



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.03.2006 Bulletin 2006/11

(51) Int Cl.:
E04B 1/80 (2006.01) E04B 1/86 (2006.01)
E01F 8/00 (2006.01)

(21) Application number: 05076977.7

(22) Date of filing: 30.08.2005

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: Di Chio, Ernesto
70100 Bari (IT)

(72) Inventor: Di Chio, Ernesto
70100 Bari (IT)

(30) Priority: 13.09.2004 IT BA20040037

(54) Multifunction gas structural element

(57) It is a multifunction gas structural element with rectangular section (1), normally constituted from two parallel layers (2) that constitute the outside covering between which one or more layers (3) lightened by the presence of cylindrical cavities or possible hermetic sealing tubing (4) manufactured article are interposed.

In such a way the space inside the interspace turns out subdivided in several cells. The layers like the walls

of the cylinders (in the case of tubing manufactured article) can be realized with various materials and variable thickness depending on the function which the structural element will have to perform.

The outside covering can be constituted from plastic, composite or metal material rolled sections.

Some or all the cells are filled with gas in order to confer rigidity and stability to the structural element and the whole structure.

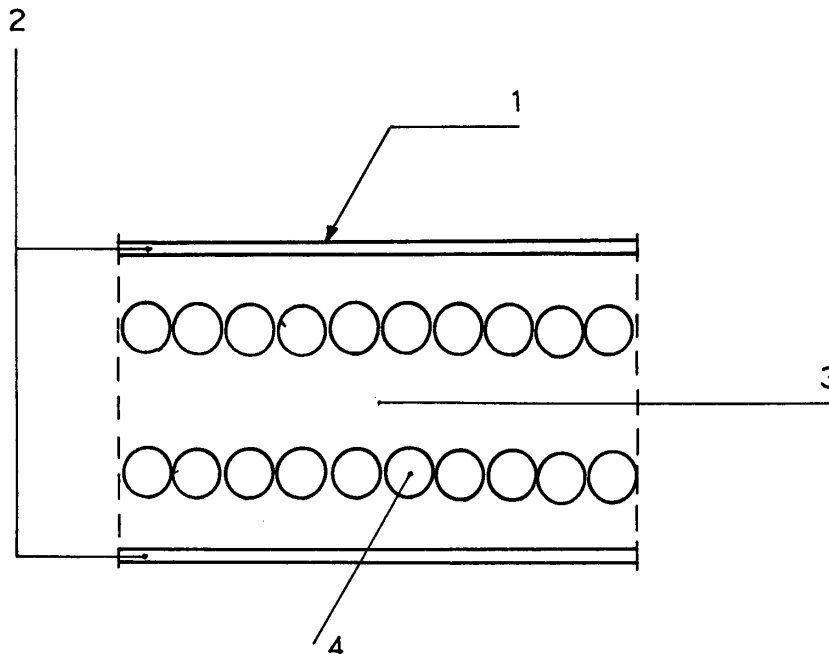


Fig. 1

Description

[0001] The present invention relates to a multifunction gas structural element, suitable i.e. to realize structures for building and urban furniture (as for example coverings, tunnels, safety barriers or support for protection slabs against the throw of objects), and that can be used, also, to realize sound-insulating and sound-absorbing acoustic barriers.

[0002] Realizing structures for the building and urban furniture using pre-fabricated modular elements manufactured out of metal, composite materials among which the reinforced concrete) and polymers, is well known.

[0003] The mentioned conventional technique presents as limit the necessity of executing on the site all the operations to realize the carrying structure of the building.

[0004] A second critical factor is represented by the construction weight of the structure, if it raises itself on work of art.

[0005] An object of the present invention is to use a gas compressed inside cylindrical cavities realized inside a structural element of the cited conventional technique type, in order to confer rigidity, and consequent structural function, to the element of which the cavities form integrating part.

[0006] Another object of the present invention is to reduce the construction weight of the structural element, characteristic that turns out particularly important in the realization of barriers or other manufactured articles on work of art.

[0007] A third object of the present invention is to provide, as application, a structural element with sound-absorbing or sound-insulating characteristics.

[0008] A fourth object of the present invention is to provide a structural modular-type element in order to minimize the operations to be executed on the existing infrastructures and to reduce, at the same time, risks during the laying in work, with consequent reduction of the production costs.

[0009] A fifth object of the present invention, which depends on the precedent, is the realization of modular units possibly prefabricated, that can be arranged and differentiate according to the various functional requirements, which require a minimum time of laying in work.

[0010] On the basis of the invention, the innovative structural element reaches all the stated objects and in particular performs its function (which is to resist to structural loads and stresses or to form integrating part of a structure) more effectively in comparison to what acquired by the state of the art, thanks to the fact it foresees inside a conventional structural element a component "lightened" by the presence of cavities that, filled with gas characterized by opportune values of the pressure, they allow to obtain appropriate physical and mechanical characteristics (of rigidity, resistance, sound absorption, etc.).

[0011] The above-mentioned characteristics are war-

ranted from the form and the nature of the materials.

[0012] The option concerning the use of the inert gas can increase the conformity of manufactured article with to the security qualifications either at level of elements and materials or at level of building and of exercise.

[0013] By way of non-limitative example, a practical embodiment of the invention, illustrated in the figure of the enclosed drawing table, is described.

- the figure 1 illustrates in section the typical structural element according to the invention.

