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

(11) EP 0 962 593 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.12.1999 Bulletin 1999/49

(51) Int Cl.[6]: **E01F 8/00**, E01F 8/02

(21) Application number: **99201640.2**

(22) Date of filing: **26.05.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **26.05.1998 NL 1009264**

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(54) Sound-damping wall for arrangement alongside a railroad or highway

(57) Sound-damping wall for arrangement alongside a railroad or highway, said wall being composed of substantially rectangular panels (1) manufactured of plastic, ceramic or metal, said panels having a substantially rectangular cross-section. One transverse wall (3) of a panel (1) is a longitudinally extending, almost C-shaped portion (5) and the other transverse wall (4) is formed in such a way, that a protruding part (6) thereof can be matingly received in the C-shaped portion (5) of a subsequent panel (1). At least one longitudinal wall (2) of a panel (1) is provided with a perforation (9). The subsequent transverse walls (3, 4, 8) of a panel are provided with a number of aligned slots (13) through which a strip (14) can be slid. The panels (1) can be completely or partly filled with a sound-absorbing material (17), such as in the form of mineral wool or a substrate in which plants can grow, which material might be mounted on a partition wall (16).

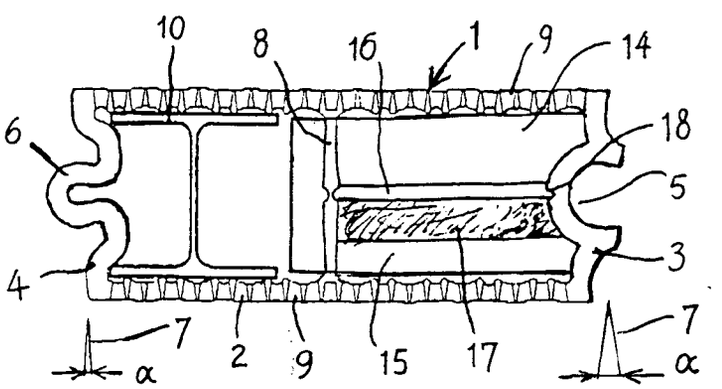

FIG. 2

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Description

[0001] The invention relates to a sound-damping wall for arrangement alongside a railroad or highway.

[0002] Sound-damping walls are known in many designs, such as e.g. the vegetation screens according to EP-C-0128245, which are also executed in the shape of an inverted V, in particular for use with a railroad, such as according to EP-C-0265991. Other types of walls are also used, in which plastic sheets and the like are employed. In these last cases, it mostly concerns walls only reflecting sound so that it is less able to penetrate into the surroundings of the railroad or highway.

[0003] Although vegetation screens have the advantage that they largely absorb sound, it is a disadvantage that they require relatively much maintenance. Further, in particular with the inverted V-shape, they require much space for arrangement, which will not always be available.

[0004] Likewise, with the other stated types of sound-damping walls, which only reflect sound, in many cases it is a disadvantage, that arranging them requires relatively much time, although they require less space.

[0005] The invention aims to remove these difficulties and to that end provides for a sound-damping wall characterized in that it is composed of substantially rectangular panels having a substantially rectangular cross-section, with the one transverse wall of a panel having a longitudinally extending, almost C-shaped portion and the other transverse wall being formed such, that a protruding part thereof can be matingly received in the C-shaped portion of a subsequent panel, at least one longitudinal wall of a panel being provided with a perforation.

[0006] Such a panel can be manufactured at low cost from recycled plastic and in any desired color, or transparent. Manufacture from ceramic material or metal, aluminium for example, is also possible.

[0007] The panels can be slid together in longitudinal direction so that a continuous sound-damping wall will arise. The engaging parts of the transverse panels provide acoustically completely sealed-off walls.

[0008] By perforating at least one wall of the panel, sound produced at that side, will be largely absorbed, and thus not be reflected.

[0009] For stiffening the longitudinal walls of a panel so that it can have a considerable width, one can mount at least one secondary transverse wall between the transverse walls being square to the longitudinal walls and being connected with them.

[0010] According to an embodiment, the transverse walls can form an angle between 2 and 10° to a plane square to the longitudinal walls, in such a way that they enclose a sharp angle between each other. In particular, the angle between a transverse wall and the plane square to the longitudinal walls will be approximately 5°.

[0011] In this way, it is achieved that in one position, a normal flat wall will arise in that the angular rotations of the transverse walls compensate each other. In the other position, the longitudinal walls of subsequent panels will enclose an angle. Due to this, a bent screen can be obtained.

