

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 362 963 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

19.11.2003 Bulletin 2003/47

(51) Int Cl.7: **E04B 1/86**, G10K 11/172

(21) Application number: **03009375.1**

(22) Date of filing: **25.04.2003**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**

Designated Extension States:

AL LT LV MK

(30) Priority: **26.04.2002 IT PD20020105**

(71) Applicant: **Zenone Soave & Figli S.p.A.**
36100 Vicenza (IT)

(72) Inventors:

- **Fracasso, Giuseppe**
36100 Vicenza (IT)
- **Bedogni, Giorgio**
36100 Vicenza (IT)
- **Casciana, Giuseppe**
36100 Vicenza (IT)

(74) Representative: **Gustorf, Gerhard, Dipl.-Ing.**
Patentanwalt,
Bachstrasse 6 A
84036 Landshut (DE)

(54) **Soundproofing panel made of FRP (Fiber-Reinforced Polymer) composite with a sound-absorbing surface characterized by parallel longitudinal strips**

(57) The invention is a new soundproofing panel made of composite material, suitable for installation along railways and/or roads, comprising a box structure whose side facing the source of the noise is covered with suitably-spaced staves. The new soundproofing

panel comprises an FRP box structure (S1, S2), a layer of sound-absorbing material (F), spacers (D), and parallel staves with an arched T-shaped cross-section; these staves (T) are preferably arranged alternately, i. e. so that each stave (T) has its cross-section inverted with respect to the two staves (T) on either side.

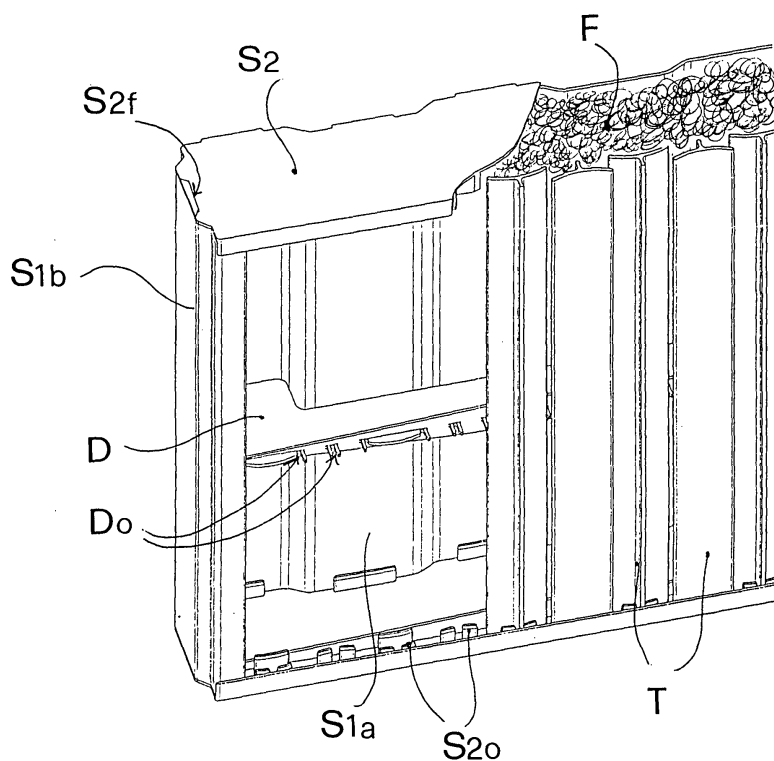


Fig. 1

Description

[0001] The present patent concerns fixed installations for absorbing noise and noise pollution coming from road and/or railway traffic and particularly it concerns a new soundproofing box panel made of FRP composite.

[0002] Along major communication routes, where the railway or road traffic is intense, a considerable amount of noise is generated, giving rise to excessive noise pollution levels.

[0003] People living in the vicinity of such major traffic routes are consequently affected by noise to such a degree that they may even suffer severe consequences to their hearing or nervous system.

[0004] Various devices and systems have been studied and manufactured to reduce and absorb traffic noise, such as the well-known embankments constructed alongside traffic routes. Such embankments do not provide adequate protection from noise, however, they occupy a wide stretch of land on either side of the road or railway line, and their construction involves the use of costly machinery.

[0005] Some types of modular panel, generally made of metal and/or plastic and containing sound-absorbing material, are also well known. Such panels are relatively easy to install, but do not always meet the needs, particularly as concerns durability.

[0006] To overcome all the above-mentioned drawbacks, a new type of composite soundproofing box panel has been designed and constructed, whose surface facing the source of noise is covered with suitably-spaced staves. The composite box panel is filled with a layer of sound-absorbing material.

