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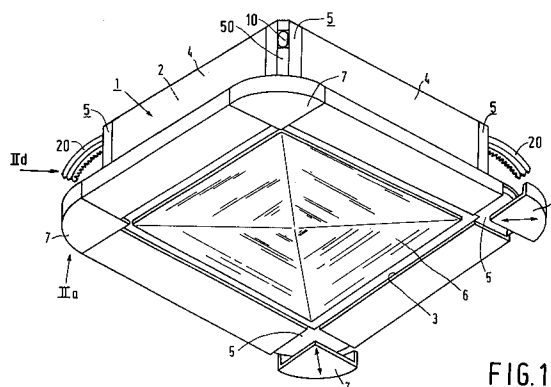
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NL-5656 AA Eindhoven (NL)**(54) **Luminaire for recessed mounting in a false ceiling.**

(57) The luminaire has a housing (1) in which unround openings (10, 11) are present through which arc-shaped support arms (20) of unround cross-section project. The support arms (20) have teeth (21) which cooperate with boundaries of the openings (10, 11). When a luminaire has been built in, the support arms (20) rest on the ceiling. Their teeth (21) and the boundaries of the openings (10, 11) fix these arms in their support positions. The luminaire may be of modular construction.

**FIG.1****EP 0 618 401 A1**

The invention relates to a luminaire for recessed mounting in a false ceiling, comprising:

a housing with a base wall and opposite thereto a window for the emission of light;

mutually interconnected side walls joined to the base wall;

support arms movably connected to the housing and suitable for supporting the luminaire on a false ceiling in a support position of these arms;

which luminaire is provided with means for fixing the support arms in their support positions.

Such a luminaire is known from EP 0 140 058 B1.

The support arms in the known luminaire are fastened to the outside of the housing with hinging possibility. They are profiled or bent so that they have a support surface of complicated shape at a side thereof. The object of this is to reduce horizontal forces on the false ceiling in all those cases in which the hinging points of the support arms are at a lower level than their support points on the ceiling. The fastening spot of the support arm which is in a comparatively low position relative to the ceiling is necessary because of the nature and construction of the fixation means.

The fixation means of the known luminaire comprise for each support arm an arc-shaped fixation arm which projects through a opening in the housing to the exterior and which is hinged to the relevant support arm. The arc-shaped fixation arm has a sawtooth profile at its exterior, which profile cooperates with the boundary of the opening in the housing. The hinging connection between the support arm and the fixation arm accommodates a spring element which strives to increase the angle enclosed by the support arm and the fixation arm, and thus to keep the sawtooth profile in engagement with the boundary of the opening.

The support arms are of a complicated shape. False ceiling constructions must be known in order to give the arms the correct profiles in the correct locations. The support arms and their fixation means always require the manufacture and assembly of at least three components, the provision of openings in the housing, and a complicated mounting operation in and at the housing.

Another luminaire for recessed mounting in a false ceiling is known from EP 0 268 283 A2. Here, again, support arms are hinged to the housing. They can be pressed towards the ceiling in downward direction by means of a screw which is tightened. Disadvantages of this luminaire are *inter alia* the complicated suspension means for the support arms, the necessity of using tools for mounting the luminaire in a ceiling, the time required for this mounting operation, and the limited application possibilities of the luminaire in ceilings of differing constructions and constructional dimensions.

It is an object of the invention to provide a luminaire of the kind described in the opening paragraph which comprises means for mounting the luminaire in a false ceiling which are simple and which are of a construction which is easy to mount, and which nevertheless facilitates a fast and easy mounting of the luminaire in false ceilings of various types.

According to the invention, this object is achieved in that the support arms are each arc-shaped, concave as seen from the window, and have a unround cross-section, and in that the means for fixing the support arms in their support positions comprise unround openings in the housing through which respective support arms project to the exterior and teeth at the support arms which can cooperate with a boundary of the relevant unround opening, which boundary extends along the window.

The means for fastening the luminaire according to the invention require support arms and openings in the luminaire only. The openings may be obtained in a simple manner, for example, by stamping or, in the case of housings or housing portions made from synthetic resin, by leaving them out during moulding. The support arms may be in one piece and made of, for example, synthetic resin, for example of polyamide, possibly reinforced with fibres, for example with glass fibres. The support arms may then be formed in one operation in a mould.