[0012] If one standard panel would be applied, it will be necessary that both longitudinal walls are provided with a perforation. If one wishes that only one transverse wall will be provided with a perforation, two differently executed panels will have to be applied. Naturally, this will have to be taken into account on mounting.

[0013] For obtaining a firm connection between the mutually connected panels, the subsequent transverse walls are provided with a number of aligned openings through which an elongated member being square to said transverse walls can be slid.

[0014] Preferably, the openings will be in the shape of slots being transversely to the longitudinal direction of the transverse wall and extending up to the longitudinal walls of the panel and the elongated member will be a strip. The strip will then almost lie against the inner side of the longitudinal walls.

[0015] The strips will cause the subsequent panels to lie exactly in one plane. Therefore, the tolerances in the dimensions of the engaging portions of the panels can be accomodated. At the same time the strips will serve for absorbing the transverse forces, such as exerted by the wind, acting on the panels. Due to this, overload of the connecting elements of said panels and bending of an assembly of sheets can be prevented.

[0016] By applying the strips also the upper edges of a number of mutually connected panels are aligned so that an esthetic unity is obtained. The position of such an assembly can also be adapted when the foundation of a number of such assemblies on one location would be slightly more subsided than on another location.

[0017] For securing a vertical wall to the ground, one can use posts which are anchored to the ground and which are designed such that they can be received in the cavity of a panel. The posts will generally be made of metal and are, after mounting panels thereon, invisible from the outside and protected against weather influences. Due to this, grounding of the metal parts may be unnecessary.

[0018] Apart from extending in longitudinal direction, the panels can also extend in horizontal direction such as for establishing a sound screen over a railroad or highway, in which the sound screen is curved upwards over a road. In that case, the transverse walls of the panels will have to be supported by constructional elements enclosing them. Said elements can be anchored to the ground.

[0019] According to an embodiment of the invention, the panels can be partly or completely filled with a sound-absorbing material, such as in the form of mineral wool.

[0020] When the one longitudinal wall of a panel is not provided with perforations, the sound-absorbing material can be applied on this wall.

[0021] The sound-absorbing material can also be a substrate suitable for having plants grown therein. This can improve the appearance of the screen.

[0022] It is also possible, to mount a partition wall in a panel, said partition wall being parallel to the longitudinal walls of the panel and being provided with a layer of sound-absorbing material on at least one side.

[0023] In case of application alongside a railroad or a highway, with loose ground, it may be desirable to damp the vibrations being transmitted to the environment through the ground. In order to achieve this, it is possible to mount the sound damping screen according to the invention across a certain height into the ground. Then, the downwardly facing cavities of the panels will naturally be sealed-off, so that no ground can penetrate into them. Additionally, it may be desirable to seal off the cavities at the top side to prevent ground from getting into it.

[0024] In that case, the wall can also serve as earth-retaining structure and not be intended only for absorbing vibrations. In general, then only one longitudinal wall will be provided with a perforation.

[0025] The invention is further explained by way of an embodiment, shown in the drawing, in which:

fig. 1 shows a view of a part of a sound-damping wall according to the present invention, formed by a number of panels, with only two of them being shown, one of them partly;
fig. 2 shows a cross-section according to the line II-II of fig. 1 across one single panel; and
fig. 3 shows a side view of the panel of figs. 1 and 2.

[0026] The drawing shows a panel 1 consisting of the longitudinal walls 2 and the transverse walls 3 and 4. The transverse wall 3 is provided with a C-shaped portion 5 in which a protruding portion 6 connected to said transverse wall 4 can be fittingly received. Owing to this, said elements can not be pulled apart.

[0027] The transverse walls 3 and 4 are not square to the longitudinal walls 2, but can enclose an angle α with a plane 7 being square to the longitudinal walls. Due to this, the transverse walls will enclose an angle twice as large. The angle α will preferably be about 5°, but can of course also have another value, depending on the application of the panels 1.

[0028] The longitudinal walls 2 are additionally supported in relation to each other by one or more intermediate transverse walls 8. At least one of the longitudinal walls 2 is provided with perforations 9. The dimensions of the openings concerned can be adapted to the purpose. Generally, however, one and the same perforation can be used for various purposes.

[0029] As shown in the figs. 1 and 2, a panel 1 can be slid onto a post 10 which is anchored to the ground 12 by means of a baseplate 11. A number of panels can then be mutually connected and the last panel of a series can be mounted on a post 10.

