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(54) **A lighting assembly.**

(57) A lighting assembly is provided for use with a suspended ceiling arrangement and comprises a light fitment (14,15,17) incorporating electrical components including at least one light socket, and a suspension means (1,2,3,9,10,11,12,13,20) for the light fitment. The suspension means comprises at least one pair of opposed parallel support plates (1) which can be suspended a fixed distance apart and each of which can be secured to one or other of a pair of parallel support rails (4) for the suspended ceiling. Preferably, a beam (3) is connected to each of the support plates (1) of the pair, between which pair of beams (3) the light fitment (14,15,17) can be slid into position between the plates (1). This enables the lighting assembly to be installed at the same time as the suspended ceiling arrangement itself rather than prior to it and in this way the lighting assembly as a whole is positioned with much more accuracy, fitting well with the various elements of the ceiling arrangement.

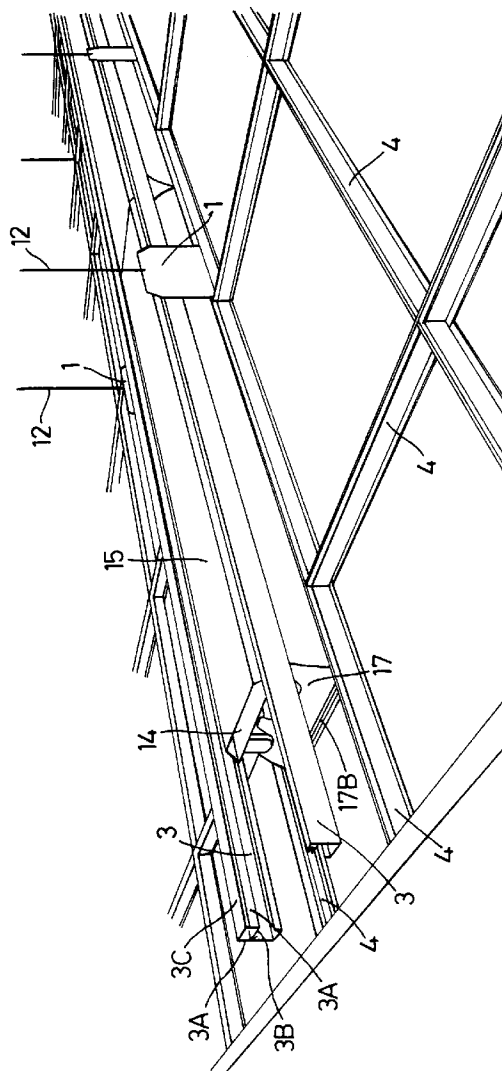


Fig. 3

The present invention relates to a lighting assembly for use in areas where there is a suspended ceiling and, in particular, to an assembly for use with fluorescent or other forms of tube lighting.

Conventionally, when an area has a suspended ceiling the light fittings for the area are arranged so that their lower edges are flush with the ceiling and the components making up the fitting are recessed above the ceiling. In this way most of the components making up the fitting are hidden leaving only the actual light, a reflector and perhaps a louvre or light diffuser on show. When fluorescent or other forms of tube lighting is to be used, the fittings usually comprise rectangular fabricated metal housings in which the lights, a reflector and all the electrical control gear and wiring for the lights are mounted. A functional or decorative louvre or a diffuser may then be used to cover the lights and rest on flanges formed across the lower open side of the housing.

Usually, the use of such light fittings is planned along with the plans for the suspended ceiling itself and they are installed prior to the suspended ceiling, which is then built around the suspended fittings. However, this means of installation can lead to several problems. First, it is difficult to make the fabricated housings rigid without also making them heavy. This means that they tend to distort and twist under their own weight when suspended from a ceiling soffit in use so that they do not hang square leading not only to problems with the fitment of the ceiling around them but also to difficulty in locating the light fitments and the louvres or diffusers therein. Second, as the ceiling is built around and tied to the housings, it is easy for force to be exerted on the sides of the housing pulling or pushing it out of shape, again leading to problems in the location of the light fitments and the louvres or diffusers to the extent that in severe cases the louvre or diffuser cannot be fitted into or be retained by the housing. Finally, because of the size of the fabricated housing such light fittings tend to be expensive to make.

