

(12) **UK Patent**

(19) **GB**

(11) **2513651**

(13) **B**

(45) Date of B Publication

**05.02.2020**

(54) Title of the Invention: **A lighting system for use in a display**

(51) INT CL: **F21S 9/02** (2006.01)

(21) Application No: **1308018.9**

(22) Date of Filing: **03.05.2013**

(43) Date of A Publication **05.11.2014**

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(56) Documents Cited:

**WO 2014/044305 A1      WO 2003/089838 A1  
DE 202006005111 U1**

(58) Field of Search:

As for published application 2513651 A viz:  
INT CL **F21S**  
Other: **Online: WPI, EPODOC**  
updated as appropriate

Additional Fields

Other: **None**

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**GB 2513651 B**

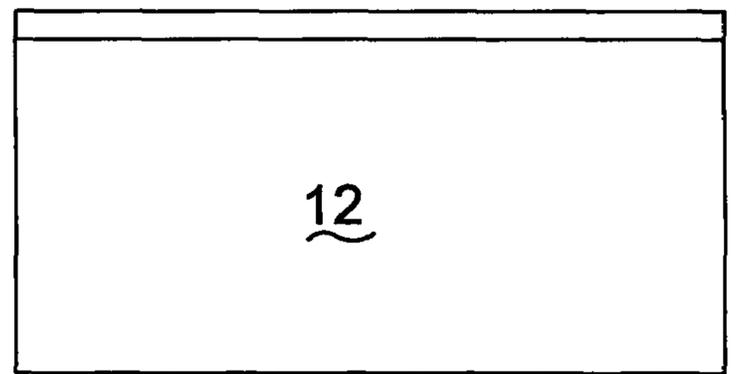
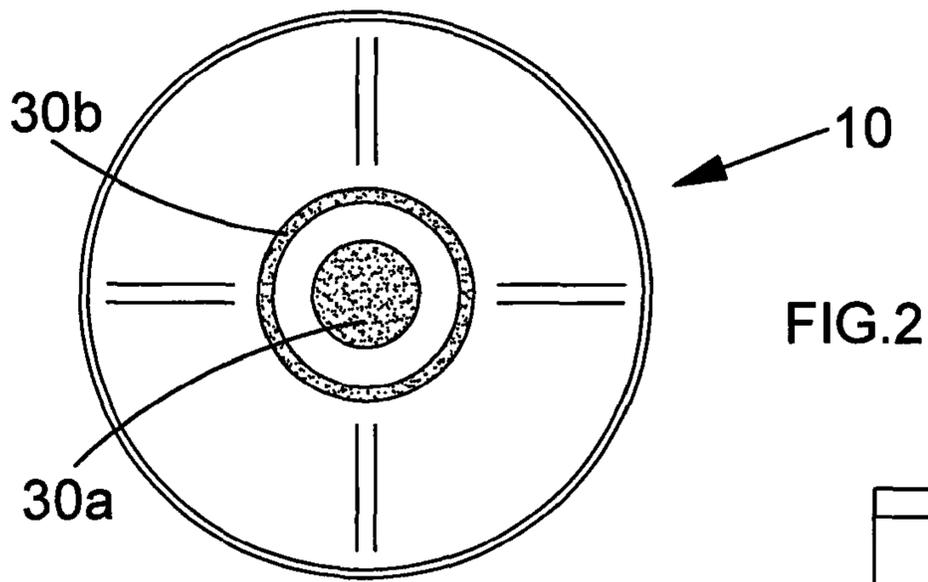
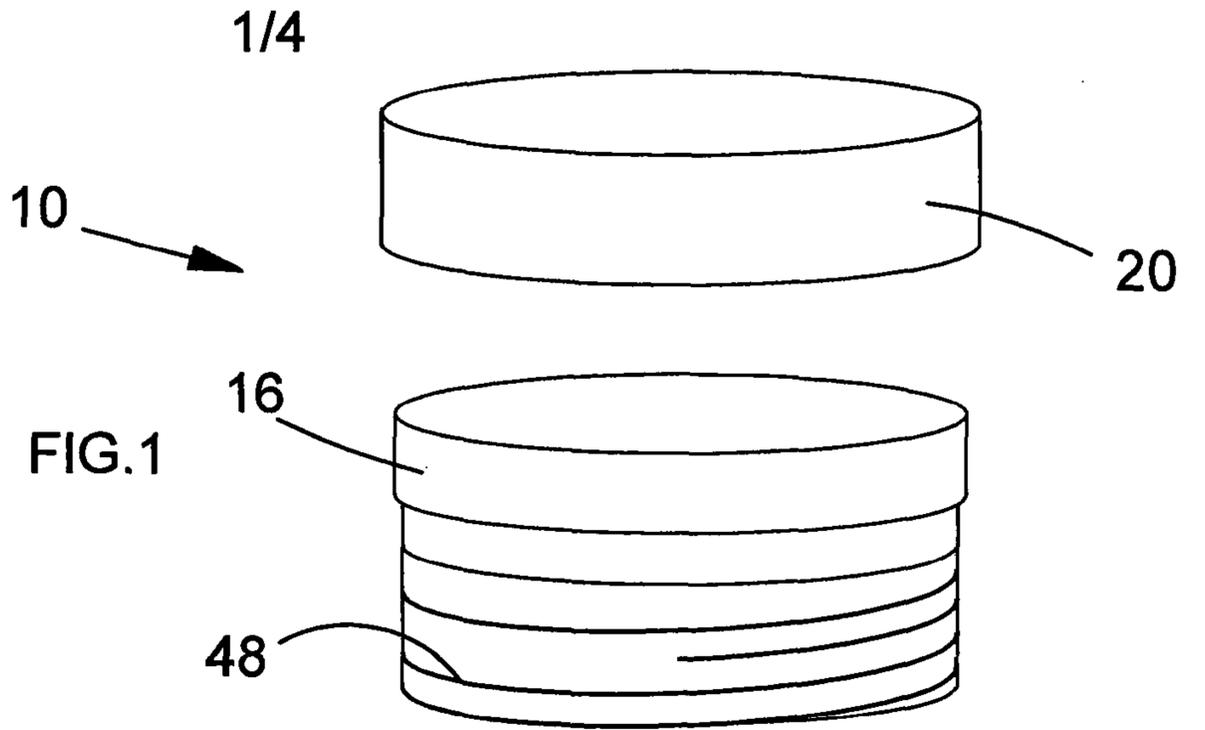
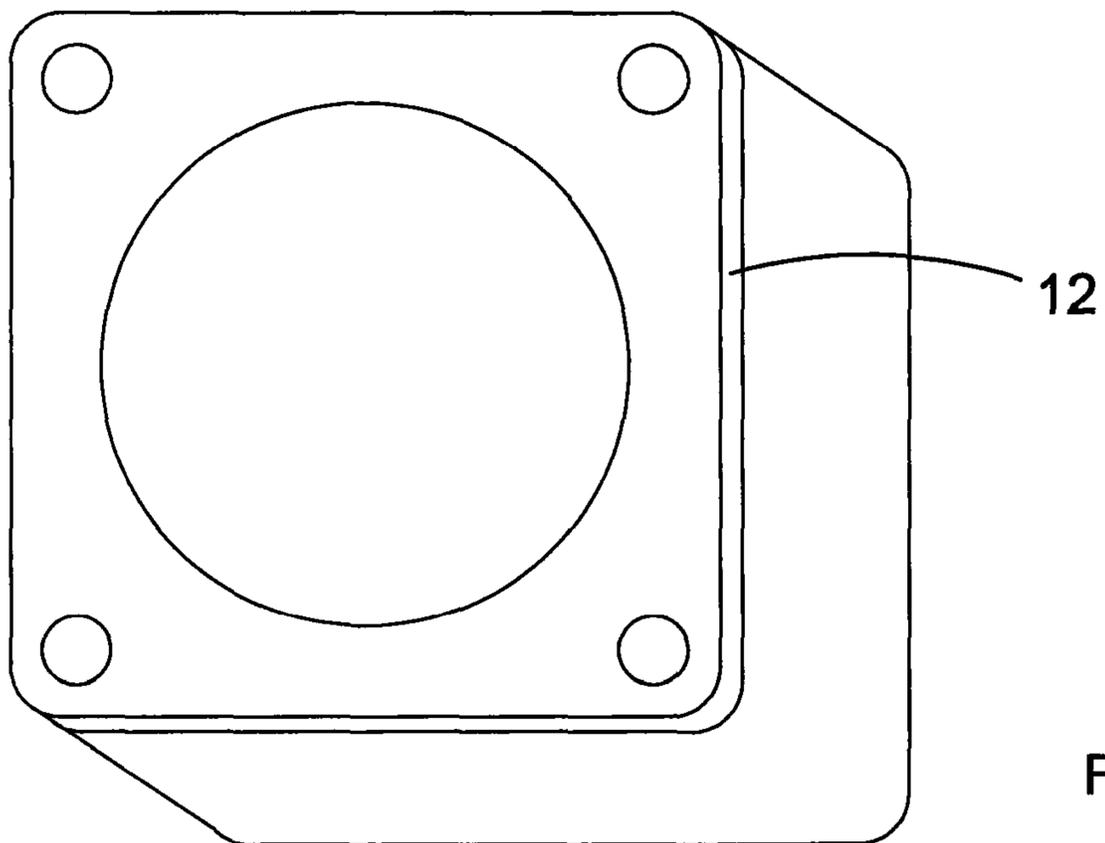