Mounting of the support arms is very simple: a support arm is simply inserted with an end into a corresponding opening, for example, from the housing.

Mounting of the luminaire in a ceiling is equally simple. The luminaire is brought into a false ceiling with the support arms not or hardly projecting from the housing, or projecting little therefrom. The support arms are then pressed further outwards through the relevant openings with a finger of a free hand, while the luminaire is kept in position with the other hand. When two, for example diametrically opposed support arms have been pressed outwards into engagement with the ceiling, the luminaire is already suspended. If so desired, additional support arms may be pressed further outwards for a good, even support of the luminaire. It is alternatively possible not to insert the support arms into the relevant openings until after the luminaire has been brought into the ceiling. The teeth at the support arm in cooperation with the boundary of the opening prevent the support arm from reducing or losing its pulling force on the luminaire.

Owing to its arc shape, for example circular arc shape, but possibly an alternative curved shape, and owing to its position with its concave side

facing the window, the support arm is capable of approaching the ceiling from above during mounting. The ceiling is substantially loaded in vertical direction by this. It is favourable for this purpose to position the opening in the housing at a distance from the window, subject to the luminaire height. It is alternatively possible to provide the opening in the base wall. Then the luminaire can be used in ceilings of widely differing constructions and constructional dimensions.

A burr may be present in the opening providing some friction with the support arm so as to prevent the support arm from becoming detached from the opening before the luminaire has been placed in a ceiling. Alternatively, the opening may be dimensioned so as to provide a sliding fit, for example in one direction, for example parallel to the window, or the support arm may have a locally widened portion at an end outside the housing.

The opening and the support arm are unround in order to avoid that the support arm rotates in the opening and thus is supported less securely on the ceiling, on the plating or on constructional parts thereof.

The teeth of the support arms may be present at the convex side thereof. The support arms bearing on a ceiling are then automatically pressed against the upper boundary of the relevant opening with their teeth.

In a favourable embodiment, the house is double-walled at the area of the openings. The support arms then have a very stable position relative to the housing. It is favourable, for example in a modification of this embodiment, to dimension the openings with clearance in the direction transverse to the window. This renders it easier to put the support arm in its position.

In a further modification, the teeth of the support arm are present at the concave side of the arm. This has the advantage that the support arm can be pressed outward with little resistance from the teeth and that the arm will fix itself in the opening the moment resistance is experienced from the ceiling into which the luminaire is incorporated. The clearance in the outer wall may then be wider than in the inner wall.

It is advantageous when the support arm has ridges extending substantially parallel to the window at a end face outside the housing. The arm can get a good grip on the ceiling with these ridges.

It is also advantageous when the support arm has a widened portion at an end face inside the housing for serving as a contact spot for a finger, for example a thumb, or as a grip for a thumb with a middle finger and an index finger in opposition therewith, for pressing or guiding the support arm to the outside. Such a grip is also convenient for

detaching the support arm from the boundary of the opening and then pulling it back when it is desirable to remove a recessed luminaire from a ceiling.

The construction of the luminaire according to the invention is suitable for electric lamps of various types such as incandescent lamps and discharge lamps, for example fluorescent lamps such as compact fluorescent lamps. The construction is particularly suitable for use in luminaires of modular construction in which side walls are formed in that profiled strips, for example made of synthetic resin, are cut off to the required wall length and the walls are fastened to one another, and possibly also to a base wall, by means of corner pieces. The openings for the support arms may then be present in the corner pieces, so that the profiles need not have any openings transverse to their longitudinal direction, for which purpose they would have to be specially processed.

An embodiment of the luminaire according to the invention is shown in the drawing, in which

Fig. 1 is a perspective view;

Fig. 2 a shows a detail of the opened housing taken on the line IIa in Fig. 1;

Fig. 2 b is a elevation along IIb in Fig. 2 a;

Fig. 2 c is an elevation of a portion of Fig. 2 a along IIc; and

Fig. 2 d shows the support arm of Fig. 2 c in side elevation.

