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

(11) EP 2 365 149 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.09.2011 Bulletin 2011/37

(51) Int Cl.:
E04B 5/10 *(2006.01)*

(21) Application number: **10382288.8**

(22) Date of filing: **04.11.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **04.11.2009 ES 200901530 P**

(27) Previously filed application:
04.11.2009 ES 200901530

(71) Applicant: **Advanced Simulation Technologies SL**
33203 Gijon (ES)

(72) Inventors:
- **JOSE LUIS, SUAREZ SIERRA**
  33300, VILLAVICIOSA (ES)
- **SUAREZ SIERRA, ROBERTO**
  33203, GIJON (ES)
- **GUERRRERO MUÑOZ, JUNCAL**
  33203, GIJON (ES)
- **DEL COZ DIAZ, JUAN JOSE**
  33208, GIJON (ES)
- **GARCIA NIETO, PAULINO**
  OVIEDO (ES)

(74) Representative: **Ungria Lopez, Javier**
Avda. Ramón y Cajal, 78
28043 Madrid (ES)

(54) **Steel floor Lightweight Techical Component**

(57)

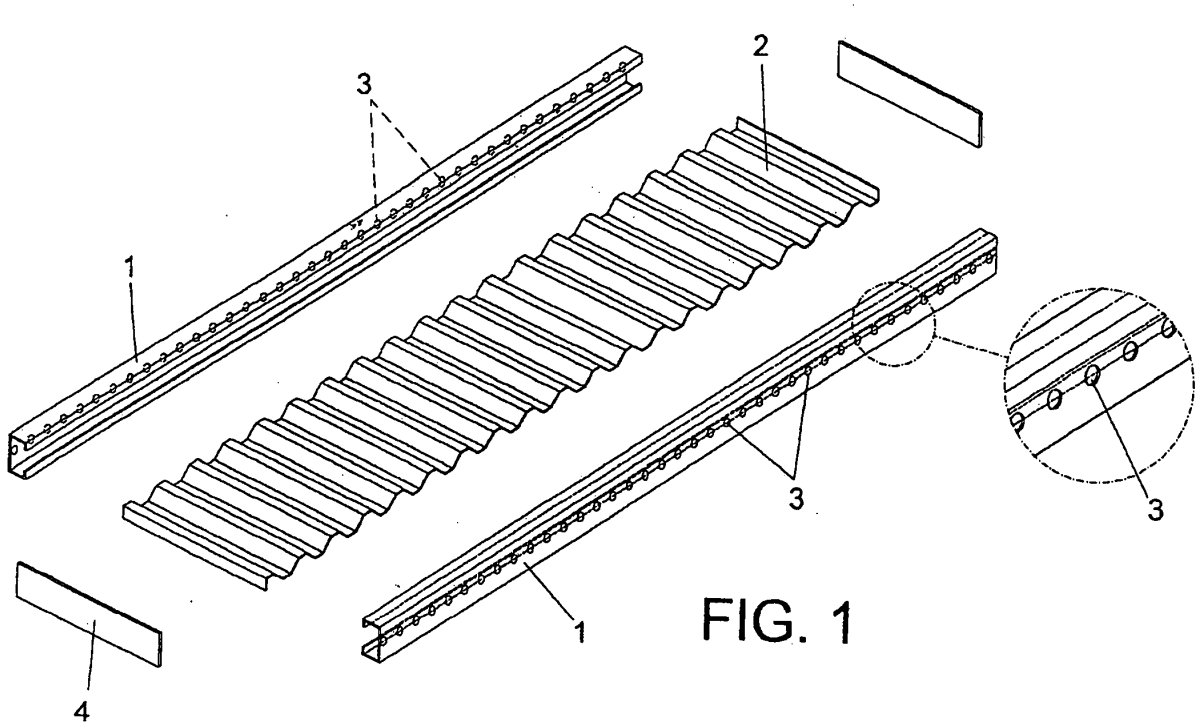

FIG. 1

EP 2 365 149 A2

Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is to provide a new lightweight technical slab component, as an industrial product oriented to its manufacturing at flexible production lines, intended for application in the field of construction of buildings of all types.