FIG.3



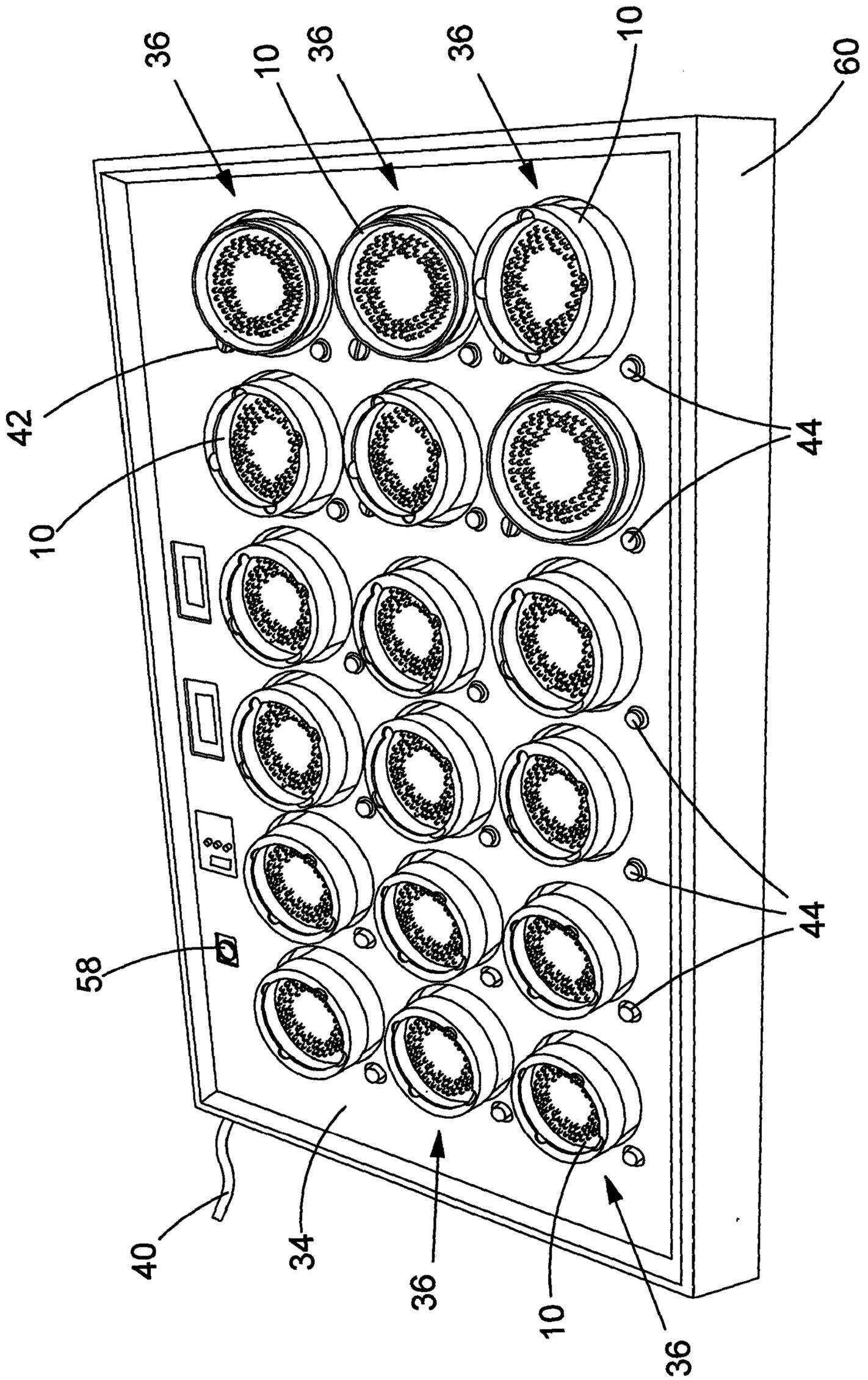


FIG. 5

3 3 4

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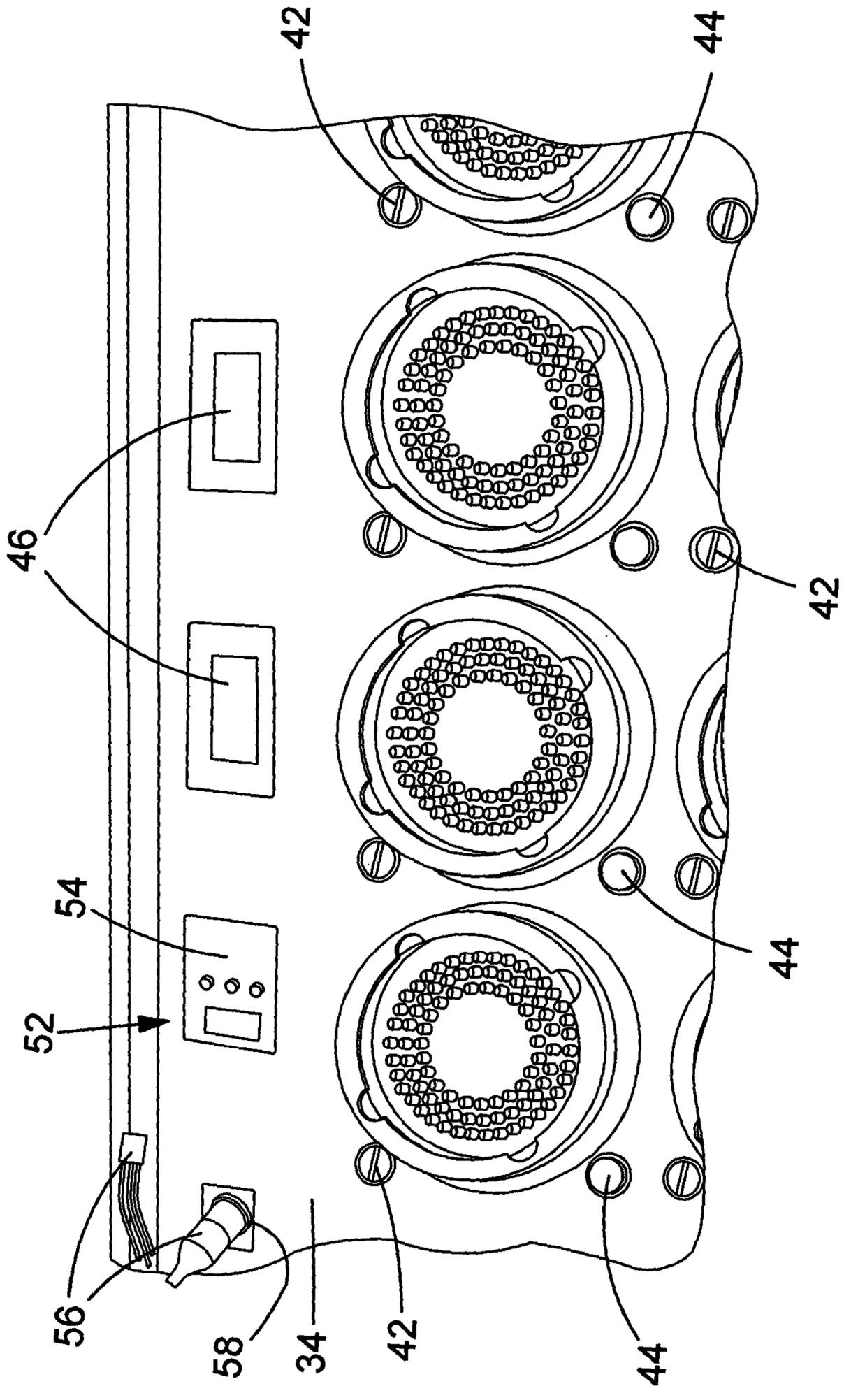


