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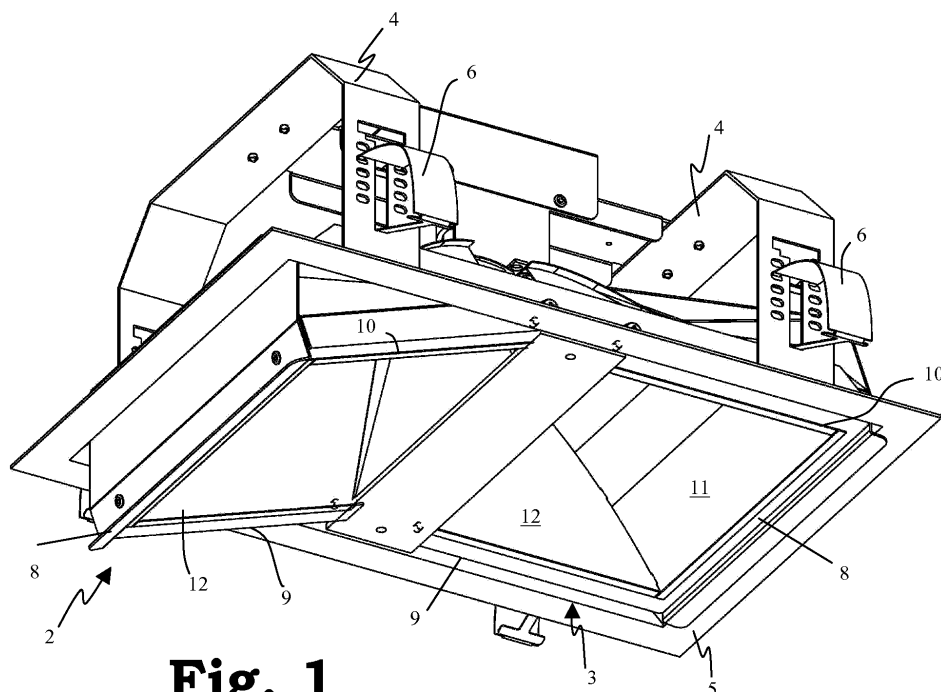
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(54) **Lighting apparatus**

(57) The present invention relates on the one hand to a lighting apparatus comprising a gas discharge lamp (1) which is preferably arranged in the apparatus so as to be in an approximately vertical position when the lighting apparatus is placed in the use position, the apparatus being provided in order to produce a batwing light distribution and comprising at least two separately orientable reflectors (2), (3) to reflect the light emanating from this lamp (1). This apparatus allows production of an effective, energy-efficient and flexible lighting installation

which is particularly suitable for lighting an aisle between shelves in a shop layout, this lighting accentuating the products on the shelves.

On the other hand, the present invention also relates to a shop layout comprising a number of lighting apparatuses according to the present invention which are fastened above an aisle between shelves, each lighting apparatus comprising, at the sides of the gas discharge lamp that face the shelves, a respective separately orientable reflector (2), (3).



**Fig. 1**

## Description

**[0001]** The present invention relates to a lighting apparatus comprising a holder in which a gas discharge lamp is provided and reflection means to reflect the light emanating from this lamp.

**[0002]** More specifically, the present invention relates to a lighting apparatus which is provided to be used for lighting, inter alia, shops, sale areas, showrooms, warehouses and the like, the apparatus being fastened to the ceiling or integrated in the ceiling. This field of application is generally referred to as shop lighting.

**[0003]** The present invention also relates to a shop layout itself, comprising a number of shelves between which an aisle is formed and a number of lighting apparatuses which are fastened above this aisle and provided with a gas discharge lamp and reflection means to reflect the light emanating from this lamp.

**[0004]** A large number of shops, and certainly supermarkets, have sale areas in which the products on offer are positioned on shelves. These shelves are usually 1.8 m to 2 m high and are arranged in parallel rows, so a two metre-wide aisle is formed between two neighbouring rows. It is known to configure the lighting of a shop layout of this type based on fluorescent lamps fastened to a central line above the aisles.

**[0005]** In order to arrive at lighting which accentuates the products in the aisles more and lights the aisle itself less, use is also increasingly being made of lighting apparatuses having gas discharge lamps which are fastened to the ceiling in such a way that the beam of light emanating from each apparatus is oriented toward one of the shelves. Two series of lighting apparatuses must therefore be provided for each aisle in order uniformly to light both shelves at opposing sides of an aisle. As a result, both the installation costs and the power consumption of a lighting installation of this type are fairly high.

**[0006]** In addition, it is often impossible to light the shelves at opposing sides of an aisle in a uniform manner. After all, it is not always possible to place the lighting apparatuses in the centre of the aisle, for example as a result of the fact that the supporting construction of the ceiling does not permit this. Furthermore, the ceiling height, the width of the aisle and the height of the shelves can also differ, so the lighting apparatuses used do not ensure optimum and uniform light intensity and light distribution.

**[0007]** An object of the present invention is to provide an effective, energy-efficient and flexible lighting installation which is suitable for lighting an aisle between shelves in a shop layout and with which the above-indicated drawbacks can be remedied.

**[0008]** This object is achieved by providing, according to the present invention, a lighting apparatus comprising a gas discharge lamp and reflection means to reflect the light emanating from this lamp, the lighting apparatus being provided to produce a batwing light distribution and said reflection means comprising at least two separately

orientable reflectors.

**[0009]** A batwing light distribution is a light distribution in which the light intensity in a zone below the lighting apparatus is relatively low, whereas at opposing sides of this zone having relatively low light intensity a zone having relatively high light intensity is obtained. A symmetrical batwing light distribution is represented in Figure 7 appended hereto.

**[0010]** The reflectors are preferably what are known as asymmetrical reflectors. The position of the focal point of the lamp relative to a reflector varies according to the reflector position. The fact that the position of these reflectors is adjustable allows the batwing light distribution produced with this apparatus to be influenced to a high degree.

**[0011]** It is thus possible to light the shelves at opposing sides of an aisle uniformly under all conditions, using a single lighting apparatus having one gas discharge lamp. If, for example, the apparatus cannot be placed centrally relative to the shelves or if the shelves to be lit are not of equal height, orienting the respective reflectors differently nevertheless allows these shelves to be lit uniformly and effectively in a manner accentuating all of the products equally.