It is an object of the present invention to provide a lighting assembly for use with a suspended ceiling arrangement which overcomes or substantially mitigates the aforementioned disadvantages.

According to a first aspect of the present invention there is provided a lighting assembly for use with a suspended ceiling comprising a light fitment incorporating electrical components including at least one light socket, and a suspension means for the light fitment, and characterised in that the suspension means comprises at least one pair of opposed parallel support plates which can be suspended a fixed distance apart and each of which can be secured to one or other of a pair of parallel support rails for the suspended ceiling.

Preferably, the suspension means comprises two pairs of support plates. Alternatively, the opposed

parallel support plates are of a length commensurate with that of the light fitment and also fulfil the function of light-spill baffles.

Preferably also, the suspension means comprises a rigid tie bar which can be secured between the support rails.

Preferably also, the tie bar is fastened to each of the support rails by a bracket using means which prevent relative rotation of the bar with respect to the rail.

Preferably also, a beam is connected to each of the pair of support plates, on which pair of beams the light fitment can be slid into position between the plates.

Preferably also, the light fitment comprises an inverted tray housing at least one pair of opposed light sockets for a tube light, such as a fluorescent tube light, and above which is located electrical control gear for the light.

Preferably also, the light fitment comprises a louvre which is spring mounted to the tray to cover the light. Preferably, along opposed sides of the louvre are located flanges which in use abut the support rails for the ceiling.

According to a second aspect of the present invention there is provided a lighting assembly and a suspended ceiling combination comprising a light fitment incorporating electrical components including at least one light socket, a suspension means for the light fitment, and at least one pair of parallel support rails for decorative elements making up the ceiling, and characterised in that the suspension means comprises at least one pair of opposed parallel support plates which are suspended a fixed distance apart and each of which is secured to one or other of the pair of parallel support rails.

The assembly of the invention differs from the prior art in that it is installed at the same time as the suspended ceiling itself rather than prior to it and in this way the lighting assembly as a whole is positioned with much more accuracy. The suspension means provided for holding and suspending the light fitment comprising the light, a reflector and a louvre or a diffuser is assembled at the same time as the supporting rails for the suspended ceiling are positioned so that the ceiling does not have to be constructed around the finished lighting assemblies. The whole suspended ceiling arrangement including the lighting assemblies is, therefore, constructed in a unified fashion so that the lighting assemblies fit well with the various elements of the ceiling.

The present invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 is an exploded perspective view of part of a lighting assembly according to the invention together with a pair of suspended ceiling support members;

Figure 2 is a perspective substantially horizontal

view of the assembly shown in Figure 1, when almost completely assembled as part of a suspended ceiling arrangement; and

Figure 3 is a perspective view from above of the completed assembly.

The assembly according to the invention comprises a light fitment and a suspension means to enable the fitment to be mounted into a suspended ceiling arrangement. The suspension means has been designed for use with the two main types of suspended ceiling arrangements currently on the market and it is envisaged that little alteration would be required to enable it to be used with any particular new arrangement.

In a conventional suspended ceiling arrangement, a plurality of support rails are suspended by wires or the like from a ceiling soffit and interlocked at right angles to form a rigid criss-cross pattern. Usually, the rails are spaced at regular intervals in both directions to form square apertures in which tiles or other decorative elements are located. However, some of the rails may be located closer together in certain parts of the ceiling so that light fittings and the like can be mounted therebetween and the ceiling tiles or other decorative elements supported by the rails butt directly up to the fittings. In the present invention, the suspension means is intended to be tied to the support rails of a ceiling arrangement and to be installed in an area at the same time as the ceiling so that the light fitments can be mounted after completion of the installation of the support rails.

As shown in the drawings, the suspension arrangement comprises a plurality of pairs of identical support plates 1, only one of which is shown in Figure 1. The plates 1 are substantially rectangular in shape but with two corners removed to reduce weight and with an angled flange 1A along one edge which engages with a support member or rail 4 forming part of the suspended ceiling arrangement. The plates 1 are provided with a plurality of slots and holes to enable them to be mounted in position and to be connected to the light fitment of the assembly. Some of the holes and the slots are spaced and dimensioned according to the particular type of suspended ceiling arrangement with which the assembly is to be used but these can be altered to suit any suspended ceiling arrangement.