FIG.6

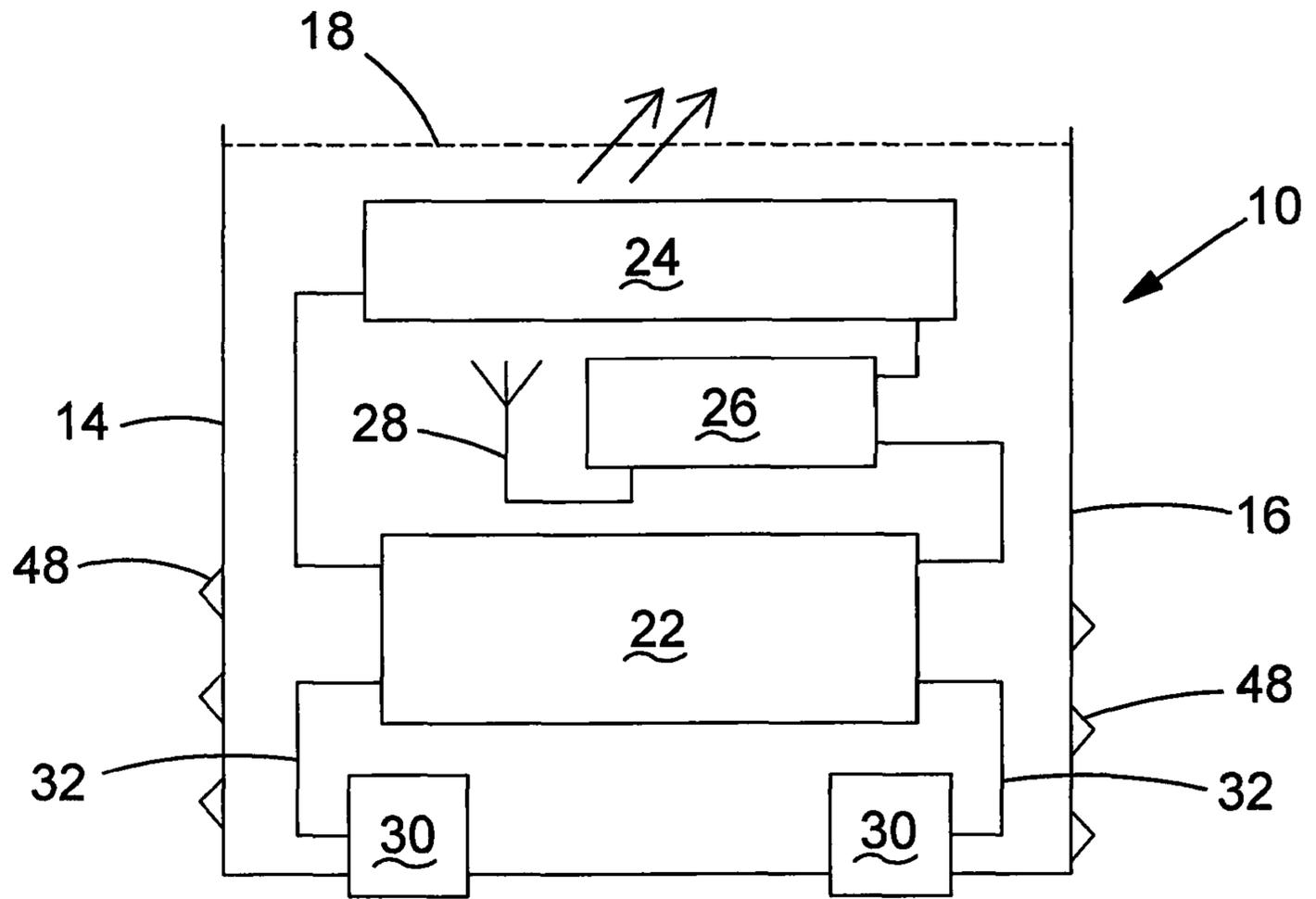


FIG.7

