(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 614 042 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **94200517.4**

(51) Int. Cl.[5]: **F21V 31/00**, F21S 7/00

(22) Date of filing: **01.03.94**

(30) Priority: **05.03.93 EP 93200638**

(43) Date of publication of application:
07.09.94 Bulletin 94/36

(84) Designated Contracting States:
BE DE ES FR GB IT NL SE

(71) Applicant: **N.V. Philips' Gloeilampenfabrieken**
Groenewoudseweg 1
NL-5621 BA Eindhoven (NL)

(72) Inventor: **Penning, Cornelis, c/o INT.**
OCTROOIBUREAU B.V.
Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)

(74) Representative: **Rooda, Hans et al**
INTERNATIONAAL OCTROOIBUREAU B.V.,
Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)

(54) Segment for a line illumination device and device provided therewith.

(57) The segment (20) for a line illumination device which has a plurality of tubular fluorescent (2) and of single-ended compact fluorescent lamps (3) mounted alternatingly against a carrier (1), comprises a U-shaped profile (21) in which electrical components (24) for supplying power to the lamps are accommodated. The components are present in an open container (30) which can be coupled to the profile (21) in a watertight manner. The container (30) may be secured to a holder (40) destined for being mounted against a carrier (1) of the illumination device. The segment (20) allows for a fast and easy mounting of the device of any length and for easy replacement of components.

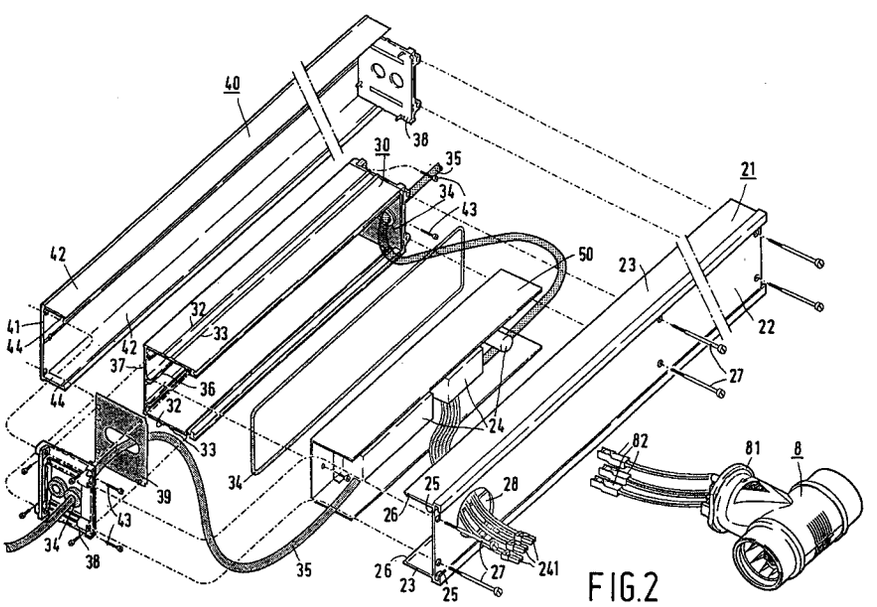


FIG.2

EP 0 614 042 A1

The invention relates to a segment for a line illumination device of tubular fluorescent lamps which are to be mounted in line against a carrier and which each have end portions with respective lamp caps, alternating with single-ended compact fluorescent lamps whose lamp caps face towards the carrier,

which segment is provided with a substantially U-shaped profile having a base and legs, in which profile supply components for the electric supply of fluorescent lamps are accommodated, and which segment is furthermore provided with means for fastening a mounting member fitted with lampholders for fluorescent lamps. The invention also relates to a line illumination device provided with such a segment.

Such a line illumination device and a segment for it are known from EP 0.510.963-A2.

The known line illumination device renders it possible to illuminate the carrier evenly. In contrast to other line illumination devices, which are constructed exclusively with tubular fluorescent lamps, this device causes no interruptions in the illumination pattern which are the result of the comparatively dark end portions of the tubular lamps, and of the lamp caps and the lampholders in which these are held, from which no light at all issues. The compact fluorescent lamps with their comparatively high brightness compensate for the lack of light in these dark regions in other devices.

When the device known from EP 0.514.963-A2 is arranged behind a translucent screen, this screen can also be evenly illuminated.