[0007] The main aim of the new soundproofing panel is to absorb the sound waves generated by vehicles in transit without reflecting them back towards the source of the noise, and without transmitting them to the other side of the panel.

[0008] These and other direct and complementary aims are achieved by the new composite soundproofing panel comprising a box structure whose main face on the traffic side is covered with suitably-spaced staves.

[0009] The characteristics of the new soundproofing panel will be better clarified by the description that follows, with reference to the attached drawing, as an illustrative and not restrictive example.

[0010] Figure 1 shows an axonometric projection of the new panel with a partial cross-section, while figure 2 shows a vertical cross-section of the same new soundproofing panel.

[0011] The new soundproofing panel comprises a box structure (S1, S2), a layer of sound-absorbing material (F), spacers (D), and parallel staves (T).

[0012] The box structure (S1, S2) is constituted by a profiled element (S1), substantially comprising a rear wall (S1a) with two folded edges (S1b) and two generically flat closing elements (S2) situated at either end (S1) so as to obtain a generic parallelepiped lacking one

main face.

[0013] The profiled element (S1) preferably has its three faces (S1a, S1b) with a particular shaping; to be precise, the main face (S1a) is generically corrugated so as to make the profiled element more sturdy, while the two edges (S1b) have concave and/or convex ribbing to allow for the proper coupling of several adjacent profiled elements, or soundproofing panels.

[0014] The right- and left-hand closing elements (S2) are each composed of a flat part having the same shape as the cross-section of the profiled element (S1), complete with rims lying adjacent to the sides of said profiled element (S1). Moreover, each of the two closing elements (S2) has one or more holes (S2f) to allow for the run-off of any water accumulated inside the soundproofing panel due to condensation or infiltration.

[0015] On the open face of the box structure (S1, S2) there are staves (T), comprising bands or strips suitable for partially closing this face of the box structure (S1, S2).

[0016] The staves (T) are arranged parallel to each other in one or more rows and their length and distance between centers are such that they cover from 20% to 80%, but preferably 40%, of the area of the open side of the box structure (S1, S2).

[0017] These staves (T) are arranged preferably parallel to the length of the profiled element (S1).

[0018] The staves (T) may have a flat cross-section, an L-shaped cross-section, a U-shaped cross-section, a T-shaped cross-section or, preferably, a T-shaped cross-section in which the horizontal part of the T forms an arch and the vertical part is wider at the bottom end.

[0019] The staves (T) with a U-shaped cross-section, the staves (T) with a T-shaped cross-section with straight sides, and the staves (T) with an arched T-shaped cross-section are preferably arranged alternately, i.e. so that each staff (T) has its cross section inverted with respect to the two staves (T) on either side.

[0020] Tongues (S2o) may be provided or created on the profiled element (S1) or on the closing elements (S2) for the purpose of retaining the staves (T) and keeping them correctly oriented.

[0021] The cavity formed between the profiled element (S1), the closing elements (S2) and the staves (T) is occupied by a layer of soundproofing material (F), preferably made of rock wool or glass wool.

[0022] This cavity also contains spacers (D) composed of generically flat elements having three sides shaped exactly like the cross-section of the profiled element (S1) and the fourth side shaped with tongues (Do) suitable for holding the staves (T) and keeping them correctly spaced.

[0023] The new panel, constructed as described above, is installed along the railway and/or road traffic route, orienting the side of the panel fitted with the staves (T) towards the source of the noise and juxtaposing the panels so that the concave and/or convex ribbing of each panel fits exactly into the convex and/or concave

ribbing of the panels above and below.

[0024] The panels can be arranged with the staves (T) oriented at any angle, horizontal or vertical.

[0025] The new panel, constructed as described above, prevents the propagation of noise, absorbing the sound waves instead of reflecting them back towards the source of the sound, and it does not collect any water due to condensation or rainfall.

[0026] Therefore, with reference to the above description and to the attached drawings, the following claims are put forth. 10