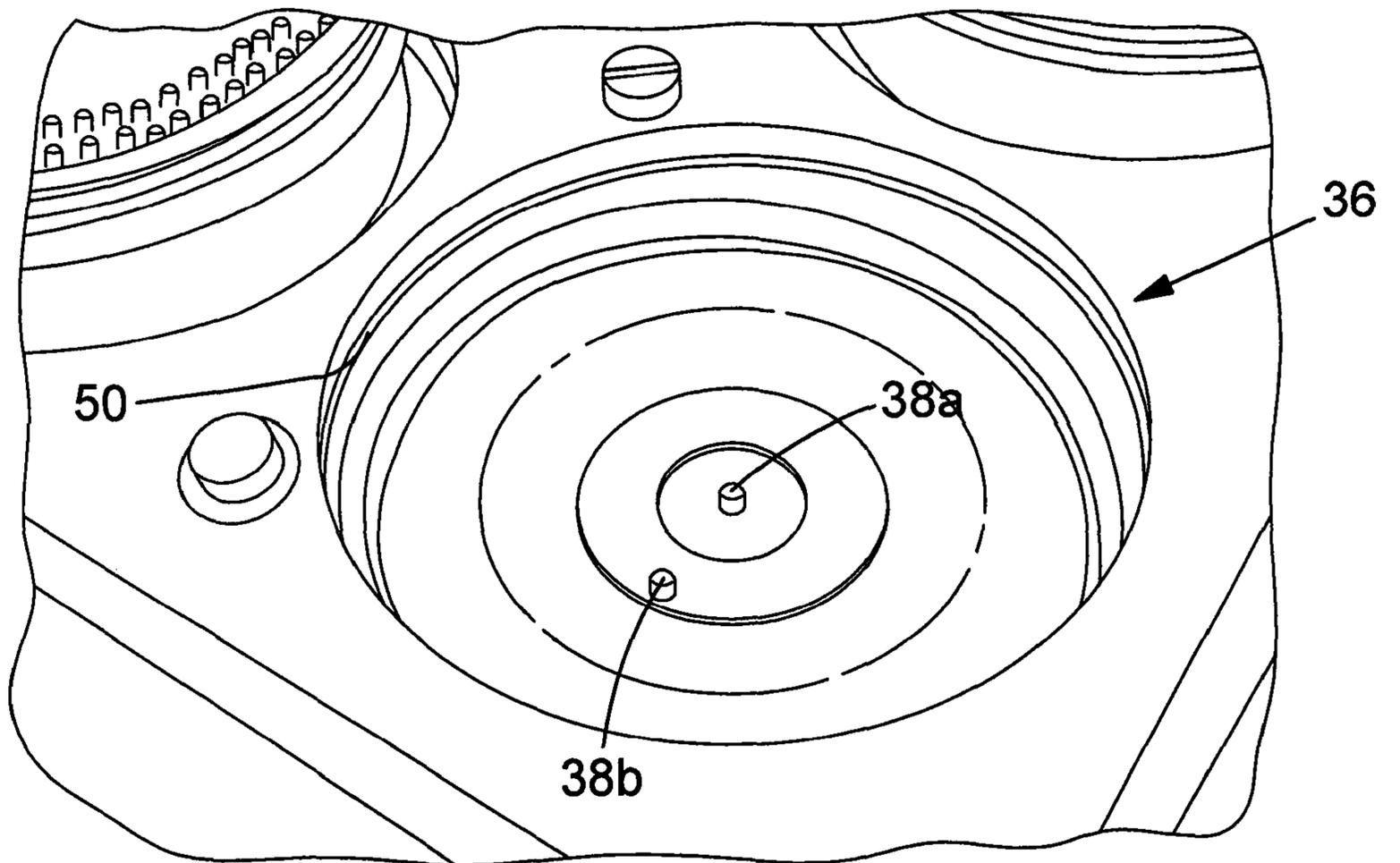
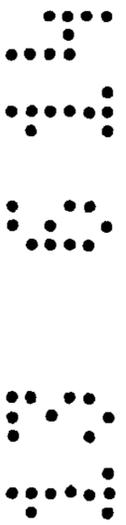


