.

US Patent 4,802,206, for example, describes an emergency light fixture for mounting in a ceiling, and particularly a suspended ceiling, which includes a drop-down panel normally closing an opening in the ceiling and an electric lamp concealed behind the panel. It provides emergency lighting in the event of a failure of the main lighting AC power supply. If the AC power should fail, the panel automatically drops down below the level of the ceiling along with the electric lamp and the lamp automatically turns on to illuminate a selected path of egress.

Emergency lighting systems designed particularly for deployment in fires are often designed to be physically robust in order to withstand the high temperatures which can be caused by both direct heating and contact with hot smoke. Also, large quantities of dense smoke are often generated during a fire which can obscure the light illumination in some circumstances. It may be possible to attempt to mitigate the potential effects of damage by heat and obscuration by smoke by positioning the emergency lighting in areas of a building expected to be least susceptible, initally, to such damage. Thus, lighting can be placed at floor level but it is often the case that the preferred position for optimum visibility of such lighting is at an elevated position where, however, it is more likely to be obscured by smoke driven up to a ceiling and then drawn along it to a point of extraction.

The present invention in a first aspect provides an emergency lighting system which includes a light and means for lowering the light below a ceiling level in the event of an emergency characterised in that before lowering of the light in an emergency the light is useable as a non-emergency light. Such an emergency lighting system provides an emergency light which can be lowered to a desired operational position below a ceiling during an emergency, for example below the expected level of smoke during the period anticipated for evacuation of the area of the emergency light, but can provide useful illumination before any emergency occurs.

According to a second aspect of the present invention, an emergency lighting system which includes an emergency light and means for lowering the light below a ceiling level in the event of emergency is characterised in that the means for lowering the light comprises a smoke curtain to which the emergency light is attached.

The smoke curtain can be installed at a position in a building where it is expected that smoke will traverse across a ceiling and where the smoke is ideally to be halted in its progress. By providing that an emergency light is lowered by a smoke curtain, an emergency light is provided in an area where smoke is perhaps expected during a fire (and therefore is likely to obscure prior art ceiling mounted emergency lights) at a height expected to be below the smoke as determined by the parameters determining the design depth of the smoke curtain, at least during the early part of a fire.

Each emergency lighting system of the present invention is therefore able to provide elevated lighting in an area of a building which is expected to be smoke filled near a ceiling yet be in a position which is clear of the smoke at least during the early part of the emergency.

The smoke curtain could be of a depth to partition a room, in which case the emergency light will be at floor level and can indicate to escapees that the partition is down and if desired indicate the escape direction.

The emergency lighting system is conveniently contained within the ceiling space between a true ceiling and a false ceiling with, preferably, the smoke curtain stored in retracted form. It can also be installed in true ceilings if the retracted form is sufficiently compact.

The light may be concealed within the ceiling space behind a panel before deployment and may be deployed by lowering the light through an aperture in the false ceiling thus lowering the emergency light into the room and deploying the smoke curtain.

The panel may be a light transparent panel fixed to the underside of the light in which case the emergency lighting system can provide illumination during a non-fire emergency when it may not be desirable to deploy the smoke curtain as well.

Alternatively, the emergency light can be at or close to ceiling level, rather than being disposed within a false ceiling space before deployment of the smoke curtain, the lighting system being lowered further into the room on deployment of the smoke curtain.

A convenient form of light to be used with an emergency lighting system of the present invention is a striplight that extends along at least part of the length of the lower edge of the smoke curtain. This striplight may bear a light-transparent or opaque plate which conceals the striplight until it is deployed or allows use as a non-emergency light.

The emergency light may be designed solely for emergency illumination in the event of a fire or it may form part of an emergency escape route marking system, for example as part of a system of illuminated arrows and exit signs.

The emergency lighting system may include a release means which when activated allows the light to fall under gravity whilst deploying the smoke curtain to assume a deployed position, for example electromagnetic locks engaged with the light which automatically release the emergency light if current to the locks is cut.