**[0012]** The lighting produced can also subsequently be altered at all times and adapted to highly specific requirements or circumstances in the shop layout.

**[0013]** The fact that the intended object is achieved using a single apparatus having one lamp reduces both the installation costs and the power consumption considerably while maintaining the required light intensity.

**[0014]** In a highly preferable embodiment of the lighting apparatus according to the present invention, the aforementioned gas discharge lamp is arranged in the apparatus in such a way that this lamp is in a substantially vertical position when the lighting apparatus is placed in the use position.

**[0015]** This presupposes that the axis of symmetry running through the fitting of the gas discharge lamp is in a substantially vertical position.

**[0016]** With regard to the typical light distribution of a gas discharge lamp, in the vertical planes through the photometric centre point of the lamp (known as the C planes), in all of the C planes the light intensity for each angle  $\gamma$  (gamma) located between  $0^\circ$  and  $20^\circ$  and between  $160^\circ$  and  $180^\circ$  is relatively small, whereas the light intensity is much higher for an angle  $\gamma$  (gamma) between  $20^\circ$  and  $160^\circ$ . This is clearly illustrated with reference to the light distribution curves in Figures 5 and 6 for two different types of lamp in the CO/C180 planes (in solid lines) and the C90/C270 planes (in broken lines). The measurements were taken in accordance with C,  $\gamma$  goniophotometry as set out in the "Technical report: 'The photometry and goniophotometry of luminaires'" (ISBN 3 900 734 74 7).

**[0017]** As a result of a vertical arrangement of a gas discharge lamp in an aisle between two rows of shelves, there is thus obtained, exclusively as a consequence of

the characteristic light distribution of the lamp, the desired effect, namely that there is produced a batwing light distribution comprising two zones which have relatively high light intensity and are separated from each other by a zone having lower light intensity, less light being emitted in the aisle, i.e. in the zone below the lamp, than in the direction of the shelves at opposing sides of this aisle. This eliminates the need for means to reduce the light intensity in a zone of the aisle that is located below the lamp. This benefits the simplicity and the cost price of the lighting apparatus. The separately orientable reflectors allow further influencing of this light distribution.

**[0018]** In a particularly advantageous embodiment, the lighting apparatus is configured in such a way that the two zones having greater light intensity that are a result of the batwing light distribution can each be positioned separately by orienting the aforementioned reflectors. This allows the zones having relatively high light intensity each separately to be placed, in accordance with the requirements and the circumstances, further away from or closer to the vertical axis.

**[0019]** In another preferable embodiment of the lighting system according to the present invention, the lighting apparatus comprises two reflectors which together form a predominantly bowl-like or box-like reflection space having an open underside, whereas the gas discharge lamp is predominantly arranged in this reflection space, so each reflector can reflect a portion of the light emanating from the gas discharge lamp.

**[0020]** In still another embodiment, the gas discharge lamp is arranged between the two reflectors and screening means are provided to limit or to prevent the passage of light via lateral openings between the reflectors. Preferably, there is provided at opposing sides of the lamp a screening element having a predominantly V-shaped profile at the level of the lamp, the screening elements with the angular portion of this V shape facing each other opposite the lamp. In another possible embodiment, the V-shaped screening elements can be arranged, facing one another with the open side of the V, opposite the lamp. As a result, the light arriving on the inner wall of these screening elements is predominantly reflected in the direction of the orientable reflectors, so this light can also be oriented toward the shelves.

**[0021]** Screening means can also be provided to limit or to prevent the passage of light via openings, located at the upper side, between the reflectors. A cover cap may thus, for example, be provided in or opposite this opening.

**[0022]** These screening means preferably have a shape and dimensions such that they cover the openings between the reflectors irrespective of the adjusted position of the reflectors. They can, for example, be configured with a reflective surface at the lamp side.

**[0023]** If the lighting apparatus is fastened above an aisle between two rows of shelves in the most advantageous position, the reflectors being located at the sides facing the shelves at opposing sides of the gas discharge

lamp, whereas the aforementioned lateral openings are provided between the reflectors at a side of the lamp that faces the aisle, the former screening means prevent too much light from being emitted via the lateral openings in the longitudinal direction of the aisle and from lighting this aisle excessively and/or having a dazzling or at least disruptive effect.

**[0024]** In a particularly preferable embodiment, the reflectors are connected to a common frame, so each reflector is rotatable, independently of the other reflector (s), relative to a respective axis and can be placed in a number of different positions. The reflectors can be rotatably connected to the frame by simple connecting means.

**[0025]** Each reflector is preferably configured with a concave upper wall facing the lamp and a number of side-walls connecting thereto.

**[0026]** The gas discharge lamp is preferably a high-pressure gas discharge lamp such as, for example, a high-pressure sodium vapour gas discharge lamp or a high-pressure mercury vapour gas discharge lamp.

**[0027]** In order to enable the lighting apparatus to meet specific safety requirements, the lamp is preferably provided in a screened space delimited by means of walls made predominantly of transparent material. These walls may, for example, consist of glass.

**[0028]** In a highly preferable embodiment, the lighting apparatus comprises a housing in which the gas discharge lamp and the aforementioned reflectors are provided, and it is configured as a built-on apparatus.

**[0029]** In the present patent application, the term 'built-on apparatus' is used to describe both a lighting apparatus provided to be fastened to a ceiling or wall and a lighting apparatus provided to be suspended from a ceiling (or other supporting construction) by means of a suspension system, in a position removed from that ceiling (or this supporting construction).

**[0030]** Equally, the lighting apparatus can also be configured as a built-in apparatus and be provided with the conventional means to integrate and to fasten the apparatus in a ceiling.

**[0031]** One of the primary fields of application of the lighting apparatus according to the present invention is shop layouts, more specifically sale areas or warehouses and the like where shelves are arranged and where aisles between these shelves have to be lit in a manner bringing about accentuated lighting of the products displayed on the shelves. The present invention therefore also relates to a shop layout in which one or more lighting apparatuses according to the present invention are provided.