FIG.8



A lighting system for use in a display

The present invention relates to a lighting system for use in a display, and relates particularly, but not exclusively, to a rechargeable battery operated and radio-controlled lighting system for use in table displays.

It is becoming increasingly popular to decorate tables at a dining event for a large number of people with illuminated table decorations. With recent developments in LED technology, it is possible to produce significant amounts of light from a battery operated lighting unit for the duration of an event. It is also known for such devices to include differently coloured LEDs allowing the lighting unit to produce different colours of light and for the whole unit to be radio-controlled allowing the switching on and off of the device, the colour of the light produced and the brightness to be individually controlled from a remote location.

It is preferable that such lighting units are provided with a rechargeable battery thereby removing the need for regular replacement of the battery if it can be simply recharged. However, recharging of the batteries in the lighting unit is vitally important since it is critical that the battery is sufficiently charged at the start of an event for it to last for the duration of the event. As a result, multiple lighting units are stored in a carrying case that includes a power supply input and recharging leads for each of the lighting units. Such carrying cases are useful for allowing multiple lighting units to be charged at the same time from a single power supply. However, the connection of the lighting unit to the power supply can be difficult and

can lead to some lighting units not being fully recharged before being reused.

Furthermore, the theft of lighting units from within a display can on occasion be a problem. Some displays require  
5 an open portion or make the lighting unit clearly visible leaving it vulnerable to theft.

Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

According to an aspect of the present invention, there  
10 is provided a lighting system for use in a display, the system comprising:-

a plurality of lighting units including:-

a first housing;

at least one rechargeable battery contained within said  
15 first housing;

lighting means for producing light and powered by said rechargeable battery;

a plurality of first electrical contacts for connecting said battery to a supply of recharging power; and

20 at least one first threaded portion; and

at least one charging unit including:-

a power supply for receiving electrical power; and

a plurality of charging stations, each charging station having a plurality of second electrical contacts  
25 connected to said power supply and adapted to engage said first contacts to provide said supply of recharging power to a said lighting unit and having a second threaded portion adapted to engage a first

threaded portion of said lighting unit to retain said lighting unit in engagement with said charging station.

By providing rechargeable lighting units with electrical contacts that engage equivalent contacts in one of the plurality of charging stations in a charging unit and providing the charging stations and lighting units with mutually engaging threads, the advantage is provided that the lighting units can be easily recharged and the lighting units held firmly in connection with the charging stations. As a result, there is very little likelihood of lighting units either falling out of the charging unit or not being properly engaged with the charging station and therefore not properly charging. Furthermore, with each lighting unit secured within the charging unit there is little or no risk of damage to the lighting units which generally include breakable parts such as glass windows and sensitive components.

In a preferred embodiment, at least one said charging station further comprises at least one indicator device for indicating at least one characteristic of a said battery of a respective lighting unit located in said charging station.

In another preferred embodiment, the characteristic comprises the charge held in said rechargeable battery.

By providing an indicator device for indicating at least one characteristic of the battery in a charging station, the advantage is provided that an operator can quickly check the status of the charge of each lighting unit once a charging cycle has been completed. As a result, even in the unlikely event that a lighting unit was not properly located within its charging station, the operator can ensure that an insufficiently charged lighting unit is not used. An incorrect charge can indicate either a problem with the battery or a problem with the location of the lighting unit

within the charger, therefore establishing whether the battery needs to be changed.

In a further preferred embodiment, at least one said charging station further comprises a switch for operating  
5 said indicator device.

