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(54) **A wall element, a kit of parts for a wall element and a method for mounting such a wall element**

(57) Wall element, comprising a series of tubes (2) provided on the outside with a fibrous covering (3), which tubes (2) are placed near one another in a generally parallel way in order to form a plane, characterised in that the wall element (1) further comprises at least one rigid longitudinal element (4,6,7) connected with the tubes (2)

in a direction perpendicular to or inclined with respect to the orientation of the tubes (2) in order to hold the tubes (2) together to form a rigid surface, where the wall element (1) doesn't comprise two rigid longitudinal elements, oriented parallel to the tubes (2), and reaching from the first range of free extremities of the tubes (2) to the second range of free extremities of the tubes (2).

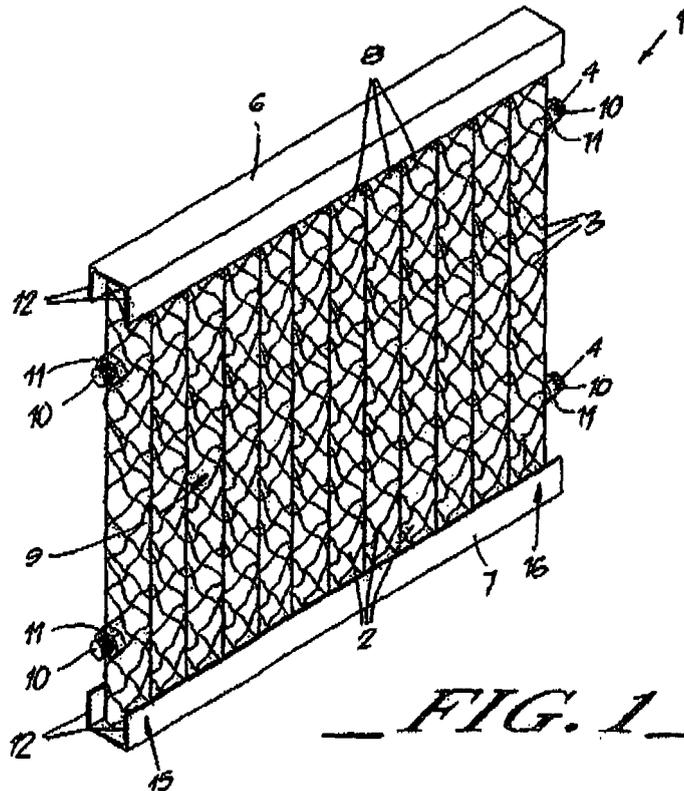


FIG. 1

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Description

Field of the Invention

[0001] This invention relates to a wall element, as well as to a kit of parts for such a wall element and to a method for mounting such wall element, more in particular of the type comprising a series of tubes provided on the outside with a fibrous covering, which tubes are generally placed near one another in order to form a plane.

Background of the Invention

[0002] A wall element of that kind is disclosed in EP1.017.907.

[0003] The tubes can be round thin walled plastic tubes, or they can also be made of bamboo.

[0004] The outside can be covered with coir fibres, or fibres from flax, hemp and/or tiger grass.

[0005] The effect of the fibrous covering is the direct aesthetic effect, and the improved capacity of such a wall element to be overgrown by plants.

[0006] Commercially available wall elements of this kind are constructed as a rectangular metal frame of U-shaped profiles, wherein the plastic tubes covered with coir fibres are arranged in a closely abutting manner.

[0007] Each tube is held in place, on the one hand, in the plane of the wall element by two neighbouring tubes or, in case of the two ultimate tubes, by one neighbouring tube and a U-shaped profile as part of the frame in line with the tubes and, on the other side, perpendicularly on the plane of the wall, by the locked position of the free extremities of the tubes between the legs of the U-shaped profiles.

[0008] These wall elements require assembly in the production facilities and, due to their relative high weight, they require at least two persons and in general also a crane to be mounted in a fence structure.

[0009] Indeed, such wall elements are usually used as a building element for a fence. Such fences in general consist of a series of the above wall elements and a suitable amount of I-profiled supports which are rigidly provided, in general concreted, in the ground at regular distance in accordance with the width of the wall elements.

[0010] Once the I-profiled supports are rigidly placed in position, the wall elements have to be slit between the flanges of I-profiled supports.

[0011] Because of the weight and the height of the wall elements, usually a crane is used in order to lift the wall elements up to the height of the free extremities of the I-profiled supports. From that position, the wall elements can be lowered and carefully slit between the said flanges of the I-profiled supports.

