SOUND BARRIER WALL SYSTEM

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ABSTRACT

A sound barrier wall system for reducing the transmission of noise into residential and commercially sensitive areas. The sound barrier wall system includes a partition member having a plurality of rib members and a rear wall, and a plurality of support members positioned about the distal ends of the partition member. The partition member includes an upper slot and a lower tongue for allowing interlocking with adjacent partition members. The plurality of rib members extending from the rear wall form a sound dampening surface that breaks up the sound waves and deflects the sound waves away from a residential area. A plurality of cavities preferably extend into the inner surface of the rear wall of the partition member for further increasing the sound dampening capabilities.

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BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates generally to sound barrier walls and more specifically it relates to a sound barrier wall system for reducing the transmission of noise into residential and commercially sensitive areas. The sound barrier wall system may also be used as a building layer to reduce the transmission of noise into a structure.

[0003] 2. Description of the Prior Art

[0004] Sound barrier walls have been in use for years. Typically, a sound barrier wall is constructed of a solid wall structure along a road, railroad, commuter rail, airports and other noisy and traveled pathways. The sound barrier wall may be comprised of wood, concrete, plastic, composite materials and other types of materials capable of deflecting and/or absorbing various sound frequencies (low to high frequencies). The conventional sound barrier wall is typically constructed similar to a building structure and therefore requires significant amount of time and money to adequately construct.

[0005] The main problem with conventional sound barrier walls is that they are expensive to construct. Another problem with conventional sound barrier walls is that they require a significant amount of time and planning to construct. A further problem with conventional sound barrier walls is that they are relatively complex and difficult to construct.

[0006] Examples of patented sound barrier walls which are illustrative of such prior art include U.S. Pat. No. 4,707,962 to Meheen; U.S. Pat. No. 5,324,469 to Walter; U.S. Pat. No. 5,539,163 to Anderson; U.S. Pat. No. 4,278,146 to Lerner; U.S. Pat. No. 6,016,887 to Underhill.

[0007] While these devices may be suitable for the particular purpose to which they address, they are not as suitable for reducing the transmission of noise into residential and commercially sensitive areas. Conventional sound barrier walls are inefficient in deflecting and absorbing sound waves and are relatively expensive to construct. Both the panel and the network within are unique in that their geometry is designed to dissipate sound waves at a broad range of frequencies. The present invention is absorptive, as opposed to reflective and its homogeneous materials make it more durable and less susceptible to problems such as changes in thermal conditions.

[0008] In these respects, the sound barrier wall system according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in such doing provides an apparatus primarily developed for the purpose of reducing the transmission of noise into residential and commercially sensitive areas.

SUMMARY OF THE INVENTION

[0009] In view of the foregoing disadvantages inherent in the known types of sound barrier walls now present in the prior art, the present invention provides a new sound barrier wall system construction wherein the same can be utilized for reducing the transmission of noise into residential and commercially sensitive areas.

[0010] The general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new sound barrier wall system that has many of the advantages of the sound barrier walls mentioned heretofore and many novel features that result in a new sound barrier wall system which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art sound barrier walls, either alone or in any combination thereof.

[0011] To attain this, the present invention generally comprises a partition member having a plurality of rib members and a rear wall, and a plurality of support members positioned about the distal ends of the partition member. The partition member includes an upper slot and a lower tongue for allowing interlocking with adjacent partition members. The plurality of rib members extending from the rear wall form a sound dampening surface that breaks up the sound waves and deflects, and or dissipates the sound waves away from a residential area. A plurality of cavities preferably extend into the inner surface of the rear wall of the partition member for further increasing the sound dampening capabilities.

[0012] There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the invention that will be described hereinafter and that will form the subject matter of the claims appended hereto.

[0013] In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of the description and should not be regarded as limiting.

[0014] A primary object of the present invention is to provide a sound barrier wall system that will overcome the shortcomings of the prior art devices.

[0015] A second object is to provide a sound barrier wall system for reducing the transmission of noise into residential and commercially sensitive areas.

[0016] Another object is to provide a sound barrier wall system that is easy and simple to construct.

[0017] An additional object is to provide a sound barrier wall system that may be installed in various locations and geographical conditions without significant modifications.

[0018] A further object is to provide a sound barrier wall system that is visually pleasing to individuals.

[0019] A further object is to provide a sound barrier wall system that may be produced from various types of materials including but not limited to concrete, plastic, fiberglass, composite materials, high density polyethylene, metal, wood and various other types of materials.