For applications in the open air and for applications in humid spaces it is desirable that the supply components can be closed off from the surroundings in a watertight manner. It is also desirable that the device can nevertheless be installed with ease.

It is an object of the invention to provide a segment for a line illumination device of the kind described in the opening paragraph which offers the possibility of closing off the supply components from the surroundings in a watertight manner and which is nevertheless of a simple construction which renders possible an easy installation of a line illumination device with that segment. It is also an object of the invention to provide a line illumination device fitted with such a segment.

According to the invention, this object is achieved in that an open container with supply components is present in the substantially U-shaped profile of the segment, which container can be coupled to the profile in a watertight manner.

The segment may have a length which is chosen from a plurality of lengths. The segment may be designed, for example, for accommodating one tubular lamp of approximately 36 W with a length of approximately 120 cm and one compact lamp. The segment then has a length of approximately 128 cm. The segment may alternatively accommodate one tubular lamp of approximately 58 W with a length of approximately 150 cm and one compact lamp, in which case it is approximately 158 cm long. In an alternative embodiment, however, the segment has a multiple of one of these lengths, or it has in addition to a tubular lamp of the one length one or several tubular lamps of the other length. In a concrete device, the kind(s) of the segments used depend(s) on the length of the carrier which is provided with the line illumination device.

In view of the considerable length which a segment may have, and because each lamp is to be fed through connection of its lamp cap(s) to the supply, it is practical to accommodate the supply components of a compact lamp and of a tubular lamp in the profile in the vicinity of these lamps. In a segment comprising, for example, two or three tubular lamps, therefore, there may be two or three containers present.

The segment according to the invention now renders it possible to provide the cabling between the containers, and possibly also between adjoining segments, and to bring the containers into the profile after that and also close them off in a watertight manner on the profile. For connection to lampholders of fluorescent lamps, a cable may issue to the exterior, for example, from the profile in a watertight manner. Alternatively, such a cable may issue from a wall, for example an end face of the container to the exterior in a watertight manner and extend through or alongside the profile towards lampholders.

In a favourable embodiment, the profile has mutually facing open ducts at the base side facing away from the legs. These open ducts together may form means for fastening a mounting member. The mounting member may have a flange for this purpose with a first dimension which is smaller than the distance between the open ducts and a second dimension which is greater than this distance. The mounting member may then be brought with its flange between the open ducts and coupled to the ducts in bayonet-fashion in that it is given an angular rotation of, for example, 90°. Similarly, a screen may be provided in that supports for that screen are given similar flanges and are coupled to the profile in the same manner, using the open ducts. The lamps may be present behind said screen in the finished device.

A cable or wires may issue to the exterior from the mounting member so as to be coupled to a cable from the segment. It is favourable, however, when the mounting member covers an opening in the profile and, for example, a cable from the mounting member is coupled to, for example, a

cable from the segment. If the opening in the profile has not yet been sealed around the relevant cable, the mounting member may be provided, if necessary, with an interposed seal, for example a scaling ring or disc.

In a favourable embodiment, the container is fastened to a holder designed for mounting against a carrier of the line illumination device. In this embodiment, the holder may be mounted against the carrier, and cables may be guided from a container, for example through an end face thereof, for example through the use of grommets, towards adjoining segments in a watertight manner. The holder may be a plate, for example a flat plate, but alternatively it may be, for example, a substantially U-shaped duct having a base and legs. Such a duct has an advantage of a greater rigidity than a plate.

In a further particular embodiment, the holder has rims at the legs with hooks which are directed inwards, which hood provide a snap connection with first ridges on the container. An attractive aspect of this is that a coupling is already created when a container is put in its position in the holder. This is convenient when a device, for example one provided against a roof edge, needs servicing and a container is to be exchanged. If so desired, however, the container may additionally be fixed against the holder, for example with screws. For this purpose, screws may be inserted, for example, through holes at the outside of end faces of the containers, so that no sealing means between said screws and the container need be used for maintaining watertightness.

In an embodiment, the substantially U-shaped profile has edges at the legs with inwardly directed hooks which provide a snap connection with second ridges on the container. An attractive aspect of this embodiment is that the mere positioning of a container in the profile achieves a coupling. This is convenient when the segment is being assembled. It is also important during mounting of a device against a carrier, or during maintenance of a device already mounted. The operator who returns the profile around a container fastened to a holder has both hands free for tightening the profile against the container, for example with screws, and thus ensuring watertightness.