In a preferred embodiment, at least one said charging unit further comprises a switch for operating the or each indicator device in said plurality of charging stations.

In another preferred embodiment, the lighting means  
10 further comprises a plurality of light producing devices that can individually or cooperatively produce differently coloured light.

In a further preferred embodiment, the lighting unit further comprises at least one radio receiving device and at  
15 least one control device that cooperate to control said lighting unit remotely by radio communication.

In a preferred embodiment, the first threaded portion comprises an external thread and said second threaded portion comprises an internal thread.

20 In another preferred embodiment, the power supply comprises at least one transformer device for converting mains power supply into said recharge power supply.

In a further preferred embodiment, the charging unit comprises at least one second housing.

25 In another preferred embodiment, the second housing comprises a carrying case.

By providing a housing, in the form of a carrying case, the advantage is provided that the lighting units can be easily charged and stored after use using the same device.

According to another aspect of the present invention, there is provided a display device comprising:-

at least one structural element; and

a lighting system as set out above in which at least one  
5 lighting unit is located adjacent a respective said structural element such that light from said lighting unit is directed towards said structural element.

In a preferred embodiment, at least one said structural element comprises at least one partially transparent  
10 material.

The display device may further comprising a third housing containing a further second thread for receiving a first thread to retain said lighting unit.

Preferred embodiments of the present invention will now  
15 be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings in which:-

Figure 1 is a side view of a lighting unit used in the present invention;

20 Figure 2 is a view of the lighting unit of Figure 1 from below;

Figures 3 and 4 are side and perspective views of a container for housing the lighting unit of Figures 1 and 2;

Figure 5 is a perspective view of a charging unit of  
25 the present invention containing lighting units of Figures 1 and 2;

Figure 6 is a close-up view of a portion of the charging unit of Figure 5;

Figure 7 is a schematic representation of the lighting  
30 unit of Figures 1 and 2; and

Figure 8 is a close-up of a portion of the charging unit of Figures 5 and 6 showing a charging station.

A lighting unit 10 is used in a display device, for example a display device used on a table as a centre piece. The display device typically includes a first structural element in the form of a box 12 into which the lighting unit 10 is located. Typically a further structural element, for example an aesthetic structure, formed from Perspex (RTM) or another transparent material, is placed on top of the box 12 so that light emitted by lighting unit 10 shines up through the transparent material.

The lighting unit 10 includes a first housing 14 which has a body 16, a window 18, formed from a sheet of glass or other transparent material, and a retaining ring 20 which keeps the window 18 in engagement with body 16. Contained within the housing are other components of the lighting unit including a rechargeable battery 22 and lighting means, in the form of a bank of LED's 24. It will be apparent to persons skilled in the art that any form of lighting device would be suitable, although LED devices are ideal due to their efficiency in light production making them ideal for use with battery power as well as their ability to combine to produce a variety of colours. The LED's 24 operate under the control of processor 26 which is in turn controlled via radio signals received by aerial 28. The lighting system also includes a plurality of first electrical contacts that are connected, via connections 32, to the battery 22 to supply recharging power to the battery. The contacts 30 can be either located externally of the housing with the connectors 32 extending through the housing or the contacts themselves extending through the housing, as shown in Figure 7. The contacts 30 are preferably, and as shown in

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Figure 2, a pair of contacts one of which being a circular disc of metal, indicated as 30a in Figure 2, and the other being an annular contact formed from a ring of metal, indicated at 30b and extending around the contact 30a.

5           The lighting unit 10, together with further similar lighting units, forms part of a lighting system that includes a charging unit 34. The charging unit 34 has a plurality of charging stations 36 each designed to receive a lighting unit 10. Each charging station has a plurality of second  
10 electrical contacts 38a and 38b that are adapted to engage the first contacts 30a and 30b respectively to provide recharging power to the rechargeable battery 22. The second electrical contacts 38 are connected to a power supply indicated by power supply wire 40 via a transformer (not  
15 shown).

Each charging station 36 is provided with a fuse 42 so that, in the event of a problem with a lighting unit 10 or charging station 36, only that fuse blows and the remaining charging stations are able to operate. Each charging  
20 station 36 is also provided with an illuminated press switch 44. The illumination function of switch 44 operates independently of the switching function. Switch 44 illuminates when a lighting unit 10 is located in a charging station 36 and the first and second contacts are in  
25 engagement with each other thereby charging the battery. When the battery has finished charging the illumination within switch 44 stops, thereby indicating that the battery 22 in lighting unit 10 is fully recharged. The switch function of illuminated press switch 44 operates to test the  
30 voltage in the battery 22 of a lighting unit 10 that is located in the charging station 36 associated with switch 44. When the switch 44 is pressed the voltage supplied by the

battery 22 is displayed in either or both of display screens 46. Two screens are provided so that one screen acts as a backup for the other in the event of a component failure.