The emergency lighting system according to the present invention may be used in conjunction with a detection means for detecting a fire, a signalling means for relaying a signal from the detection means to the lighting system and an emergency activation means for activating the release means and activating the light in response to the received signal from the signalling means. The detection means may be a smoke detector and the activation means may comprise a battery which is dedicated to powering the light.

The emergency lighting system may include a further activation means arranged on activation to activate the release means independently of activation by the emergency activation means. This allows timed or manual operation of the light when in retracted state, for use, for example, as night illumination or for regular testing.

An embodiment of the invention according to its two aspects will now be described by way of example only with reference to the accompanying drawings in which:

Fig. 1 is a schematic diagram of an embodiment of the invention.

Figs. 2a and 2b are schematic cross-sectional views showing the embodiment of Fig. 1 in undeployed and deployed positions, respectively.

With reference to Fig. 1, the emergency lighting system 2 comprises a smoke curtain 4 to which is attached at its lower edge an emergency light 5. The emergency light 5 includes an elongate lightweight box section 6 which encloses wiring 8 and a lighting element 9. The light 5 is protected by a light-transmitting cover 10 which has laterally extending flanges 12. The box may alternatively be an extruded section.

Indents 17 (one of which is shown) engage with a release means which will be described with reference to Fig. 2. Apertures 21 at the lower edge of the smoke curtain 4 provide leakage of smoke across the smoke curtain where it is deemed more desirable to provide some extra period of visibility of the light than some additional smoke containment by the smoke curtain 6.

Fig. 2a shows the installation of the undeployed (retracted) emergency lighting system shown in Fig. 1. The retracted smoke curtain 4 is located in a ceiling space 13, defined by a true ceiling 14 and a false ceiling 18, and fixed to the true ceiling 14. The light 5 is located in an aperture 16 of the suspended ceiling 18, the box section 6 extending through the aperture 16 while the flanges 12 are held in overlapping relationship with that area of the suspended ceiling 18 which surrounds the aperture, so acting to conceal the pleated retracted smoke curtain 4 and ceiling space 13 beyond.

It will be appreciated that the installation shown in Fig. 2a is particularly unobtrusive and allows the provision of effective emergency lighting systems without sacrificing the aesthetic integrity of the surrounding architecture and allows use of the light 5 during a non-emergency.

The release means for the embodiment of Fig. 2a comprises four solenoid release catches 19, two of which are shown in Fig. 2a, which have rods 23 maintained in engagement with indents in the housing 17 (see Fig. 1). These act against springs (not shown) and so maintain the emergency lighting system in non-deployed position as long as there is a power supply to the solenoids.

The emergency light system is deployed, in this case, by removing the power from the solenoids which cause the rods 23 to retract so allowing the light 5 to fall under the influence of gravity so deploying the smoke curtain 4.

Other means of release of the emergency light 5 to effect deployment can, of course, be employed. If the smoke curtain 5 is retracted in a rolled form on an axle, for example, deployment could be effected by releasing a brake associated with the axle or rotating the axle by a motor.

It is expected in some circumstances that the light generated by the emergency light 5 when deployed could be designed to provide rising convection currents which will tend to make the smoke rise in the region of the smoke curtain thereby increasing the smoke-retaining properties of the smoke curtain and in some cases encouraging venting through the aperture 16 once the light 5 heats up.

In Fig. 2b, the components in common with Fig. 2a are given the same reference numerals. The smoke curtain 4 is shown in extended deployed position during a fire, where smoke 20 has collected to form a layer just below the false ceiling 18.

The emergency light 5 is suspended at a level below the bottom of the smoke curtain 4 and at least at this stage of the emergency is below the smoke layer 20 at the top of the room and so can provide the required emergency lighting notwithstanding the accumulation of smoke and is protected from heating effects of the smoke.

In the present embodiment the movement of the light 5 down from the false ceiling 18 reveals the aperture 16 in the false ceiling 18 which may provide a duct for active or passive extraction of smoke from the room into the false ceiling space 13 thereby alleviating some of the smoke hazard from the room. This aperture is automatically opened during deployment using this particular embodiment of the invention.