[0012] It is clear that the I-profiled supports coincide with the vertically oriented portions of the frame.

[0013] Because of the thickness and in general of the dimensions of the closed frame used for wall elements as commercially available today, existing fence struc-

tures of concrete upstanding supports with concrete panels, or of wooden supports wherein generally wooden wall elements are provided, can not be reused by removing the panels and by subsequently sliding in such wall elements.

[0014] Both the I-profiled supports and the U-shaped frame profiles of the wall element are generally made of galvanized steel.

[0015] According to a first aspect, the present invention aims at a wall element which is lighter than the known wall elements of this kind.

[0016] Furthermore, the invention aims at a wall element that can be produced cheaper and that requires fewer resources.

Summary of the Invention

[0017] To this aim, according to a first aspect, the invention relates to a wall element, comprising a series of tubes provided on the outside with a fibrous covering, which tubes are placed near one another in a generally parallel way in order to form a plane, whereby the wall element further comprises at least one rigid longitudinal element connected with the tubes in a direction perpendicular to or inclined with respect to the orientation of the tubes in order to hold the tubes together to form a rigid surface, where the wall element doesn't comprise two rigid longitudinal elements, oriented parallel to the tubes, and reaching from the first range of free extremities of the tubes to the second range of free extremities of the tubes.

[0018] It is clear that such a wall element according to the present invention differs from the known wall elements in that it doesn't comprise a frame surrounding the tubes, but in stead one or several rigid longitudinal elements whereof non is oriented according to the orientation of the tubes, which indeed results indeed in a potential reduction of the weight of the wall element.

[0019] According to a basic embodiment, the tubes of the wall element according to the present invention have a series of holes in the plane of the wall element, and a first rigid longitudinal element which reaches through the said holes, for example a spear shaped rod with a diameter slightly smaller than the holes.

[0020] It is clear that such embodiment is light weighted as compared to the existing wall element comprising two upstanding and two horizontally oriented profiles making up the surrounding frame of the tubes.

[0021] The free extremities of the rigid longitudinal element can be provided of tensioning means, such as a nut that can be screwed on a threaded end, in order to keep the tubes tightly together after assembly of the tubes and the rigid element.

[0022] According to a special embodiment, such a wall element basically consisting of tubes kept together by means of a through going rod, is featured with a U-shaped profile arranged near one of both ranges of free extremities of the tubes.

[0023] Such a U-shaped profile is a second rigid longitudinal element that can cooperate with the first rigid longitudinal element for maintaining the tubes together in order to form a rigid wall element.

[0024] Another advantage of this embodiment is that the side of the wall element whereon the U-shaped profile is provided is extra protected for being located on the ground or it can form a cap which prevents water from trickling in the tubes.

[0025] A further embodiment can be such that a U-shaped profile is arranged near both ranges of free extremities of the tubes, combining all above advantages.

[0026] According to another preferred embodiment, the tubes of the wall element according to the present invention have two series of holes in the plane of the wall element, and a first rigid longitudinal element which reaches through the first series of holes, and a second rigid longitudinal element which reaches through the second series of holes.

[0027] Such embodiment provides in a rigid wall element which is must lighter than the presently available wall elements, and which can be handled and placed together as part of a fence, for example between concreted I-profiled supports.

[0028] If both rigid longitudinal elements are oriented according to a mutually deviating angle with respect to the tubes, the rigidity is even higher as no parallelogram shape can be obtained.

[0029] The present invention is also about a method for building a fence by mounting such wall elements according to the present invention.

[0030] The method comprises the steps of rigidly providing a first upstanding support in the ground, placing a wall element according to the invention joining with its first upstanding edge the said first support, rigidly providing a second upstanding support in the ground joining the second and opposing upstanding edge of the wall element, such that the wall element is vertically held in position by the two joining upstanding supports.

[0031] According to an alternative, the method comprises the steps of rigidly providing a first and a second upstanding support in the ground at a suitable distance in order to have sufficient space for the wall element to be placed between the said supports, placing a wall element according to the invention between the first and the second upstanding supports, such that the wall element is vertically held in position by the two joining upstanding supports.

[0032] In order to be held vertically, the wall element can be connected mechanically to one or both of the supports, or can be captured between flanges or protrusions provided on the support.

[0033] A particular method would foresee in a step where a profile is provided on the ground before providing the wall element, such that the wall element can be located on the said profile on the ground.

[0034] This profile can for example be a U-shaped profile which in that case is provided on the ground with the

flanges upwardly oriented.

[0035] The profile can be connected to one or both of the upstanding supports.