The pairs of support plates 1 are rigidly suspended from a ceiling soffit so that the plates 1 are parallel and opposed with the flanges 1A projecting towards each other. The distance between the plates should be commensurate with the dimensions of the light fitment forming part of the assembly.

Although in theory for shorter light fitments only one pair of support plates 1 is required, in practice at least two pairs of plates 1 are usually required for each light fitment to form the assembly of the invention. Thus, when constructing a suspended ceiling

arrangement comprising light assemblies according to the invention pairs of support plates 1 are mounted at regular intervals in rows across the ceiling soffit at positions where it is envisaged lighting will be required. Typically, the plates 1 of each pair will be spaced 300mm apart and the parallel pairs of plates will be mounted at 1.8 m intervals in a row. However, in an alternative arrangement, not shown in the drawings, the support plates 1 can also fulfil the function of light-spill baffles to prevent light leakage from the light fitment above the suspended ceiling arrangement. In this case, the plates 1 are elongated horizontally so that their length is commensurate with that of the light fitment they support.

The plates 1 can be suspended from a ceiling soffit by any convenient means but are preferably rigidly suspended by means of right-angled brackets 2 and support wires 12. As shown in the Figures 1 and 2, the brackets 2 are attached to the plates 1 by means of studs 10 on one face 2A and their other right-angled face 2B has an eye-bolt 9 and nut 19 attached thereto by means of which the bracket 2 is connected to the wires 12. The studs 10 engage through slots 1B formed in the plates 1 to allow for slight variations in the location of the wires 12 and to permit the pairs of plates to be suspended facing one another with accuracy.

Alternative suspension means is, however, possible as shown in Figure 2 wherein two further means are shown. For example, the plates 1 could be suspended at each side by pairs of wires 20 which are tied together and tensioned by a spring clip 11. One of these wires 20 is hooked into a vertical slot 1C formed in the plate 1 and attached to the clip 11, whereas the other wire 20 is attached to the clip 11 and to a suspension point in the ceiling soffit, the clip 11 enabling the wires 20 to be shortened or lengthened to locate the plate exactly in position. A third option is to suspend the plates 1 at each side simply by one wire 13 which is located in the slot 1C. However, this option does not permit the exact position of the plate 1 in relation to the ceiling to be varied easily as may be necessary when the rest of the assembly is put together.

After suspension, the pairs of plates 1 are connected to the support rails 4 forming part of the ceiling arrangement. One of the plates 1 in each pair is connected to one of a pair of rails 4, which are suspended in a conventional manner, so that the flange 1A locates beneath an enlarged portion 4A of the rail, which in this example has an inverted T-shaped cross-section with the portion 4A being along the top of the upright stem of the inverted T. The plates 1 are bolted to the rails 4, the bolts (not shown) engaging through slots 1D in the plates 1 and the square holes 4B in the rails 4 so that the position of the plates relative to the rails 4 can be adjusted if necessary.

To ensure that the pairs of rails 4 are correctly

spaced relative to one another all along their length and are held rigidly in position, the rails 4 are connected together by tie bars 6 at regularly spaced intervals. Each of the tie bars 6 is preferably a rigid rectangular member and is connected between the pair of rails 4 by means of a pair of mounting brackets 5. The brackets 5 are each connected to one of the rails 4 by means of square-headed studs 7 to prevent relative rotation as one edge of each of the studs 7 abuts the cross-bar of the T of the rail 4. The bars 6 are rivetted to the brackets 5 by pairs of rivets 18 also to prevent relative rotation. Preferably, the tie bars 6 are spaced between the rails 4 at the same interval, say 1.8 m, as the pairs of plates 1, and located centrally of the plates 1.

Secured to the plates 1 of each pair along the rows parallel to the rails 4 are beams 3. The beams 3 form a gear tray support and cable management system and are preferably made as rigid aluminium extrusions that can be cut to appropriate lengths corresponding to the distance between consecutive pairs of plates 1 in each row. The beams 3 have a substantially channel-shaped cross-section and at least one of them is provided with an upstanding lip 3A along one or both upper edges which in use defines a cable tray 3B.

Two beams 3 are secured to each plate 1 by a double nut and bolt fixing 8 to prevent relative rotation so that the two beams 3 adjoin centrally of the plate 1. Beams 3 are thus secured along the rows of the ceiling arrangement parallel with the rails 4 so that parallel pairs of beams 3 face each other between the pairs of plates 1.