Claims

1. Soundproofing panel comprising a parallelepiped FRP box structure (S1, S2) and a layer of soundproofing material (F), **characterized in that** it is composed of a parallelepiped boxed structure (S1, S2) with the side facing the source of the noise open and partially covered with rods or staves. 15 20
2. Soundproofing panel according to claim 1, **characterized in that** the rods or staves are placed in one or more rows to cover from 20% to 80% of the surface area. 25
3. Soundproofing panel according to claims 1, 2, **characterized in that** the panel wall facing the source of the noise is composed of parallel staves (T) lying side-by-side that cover 40% of the surface area. 30
4. Soundproofing panel according to claims 1, 2, **characterized in that** it comprises generically rectangular spacers (D), situated inside the box structure (S1, S2), having one side shaped to form tongues (Do) suitable for retaining the staves (T) and keeping the right distance between them. 35
5. Soundproofing panel according to claims 1, 2, 3, 4, **characterized in that** the staves (T) have a T-shaped cross-section. 40
6. Soundproofing panel according to claims 1, 2, 3, 4, **characterized in that** the staves (T) have a T-shaped cross-section with an arched horizontal part and a vertical part that is wider at the bottom end. 45
7. Soundproofing panel according to claims 1, 2, 3, 4, **characterized in that** the staves (T) have a U-shaped cross-section. 50
8. Soundproofing panel according to claims 1, 2, 3, 4 or 5 or 6, **characterized in that** the staves (T) are arranged alternately, i.e. so that each stave (T) has its cross-section inverted with respect to the two staves (T) on either side. 55
9. Soundproofing panel according to claims 1, 2, 3, 4 or 5 or 6, 7, **characterized in that** tongues (S2o) are provided or made on the box structure (S1, S2) for holding the staves (T) and maintaining their correct orientation.
10. Soundproofing panel according to claims 1, 2, 3, 4 or 5 or 6, 7, 8, **characterized in that** there is a channel or groove on the underside of the box structure (S1, S2) to allow for the run-off of water accumulated in the panel due to condensation or infiltration.