In an embodiment of the segment, the supply components are present in the container on a component carrier which is fastened against a split shaft at a wall of the container. The component carrier renders mounting of the components in the container easier. The components may be fixed in locations chosen at will, also determined by their shapes and sizes, on the component carrier, for example with screws, hollow rivets, *etc*. The component carrier may be fixed in the container without a wall of the container having to be pierced for this purpose. Screws or, for example, pop rivets may readily be fixed in the split. No container wall need be drilled through for this.

An embodiment of the segment and of the device according to the invention is shown in the drawing, in which

Fig. 1 is a perspective view;

Fig. 2 is an exploded view of the segment of Fig. 1;

Fig. 3 shows the opened segment of the preceding Figures; and

Fig. 4 shows a mounting member from the preceding Figures in cross-section.

In Fig. 1, the segment for a line illumination device with tubular fluorescent lamps 2 which are mounted in line against a carrier 1 and which each have end portions 3 with respective lamp caps 4, alternating with single-ended compact fluorescent lamps 5 (see Fig. 4) whose lamp caps 6 face towards the carrier 1, is mounted against the carrier 1, in the Figure in a cavity reserved in this carrier. The segment comprises three tubular and three compact fluorescent lamps.

The segment 20 is provided with a substantially U-shaped profile 21 with a base 22 and legs 23, in which profile supply components 24 (see Fig. 3) for the electric supply of fluorescent lamps 2, 5 are accommodated, and which segment in addition is provided with means 7 for fastening a mounting member 8 provided with lampholders 9, 10 (see Fig. 4) for fluorescent lamps 2, 5.

Just as the mounting member 8 on the left in the Figure can accommodate a second end portion of a tubular fluorescent lamp which is also mounted in a preceding segment, the tubular fluorescent lamp which is mounted in the mounting member on the right in the Figure is accommodated with its second end portion in a next segment of the device.

An open container 30 with supply components 24 is present (see Fig. 3) in the substantially U-shaped profile 21 of the segment 20, which container can be coupled to the profile 21 in a watertight manner.

In Fig. 2, the extruded profile 21, for example made of aluminium, in the embodiment shown has mutually facing open ducts 25 at the base 22, at the side thereof facing away from the legs 23. The mounting member 8 has a flange 81 which can form a bayonet coupling with the ducts 25 of the profile 21. Supports for a screen to be mounted in front of the lamps, if applicable, which transmits and/or reflects the light of the lamps, may be coupled to the segment in a similar manner.

The container 30 is fastened to a holder 40, by means of screws 43 in the Figure, which holder is destined for mounting against a carrier (1 in Fig. 1) of the line illumination device.

The holder 40 is substantially U-shaped with a base 41 and legs 42. The holder shown is an extruded profile which was cut off to the desired length.

The holder 40 has rims with inwardly directed hooks 44 at its legs 42, which hooks provide a snap connection with first ridges 32 on the container 30. The holder and the container can be quickly coupled as a result. The coupling may be the definitive or a provisional coupling. In the latter case, for example, the screws 43 are additionally used.

The substantially U-shaped profile 21 in the embodiment drawn also has rims with inwardly directed hooks 26 at the legs 23, which hooks provide a snap connection with second ridges 33 on the container 30. This coupling is an auxiliary coupling which may be present during transport from the factory to the place of assembly of the line illumination device. The container 30 and the profile 21 may then be easily and quickly detached from one another for mounting of the device. After the cabling 35 has been laid to preceding and subsequent segments, the container and profile may be readily coupled together again. The operator then has both hands free for making the coupling watertight, for example with screws 27, in the Figure owing to the presence of a gasket 34.

In embodiments in which wiring to the mounting member issues to the exterior in a watertight manner, for example through an end face 38 or through the profile 21, the container 30 is then closed in a watertight manner.

The supply components 24 such as components for starting, operating, stabilizing, and possibly dimming, such as a ballast, a starter, a capacitor, *etc.*, are present in the container 30 on a component carrier 50 which is fastened against a split shaft 36 at a wall 37 of the container 30. In the embodiment drawn, the component carrier has a U-shaped design for obtaining a good stability in the container and an even temperature distribution.

The container in the Figure is an extruded U-shaped duct which is closed in a watertight manner at its ends by means of end faces 38 with interposed gaskets 39. The cables 35 are led to the exterior in a watertight manner through grommets 34.