When constructing a suspended ceiling arrangement incorporating a lighting assembly according to the invention, the aforementioned components of the assembly make up a suspension means for a light fitment and they are assembled in position at the same time as the rails 4 of the ceiling arrangement are being hung in position. Once all the rails 4 have been positioned, the light fitment portion of the assembly is positioned before the ceiling arrangement is finished by the location of the decorative elements between the rails 4. Some of these decorative elements are also cut so that they can butt up to the light fitment to give the ceiling a finished appearance.

As shown in Figures 2 and 3, in this example the light fitment comprises a gear tray 14, which is an inverted tray with a reflecting surface in which are located sockets (not shown) to hold lights such as fluorescent tubes. Above the gear tray 14 under a cover 15 is located conventional electrical control gear for the lights. The gear tray 14 has a width corresponding to the distance between the plates 1 of each pair and is adapted to engage in the lower channels defined by the opposed beams 3. The wiring for the lights is also retained by the beams 3 in the upper cable trays 3B, which may be covered by a detachable lid 3C as

shown in Figure 3.

When installing a ceiling, one or more trays 14 are slid along opposed lengths of beams 3 and located at the predetermined positions where light is desired. Preferably, the trays 14 are of the order of 1.8 m in length so that the ends of a tray 14 correspond with the positions of the tie bars 6.

Spring mounted within the tray 14 to cover the lights themselves is a diffuser or louvre 17. The length of the louvre 17 is arranged to match exactly that of the gear tray 14. The louvre 17 is retained within the tray 14 by means of four wishbone springs 16 which are attached to the louvre 17 and have two projecting legs 16A engageable in slots 14A formed in the tray 14. Around the lower edges of the louvre 17 are projecting flanges 17A, 17B. The flanges 17A along the length of the louvre 17 locate beneath the cross-pieces of the rails 4 whereas the flanges 17B across the ends of the louvre 17 run between the rails 4 and cover the tie bars 6. The flanges 17A, 17B are pulled tight to abut the rails 4 and the tie bars 6 respectively by the springs 16.

Once the lighting assemblies have been completed, the suspended ceiling arrangement is itself finished as previously described by the location of ceiling tiles or other decorative elements between the rails 4. Those tiles or elements that butt up to the ends of the light fitment are rested on the rails 4, which abut the flanges 17B of the louvre 17 to give the installation a finished appearance.

It will be appreciated that the lighting assembly of the invention is not subject to the same disadvantages as those used with suspended ceiling arrangements in the prior art as the suspension means is built together with the ceiling. In addition, it is lighter in weight and cheaper to produce than those assemblies used previously as the large cumbersome fabricated housings used in the prior art are no longer part of the assembly. This also makes the lighting assembly easier to install.

Claims

1. A lighting assembly for use with a suspended ceiling comprising a light fitment (14, 15, 17) incorporating electrical components including at least one light socket, and a suspension means (1, 2, 3, 9, 10, 11, 12, 13, 20) for the light fitment, and characterised in that the suspension means (1, 2, 3, 9, 10, 11, 12, 13, 20) comprises at least one pair of opposed parallel support plates (1) which can be suspended a fixed distance apart and each of which can be secured to one or other of a pair of parallel support rails (4) for the suspended ceiling.
2. An assembly as claimed in Claim 1, characterised

in that the suspension means (1,2,3,9,10,11,12,13,20) comprises two pairs of support plates (1).