**[0032]** More specifically, the present invention also relates to a shop layout comprising a number of shelves between which an aisle is formed and a number of lighting apparatuses which are fastened above this aisle and provided with a gas discharge lamp and reflection means in order to reflect the light emanating from this lamp, wherein each lighting apparatus is provided to produce a batwing light distribution and wherein the aforementioned

reflection means comprise at least two separately orientable reflectors.

**[0033]** The above-described advantages and effects of the lighting apparatus according to the present invention are fully utilized in a shop layout of this type and result in a particularly advantageous shop layout with lighting which is more effective, energy-efficient and flexible than is the case in the known shop layouts.

**[0034]** Preferably, the lighting apparatuses installed in this shop layout are provided with a gas discharge lamp which is in a substantially vertical position. In a most preferable layout, the lighting apparatuses are arranged in such a way that a respective reflector is provided at the sides of the gas discharge lamp that face the shelves.

**[0035]** In the following description, a lighting apparatus according to the present invention is described in greater detail. This description serves merely further to illustrate the characteristics and advantages of the present invention and may therefore not be regarded as a limitation of the protection sought in the claims of the present patent application for the present invention, nor of the field of application thereof. In this description, reference numerals will be used to refer to the appended drawings, in which:

■ Figure 1 is a perspective view of a built-in lighting apparatus according to the present invention, viewed from the underside thereof;

■ Figure 2 is a more schematic, perspective view of the lamp and the reflectors of this lighting apparatus;

■ Figure 3 is a view from below of the components of the lighting apparatus that are shown in Figure 2;

■ Figure 4 is a schematic side view of the reflectors and the lamp of the lighting apparatus in a state in which the reflectors are placed in differing positions;

■ Figures 5 and 6 show the light distribution curve, in the C0/C180 planes and the C90/C270 planes, of two different gas discharge lamps - a 'PHILIPS CDM-T 70W' lamp and a 'OSRAM HCI-T 70W' lamp respectively; and

■ Figure 7 shows a possible light distribution curve of the lighting apparatus, in the C0/C180 planes and the C90/C270 planes.

**[0036]** The lighting apparatus shown in Figures 1 to 4 is configured as a built-in apparatus and accordingly comprises a built-in frame (4) carrying therebelow a rectangular framework (5). The built-in frame (4) is provided to be received in an opening in a ceiling in a position in which the framework (5) extends around the opening in the plane of the ceiling and is provided with fastening means (6) for the fastening thereof in the opening in the ceiling.

**[0037]** A holder (7) for a gas discharge lamp (1) is oriented downward with the opening for the lamp fitting, fastened to the built-in frame (4) centrally in relation to the framework (5). A high-pressure gas discharge lamp (1) having an elongate shape is placed in this holder (7),

so the axis of symmetry (A), running through the fitting, of this lamp (1) extends almost vertically when the lighting apparatus is fastened in a ceiling. Depending on the desired light intensity and light colour, a high-pressure mercury vapour gas discharge lamp (1) having a capacity of 35 W, 70 W, 100 W or 150 W can, for example, be provided. If a high-pressure sodium vapour gas discharge lamp (1) is used, a lamp capacity of 50 W or 100 W can be provided. A high-pressure xenon gas discharge lamp is also possible.

**[0038]** Furthermore, the lighting apparatus also comprises two reflectors (2), (3) which are rotatably fastened to the built-in frame (4) at opposing sides of the gas discharge lamp (1). These reflectors (2), (3) are each other's mirror image with respect to a vertical plane running through the lamp (1) perpendicularly to the long sides of the framework (5).

**[0039]** Each reflector (2), (3) comprises a bottom edge (8, 9, 10) having three sides (8), (9), (10) connecting perpendicularly to one another so as to form a U, and a number of reflector walls (11), (12), (13) which connect upwardly to these sides and connect to one another and define a laterally surrounded reflection space having an open underside. The aforementioned edge (8-10) fits one side of the lamp (1) within the aforementioned framework (5).

**[0040]** From the side (8) of the edge (8 - 10) running parallel to the adjacent short side of the framework (5), a concavely curved upper wall (11) extends upward and terminates in proximity to the lamp (1), whereas the two other parallel sides (9, 10) of the edge (8 - 10) connect to respective sidewalls (12), (13) which extend obliquely upward and connect thereabove to the concave upper wall (11). The space laterally delimited by these reflector walls (9), (10) is thus also open at the side facing the lamp (1). The reflector walls (11), (12), (13) are located above the framework (5) when the edge (8 - 10) is located in the plane of the framework (5). As shown for the left-hand reflector (2) in Figure 1, the reflectors (2), (3) can be rotated downward.

**[0041]** Together, the two reflectors (2), (3) form a bowl-like reflection space having a rectangular open underside. As a result of the fact that the lamp (1) is located between the reflectors (2), (3), the walls (11, 12, 13) of this reflection space are interrupted at the level of the lamp (1).

**[0042]** In order to prevent the passage of light between the reflectors (2), (3) in the lateral direction - in a direction perpendicular to the long sides of the framework (5) - a screening element (14), (15) is provided at this location, at opposing sides of the lamp (1). Each screening element (14), (15) comprises two flat walls which connect to each other at an acute angle and extend downward next to the lamp (1). Both screening elements (14), (15) face the lamp (1) with the angular portion (16) and extend over sufficient width to cover the openings between the reflectors in any possible position of these reflectors (2), (3). As a result of their V shape at the level of the lamp

(1), the screening elements (14), (15) reflect the light originating from the lamp in the direction of the orientable reflectors, so a considerable portion of this light can also reach shelves. This, again, results in improved accentuating of the products on the shelves.

[0043] A cover cap is provided above the lamp (1) to prevent the passage of light between the reflectors (2), (3) in the upward direction. The screening means (14), (15) and the cover cap are configured with a reflective surface at the lamp side and thus act in this apparatus as fixed reflectors.

[0044] The parallel sides (9), (10) of the edge (8) of each reflector (2), (3) are rotatably connected to the long sides of the aforementioned framework (5). This connection is produced at two opposing locations, so each reflector (2), (3) is rotatable about a notional axis (17) extending perpendicularly to the long sides of the framework (5). Each reflector (2), (3) can be placed as a result of this rotation in any desired position and can be fixed in this position with the aid of conventional mechanical means (not shown in the figures).