[0030] For supporting the series of panels, slots 13 have been provided in the transverse walls 3, 4 and 8, in which strips 14 can be received, which then almost contact the longitudinal walls 2. The series of panels 1 can then offer more resistance to the wind load or another load.

[0031] Within the panel, a dividing wall 16 being provided with a sound-absorbing material 17 such as mineral wool, for example, can be mounted in its cavity 15. This material will be situated at a longitudinal wall 2 provided with perforations 9. Naturally, the other longitudinal wall of a panel 1 can be provided with perforations too and then the other side of the dividing wall 16 can be provided with a sound-absorbing material. In this case, the wall will be double-acting. In order to fix the dividing wall 16 in its place, slots 18 have been provided in the transverse walls 18.

[0032] When one of the posts 10 of a wall would slightly subside, the assembly of panels 1 situated there might be raised and be supported at this level so that the upper edges of all panels again form a straight line. Here, the strips 14 mounted in the panels play an important part.

[0033] It will be obvious, that only one possible embodiment of a sound-damping wall according to the invention has been illustrated in the drawing and described above and that many changes can be made without leaving the inventive idea, as it is indicated in the enclosed claims.

Claims

1. Sound-damping wall for arrangement alongside a railroad or highway, characterized in that the wall is composed of substantially rectangular panels (1) having a substantially rectangular cross-section, with the one transverse wall (3) of a panel (1) having a longitudinally extending, almost C-shaped portion (5) and the other transverse wall (4) being formed such, that a protruding part (6) thereof can be matingly received in the C-shaped portion (5) of a subsequent panel (1), at least one longitudinal wall (2) of a panel (1) being provided with a perforation (9).

2. Sound-damping wall according to claim 1, characterized in that at least one secondary transverse wall (8) is mounted between the transverse walls (3, 4) and extends in parallel to them and is connected to the longitudinal walls (2).

3. Sound-damping wall according to claim 1 or 2, characterized in that the transverse walls (3, 4) form an angle (α) between 2 and 10° to a plane (7) being square to the longitudinal walls of the panel, in such a way that said transverse walls (3, 4) enclose a sharp angle between each other.

4. Sound-damping wall according to claim 3, characterized in that the angle (α) between a transverse

wall (3, 4) and the plane (7) being square to the longitudinal walls (2) is approximately 5°.

5. Sound-damping wall according to one of the preceding claims, characterized in that subsequent transverse walls (3, 4, 8) of a panel (1) are provided with a number of aligned openings (13) through which an elongated member (14) being square to said transverse walls can be slid.

6. Sound-damping wall according to claim 5, characterized in that the openings are in the shape of slots (13) being transversely to the longitudinal direction of the transverse wall (3, 4, 8) and extending up to the longitudinal walls (2) of the panel (1) and that the elongated member is a strip (14) almost lying against the inner side of the longitudinal walls (2).

7. Sound-damping wall according to one of the preceding claims, characterized in that for securing a vertically arranged wall to the ground (12), posts (10) are employed, which are anchored to the ground and which are designed such that they can be received in the cavity (15) of a panel (1).

8. Sound-damping wall according to one of the preceding claims, characterized in that the panels (1) are partly or completely filled with a sound-absorbing material (17), such as in the form of mineral wool or a substrate in which plants can grow.

9. Sound-damping wall according to claim 8, characterized in that a partition wall (16) is mounted in a panel (1), said partition wall being parallel to the longitudinal walls (2) of the panel (1) and being provided with a layer of sound-absorbing material (17) on at least one side.

10. Sound-damping wall according to one of the preceding claims, characterized in that the sound damping screen is mounted across a certain height into the ground (12) in which the downwardly facing cavities (15) of the panels (1) are sealed-off, so that no ground can penetrate into them.

11. Sound-damping wall according to one of the preceding claims, characterized in that the panels are manufactured from plastic, ceramic material or metal.

