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(54) **Prefabricated Steel beam**

(57) The invention relates to a steel beam (1) for supporting floor plates (2), consisting of a bottom plate (4) and a beam part (5). In the beam (1) and onto bottom plate (4), one or more profiles (7) are mounted, extending in a longitudinal direction, via which electric wiring liquids or gasses may be distributed. A connection can be made by drilling a hole in the profile via the bottom plate.

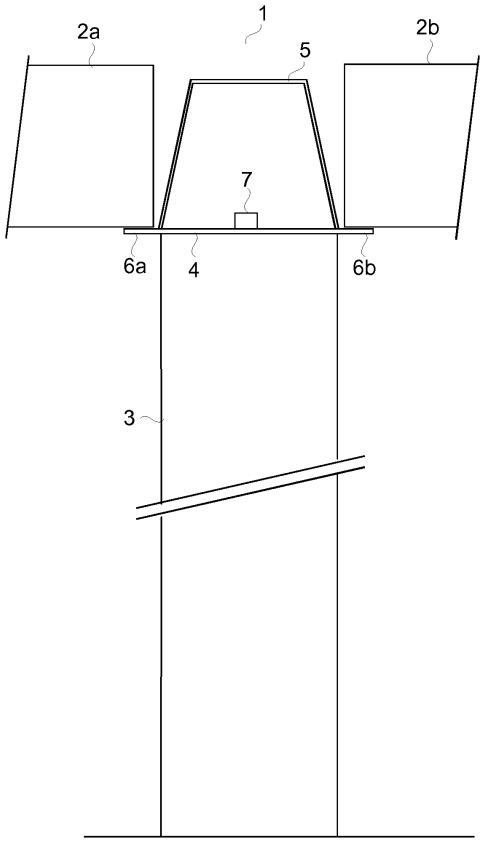


Fig. 1

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## Description

**[0001]** The invention relates to a steel beam, for supporting floor plates, consisting of a bottom plate and a beam part. A beam of this type forms operationally part of a structural floor for which the bottom plate that supports the floor plates usually remains visible. Especially because the bottom plate remains visible, this bottom plate is often used as a mounting plane for objects that have to be mounted onto the underside of the structural floor, like for example light fittings, sprinkler systems, heat exchangers and for example security system components. A disadvantage is that all these objects need to be connected, which means that a number of pipes and cables have to be mounted to the underside of the structural floor. In order to hide these pipes and cables, a false ceiling is often to be mounted, which may substantially reduce the useful volume of a building of which the structural floor forms part.

**[0002]** The prefabricated beam substantially obviates this disadvantage and is characterised in that in the steel beam at least one profile is mounted, extending in a longitudinal direction. For connecting for example a light fitting, it is sufficient then to drill a hole through the bottom plate, in such a way that this hole ends inside the profile. Wiring may be drawn towards the light fitting then via the profile.

**[0003]** A favourable embodiment of the steel beam is characterised in that the at least one profile extends over the entire length of the beam. Mutual connections between the tubes may be realised then in a similar manner in the columns or walls or other structures which support the beams.

**[0004]** A further favourable embodiment is characterised in that the at least one profile is made of metal or plastic. Profiles made of metal are especially suitable for transporting liquids and gasses, while for electrical connections plastic profiles may advantageously be used.

**[0005]** A further favourable embodiment is characterised in that the at least one profile is connected to the bottom plate, so that its location is precisely determined.

**[0006]** A further favourable embodiment is characterised in that the at least one profile is placed on a previously determined distance from the centre of the bottom plate. This makes it much more easy to strike the space enclosed by the profile. If more than one profile are enclosed by the beam, the profiles are preferably situated at previously determined distances from the centre of the bottom plate.

**[0007]** A further favourable embodiment is characterised in that the beam part is at least near the ends provided with body holes, via which profiles which are in line may be mutually coupled.

**[0008]** A further favourable embodiment is characterised in that at least one profile is a tubular profile. A tubular profile may easily be coupled, for example with the aid of clamp couplings and a tubular profile may also easily be provided with thermal insulation, which means that it can be used for transporting for example hot water or a cooling liquid.

**[0009]** In order to further simplify the coupling, the ends of the at least one tubular profile are preferably provided with S-bends, in such a way that couplings may be installed without any problem.