[0045] This lighting apparatus is integrated, for example, in a shop layout in the ceiling centrally above a two metre-wide aisle between two rows of shelves having differing heights of 1.80 m and 2.00 m respectively. The apparatus is fastened in such a way that the long sides of the framework (5) are oriented perpendicularly to the longitudinal direction of the aisle and thus also perpendicularly to the direction of the rows of shelves arranged at opposing sides. Obviously, other arrangements are also possible such as, for example, an arrangement in which the long sides of the framework (5) extend parallel to the longitudinal direction of the aisle.

[0046] Each reflector (2), (3) reflects a portion of the light originating from the lamp (1). As a result of the fact that the position of each reflector is separately adjustable, the light distribution can be defined in such a way that each shelf is optimally lit. The left-hand reflector reflects light in the direction of the shelf arranged to the left of the aisle. The right-hand reflector directs light at the shelf arranged on the right-hand side. However, the reflectors (1), (2) can also be configured in such a way as to allow light to be reflected by the left-hand reflector toward the shelf on the right-hand side and to be directed by the right-hand reflector toward the shelf arranged on the left-hand side. The aisle itself is adequately lit at lower light intensity, so this shop fitting can be used to accentuate the products on offer on the shelves.

[0047] The light distribution of the lighting apparatus in the C0/C180 planes (in the vertical plane perpendicular to the shelves) is illustrated in Figure 7 by the solid-line curve. The light distribution of the lighting apparatus in the C90/C270 planes (in the vertical plane parallel to the shelves) is illustrated in Figure 7 by the broken-line curve. This light distribution clearly shows that the light is directed for the most part toward the shelves (in the C0/C180 planes) and much less toward the aisle between these shelves (in the C90/C270 planes).

## Claims

1. Lighting apparatus comprising a gas discharge lamp (1) and reflection means to reflect the light emanating from this lamp, **characterized in that** the lighting apparatus is provided to produce a batwing light distribution and **in that** said reflection means comprise at least two separately orientable reflectors (2), (3).
2. Lighting apparatus according to Claim 1, **characterized in that** the aforementioned gas discharge lamp (1) is arranged in the apparatus in such a way that this lamp is in a substantially vertical position when the lighting apparatus is placed in the use position.
3. Lighting apparatus according to either Claim 1 or Claim 2, **characterized in that** the two zones having greater light intensity that are a result of the batwing light distribution can each be positioned separately by orienting said reflectors (2), (3).
4. Lighting apparatus according to any one of the preceding claims, **characterized in that** the lighting apparatus comprises two reflectors (2), (3) which together form a predominantly bowl-like or box-like reflection space having an open underside, and **in that** the gas discharge lamp (1) is predominantly arranged in this reflection space, so each reflector (2), (3) can reflect a portion of the light emanating from the gas discharge lamp (1).
5. Lighting apparatus according to Claim 4, **characterized in that** the gas discharge lamp (1) is arranged between the two reflectors (2), (3) and **in that** screening means (14), (15) are provided to limit or to prevent the passage of light via lateral openings between these reflectors (2), (3).
6. Lighting apparatus according to any one of the preceding claims, **characterized in that** the reflectors (2), (3) are connected to a common frame (4), so that each reflector (2), (3) is rotatable, independently of the other reflector(s) (2), (3), relative to a respective axis (17) and can be placed in a number of different positions.
7. Lighting apparatus according to any one of the preceding claims, **characterized in that** each reflector comprises a concave upper wall (11) and a number of sidewalls (12), (13) connecting thereto.
8. Lighting apparatus according to any one of the preceding claims, **characterized in that** the aforementioned lamp (1) is a high-pressure gas discharge lamp.
9. Lighting apparatus according to any one of the preceding claims, **characterized in that** the gas dis-