The luminaire shown in Fig. 1 for recessed mounting in a false ceiling comprises a housing 1 with a base wall 2 and opposite thereto a window 3 for the emission of light. Interconnected side walls 4, 5 are attached to the base wall. Support arms 20 suitable for supporting the luminaire on a false ceiling in a support position of these arms are movably connected to the housing. The luminaire is provided with means for fixing the support arms in their support positions.

In the luminaire drawn, straight portions 4 of the side walls 4, 5 merge into one another *via* angled corner portions 5. The corner portions 5 have movable cover pieces 7 which secure a screen 6 in position in the window 3.

The support arms 20 are arc-shaped, concave as seen from the window 3, and have a unround cross-section. The means for fixing the support arms 20 in their support positions comprise unround openings 10, 11 (see Figs. 2 b and 2 d) in the housing 1 through which respective support arms 20 project to the exterior. Teeth 21 at the support arms, having a sawtooth shape in the drawing, but having different shapes in alternative embodiments, can cooperate with a boundary 10', 11' of the corresponding unround opening 10, 11, which boundary extends along the window 3.

The housing is double-walled 50, 51 (Fig. 2) at least at the areas of the openings 10, 11.

The openings 10, 11 are dimensioned with clearance (Fig. 2 d) in a direction transverse to the window 3.

The teeth 21 are present at the concave side of the support arms. The support arms have a wider clearance in the opening 10 in the outer wall 50 than in the opening 11 in the inner wall 51 (Fig. 2 d).

At an end face outside the housing 1, each support arm 20 has ridges 22 extending substantially parallel to the window 3 for obtaining a grip on the ceiling; at a end face situated inside the housing 1 there is a widened portion 23 which forms a grip whereby the support arms can be readily manipulated in the case of mounting or dismounting of the luminaire.

The luminaire has a collar 8 which will press against the ceiling when mounted in a false ceiling. When the luminaire has been brought into the ceiling, the support arms can be pressed up in the housing until they experience resistance on the ceiling. When the support arms are pressed further, a elastic deformation arises therein which tightens the luminaire with its collar against the ceiling.

The housing 1 is built up from modules 2, 4, 5. The straight wall portions 4 may have been cut to the correct dimension from profiles of greater length and be interconnected by means of corner pieces 5 while enclosing the base wall 2. The luminaire shown is suitable for accommodating two compact fluorescent lamps.

Claims

1. A luminaire for recessed mounting in a false ceiling, comprising:

a housing (1) with a base wall (2) and opposite thereto a window (3) for the emission of light;

mutually interconnected side walls (4, 5) joined to the base wall;

support arms (20) movably connected to the housing and suitable for supporting the luminaire on a false ceiling in a support position of these arms;

which luminaire is provided with means for fixing the support arms in their support positions,

characterized in that the support arms (20) are each arc-shaped, concave as seen from the window (3), and have a unround cross-section, and in that the means for fixing the support arms (20) in their support positions comprise unround openings (10, 11) in the housing through which respective support arms (20) project to the exterior and teeth (21)

at the support arms which can cooperate with a boundary (10', 11') of the relevant unround opening (10, 11), which boundary extends along the window (3).

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2. A luminaire as claimed in Claim 1, characterized in that the housing is double-walled (50, 51) at least at the areas of the openings.

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3. A luminaire as claimed in Claim 2, characterized in that the openings (10, 11) are dimensioned with clearance in a direction transverse to the window (3).

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4. A luminaire as claimed in Claim 2 or 3, characterized in that the teeth (21) are present at the concave side of the support arms.

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5. A luminaire as claimed in Claim 4, characterized in that support arms have a wider clearance in the opening (10) in the outer wall (50) than in the opening (11) in the inner wall (51).

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6. A luminaire as claimed in Claim 1 or 2, characterized in that the support arms (20) have ridges (22) extending substantially parallel to the window (3) at an end face outside the housing (1).

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7. A luminaire as claimed in Claim 1, 2 or 6, characterized in that the support arms (20) each have a widened portion (23) at a end face situated inside the housing (1).