As smoke accumulates at the smoke curtain 4 the light 5 will act as a smoke barrier and will eventually become likely to be obscured by smoke. If it is preferable that the emergency light 5 remains visible rather than providing extra containment to the smoke, then the apertures 21 in the smoke curtain 4 allow leakage of the smoke across the curtain barrier before the general level reaches the emergency light. This would also have the advantage of preventing heat damage by the smoke to the light fitting, to a certain degree. The apertures 21 can be omitted if desired.

The smoke curtain in the embodiment described with reference to Figures 1 and 2 show a smoke curtain 4 which is retracted by forming the smoke curtain into pleats. Wiring 24 external to the light 5 (which need not be present in all embodiments of the present invention) is rewound during retraction of the smoke curtain 4 onto a drum 26. Alternative means of retracting the smoke curtain may be employed, for example, forming it into a roll on a rotatable, cylindrical support.

Claims

1. An emergency lighting system including an emergency light (5) and means for lowering the light (5) below a ceiling level (18) in the event of an emergency, characterised in that before lowering of the light (5) in an emergency the emergency light (5) is useable as a non-emergency light (5).

2. An emergency lighting system including an emergency light (5) and means for lowering the emergency light (5) below a ceiling level (18) in the event of an emergency characterised in that the means (4) for lowering the emergency light (5) comprises a smoke curtain (4) to which the emergency light (5) is attached.

3. An emergency lighting system as claimed in claim 1 in which the means (4) for lowering the emergency light (5) comprises a smoke curtain (4) to which the emergency light (5) is attached.

4. An emergency lighting system according to either one of claims 2 and 3 in which the smoke curtain (4) is storable in retracted form (Fig. 2a).

5. An emergency lighting system according to any one of claims 2 to 4 in which the emergency light (5) is a striplight (5) that extends along at least part of the length of the lower edge of the smoke curtain (4).

6. An emergency lighting system according to any one of claims 2 to 5 in which the emergency light (5) has a cover plate (10) such that when the emergency lighting system is installed in retracted position within a ceiling (18), the cover plate (10) is in contact in an overlapping relationship with part of the ceiling (18) to conceal the space in which the retracted smoke curtain (4) is located.

7. An emergency lighting system according to claim 6 in which the cover plate (10) is light-transparent to allow use of the emergency light (5) before lowering of the emergency light (5).

8. An emergency lighting system according to any one of the preceding claims and further including a detection means for detecting a fire, signalling means for relaying a signal from the detection means to the lighting system, and an emergency activation means for triggering deployment and activation of the light in response to the signal.

9. An emergency lighting system according to claim 8 in which the emergency activation means comprises a release means which allows the emergency light (5) to fall under gravity.

10. An emergency lighting system according to claim 9 including an activation means arranged on activation to activate the release means independently of activation by the emergency activation means.

11. A building having at least one area with a ceiling space (13) defined by a true ceiling (14) and a false ceiling (18) and including an emergency lighting system according to any of claims 2 to 10, in which the upper edge of the smoke curtain (4) is attached to the true ceiling (14) and the smoke curtain (4) is concealed in the ceiling space (13) and the emergency light (5) protrudes through an aperture (16) in the false ceiling (18) when the smoke curtain (4) is in retracted form and the smoke curtain (4) is deployable such that the smoke curtain (4) passes through the aperture (16) to assume a deployed position (Fig. 2b) in which the emergency light (5) is suspended from the true ceiling (14) by the smoke curtain (4).