5 Both the charging station 36 and light unit 10 have mutually engaging threads. A first external thread 48 is formed in the body 16 of housing 14 of light unit 10 and a second internal thread 50 is formed in the annular periphery wall of charging station 36. The purpose of these mutually  
10 engaging threads 48 and 50 is to retain lighting unit 10 within charging station 36 and to maintain the first and second electrical contacts 30 and 38 in engagement with each other thereby ensuring that battery 22 is receiving charge.

The charging unit 34 also includes a programming  
15 station 52 that is used to program the radio channel through which each lighting unit 10 will be controlled. The lighting units 10 are controlled via a lighting desk which includes a transmitter that transmits instructions to each processor 26, via aerial 28 of the lighting units 10. The programming  
20 station 52 includes a display and data entry portion 54, that is connected to a processor and a connection device 56 that plugs into a socket 58.

The charging unit 34 is formed in a carrying case 60, in which the base portion is shown in Figure 5 and a lid,  
25 with internal foam cushion, is not shown.

In use, lighting units are arranged in charging stations 36 of charging unit 34, as shown in Figures 5 and 6. By engaging the first and second threads 48 and 50, the first and second electrical connectors 30 and 38 become engaged  
30 with each other. The electrical contact 38a is located centrally within charging station 36 and engages the circular electrical contact 30a. The electrical contact 38b is spaced

apart from 38a such that it engages the annular contact 30b. Because the first electrical contacts 30a and 30b are circular and annular respectively they always engage the second contacts 38 when the first external thread 48 of lighting unit 10 is engaged with the second internal thread 50 of charging station 36. As a result, it is not necessary to find a correct orientation of the lighting unit 10 within charging station 36 in order to ensure that the battery is charged.

10           Once the first and second contacts 30 and 38 are engaged the battery 22 begins charging and the switch 44 is illuminated to indicate that charging is taking place. The light within switch 44 extinguishes once the battery 22 is fully charged and the charge in battery 22 can be tested by  
15 pressing switch 44. The reading on display screens 46 will indicate whether the battery is correctly charged and operating correctly. Once the lighting unit 10 is fully charged it can be located in box 12 to form part of the display structure. Box 12 has an internal thread (not shown)  
20 corresponding to second internal thread 50 so that the lighting unit 10 can be fixed within box 12.

          It will be appreciated by persons skilled in the art that the above embodiments have been described by way of example only and not in any limitative sense, and that  
25 various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

Claims

1. A lighting system for use in a display, the system comprising:-

a plurality of lighting units including:-

5 a first housing;

at least one rechargeable battery contained within said first housing;

lighting means for producing light and powered by said rechargeable battery;

10 a plurality of first electrical contacts for connecting said battery to a supply of recharging power; and

at least one first threaded portion; and

at least one charging unit including:-

a power supply for receiving electrical power; and

15 a plurality of charging stations, each charging station having a plurality of second electrical contacts connected to said power supply and adapted to engage said first contacts to provide said supply of recharging power to a said lighting unit and having a  
20 second threaded portion adapted to engage a first threaded portion of said lighting unit to retain said lighting unit in engagement with said charging station.

2. A lighting system according to claim 1, wherein at least one charging station further comprises at least one  
25 indicator device for indicating at least one characteristic of a said battery of a respective lighting unit located in said charging station.

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3. A lighting system according to claim 2, wherein said characteristic comprises the charge held in said rechargeable battery.

4. A lighting system according to claim 2 or 3, wherein at least one charging station further comprises a switch for operating said indicator device.

5. A lighting system according to any of claims 2 to 4, wherein at least one charging unit further comprises a switch for operating the or each indicator device in said plurality of charging stations.

6. A lighting system according to any preceding claim, wherein said lighting means further comprises a plurality of light producing devices that can individually or cooperatively produce differently coloured light.

7. A lighting system according to any preceding claim, wherein said lighting unit further comprises at least one radio receiving device and at least one control device that cooperate to control said lighting unit remotely by radio communication.

8. A lighting system according to any preceding claim, wherein said first threaded portion comprises an external thread and said second threaded portion comprises an internal thread.

9. A lighting system according to any preceding claim, wherein said power supply comprises at least one transformer device for converting mains power supply into said recharge power supply.

10. A lighting system according to any preceding claim, wherein said charging unit comprises at least one second housing.

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11. A lighting system according to claim 10, wherein said second housing comprises a carrying case.

12. A display device comprising:-

at least one structural element; and

5 a lighting system according to any of the preceding claims in which at least one lighting unit is located adjacent a respective said structural element such that light from said lighting unit is directed towards said structural element.

13. A display device according to claim 12, wherein at  
10 least one said structural element comprises at least one partially transparent material.

14. A display device according to claim 12 or 13, further comprising a third housing containing a further second thread for receiving a first thread to retain said lighting unit.

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