[0002] The new lightweight technical slab component facilitates the realization of the floor plants of such buildings, such as pieces or complete structural units, linked together and dimensionally coordinated, maintaining the technical or registrable nature of floors and ceilings simultaneously, independently and comprehensively within each component or associated constructive unit and being able to be adjusted to each specific project according to the requirements and benefits required by the rules applicable in each case, without losing thereby its character of industrial product or component.

FIELD OF THE INVENTION

[0003] The present invention falls within the construction industry, specifically in the industrial construction by means of components, following the philosophy of open building systems.

BACKGROUND OF THE INVENTION

[0004] Currently, slabs used in construction of buildings have a ratio between its own weight and other vertical actions, such as use overloads, very close to the unit, which implies that for their construction, a weight of material equivalent to that of those loads that gravitate over the same is used. For this reason and due to the evolution of a brick based construction, which requires a structural system displacing the bracing mission, the geometry of the elements of the vertical system, the horizontal planes, the cooperation of the slabs for the stability of the building is required. Such construction process is based on the use of the different technologies of concrete and ceramic elements, seeking to justify its thickness and mass, based on the various benefits required in the design codes.

[0005] Thus, in the last 50 years the slabs have increased their weight of 150 kg/m^2 to more than 400 kg/m^2, which entails a cost problem and is the source of various pathologies related to its deferred deformations, since virtually half of the armor is intended to withstand its own weight.

[0006] Additionally, and mainly due to this increase of weight, the manufacturing and on site installation technologies of the slabs are poorly industrialized compared with other building elements, such as some types of frontages, interior partitions or prefabricated structures of beams and columns. In most cases, its on site installation is based on wet processes involving the laying of amorphous materials over a base structure of joists and small vaults, caisson formwork, collaborating sheets or a final layer of compression in hollow core slabs and precast slabs.

[0007] Thus, at none of the typologies usually used as slabs in conventional building, a technical character is conferred to the material thickness occupied by the construction of the slab, which technical character is understood as the possibility of passage and accommodation of conduits and cables along with other typical elements of the facility, without necessarily having to place an additional technical floor or ceiling.

[0008] Similarly, often this type of construction involves a high incidence of workplace accidents due to their conditions of work on site, and a high rate of environmental impact, given the amount of waste and water consumption occurring in the constructions by being unable to develop construction-deconstruction processes, thereby increasing the amount of debris in landfills.

[0009] For all the above, it would be desirable to develop a slab that would overcome the weight problems of the slabs known in the state of the art and that would possess all the advantages provided by the approach of industrialized construction and open-component systems, which would allow increasing the ratios of safety, quality, productivity and sustainability in the construction of buildings of all types.

DESCRIPTION OF THE INVENTION

[0010] The present invention aims to a new lightweight technical slab component with certain geometric configuration that does not raise the issues of weight of the slabs known in the state of the art and provides many advantages for industrialized construction and open-component systems, simultaneously increasing the safety, quality, productivity and sustainability when used in the construction of all types of buildings.

[0011] The lightweight technical slab component of the invention is formed by two longitudinal profiles as beams or crossbars with holes distributed along their whole length, both to allow the passage of installations and for the union of components, connected by a horizontal enclosure in the shape of a wavy or corrugated board, which provides stability and rigidity to the slab assembly, cross topping the perimeter of the slab component in its front sides, by means of some elements in the form of a plane head plate or some kind of profile, as appropriate for each application.

[0012] The lightweight technical slab component of the invention enables its union with other slab components according to the invention or with other structural elements, thus facilitating the realization of various construction details of junction. In this case, the lightweight technical slab of the invention can form a base unit to create larger constructive groups that incorporate the rest of the performance standards both structural and nonstructural (thermal, acoustic, fire resistance,...), by combining them

with layers of specialized materials in different functions.

[0013] Thus, the lightweight technical slab component of the invention allows solving the specific benefits for each desired application and realizes a more advanced concept of constructive unit, allowing the hidden passage of all kinds of installations, available both currently and in the future, given its technical and registrable nature, which in turns confer a degree of flexibility adapted to the evolution of the different space-time uses of the plants in the buildings.