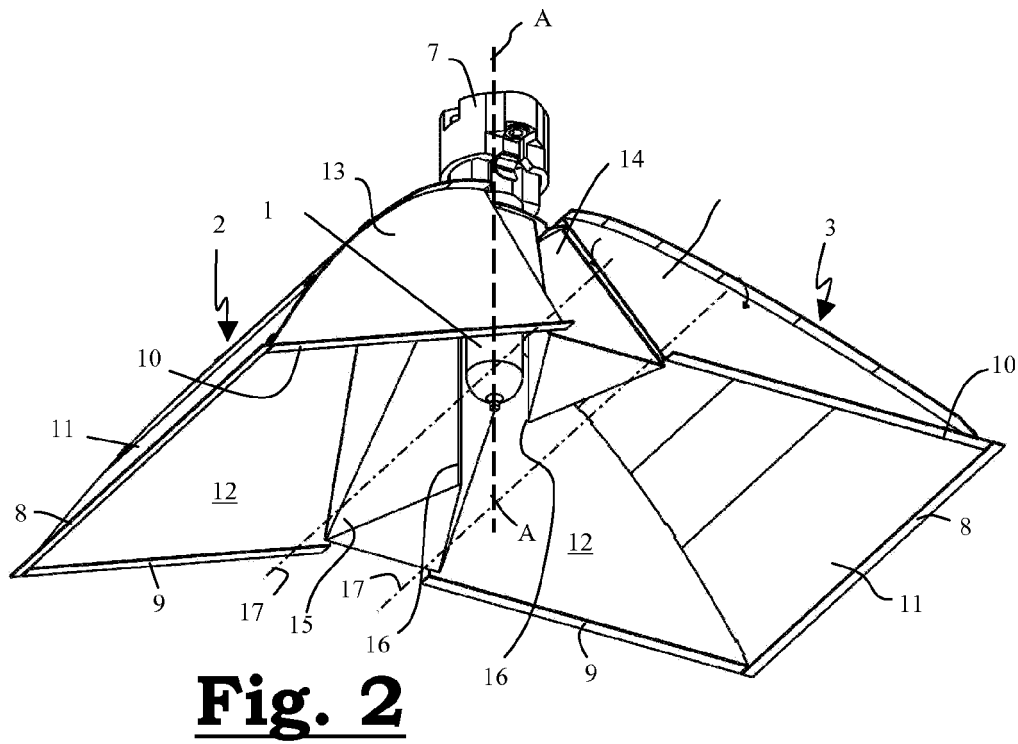
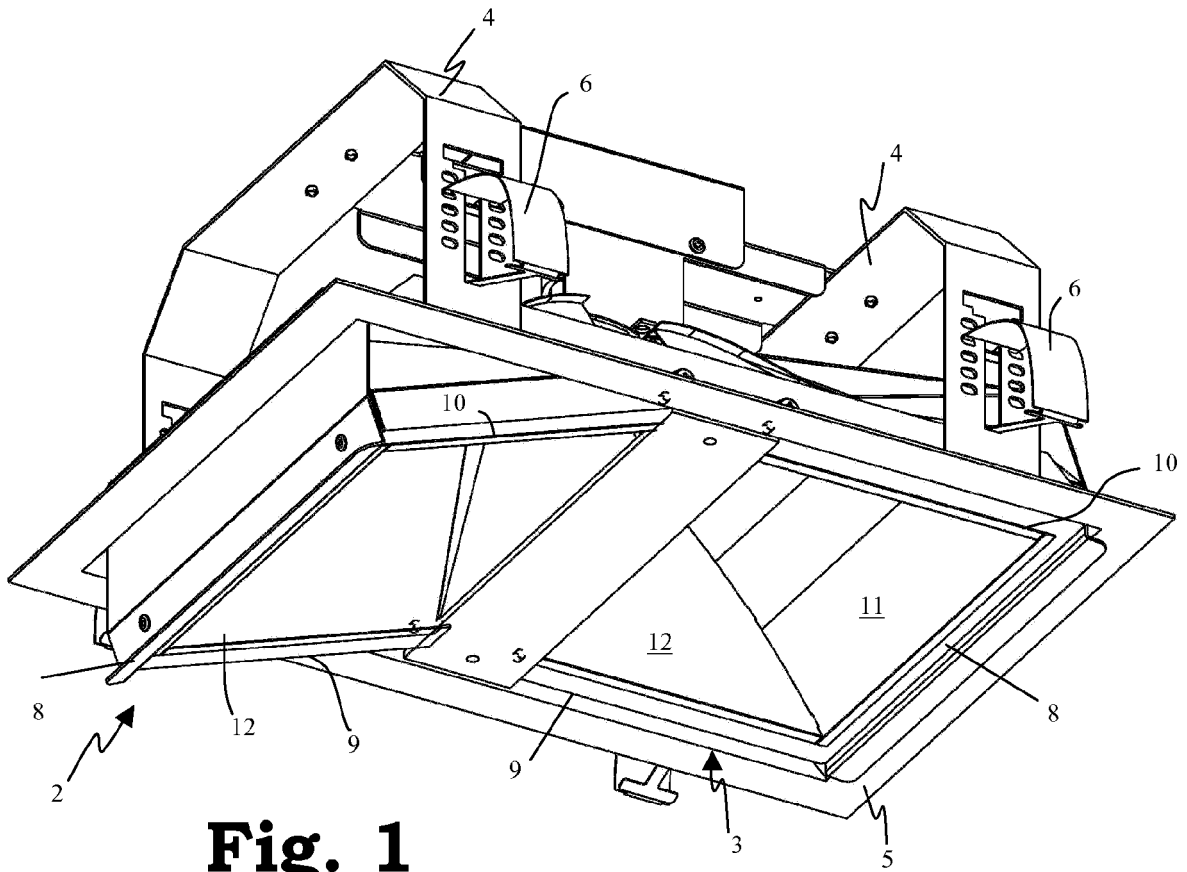
charge lamp (1) is provided in a screened space delimited by means of walls made predominantly of transparent material.

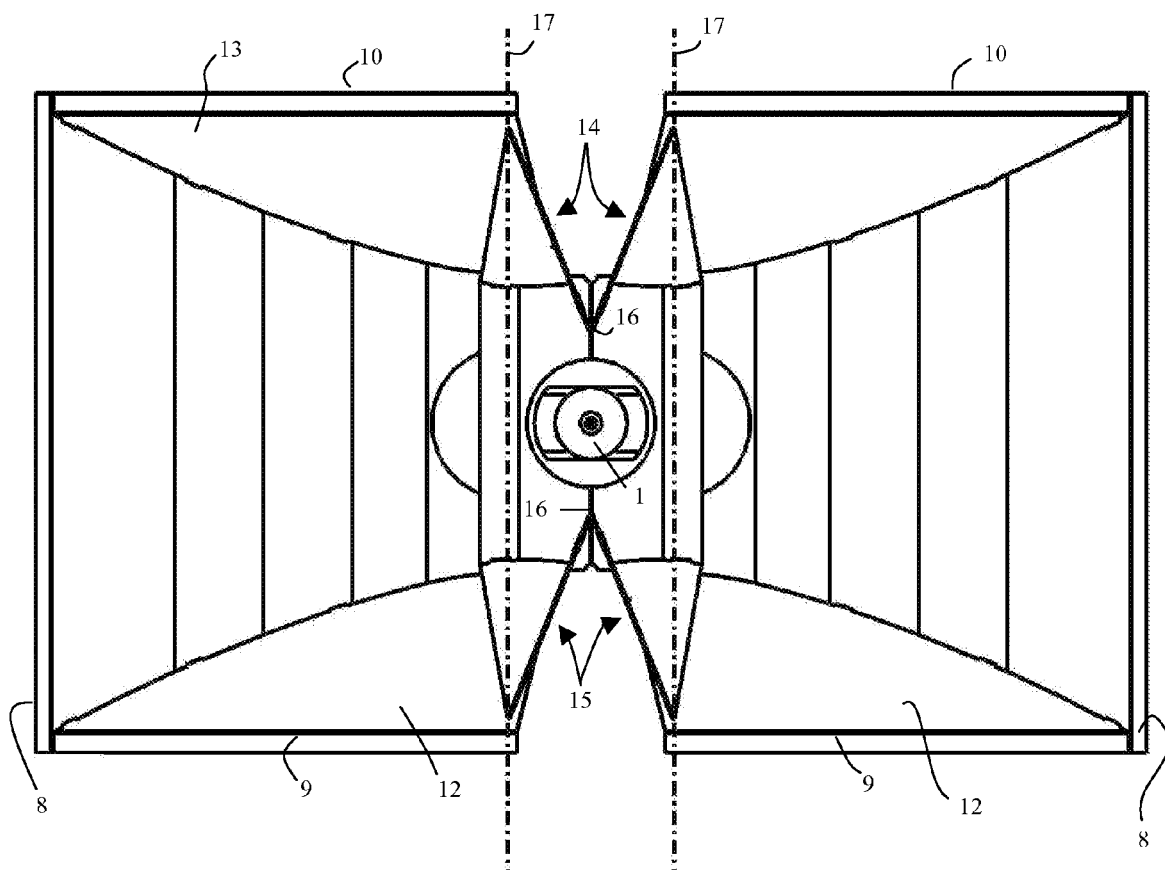
10. Lighting apparatus according to any one of the preceding claims, **characterized in that** the lighting apparatus is configured as a built-on apparatus and comprises a housing in which the gas discharge lamp (1) and the aforementioned reflectors (2), (3) are provided. 5  
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11. Lighting apparatus according to any one of Claims 1 to 9, **characterized in that** the lighting apparatus is configured as a built-in apparatus. 15
  