[0036] Another method would also foresee a step of providing a profile on top of the wall element, preferably after the wall element is put in position.

[0037] The present invention is also about a kit of parts for a wall element as described above, comprising a series of tubes provided on the outside with a fibrous covering, which tubes can be placed near one another in a generally parallel way in order to form a plane whereby the kit of parts for the wall element further comprises at least one rigid longitudinal element to be connected with the tubes in a direction perpendicular to or inclined with respect to the orientation of the tubes in order to hold the tubes together to form a rigid surface, where the wall element doesn't comprise two rigid longitudinal elements, oriented parallel to the tubes and reaching from the first range of free extremities of the tubes to the second range of free extremities of the tubes.

[0038] A kit of parts allows the product to be sold to the do-it-yourself customer.

[0039] It is a merit of the wall element according to the present invention that it can be offered as a kit of parts. Indeed, according to a specific embodiment, a kit of parts comprises tubes, each provided of a hole, and further a rod provided of two treated ends and two nuts.

[0040] It is clear that these compounds can easily be assembled by any do-it-yourself person, and if it is assembled at once joining and eventually connected to a rigid support or between two supports, there is no need for any assistant and/or any crane for sliding the wall element after assembly between the profiled supports.

[0041] The present invention is also about a method to assembly a kit of parts according to the invention.

[0042] A preferred embodiment is described in the detailed description.

[0043] With the intention of better showing the characteristics of the invention, hereafter, as an example without any limitative character, several preferred forms of embodiment are described, with reference to the accompanying drawings, wherein:

Brief Description of the Drawings

[0044]

FIG. 1 schematically represents a wall element according to the invention;

FIG. 2 represents a wall element according to the invention in plan view;

FIG. 3 represents a kit of parts of the wall element according to FIG. 1; and

FIG. 4 to 6 represent the steps of a preferred method according to the invention.

Detailed Description of Embodiment(s)

[0045] As represented in FIG. 1 and 2, the wall element 1 according to the represented embodiment of the invention mainly consists of a series of tubes 2 provided on the outside with a fibrous covering 3, four rigid longitudinal elements, in this case two rods 4 that are brought through holes 5 provided in the tubes 2, and two U-shaped profiles 6 and 7, one on each range of free extremities 8 of the tubes 2.

[0046] The tubes 2 are placed near one another in a generally parallel way so that a plane 9 is formed, in this case a generally flat plane 9.

[0047] The rods 4 have an outer diameter slightly smaller than the diameter of the holes 5. The rods 4 which protrude the plane 9 of the tubes 2 at both sides are provided of threaded ends 10 whereon nuts 11 are screwed.

[0048] Both rods 4 are provided in a generally perpendicular orientation to the tubes 2, which is a consequence of the position of the holes 5.

[0049] In this embodiment, the rods 4 are provided at a different distance from their closer range of free extremities of the tubes 2.

[0050] The U-shaped profiles 6 and 7, providing in a third and a fourth rigid longitudinal element, have an inner distance between their flanges 12 generally corresponding of slightly smaller than the outer diameter of the tubes 2, it is to say before the application of the tubes 2, such that profiles 6 and 7 are kept in place thanks to the tense cooperation.

[0051] No profile is provided in an orientation parallel to the tubes 2, which results indeed in a potential reduction of the weight of the wall element.

[0052] Although the represented embodiment shows two rods 4 and two U-shaped profiles 6 and 7, according to the present invention, one longitudinal rigid element would suffice to keep the tubes 2 together.

[0053] For example, the profiles 6 and 7 can be left away and one of the rods 4 could suffice for keeping the tubes 2 together.

[0054] Alternatively, another kind of rigid longitudinal element could be connected with the tubes 2, for example a flat profile provided of holes or hooks through which a wire is woven embracing the tubes 2 to be held in the plane of the wall element 1.

[0055] In this case, the rigid longitudinal element is connected with the outside of the tubes 2 in stead of going through a series of holes 5 provided in the tubes 2.

[0056] Anyhow, any such wall element 1 requiring less metal or other valuable material will be cheaper and/or will be lighter.

[0057] FIG. 3 represents a kit of parts of which any do-it-yourself person can assemble a wall element 1 as described above and represented in FIG. 1 and 2.

[0058] In this embodiment the kit of parts comprises a series of tubes 2 provided on the outside with a fibrous covering 3, and four rigid longitudinal elements, in this

case two rods 4 including four nuts 11 and two U-shaped profiles 6 and 7.