**[0010]** The invention will now be further explained with a reference to the following figures, in which:

- Fig. 1 represents a steel beam provided with a tube in front view;
- Fig. 2 represents a steel beam provided with a tube in side view;
- Fig. 3A represents a steel beam provided with tubes;
- Fig. 3B represents a steel beam provided with profiles;
- Fig. 3C represents a steel beam provided with a profile and two insulated tubes;
- Fig. 4A represents a composite steel beam provided with tree tubes and couplings in top view;
- Fig. 4B represents this steel beam in side view.

**[0011]** Fig. 1 represents a steel beam 1 according to the state of the art in front view, which beam 1 forms part of a floor to be poured and onto which floor plates 2a,2b are placed, and concrete columns 3 onto which beam 1 rests. In the embodiment shown here, beam 1 has an at least substantially trapezoidal cross section and it consists of a bottom part 4 and a beam part 5 which have been welded together. Bottom part 4 is wider than beam part 5, which means that rims 6a,6b are available for supporting floor plates 2a,2b before and during pouring and during curing of the concrete. A direct consequence is that bottom part 4 projects out of the ceiling, formed by the undersides of floor plates 2a,2b. Bottom part 4 forms therewith an ideal mounting platform for articles to be suspended, like light fittings, sprinkler systems and air conditioning equipment. According to the invention, steel beam 1 is provided with at least one profile 7 which extends in a longitudinal direction through steel beam 1 and via which electric wiring, water, cooling means and the like can be supplied to the articles suspended from bottom part 4. Profile 7 is connected to bottom part 4, for example welded or glued, on a precisely determined position, so that a connection may easily be made by drilling a hole in profile 7 via bottom part 4.

**[0012]** Fig. 2 represents a steel beam 1 provided with a tube 7 in side view, where a light fitting 8 is connected to bottom part 4. In bottom part 4 a hole 9 is drilled, via which wiring can be supplied to profile 7. In a wall 10 positioned underneath steel beam 1, a duct 11 is accommodated, through which the wiring in profile 7 can be led further, via a hole 12 that has to be drilled at the location of duct 11. It is also possible of course to provide steel beam 1 on that location with a standard hole 12.

**[0013]** Fig. 3A represents more in detail a steel beam 1 provided with tubes 7a,7b, which may be struck via bottom part 4 by drilling. The hole in bottom part 4 and

in the tube thus obtained can subsequently be deburred and a screw thread may be tapped in it for example. In the screw thread a standard nipple may be screwed for example, in which case standard sealing means may be used. This is important when a liquid or a gas is to be supplied or removed via the tube. Tube 7b is given a rectangular cross section, which implies that a hole may be drilled requiring less precision.

**[0014]** Fig. 3B represents more in detail a steel beam 1 provided with profiles 7a,7b, which have been welded or glued to bottom part 4 and which may also be struck via bottom part 4 by drilling. The hole in bottom part 4 thus obtained can subsequently be deburred and a screw thread may be tapped in it for example. In the screw thread a standard nipple may be screwed for example, in which case standard sealing means may be used. As the sealing now is obtained between the nipple and bottom part 4, the wall thickness of the profile no longer plays a role as far as this sealing is concerned.

**[0015]** Fig. 3C represents a steel beam 1 provided with a profile 7a for connecting light fittings and two insulated tubes 7a,7b for the distribution of cooling means for an air conditioner. Tubes 7b,7c are provided with insulating material 15b,15c, which is glued to bottom part 5 in order to prevent sidewards movements. For profile 7a and for tubes 7b and 7c applies that they may be struck by drilling at any place. Thereby a round, deburred hole in profile 7a will be sufficient for installing the wiring, while in the holes drilled in tubes 7b,7c screw thread may be tapped and connecting nipples may be fitted.

**[0016]** Fig. 4A represents a composite steel beam 1a, 1b,.. in top view, resting on columns 10a,10b, provided with three tubes 7a,7b,7c which are mutually coupled with the aid of couplings 13a,13b,13c, for example clamp couplings.

**[0017]** Fig. 4B represents these steel beam 1a, 1b,.. in side view, with body holes 14a,14b,.. being visible in beam part 5, via which couplings 13 can be fitted. It can also be seen that the ends of tubes 7 are provided with S-bends, in order to simplify the actual fitting of couplings 13.