12. Shop layout comprising a number of shelves between which an aisle is formed and a number of lighting apparatuses which are fastened above this aisle and provided with a gas discharge lamp (1) and reflection means in order to reflect the light emanating from this lamp (1), **characterized in that** each lighting apparatus is provided to produce a batwing light distribution and **in that** said reflection means of each apparatus comprise at least two separately orientable reflectors (2), (3). 20  
25
  
13. Shop layout according to Claim 12, **characterized in that** said discharge lamp (1) is in a substantially vertical position. 30
  
14. Shop layout according to either Claim 12 or Claim 13, **characterized in that** each lighting apparatus comprises, at the sides of the gas discharge lamp that face the shelves, a respective separately orientable reflector (2), (3). 35
  
15. Shop layout according to any one of Claims 12 to 14, **characterized in that** the lighting apparatuses are configured according to one or more of Claims 1 to 11. 40

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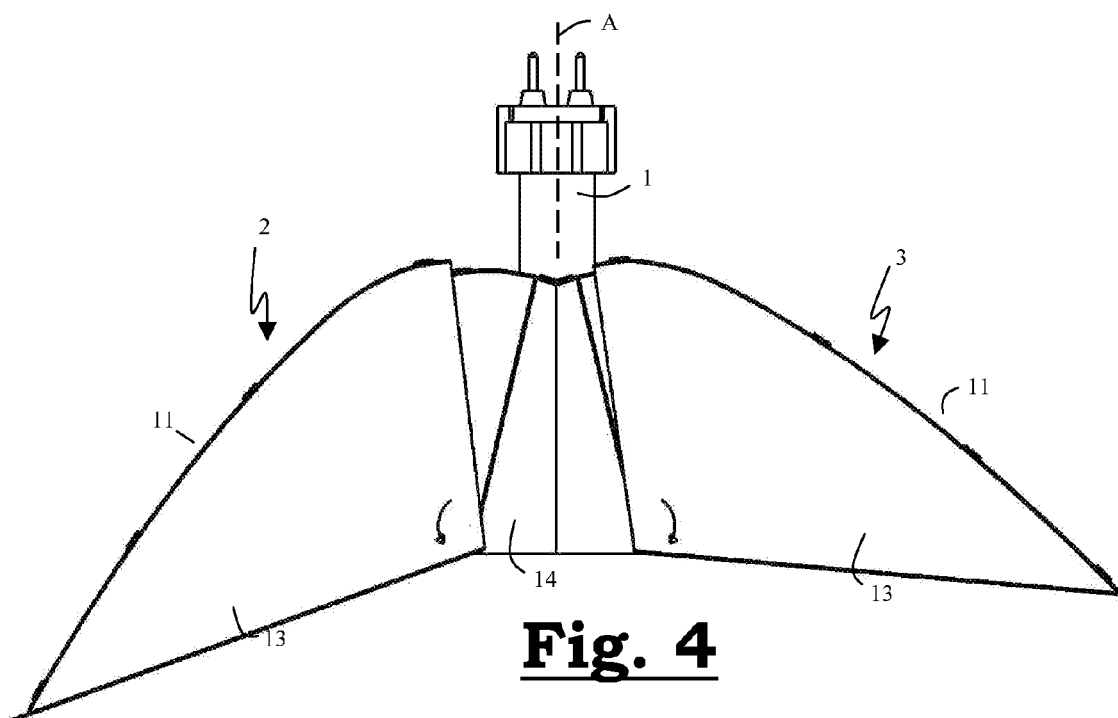
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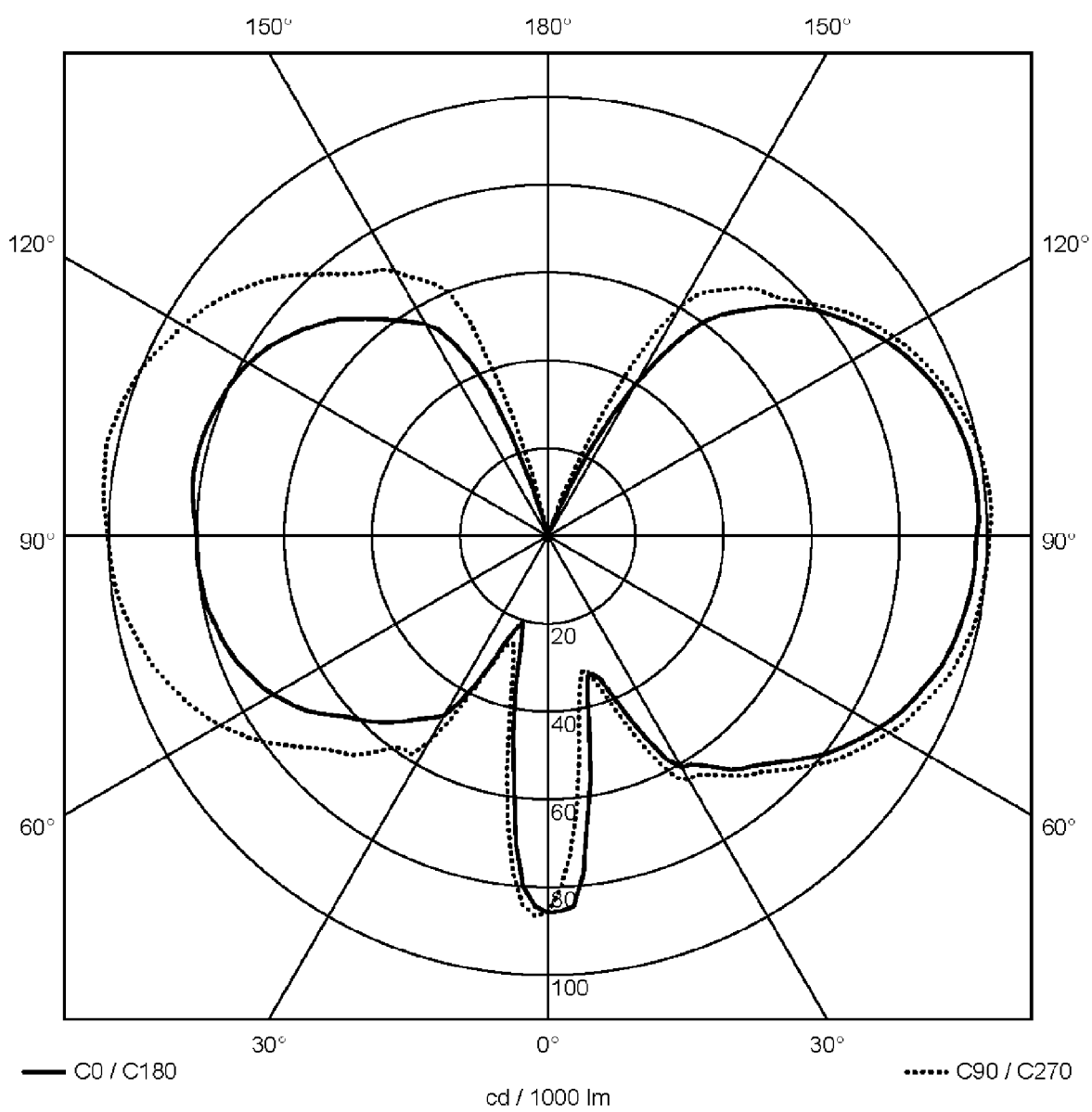