[0014] The lightweight technical slab component of the invention allows full industrialization of the slab manufacturing, providing a type of construction by assembly based on dry construction technologies, particularly with reference to functional joints and structural joints.

DESCRIPTION OF THE DRAWINGS

[0015] To complement the description being made and in order to help to better understand the features of the invention, is attached to the present specification, as an integral part thereof, a set of plans in which by way of illustration and without limitation, the following has been represented:

Figure 1 .- Shows a perspective view of the parts, which constitute the lightweight technical slab component of the invention according to a preferred embodiment of the same.

The Figure 2 .- Shows a perspective view of the slab technical component with the constitutive parts thereof assembled according to Figure 1.

Figure 3 .- Shows a slab assembly using the lightweight technical slab components in Figure 2.

PREFERRED EMBODIMENT OF THE INVENTION

[0016] The lightweight technical slab component according to the invention is formed by two side crossbars (1) formed in lightweight profile or profiles that can take different resistant forms; one enclosure or horizontal panel (2) with a wavy or corrugated plate shape, for achieving greater rigidity, located between the crossbars (1) and coupled to the same assembling the whole set; some holes or perforations (3) arranged along the entire length of the side crossbars (1), so that, if any, it is possible the passage of any installations and the union, through various fixation or linking devices, including slab components, resulting in a larger constructive unit; optionally, by means of head plates or front profiles (4) is possible to realize different delivery and/or attachment devices with the rest of the resistant elements of the construction.

[0017] With reference to Figure 1, the lightweight technical slab component according to the invention is configured by joining two side crossbars (1) or lightweight profiles, made of any formable material as lightweight profile, preferably in steel sheet. Such side crossbars (1) have a resistant form, preferably "C", "Sigma", "Omega, "I", "L", "T" or "U" form, or a simple platen or any combination of the previous forms.

[0018] Said union between the side crossbars (1) is implemented through one or more, as necessary, enclosures or horizontal panels (2) with a wavy or corrugated plate shape arranged transversely between the two crossbars, as a horizontal enclosure providing stability and rigidity to the slab assembly.

[0019] Such enclosures or horizontal panels (2) with a wavy or corrugated plate shape may have different shapes such as zig-zag, trapezoidal, corrugated, triangular, square or mixed among the previously mentioned.

[0020] In the embodiment shown in Figure 1, a single corrugated plate or sheet with trapezoidal shape is arranged. The horizontal panel or panels (2) with a wavy or corrugated plate shape are attached to the side crossbars (1) by welding or any other compatible attaching method or technology, assembling the whole set.

[0021] Along the entire length of the side crossbars (1) a series of perforations or holes (3) of appropriate size are performed and intended for both the passage of possible installations and the attaching and fixing to each other, or to other structural elements, by means of various devices and techniques, of successive technical slab components of the invention, with the object of covering the required surfaces in each case.

[0022] Optionally, for cross topping the perimeter of the lightweight technical slab component of the invention in its front sides, it additionally has some elements in the shape of head plates or front profiles (4), as appropriate in each application, on which are located different fixation or delivery devices with the rest of the resistant elements of the construction.

[0023] In use, the side crossbars (1) or lightweight profiles will be arranged with their wings towards the interior of the slab, having an edge with a preferred length of less than 400 mm and the distance between them being preferably comprised between 600 and 1,200 mm.

[0024] Preferably, the length of the lightweight technical slab component of the invention does not exceed 12 meters.

Claims

1. Lightweight technical slab component **characterized in that** it is formed by two side crossbars (1) formed in lightweight profile, one enclosure or horizontal panel (2) between the side crossbars (1) and attached thereto by welding or any other compatible attaching method or technology, with a wavy or corrugated plate shape, for achieving greater rigidity, and holes or perforations (3) arranged along the entire length of the side crossbars (1).