An additional end face 38 is present on the right in the Figure for mechanical reinforcement of the segment in view of the absence of a component container in that location.

The mounting member 8 is passed through an opening 28 in the profile 21 and seals off this opening in a watertight manner with a flange 81. For example, a scaling ring may be used for this. Wiring with connectors 241 issues from the opening to the exterior so as to be connected to wiring with connectors 82 of the mounting member 8. Two wires are to go to the lamp cap of a first tubular lamp, two wires to a compact lamp, and two wires to a second tubular lamp.

Fig. 3 shows the segment in the state in which it can be mounted against a carrier (1 in Fig. 1). Alternatively, the holder 40 could be mounted to said carrier and subsequently, the container 30, which can be coupled to the profile 21 in a watertight manner, to the holder. The profile 21 can be snapped on the container 30 and then be connected thereto in a watertight manner, while the wiring with the connectors 241 issues from the opening 28 to the exterior. After the electrical connections have been made, the mounting member can be mounted and after that the tubular lamps.

In Fig. 4, a single-ended compact fluorescent lamp is present in the mounting member 8, with its lamp cap 6 accommodated in a lampholder 10 which will be arranged near the carrier (1 in Fig. 1) of a line illumination device. Two lampholders 9 for tubular fluorescent lamps 2 are also present in the mounting member. The tubular fluorescent lamps are enveloped by a translucent tube 82. Nuts 83 with sealing rings 84 seal the mounting member 8 against these tubes in a watertight manner. In an alternative embodiment, however, the nuts may grip around the lamps themselves in a scaling manner. The mounting member has a flange 81 with a scaling ring 84 which renders possible a watertight connection to the profile (21 in Fig. 1).

Claims

1. A segment for a line illumination device of tubular fluorescent lamps (2) which are to be mounted in line against a carrier (1) and which each have end portions (3) with respective lamp caps (4), alternating with single-ended compact fluorescent lamps (5) whose lamp caps (6) face towards the carrier (1),

which segment (20) is provided with a substantially U-shaped profile (21) having a base (22) and legs (23), in which profile supply components (24) for the electric supply of fluorescent lamps (2, 5) are accommodated, and which segment is furthermore provided with means (7) for fastening a mounting member (8) fitted with lampholders (9, 10) for fluorescent lamps (2, 5),

characterized in that an open container (30) with supply components (24) is present in the substantially U-shaped profile (21) of the segment (20), which container can be coupled to the profile (21) in a watertight manner.

2. A segment as claimed in Claim 1, characterized in that the profile (21) has mutually facing

open ducts (25) at the base (22), facing away from the legs (23).

3. A segment as claimed in Claim 1 or 2, characterized in that the container (30) is fastened to a holder (40) designed for mounting against a carrier (1) of the line illumination device.

4. A segment as claimed in Claim 3, characterized in that the holder (40) is substantially U-shaped with a base (41) and legs (42).

5. A segment as claimed in Claim 4, characterized in that the holder (40) has rims at the legs (42) with hooks (44) which are directed inwards, which hooks provide a snap connection with first ridges (31) on the container (30).

6. A segment as claimed in Claim 1, characterized in that the substantially U-shaped profile (21) has edges at the legs (23) with inwardly directed hooks (26) which provide a snap connection with second ridges (32) on the container (30).

7. A segment as claimed in Claim 1, characterized in that the supply components (24) are present in the container (30) on a component carrier (50) which is fastened against a split shaft (36) at a wall (37) of the container (30).

8. A line illumination device provided with segments as claimed in any one of the preceding Claims, characterized in that the mounting member (8) has a flange (81) which provides a bayonet coupling with mutually facing open ducts (25) of the profile (21).

9. A line illumination device as claimed in Claim 8, characterized in that the mounting member (8) is passed through an opening (2) in the profile (21) and seals off this opening in a watertight manner by means of a flange (81).