[0014] With reference to the mentioned figure, the standard structural element, according to the invention, generically indicated with (1) in figure 1, it is realized coupling two side elements (2) in plastic, composite or metallic material, which constitute the outside covering, with an carrying element interposed (3) between them constituted from a layer in a material lightened by hermetic sealing cylindrical cavities (4).

[0015] In such a way the space inside the interspace turns out subdivided in several vertical cells.

[0016] The layers like the walls of the cylinders can be realized with various materials and variable thickness depending on the various functional requirements

[0017] Some or all the cells are filled with gas in order to confer rigidity and stability to the structural element and the whole structure.

[0018] These are the schematic modalities sufficient to the expert person to realize the invention, therefore in concrete application, we will be able to consider some variants of them without prejudice to the substance of the innovative concept.

[0019] Therefore, with reference to the description which precedes and the enclosed table, are expressed the following

Claims

1. Multifunction structural element, **characterized in that** it is constituted from two parallel side layers in plastic, composite or metal material between which are interposed one or more component lightened with cylindrical cavities or tubing manufactured article.

The said cavity or manufactured articles subdivide the interspace between the side elements in a plurality of cells, disposed in different manners and to various distances in function of the application.

2. Multifunction structural element as claimed in claim 1, **characterized by** the fact that the cells in which the interspace is subdivided are hermetically sealed.

3. Multifunction structural element as claimed in claim 1 and 2, **characterized by** the fact that everyone or some of the cells in which the interspace is subdivi-

vided can only be filled by compressible fluid, in general and also for structural functions.

4. Multifunction structural element as claimed in claims 1 and 2, **characterised by** the fact said cells are foreseen filled, to lighten more the structure and contain the costs, with inert gas or simply air taking into consideration values of pressure or degrees of vacuum opportune and compatible according to the various functional requirements.
5. Multifunction structural element as claimed in claim 1 and one or more than the next claims, **characterized by** the fact than the various layers like the walls of the cylinders (in the case of cavities realized with tubing manufactured article) are foreseen realized with various materials and variable thickness depending on the functional requirements.
- The all one as described, illustrated, claimed and for the purposes there specified.

5

10

15

20

25

30

35

40

45

50

55

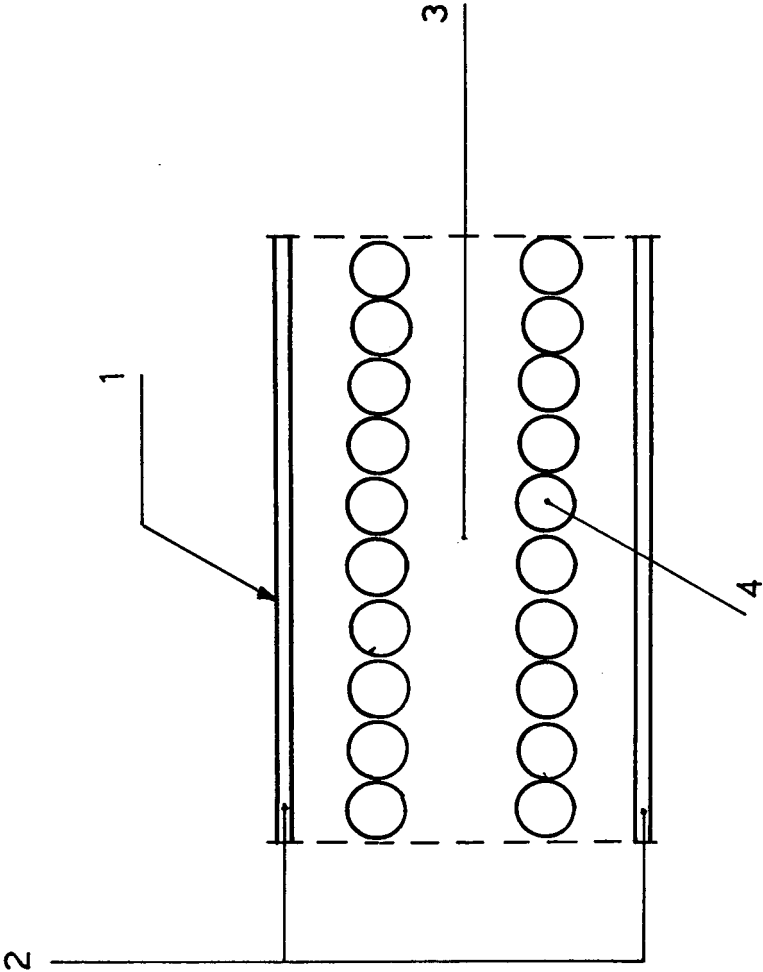


Fig.1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 6977

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 26 29 171 A1 (RODRIAN, SIEGFRIED) 12 January 1978 (1978-01-12) * the whole document *	1,2,4,5	E04B1/80 E04B1/86 E01F8/00
X	WO 02/078948 A (INTELLIGENT ENGINEERING LIMITED; KENNEDY, STEPHEN, JOHN; LEEMING, JOH) 10 October 2002 (2002-10-10) * page 5, line 12 - page 10, line 16; figures 3,10 *	1-3,5	
X	FR 2 727 189 A (PERIPHERIE) 24 May 1996 (1996-05-24) * page 6, line 35 - page 8, line 33; figures 1-3,7-13 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			E01F E04B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 January 2006	Examiner Flores Hokkanen, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

2

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 07 6977

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-01-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2629171	A1	12-01-1978	NONE
WO 02078948	A	10-10-2002	EP 1379379 A1 14-01-2004 GB 2374038 A 09-10-2002
FR 2727189	A	24-05-1996	NONE