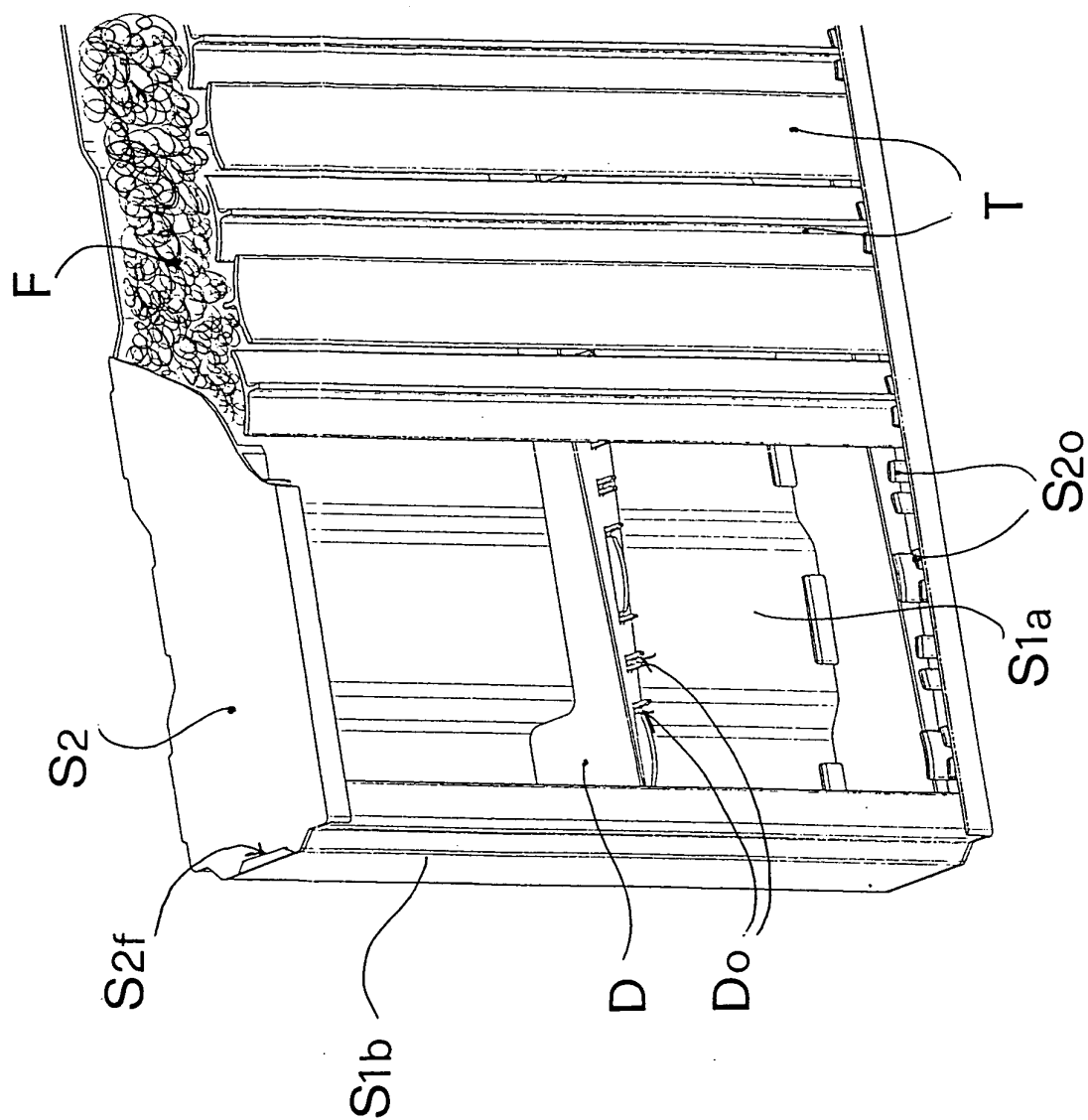


Fig. 1

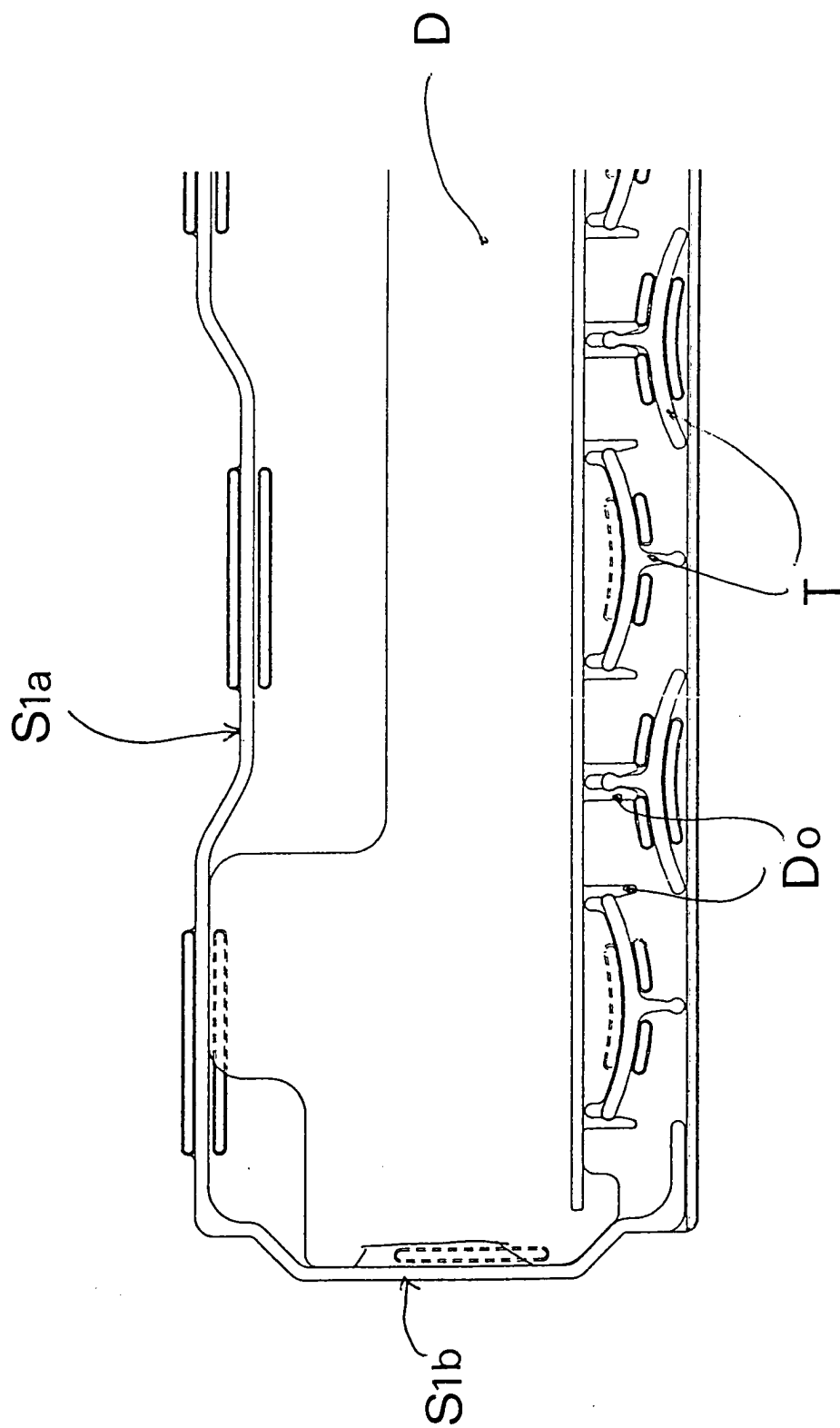


Fig. 2