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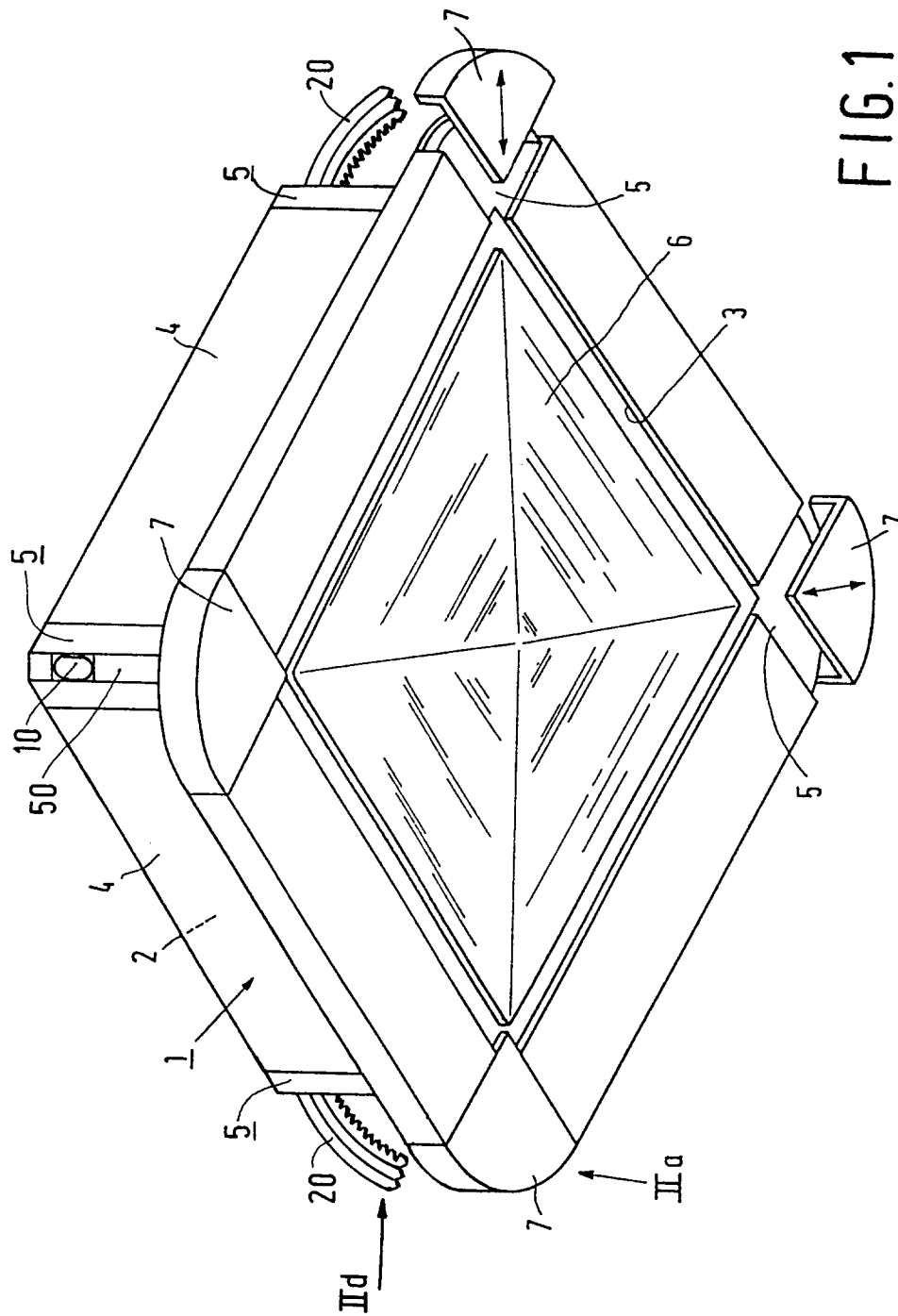
8. A luminaire as claimed in any one of the preceding Claims, characterized in that the housing (1) is built up from modules (2, 4, 5).