3. An assembly as claimed in Claim 1, characterised in that the opposed parallel support plates (1) are of a length commensurate with that of the light fitment (14,15, 17) and also fulfil the function of light-spill baffles. 5
4. An assembly as claimed in any one of Claims 1 to 3, characterised in that the suspension means (1,2,3,9,10,11,12,13,20) also comprises a rigid tie bar (6) which can be secured between the support rails (4). 10
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5. An assembly as claimed in Claim 4, characterised in that the tie bar (6) is fastened to each of the support rails (4) by a bracket (5) using means (7,18) which prevent relative rotation of the bar (6) with respect to the rail (4). 20
6. An assembly as claimed in any one of Claims 1 to 5, characterised in that a beam (3) is connected to each of the support plates (1) of the pair, between which pair of beams (3) the light fitment (14,15,17) can be slid into position between the plates (1). 25
7. An assembly as claimed in any one of Claims 1 to 6, characterised in that the light fitment (14,15,17) comprises an inverted tray (14) housing at least one pair of opposed light sockets for a tube light and above which is located electrical control gear for the light. 30
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8. An assembly as claimed in any one of Claims 1 to 7, characterised in that the light fitment (14,15,17) comprises a louvre (17) which is spring mounted to the tray (14) to cover the light. 40
9. An assembly as claimed in Claim 8, characterised in that along opposed sides of the louvre (17) are located flanges (17A) which in use abut the support rails (4) for the ceiling. 45
10. A lighting assembly and a suspended ceiling combination comprising a light fitment (14,15,17) incorporating electrical components including at least one light socket, a suspension means (1,2,3,9,10,11,12, 13,20) for the light fitment (14,15,17), and at least one pair of parallel support rails (4) for decorative elements making up the ceiling, and characterised in that the suspension means (1,2,3,9,10,11,12,13,20) comprises at least one pair of opposed parallel support plates (1) which are suspended a fixed distance apart and each of which is secured to one or other of the pair of parallel support rails (4). 50
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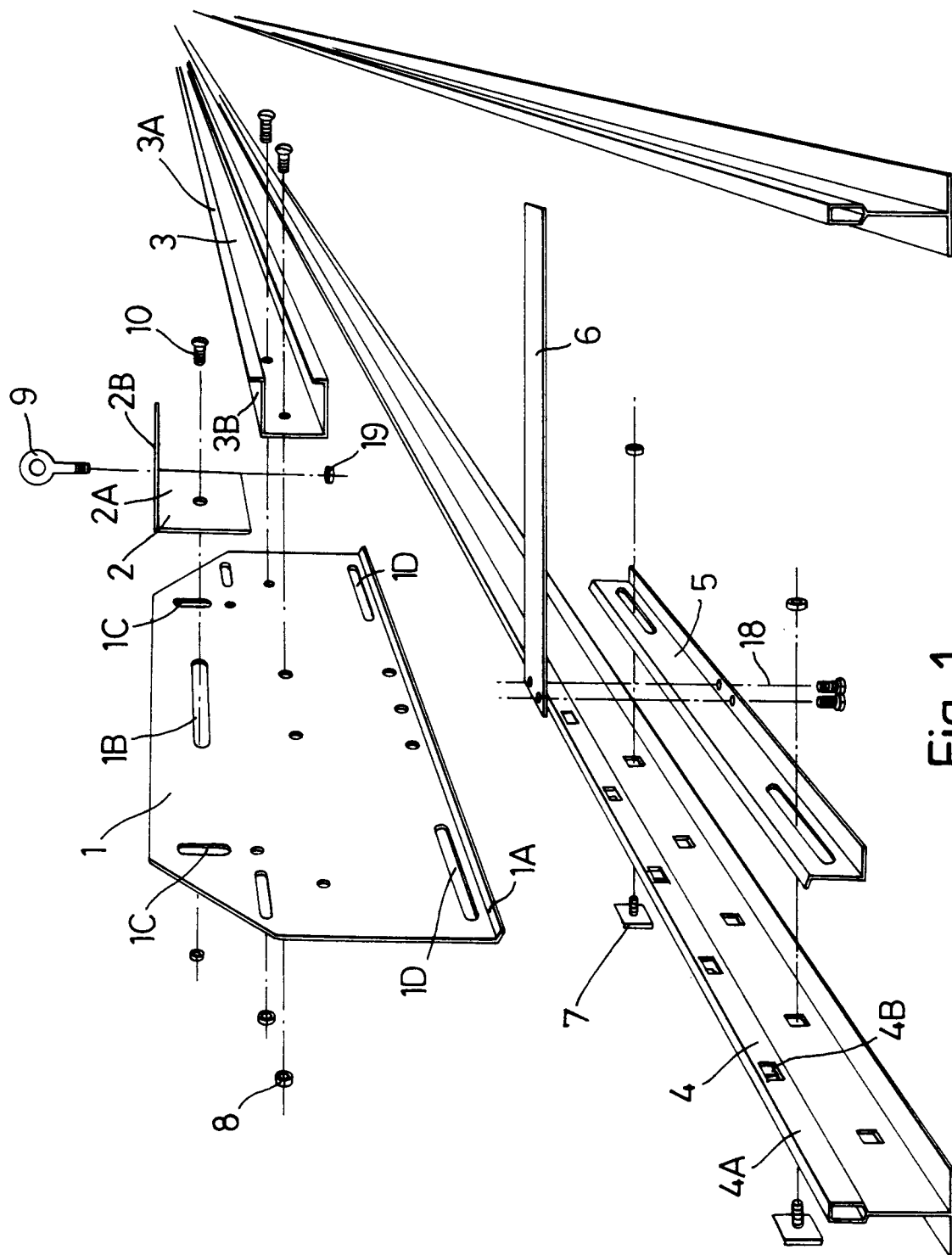