[0059] FIG. 4 to 6 show a method for mounting the kit of parts as represented in FIG. 3, as also a method for building a fence by mounting such wall elements 1 according to the present invention.

[0060] In FIG. 4, a first upstanding support 13a is shown, firmly provided, in this case concreted in the ground 14.

[0061] A U-shaped profile 7 is provided on the ground 14, connected with the first upstanding support 13a for example by means of stainless steel screws.

[0062] Afterwards, the wall element 1 can be assembled on the spot in case the wall element 1 is delivered as a kit of parts. Thereto, the two rods 4, at one side already provided of a nut 11, are brought through holes provided in the upstanding support 13a, as shown in FIG. 5.

[0063] In a next step, also represented in FIG. 5, the tubes 2 provided of holes 5 at corresponding height are put in place, one by one or per subset. The do-it-yourself person will thereby not encounter heavy weight components.

[0064] When the tubes 2 of the wall element 1 are put in place, a second upstanding support 13b can be provided in a similar manner as the previous one, joining the second upstanding edge 16 of the wall element 1.

[0065] On top of the tubes 2 is further provided a second U-shaped profile 6, the result of which is shown in FIG. 6.

[0066] It is clear that one could also put in place two or a series of upstanding supports 13, and afterwards assemble the wall element 1.

[0067] The wall element 1 can then be assembled on the spot between two already mounted upstanding supports 13, where the last tube 2 will require to be inserted from above the upstanding supports in case the upstanding supports 13 are made of a I-shaped profiles or of two U-shaped profiles.

[0068] Both mounting methods as explained here above can also be applied for a pre-assembled wall element 1.

[0069] Indeed, a pre-assembled wall element 1 is a rigid structure comprising tubes 2 and at least one or in this case two rods 4 provided with nuts 11 at both ends and tensioned such that the tubes 2 fit closely together.

[0070] If the wall element 1 also comprises U-shaped profiles 6 and 7, these might be connected already to the tubes 2, or they might be provided separately to be connected to the wall element 1 and/or the fence in the same order as discussed above.

[0071] A pre-assembled wall element 1 can thus be mounted by firmly providing a first upstanding support 13a, in a next step providing a U-shaped profile 7 on the ground 14, connecting it to the first upstanding support 13a, and further placing the pre-assembled wall element 1 on the U-shaped profile 7.

[0072] In a next step, a second upstanding support 13b

can be provided in a similar manner as the previous one, joining the second upstanding edge 16 of the wall element 1.

[0073] On top of the tubes 2, a second U-shaped profile 6 can be provided, which can also be connected to the supports 13.

[0074] Eventually one or both rods 4 protrude the plane 9 at one or at both sides, to such an extent that the protrusions can be used to connect the wall element 1 to the support 13.

[0075] The pre-assembled wall element 1 can also be inserted between two already mounted upstanding supports 13. The wall element 1 will require to be inserted from above the upstanding supports in case the upstanding supports 13 are made of a I-shaped profile or of two U-shaped profiles.

[0076] In that case, non of the rods 4 can extend too far beyond the plane 9 formed by the tubes.

[0077] Indeed, the wall element 1 will be slit from above the upstanding supports 13 between the space delimited by the flanges and the body of the upstanding supports in case these are made of a I-shaped profiles or of two U-shaped profiles, which because of the low weight of the wall elements 1 according to the invention can be performed by one person without the need for a crane. Also in this case, a U-shaped profile 7 can be provided on the ground or can already be connected with the wall element 1.

[0078] Alternatively, if the upstanding supports 13 are made of a T-shaped profile or of two L-shaped profiles, the wall elements 1, assembled on the spot or pre-assembled, can be placed without the need for lifting the wall elements 1 up to above the upstanding supports 13. In this case, the wall elements 1 can be kept in place by providing, for example screwing, any kind of abutment on the open side of the upstanding support 13.

[0079] In order to be able to use protruding rods 4 which extend beyond the body of the upstanding supports 13, cut outs can be provided in the body of the upstanding profiles 13.

[0080] If upstanding supports 13 are already available from a previous fence, the wall element 1 according to the present invention allows to reuse these supports 1. For example, the concrete I-shaped supports 1 where between concrete panels are slit can be transformed into a decorative and eventually overgrown sound absorbing fence by removing the concrete panels, eventually leaving the lower concrete panel, and placing a wall element 1 according to the present invention. It is clear that, independent from the type of upstanding supports 13, an abutment could be provided slightly elevated above the ground 14 level, which may prolong life expectancy of the wall elements 1.