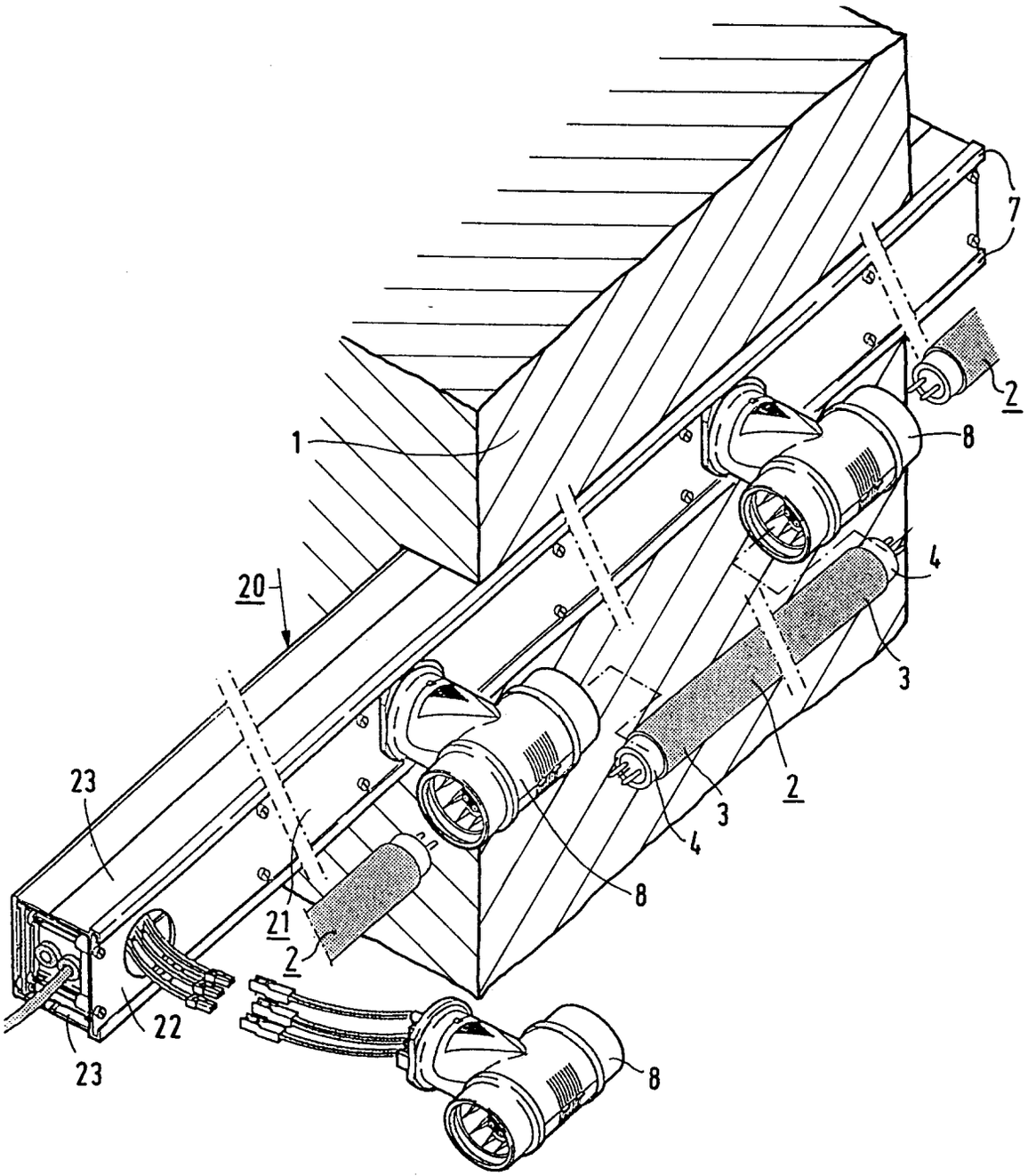


FIG.1

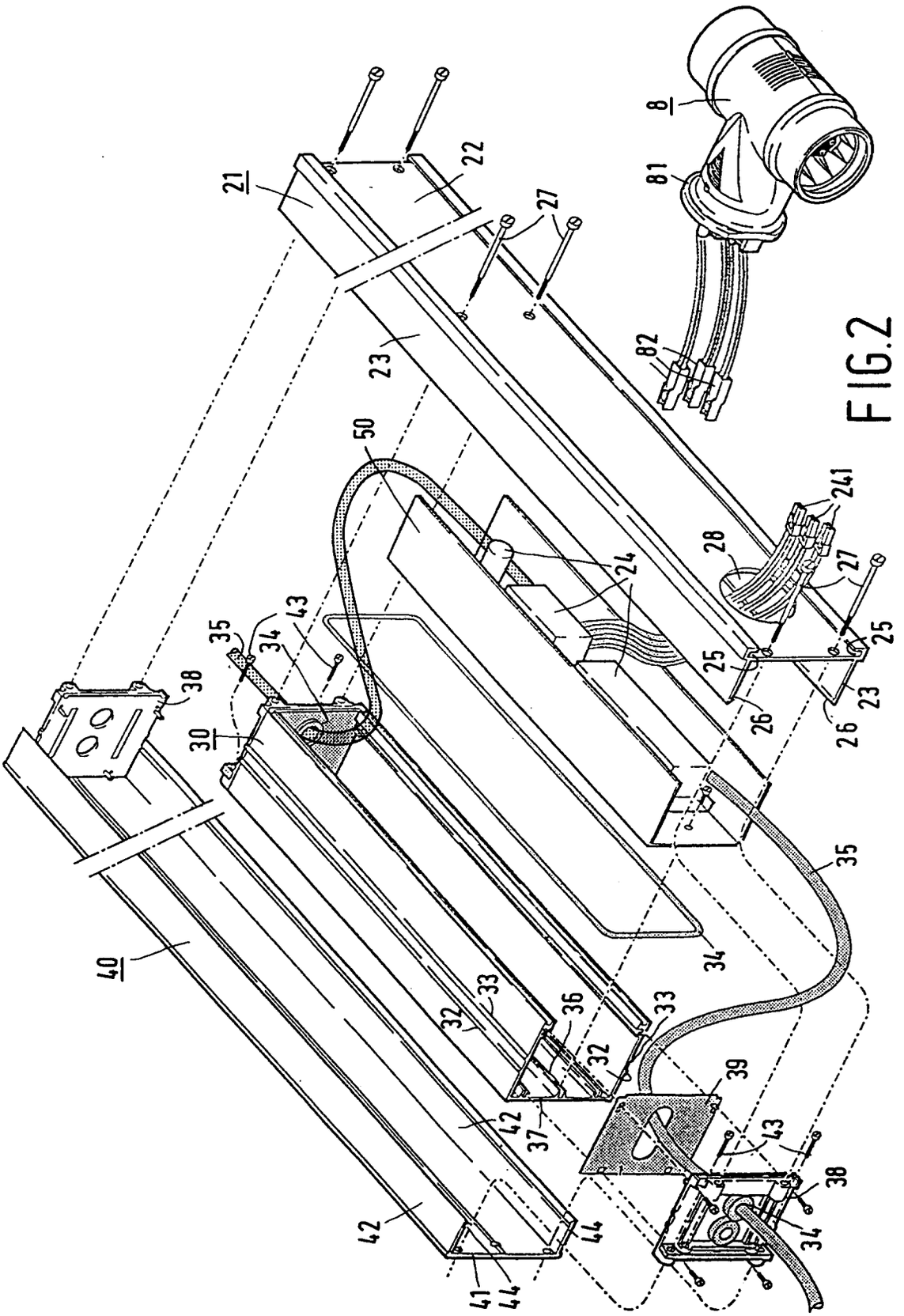

8
81
82
21
22
27
23
50
241
28
24
25
26
35
34
43
38
30
40
33
32
36
39
42
37
44
41

FIG.2

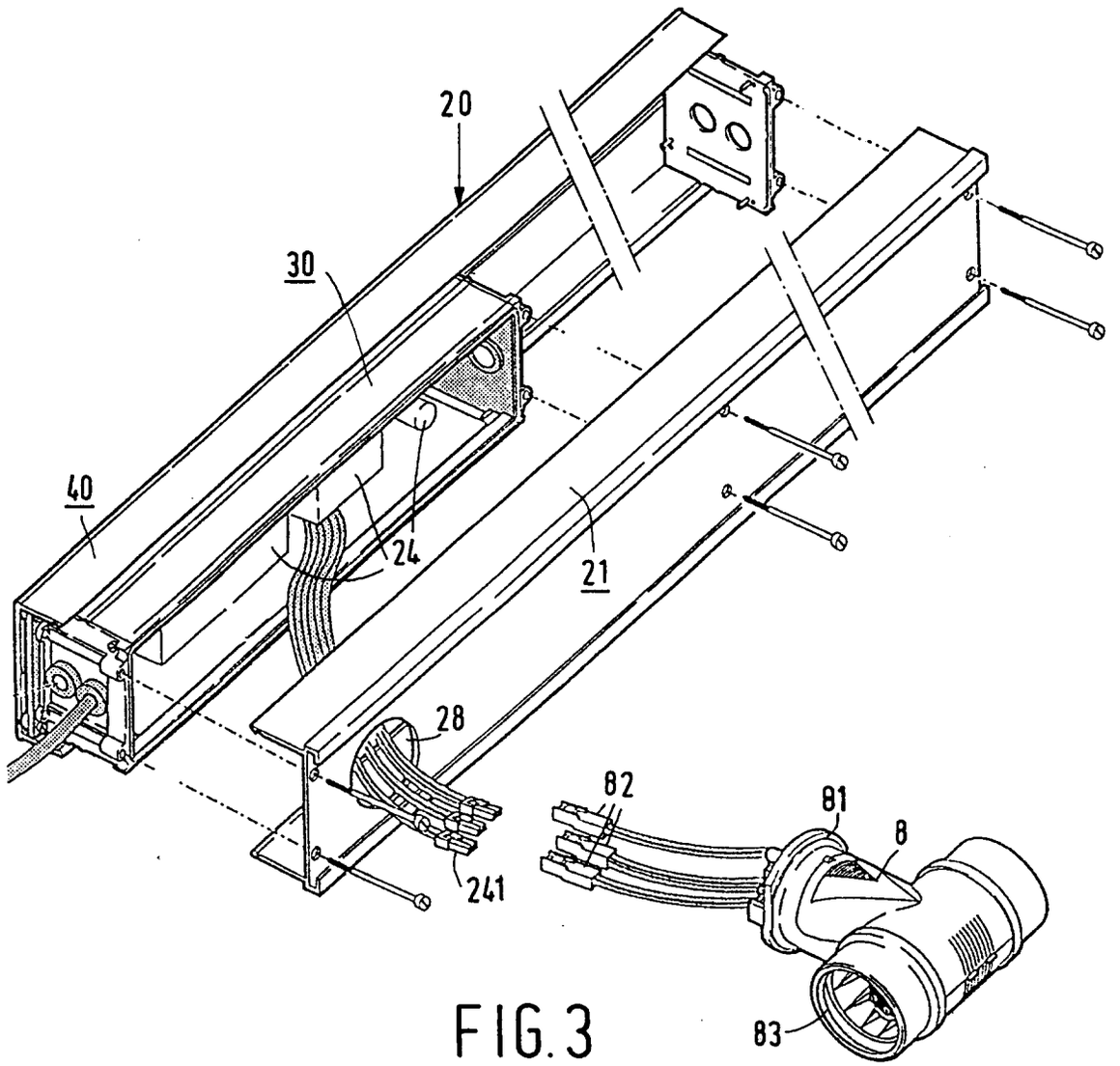


FIG.3

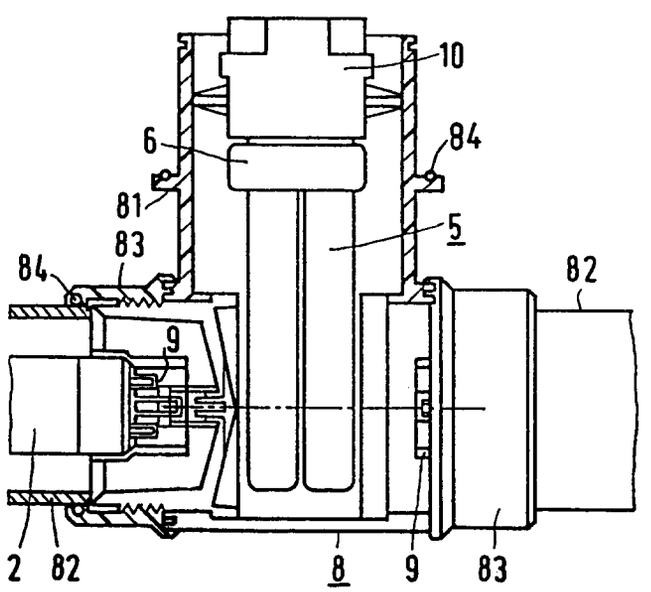


FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 20 0517

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	AT-B-361 083 (SIEMENS AG) * page 2, line 42 - line 52 * * page 3, line 1 - line 16 * * figures 1-3 * ---	1,3-6,8	F21V31/00 F21S7/00
A	GB-A-919 075 (ASHLEY ACCESSORIES LTD.) * page 1, line 54 - line 82 * * page 2, line 8 - line 47 * * figures 1,3-5 * -----	1,8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			F21V F21S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 June 1994	De Mas, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)