Fig. 1

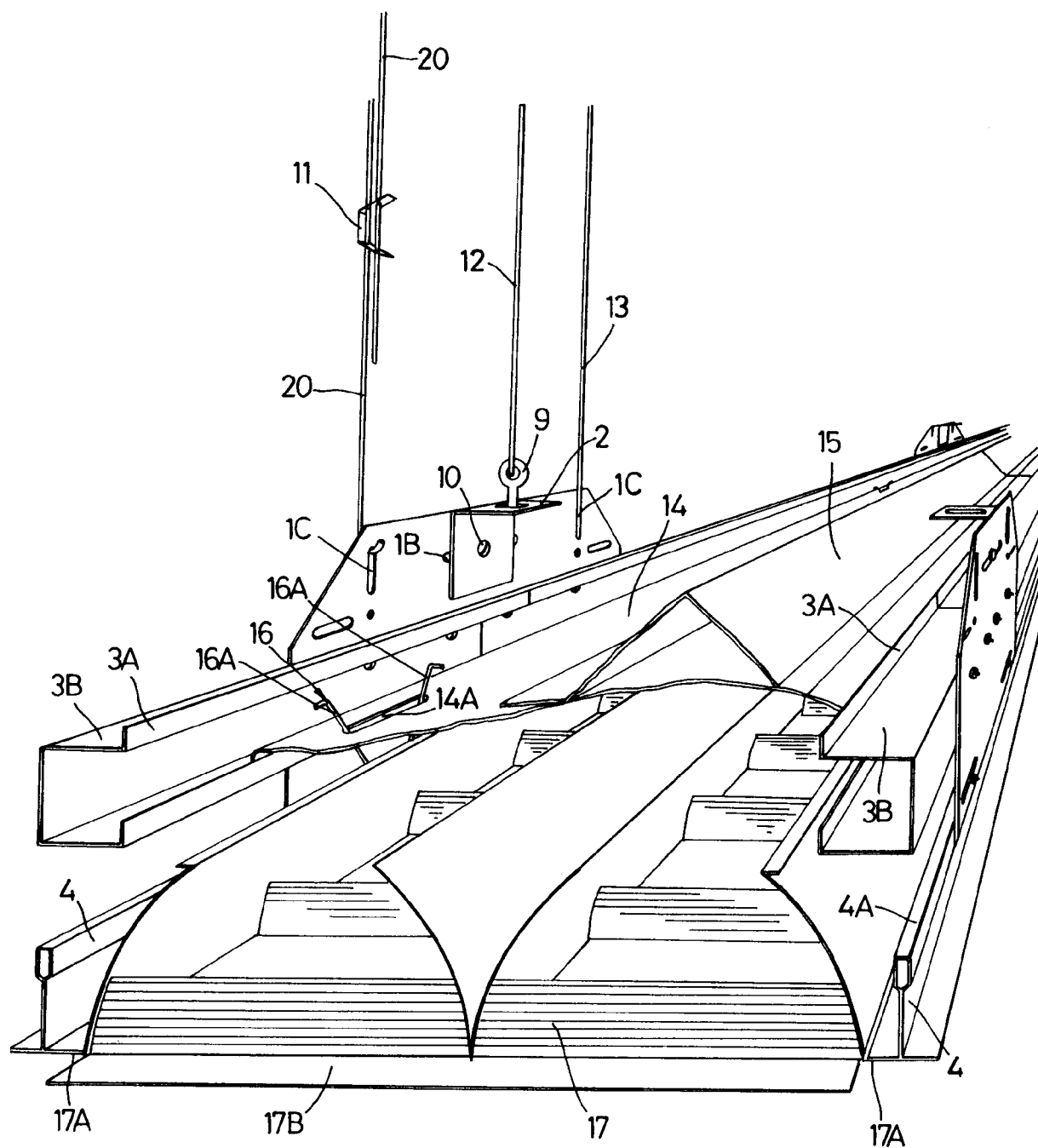