## Claims

1. Steel beam, for supporting floor plates, consisting of a bottom plate and a beam part, **characterised in that** in the steel beam at least one profile is mounted, extending in a longitudinal direction.

2. Steel beam according to claim 1, **characterised in that** the at least one profile extends over the entire length of the beam.

3. Steel beam according to claim 2, **characterised in that** the at least one profile is made of metal or plastic.

4. Steel beam according to claim 2 of 3, **characterised in that** the at least one profile is connected to the bottom plate.

5. Steel beam according to one of the previous claims, **characterised in that** the at least one profile is placed on a previously determined distance from the centre of the bottom plate.

6. Steel beam according to one of the previous claims, **characterised in that** the beam part is at least near the ends provided with body holes.

7. Steel beam according to one of the previous claims, **characterised in that** at least one profile is a tubular profile.

8. Steel beam according to claim 7, **characterised in that** of the at least one tubular profile the ends are provided with an S-bend.

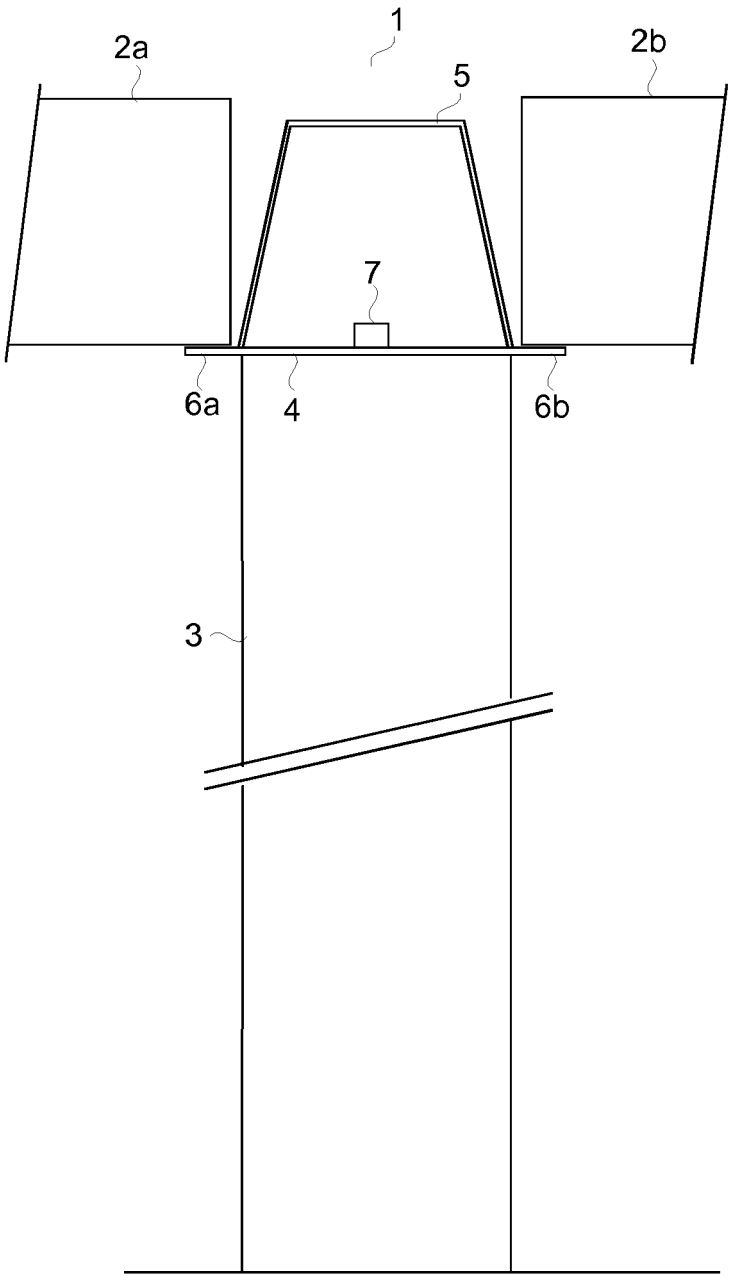


Fig. 1

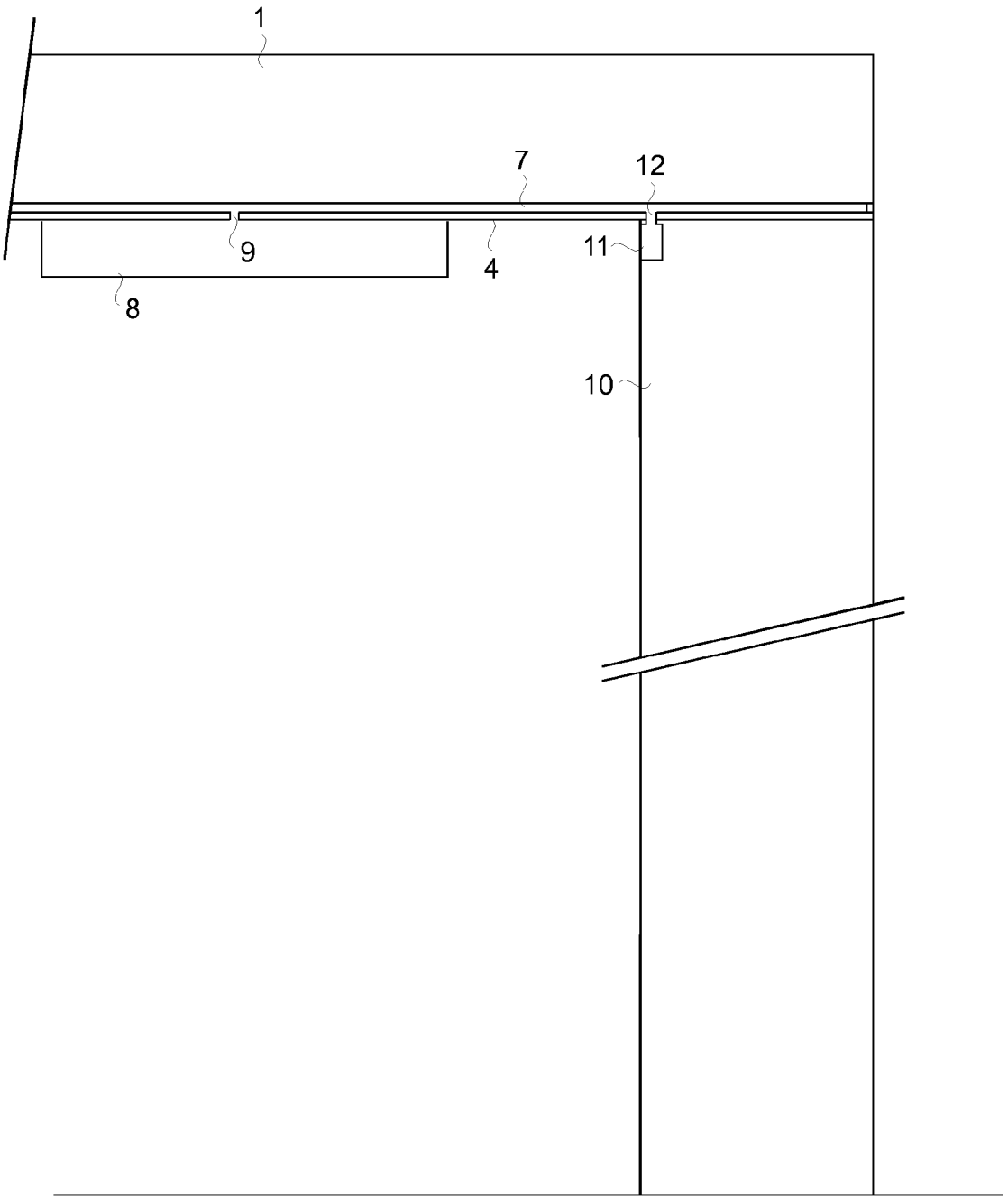


Fig. 2

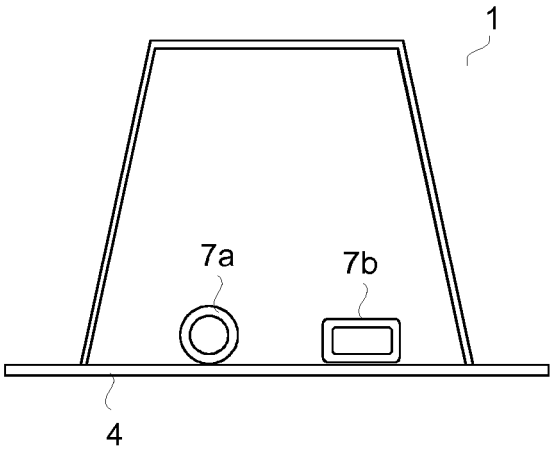


Fig.3A

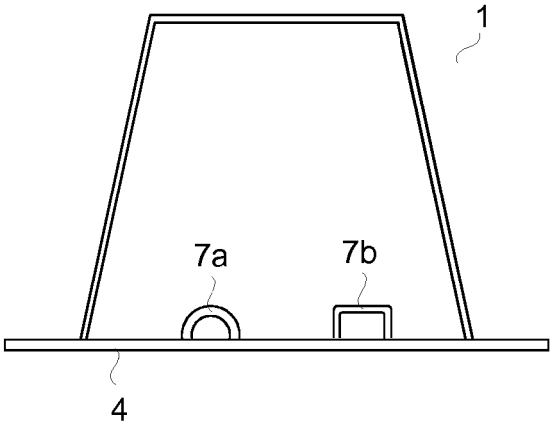


Fig 3B

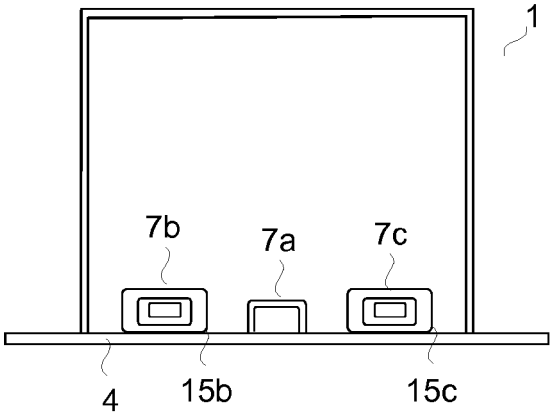


Fig 3C

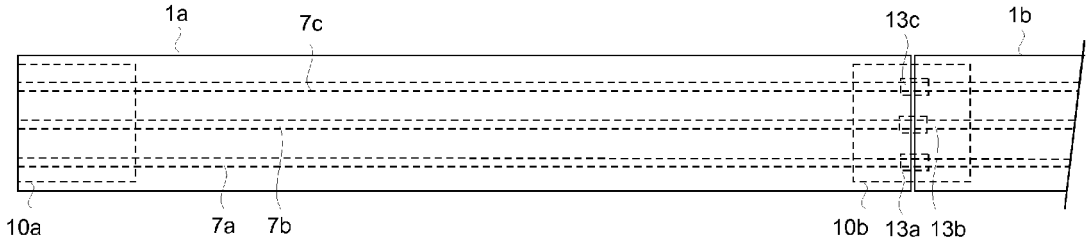


Fig. 4A

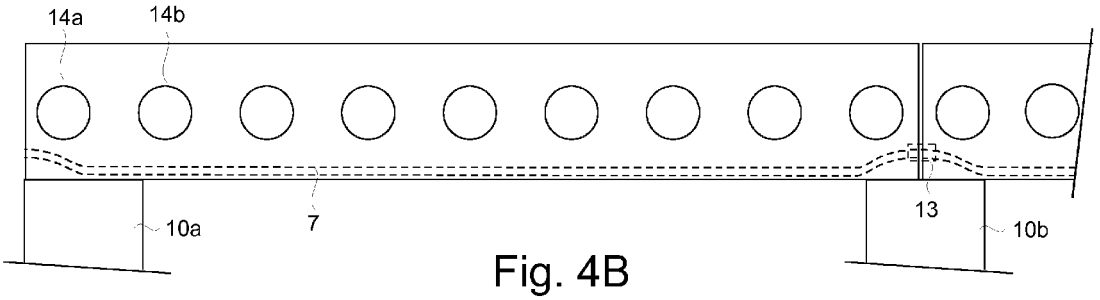


Fig. 4B