[0081] Regarding the protruding portions of the rods, which can be used to connect the wall elements 1 to the upstanding supports 13, an asymmetric design where both rods 4 are provided at a different distance from their closer range of free extremities of the tubes 2 results in

the advantage that identical wall elements 1 can be provided in an alternating way in a fence structure.

[0082] This prevents two neighbouring wall elements 1 disturbing each other at the connection with an upstanding support 13.

[0083] With respect to the holes 5 which are provided in the tubes 2, it is recommended to provide them prior to applying the fibrous covering 3 in order to prevent the fibrous covering 3 to come loose.

[0084] It is clear that a wall element 1 according to the present invention can comprise a double row of tubes 2 in order to improve its sound insulation capacity.

[0085] Although the present invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that the invention is not limited to the represented forms of the wall element, the represented kit of parts and the represented method steps, and that the present invention may be embodied with various changes and modifications without departing from the spirit and scope thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein. In other words, it is contemplated to cover any and all modifications, variations or equivalents that fall within the spirit and scope of the basic underlying principles and whose essential attributes are claimed in this patent application. It will furthermore be understood by the reader of this patent application that the words "comprising" or "comprise" do not exclude other elements or steps, and that the words "a" or "an" do not exclude a plurality. Any reference signs in the claims shall not be construed as limiting the respective claims concerned. The terms "first", "second", "third", "a", "b", "c", and the like, when used in the description or in the claims are introduced to distinguish between similar elements or steps and are not necessarily describing a sequential or chronological order. Similarly, the terms "top", "bottom", "over", "under", and the like are introduced for descriptive purposes and not necessarily to denote relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances and embodiments of the invention are capable of operating according to the present invention in other sequences, or in orientations different from the one(s) described or illustrated above.

Claims

1. Wall element, comprising a series of tubes (2) provided on the outside with a fibrous covering (3), which tubes (2) are placed near one another in a generally parallel way in order to form a plane, **characterised in that** the wall element (1) further comprises at least one rigid longitudinal element (4,6,7) connected with

- the tubes (2) in a direction perpendicular to or inclined with respect to the orientation of the tubes (2) in order to hold the tubes (2) together to form a rigid surface, where the wall element (1) doesn't comprise two rigid longitudinal elements, oriented parallel to the tubes (2), and reaching from the first range of free extremities of the tubes (2) to the second range of free extremities of the tubes (2). 5
2. Wall element according to claim 1, **characterised in that** each tube (2) has one or more holes (5) which are arranged such that one or more series of holes (5) are formed in the plane of the wall element (1), and **in that** at least one rigid longitudinal element reaches through the at least one series of holes (5). 10
3. Wall element according to claim 1 or 2, **characterised in that** the free extremities of the rigid longitudinal elements (4,6,7) are provided of tensioning means in order to keep the tubes (2) tightly together. 15
4. Wall element according to claim 1, **characterised in that** it comprises a profile (6,7) arranged near one or both of the ranges of free extremities of the tubes (2). 20
5. Wall element according to claim 1 or 2, **characterised in that** the rigid longitudinal elements (4,6,7) have a portion protruding the surface formed by the tubes (2). 25
6. Wall element according to one or more of the preceding claims, **characterised in that** it comprises at least two rigid longitudinal elements (4,6,7), which are each situated at a different distance from their closer range of free extremities. 30
7. Wall element according to one or more of the preceding claims, **characterised in that** at least two rigid longitudinal elements (4,6,7) are provided, which are oriented according to a mutually deviating angle with respect to the tubes (2). 35
8. Method for mounting a wall element according to one or more of the preceding claims, **characterised in that** the method at least comprises the steps of rigidly providing a first upstanding support (13a) in the ground (14), placing a wall element (1) joining with its first upstanding edge (15) the said first support (13a), rigidly providing a second upstanding support (13b) in the ground (14) joining the second and opposing upstanding edge (16) of the wall element (1), such that the wall element (1) is vertically held in position by the two upstanding supports (13). 40
9. Method for mounting a wall element according to one or more of the claims 1 to 7, **characterised in that** it optionally comprises the step of rigidly providing a 45
- first and a second upstanding support (13a)(13b) in the ground (14) at a suitable distance in order to have sufficient space for the wall element (1) to be placed between the said supports (13a)(13b), and further at least comprising the steps of placing a wall element (1) according to the invention between the first and the second upstanding supports (13a)(13b), such that the wall element (1) is vertically held in position by the two upstanding supports (13). 50
10. Method for mounting a wall element according to claim 8 or claim 9, **characterised in that** the wall element (1) is mechanically connected to one or both of the supports (13). 55
11. Method for mounting a wall element according to claim 8 or claim 9, **characterised in that** the wall element (1) is captured between flanges or protrusions provided on a support (13).
12. Method for mounting a wall element (1) according to claim 8 or claim 9, **characterised in that**, before the wall element (1) is placed, a profile (7) is provided on the ground (14), such that the wall element (1) can be located on the said profile (7) on the ground (14).
13. Method for mounting a wall element (1) according to claim 8 or 9, **characterised in that** a profile (6) is provided on top of the wall element (1).
14. Kit of parts for a wall element (1) according to one or more of the claims 1 to 7, **characterised in that** it comprising a series of tubes (2) provided on the outside with a fibrous covering (3), which tubes (2) can be placed near one another in a generally parallel way in order to form a plane (9) whereby the kit of parts for the wall element (1) further comprises at least one rigid longitudinal element (4,6,7) to be connected with the tubes (2) in a direction perpendicular to or inclined with respect to the orientation of the tubes (2) in order to hold the tubes (2) together to form a rigid surface, where the wall element (1) doesn't comprise two rigid longitudinal elements, oriented parallel to the tubes (2), and reaching from the first range of free extremities of the tubes (2) to the second range of free extremities of the tubes (2).