Fig. 2

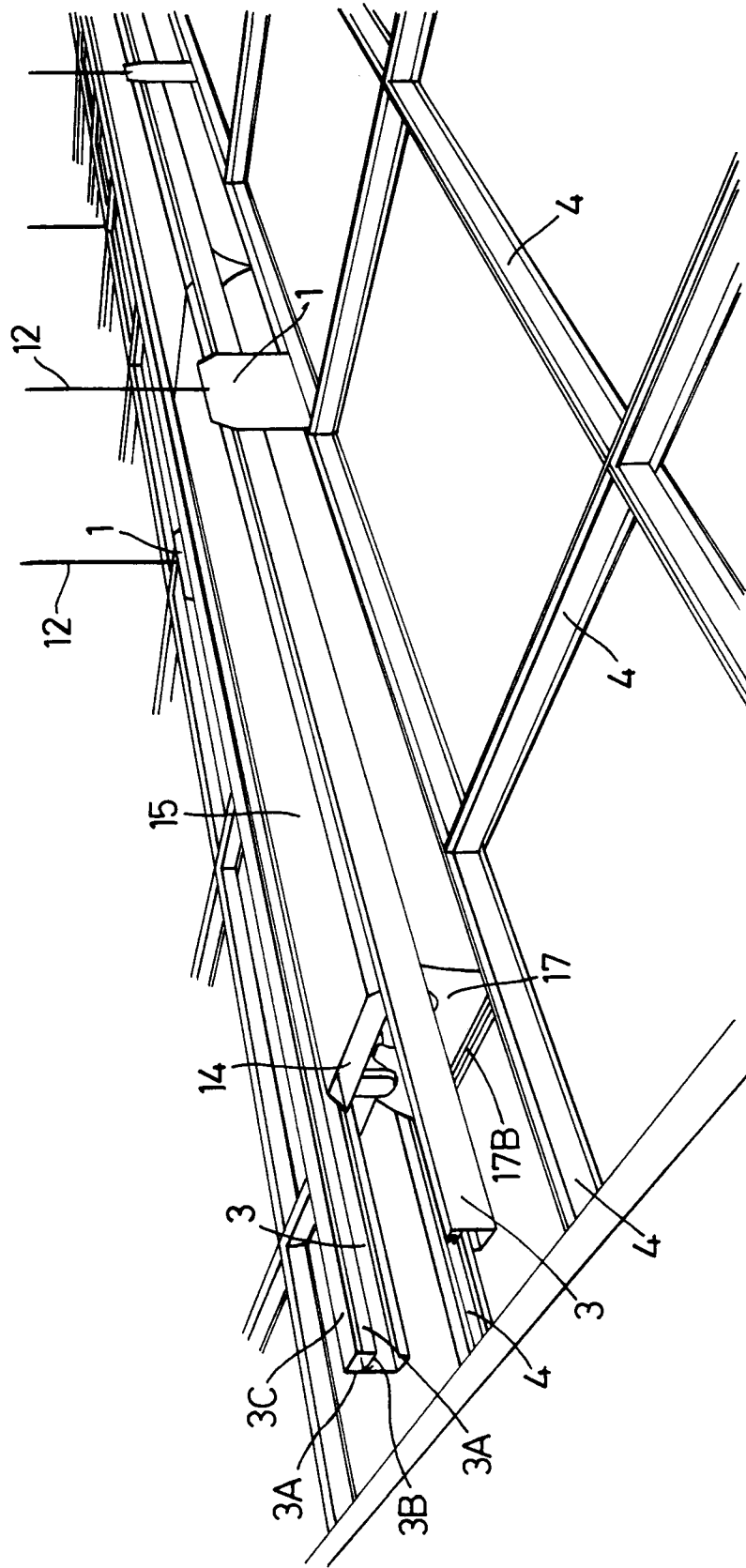


Fig. 3