Fig 1

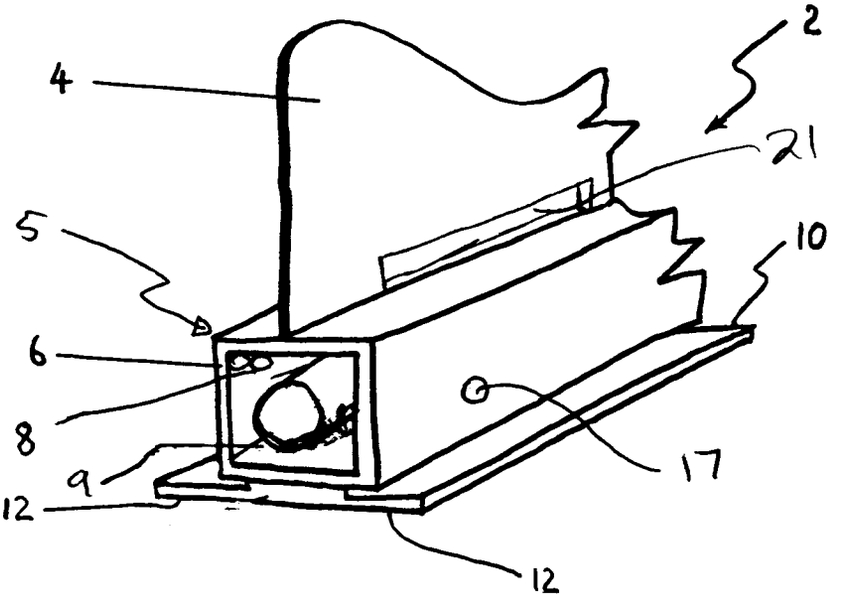


Fig 2a

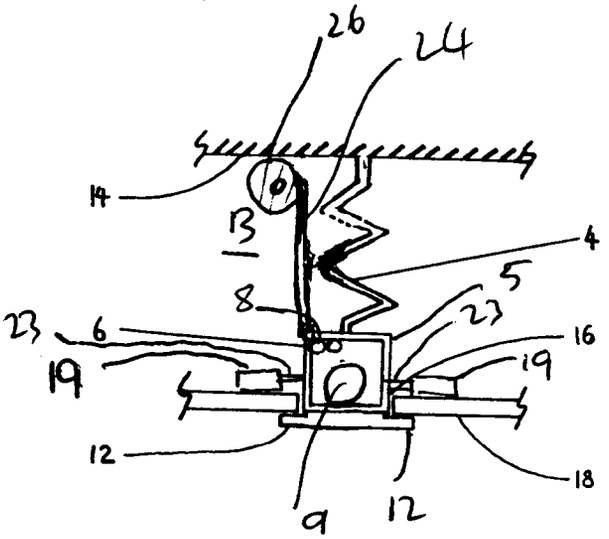
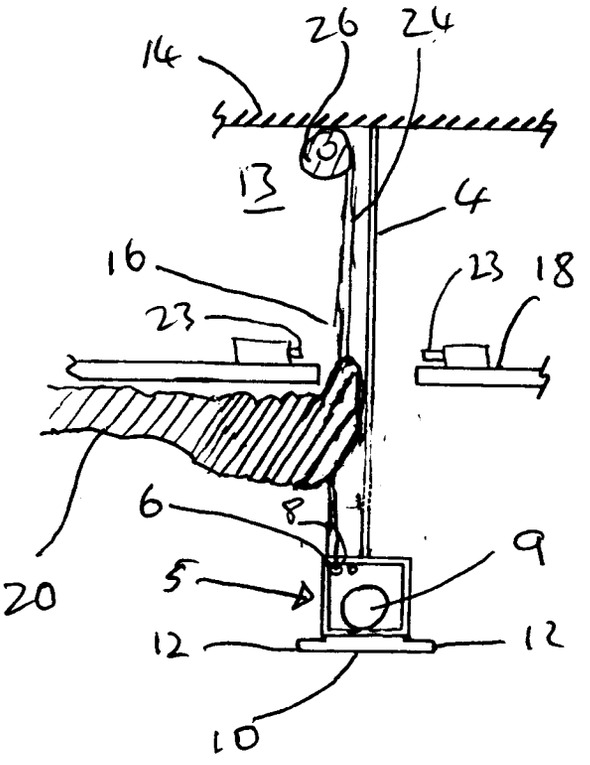


Fig 2b



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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 5486

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	US-A-4 489 308 (E. LOGAN) * the whole document * ---	1-11	G08B5/38 F21V33/00
A	US-A-4 694 281 (J. MCDERMOTT) * abstract * * column 5, line 3 - line 34; figure 4 * ---	1	
A	US-A-4 739 187 (M. NELSON) -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

G08B
F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 October 1993	SGURA, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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