**Fig. 3**

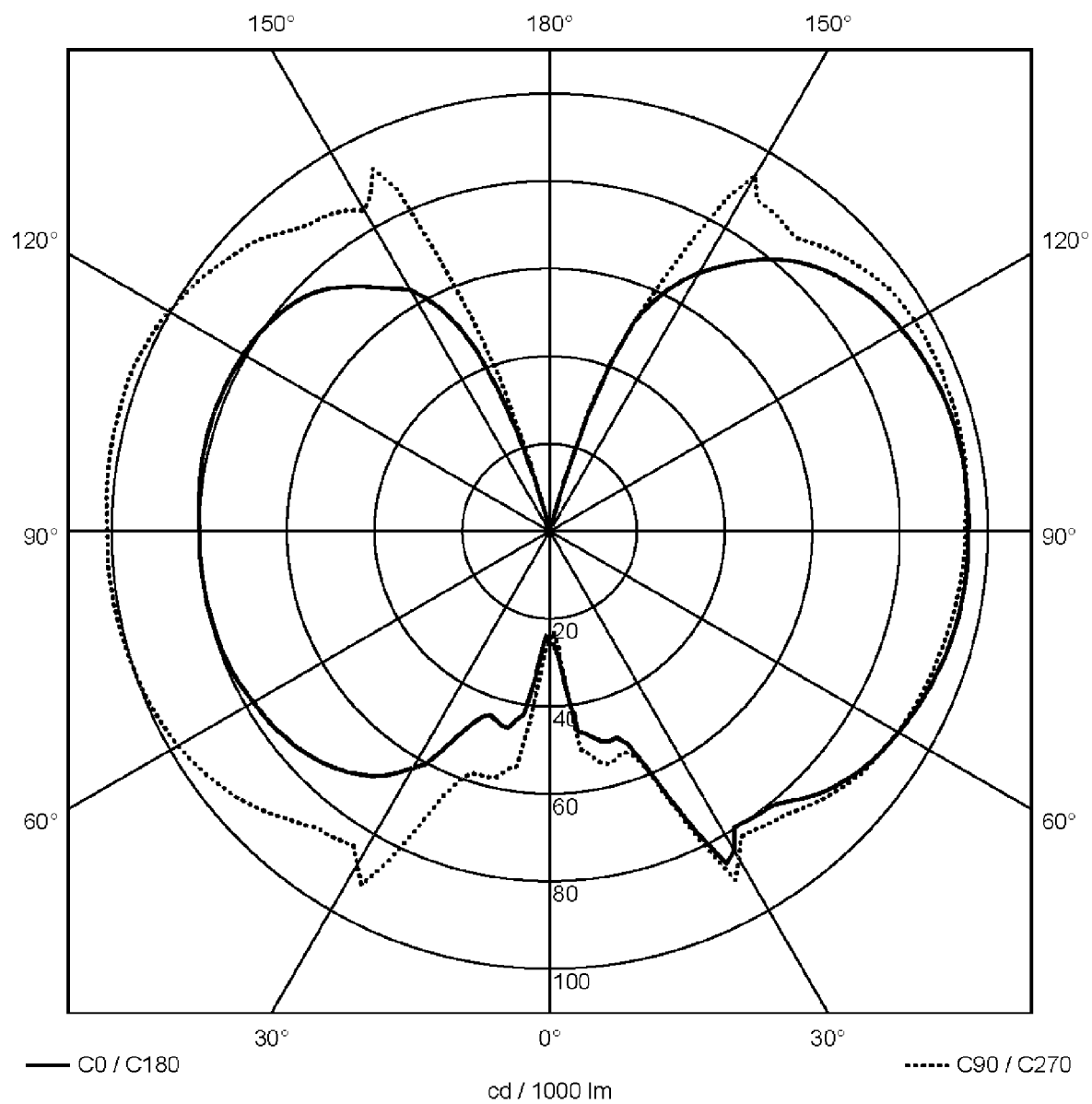


**Fig. 4**

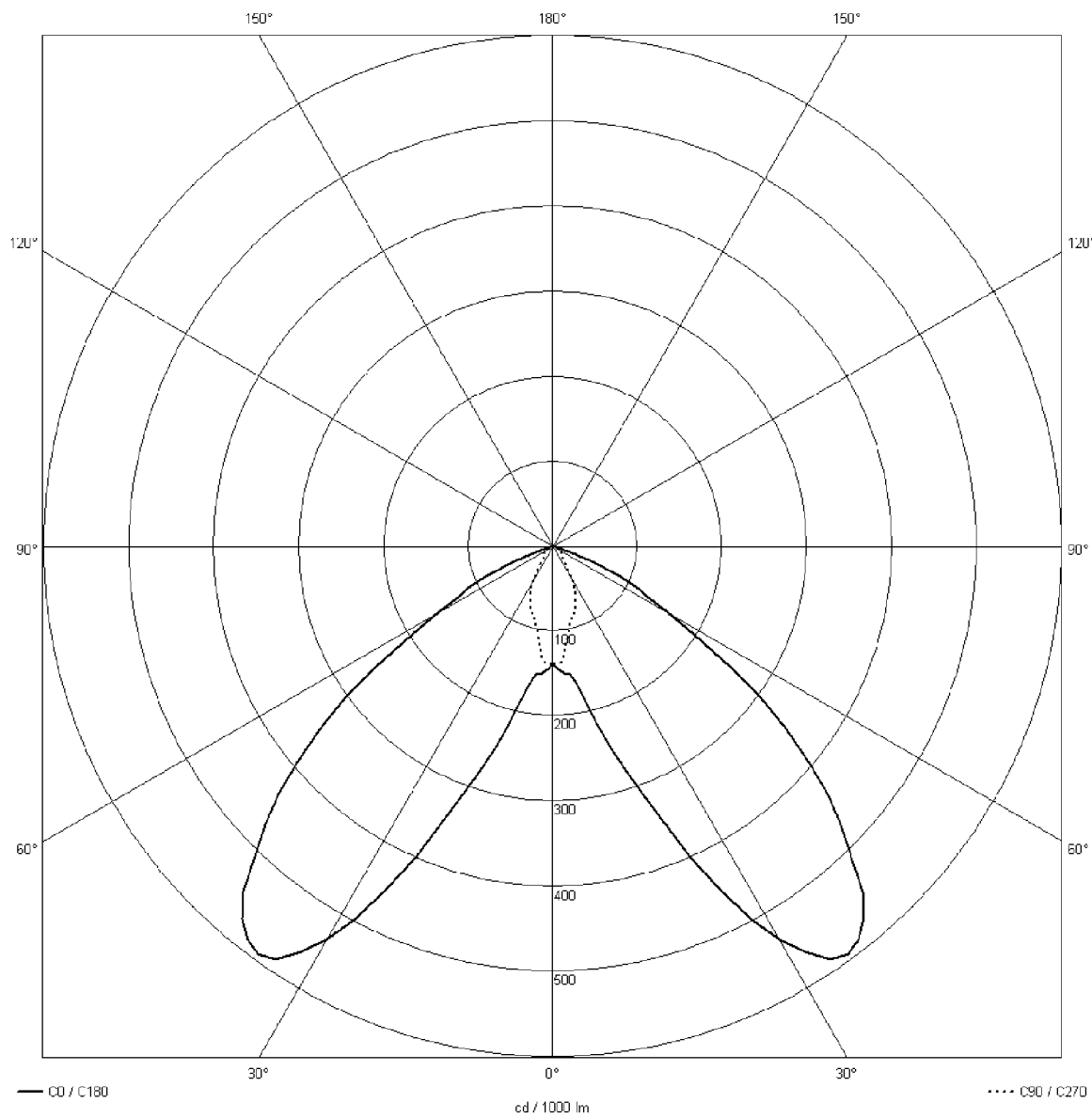




**Fig. 5**



**Fig. 6**



**Fig. 7**



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 07 12 1224

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 93/06414 A (WINDSOR D W LTD [GB]) 1 April 1993 (1993-04-01) * page 3, line 19 - page 4, line 2 * * figure 1 *	1,3,4, 6-8,11	INV. F21V14/04 F21V17/02
X	DE 18 03 911 U (SCHANZENBACH & CO GMBH [DE]) 14 January 1960 (1960-01-14) * page 2, paragraph 3 * * figures 1a,1b *	1-4,6	
X	EP 1 526 327 A1 (ALM [FR] MAQUET S A [FR]) 27 April 2005 (2005-04-27) * paragraphs [0012] - [0015] * * figure 2 *	1,2,6, 8-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			F21V
<p><del>The present search report has been drawn up for all claims</del></p>			
Place of search		Date of completion of the search	Examiner
The Hague		24 January 2008	Amerongen, Wim
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)



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Application Number

EP 07 12 1224

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- 1-11
- ☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



European Patent  
Office

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
EP 07 12 1224

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11

Lighting apparatus comprising a gas discharge lamp and reflection means.

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2. claims: 12-15

Shop layout comprising a number of shelves between which an aisle is formed and a number of lighting apparatuses which are fastened above this aisle and provided with a gas discharge lamp and reflection means.

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 12 1224

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-01-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9306414	A	01-04-1993	AT 146268 T	15-12-1996
			AU 662015 B2	17-08-1995
			AU 2591092 A	27-04-1993
			CA 2119469 A1	01-04-1993
			DE 69215882 D1	23-01-1997
			DE 69215882 T2	12-06-1997
			DK 604515 T3	02-06-1997
			EP 0604515 A1	06-07-1994
			ES 2097351 T3	01-04-1997
			JP 6510882 T	01-12-1994
			JP 3509096 B2	22-03-2004
			US 5426575 A	20-06-1995
			-----	
DE 1803911	U	14-01-1960	NONE	
EP 1526327	A1	27-04-2005	CN 1609508 A	27-04-2005
			DE 602004003452 T2	20-09-2007
			FR 2861186 A1	22-04-2005
			JP 2005129530 A	19-05-2005
			US 2005083594 A1	21-04-2005
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