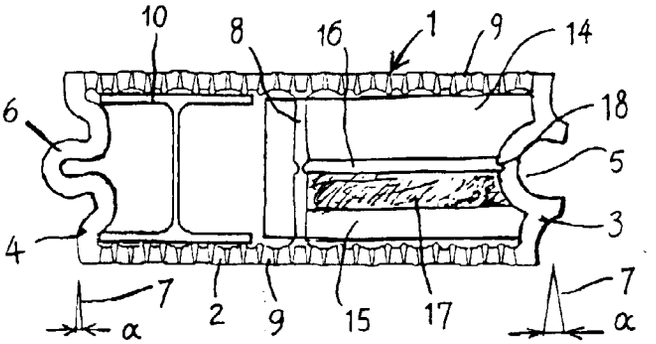

FIG. 2

FIG. 3

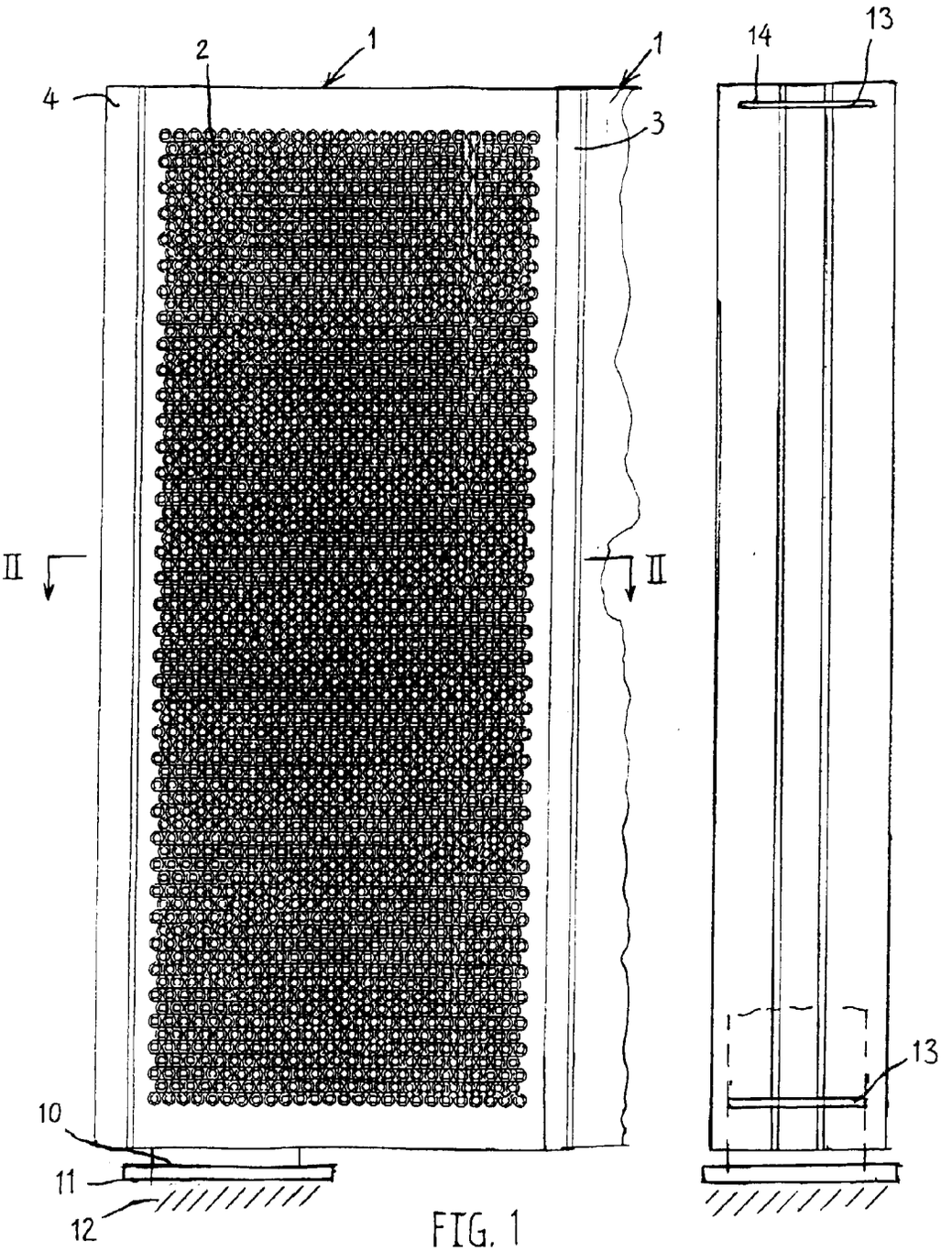

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 1640

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 40 07 990 A (CLAUS HERMANN) 20 September 1990 (1990-09-20)	1,2,7,8	E01F8/00 E01F8/02
A	* abstract; figure 1 *	3,4	
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A	* column 2, line 51 - column 3, line 4; figures *	1,8	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 September 1999	Verveer, D

CATEGORY OF CITED DOCUMENTS

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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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