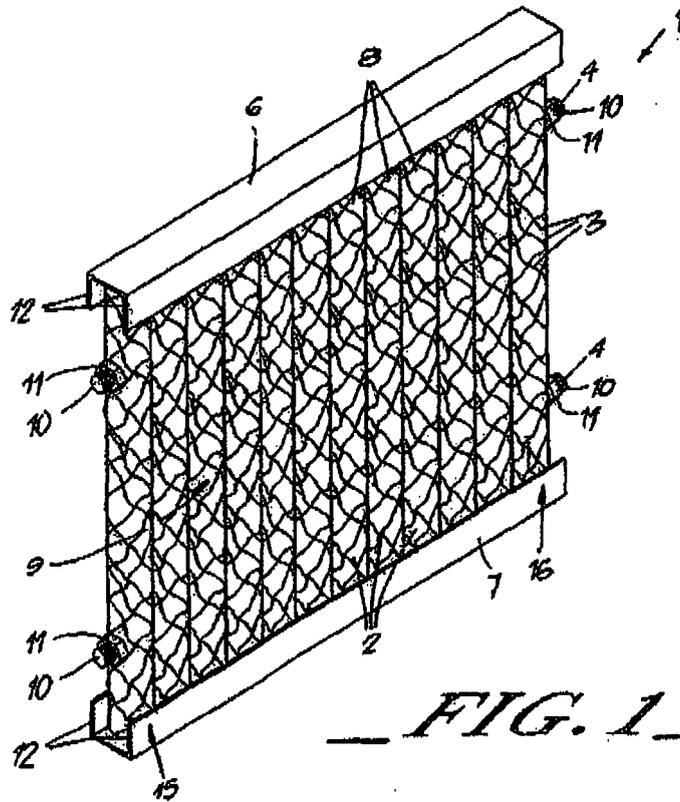


FIG. 1

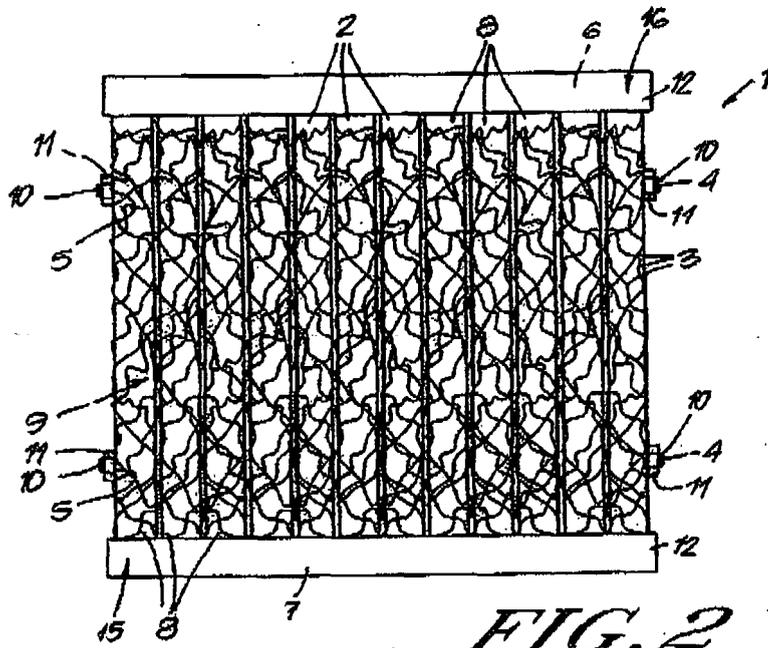


FIG. 2

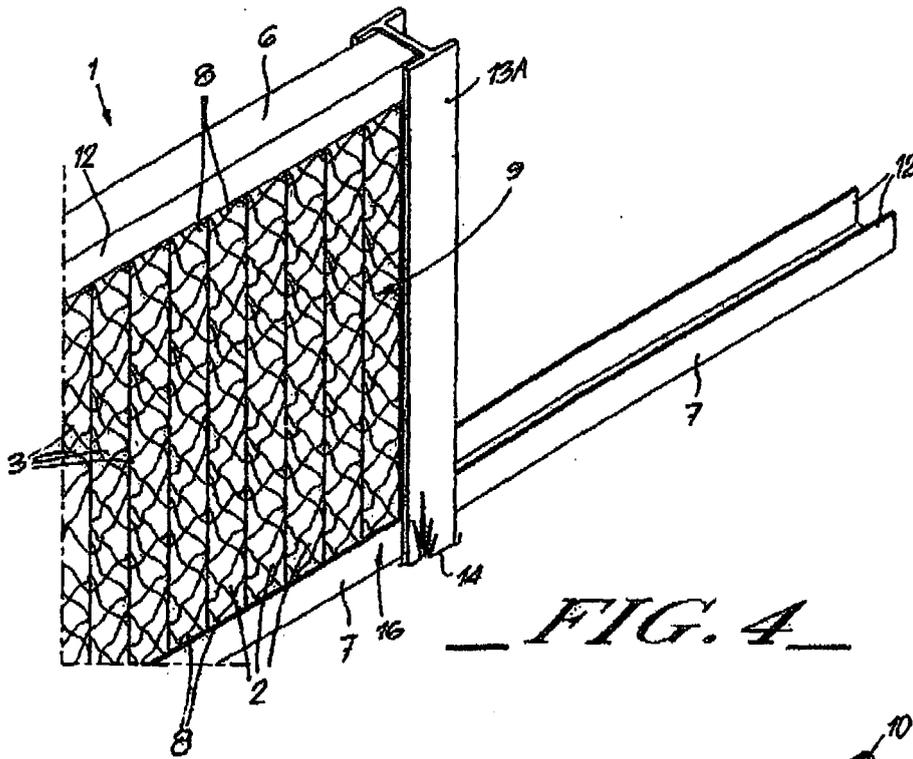


FIG. 4

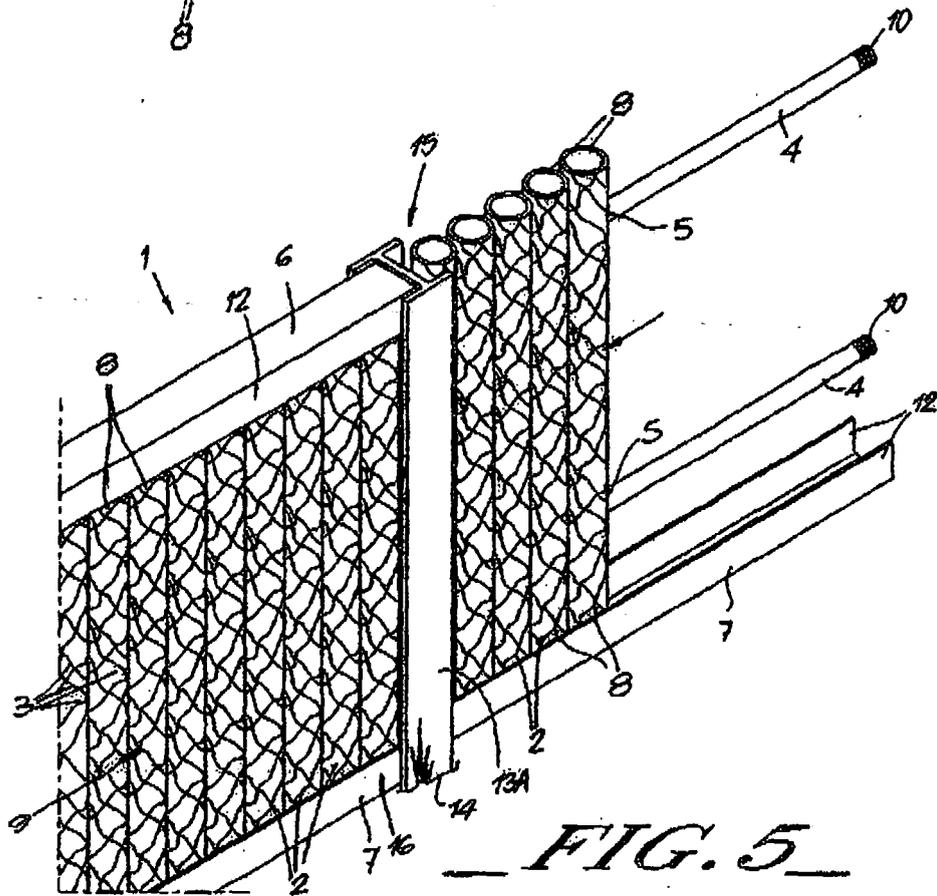


FIG. 5

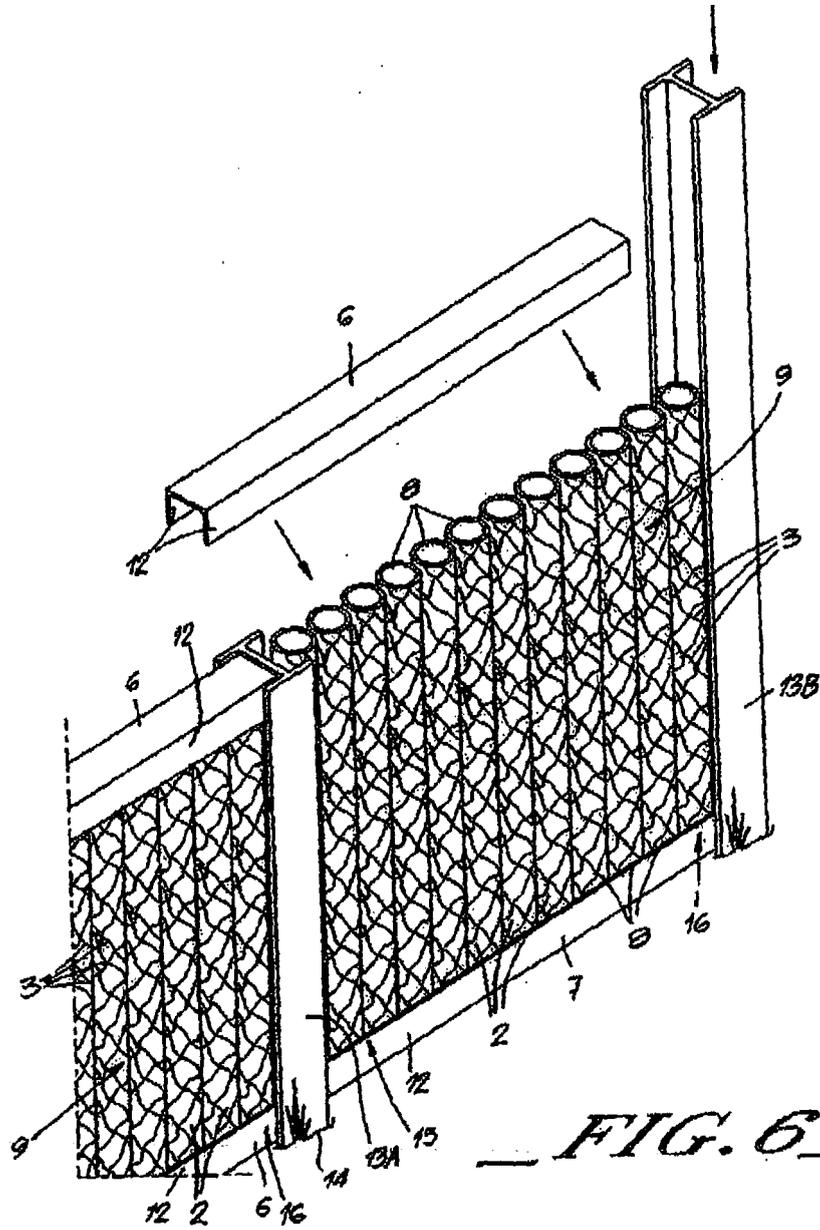


FIG. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E04H E01F E04B
4	Place of search Munich	Date of completion of the search 14 March 2008	Examiner Stefanescu, Radu
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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			

EPO FORM 1503 03.02 (P04C01)

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

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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
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