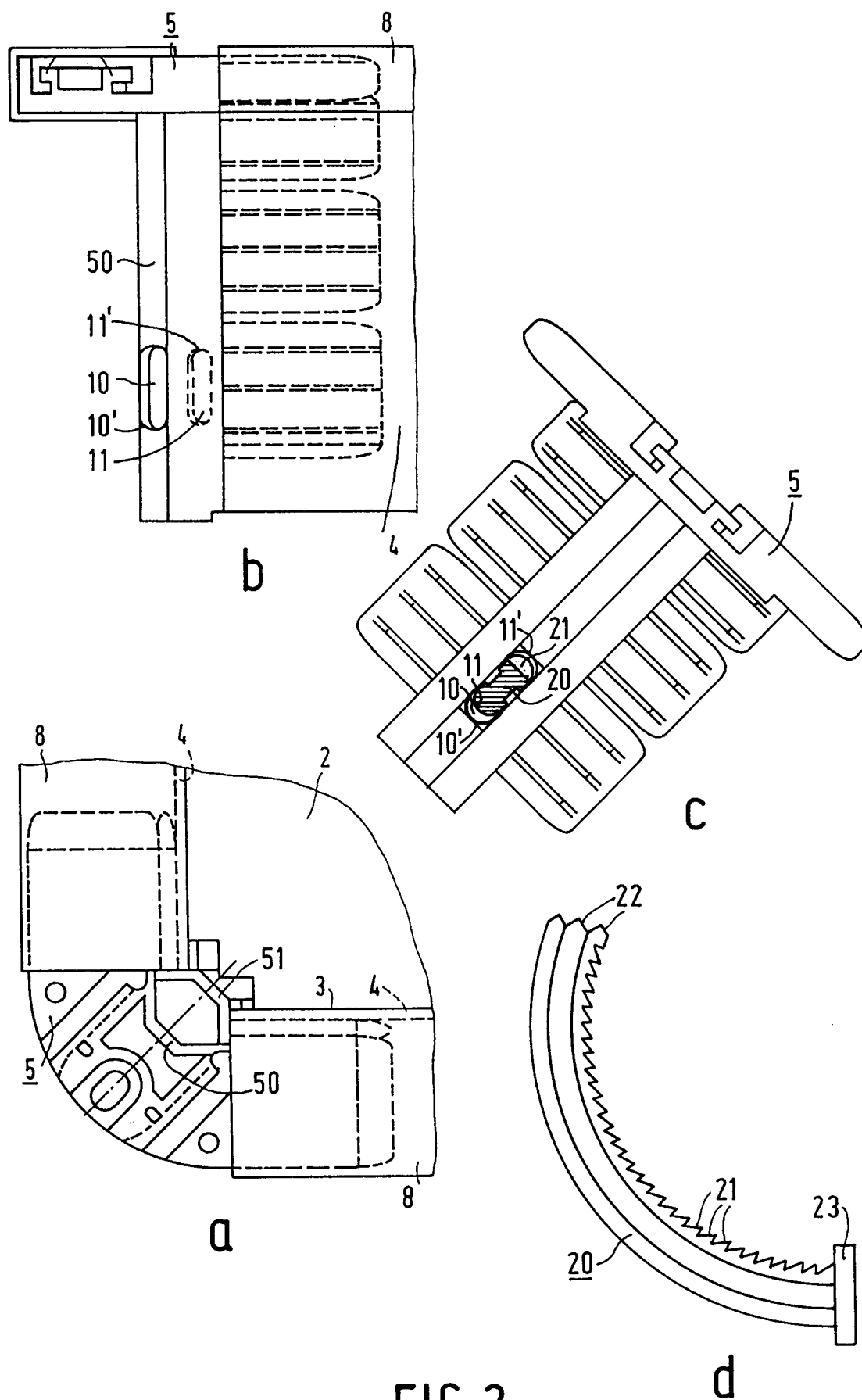
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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 0851

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,D	DE-U-85 11 028 (TRILUX-LENZE GMBH) * figure 1 *	1	F21V21/04
A,D	CH-A-388 454 (B.A.G. BRONZEWARENFABRIK AG TURGI)	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			F21V
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 June 1994	Examiner Onillon, C
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