2. Lightweight technical slab component according to claim 1, **characterized in that** further, in order to cross topping the perimeter of the lightweight tech-

nical slab component it has, on its front sides, head plates or front profiles (4) on which it is possible to place different delivery and/or attaching devices with the rest of the resistant elements of the construction.

3. Lightweight technical slab component according to claim 1, **characterized in that** the previously mentioned two side crossbars (1) are realized in steel sheet or any other material conformable as lightweight profile taking different resistant forms as C, Sigma, Omega, I, L, T, or U type, or a simple platen or any combination of the previous shapes.

4. Lightweight technical slab component according to claim 1, **characterized in that** the aforementioned enclosure or horizontal panel (2) with a wavy or corrugated plate shape for achieving greater rigidity, adopts shapes such as zig-zag, trapezoidal, corrugated, triangular, square or mixed among the previously mentioned.

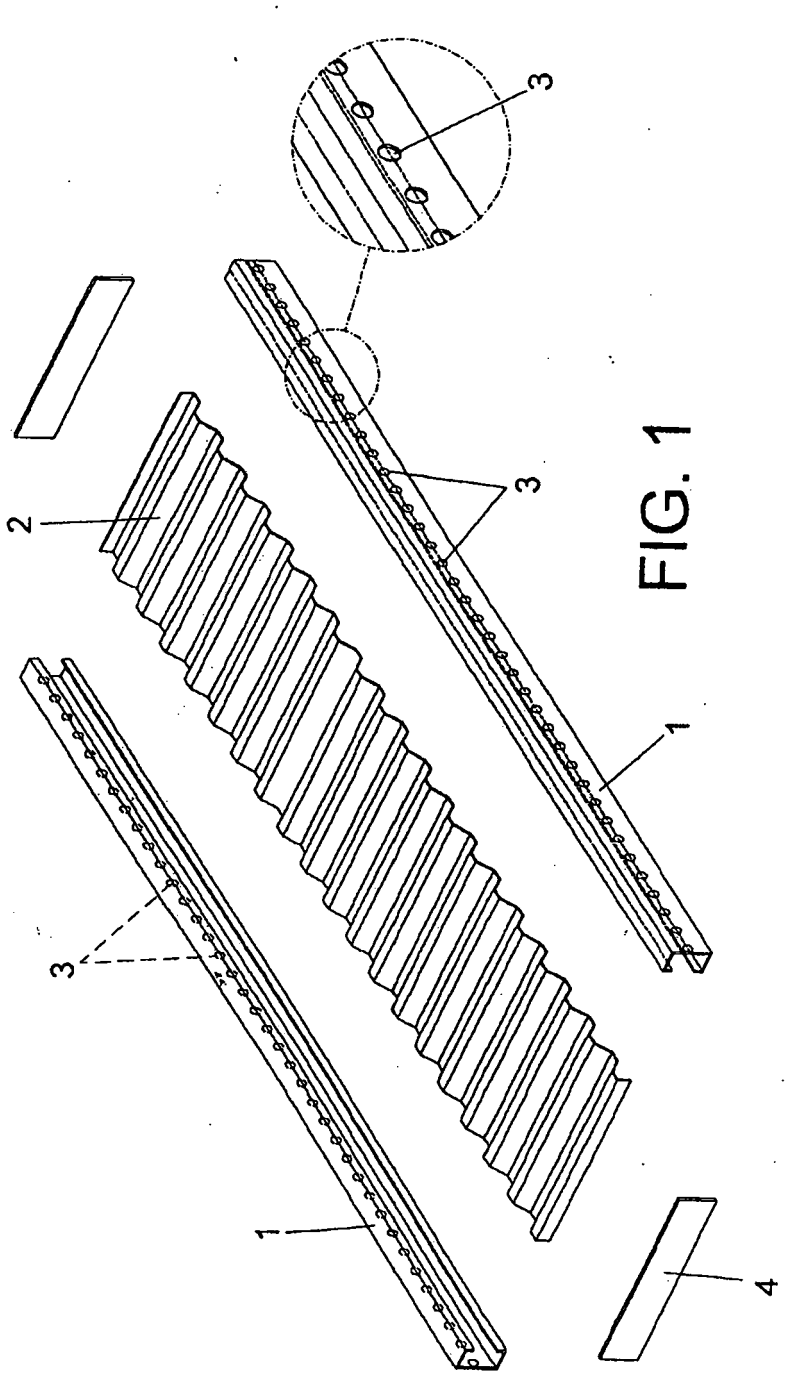

FIG. 1

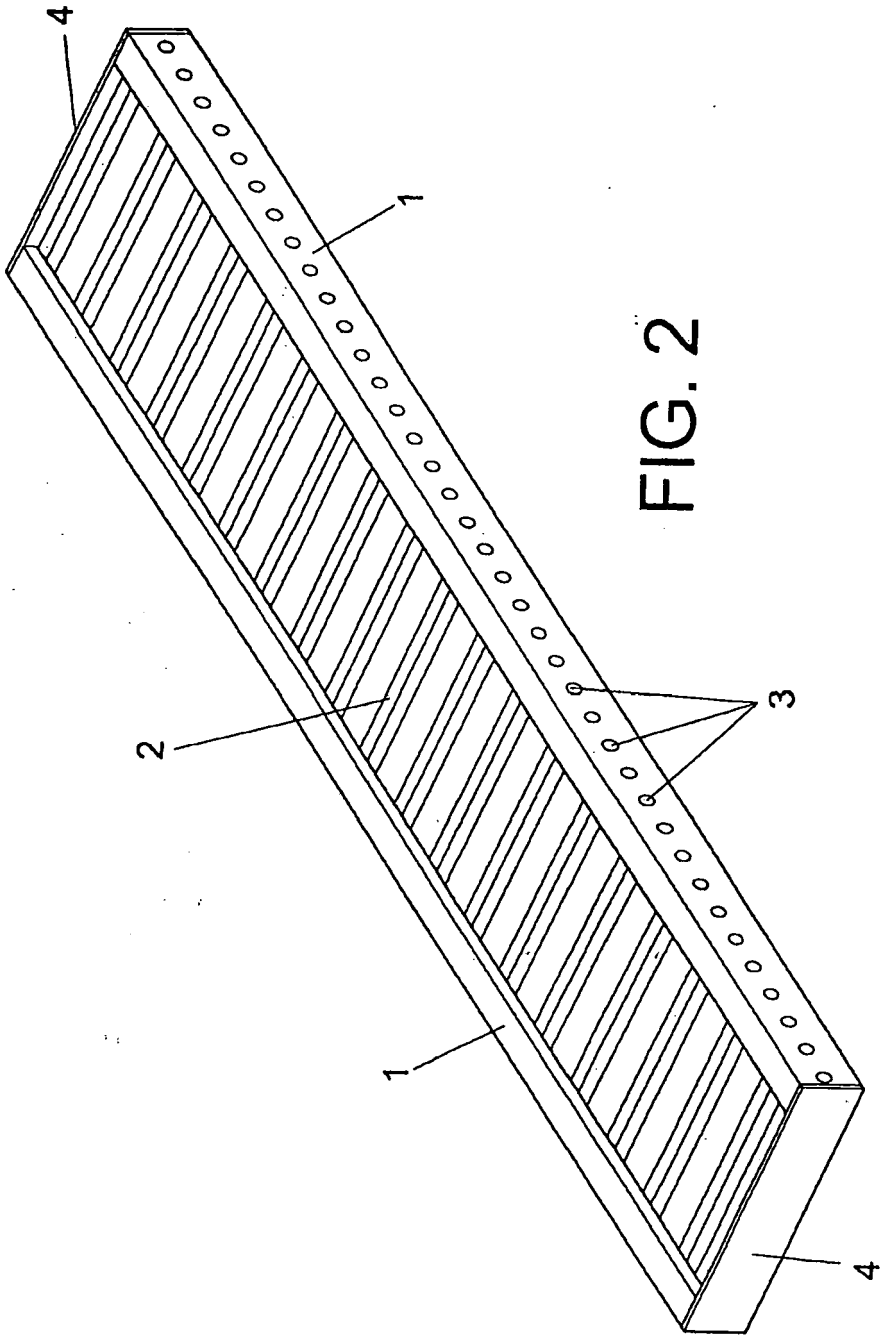

FIG. 2

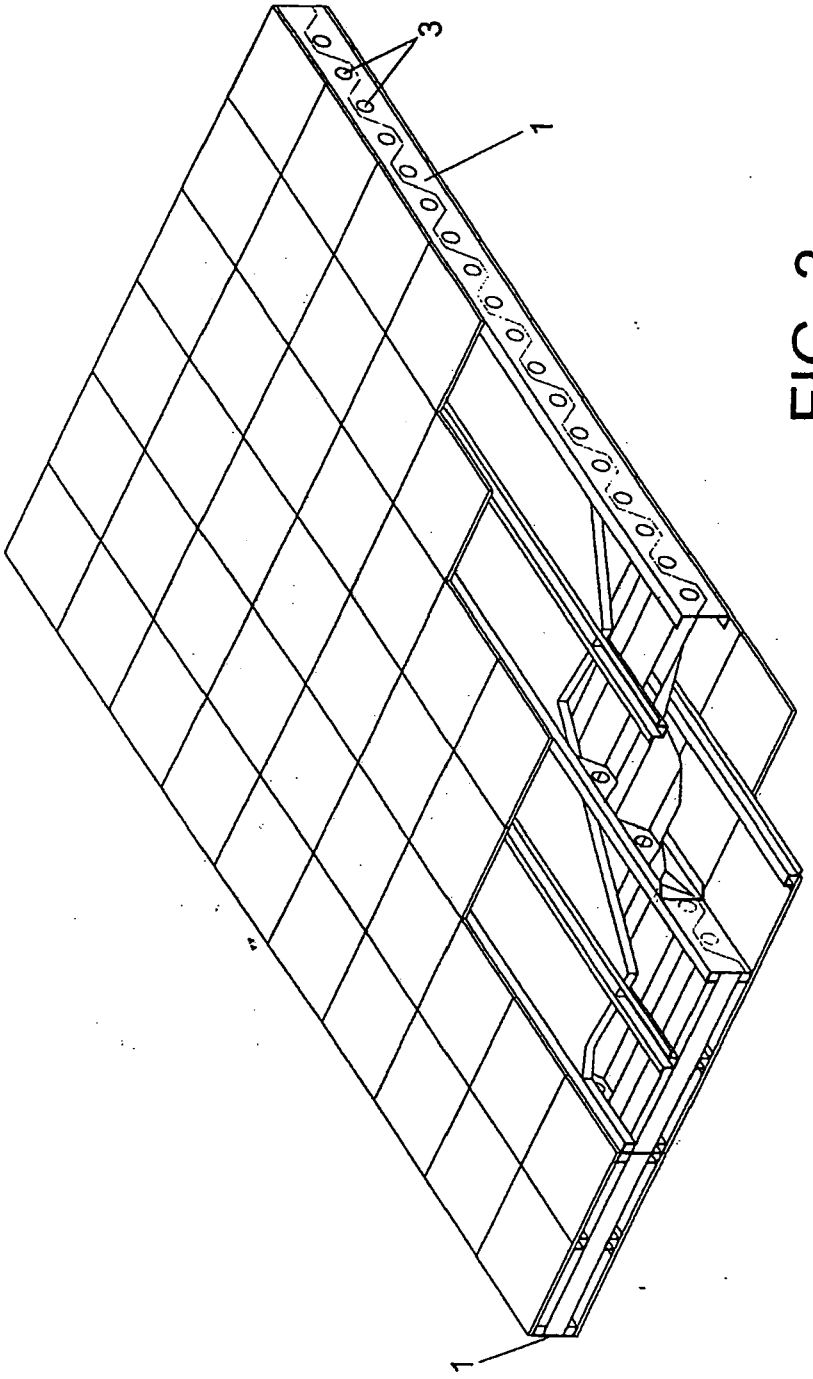

FIG. 3