[0020] Another object is to provide a sound barrier wall system that is comprised of a modular structure that may be formed to fit within various locations.
[0021] Other objects and advantages of the present invention will become obvious to the reader and it is intended that these objects and advantages are within the scope of the present invention.

[0022] To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that changes may be made in the specific construction illustrated and described within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Various other objects, features and attendant advantages of the present invention will become fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views, and wherein:

[0024] FIG. 1 is an upper perspective view of an exemplary partition member.

[0025] FIG. 2 is a front view of an exemplary partition member.

[0026] FIG. 3 is a cross sectional view taken along line 3-3 of FIG. 2 illustrating the voids created between the rear wall and the rib members of the partition member.

[0027] FIG. 4a is a cross sectional view taken along line 4-4 of FIG. 2 illustrating a concave shape of the rib members.

[0028] FIG. 4b is a cross sectional view taken along line 4-4 of FIG. 2 illustrating a convex shape of the rib members.

[0029] FIG. 5 is a top view of the partition member.

[0030] FIG. 6 is an end view of the partition member.

[0031] FIG. 7 is a side cutaway view of an alternative embodiment of the partition member.

[0032] FIG. 8 is an upper perspective view of a plurality of partition members interlocked within one another forming a wall structure.

[0033] FIG. 9 is a side cutaway view of a plurality of partition members of the alternative embodiment stacked upon one another.

[0034] FIG. 10 is an exploded side cutaway view of a plurality of partition members of the alternative embodiment with respect to one another.

[0035] FIG. 11 is an upper perspective view of a plurality of partition members interlocked within one another between a pair of support members forming a wall structure.

[0036] FIG. 12 is an exploded upper perspective view of a plurality of partition members with respect to a pair of support members.

[0037] FIG. 13 is an exploded front view of the present invention.

[0038] FIG. 14 is a top view of the present invention.

[0039] FIG. 15 is a top view of a support member.

[0040] FIGS. 16a-e are each a front view of various alternative embodiments of the partition member illustrating various designs and structures.

[0041] FIG. 17a is a side cutaway view of an alternative embodiment of the partition member illustrating a concave shape of the rib members.

[0042] FIG. 17b is a side cutaway view of an alternative embodiment of the partition member illustrating a convex shape of the rib members.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0043] Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, FIGS. 1 through 16e illustrate a sound barrier wall system 10, which comprises a partition member 20 having a plurality of rib members 22 and a rear wall 24, and a plurality of support members 70 positioned about the distal ends of the partition member 20.

The partition member 20 includes an upper slot 30 and a lower tongue 40 for allowing interlocking with adjacent partition members 20. The plurality of rib members 22 extending from the rear wall 24 form a sound dampening surface that breaks up the sound waves and deflects or dissipates the sound waves away from a residential area. A plurality of cavities 26 preferably extend into the inner surface of the rear wall 24 of the partition member 20 for further increasing the sound dampening capabilities.

[0044] As shown in FIGS. 1, 2 and 8 of the drawings, the partition member 20 is preferably constructed of an elongate structure. The partition member 20 preferably has a length greater than the height and the width as best illustrated in FIG. 1 of the drawings. Even though the partition member 20 preferably has a generally elongate rectangular shape, various other shapes may be utilized to construct the overall structure of the partition member 20. In addition, the partition member 20 may be produced from various types of sound deflecting and sound absorbing materials including but not limited to concrete, plastic, fiberglass, composite materials, high density polyethylene, metal, wood and various other types of materials.

[0045] As shown in FIGS. 1 through 3 of the drawings, the partition member 20 is generally comprised of a rear wall 24, an outer perimeter extending forwardly from the rear wall 24, and a plurality of rib members 22 extending forwardly from the rear wall 24. The plurality of rib members 22 create a plurality of openings within the partition member 20 that receive and absorb sound waves (low to high frequencies). Though not illustrated in the drawings, a sound absorbing material, such as fiber or the like, may be added between the rear wall 24 and the rib members 22 for increasing the sound absorption capabilities of the partition member 20.

[0046] The plurality of rib members 22 may form various shapes, designs and patterns as illustrated in FIGS. 1, 2, 8, 11, 13, and 16a-e. The rib member preferably create a concave shape within the inner portion of the partition member 20 as best illustrated in FIGS. 1, 3, 4a, 7 and 9 of the drawings. The concave shape of the rib members 22 allows for increase sound absorption. In an alternative embodiment, the rib members 22 may create a convex shape.
within the inner portion of the partition member 20 as illustrated in FIG. 4b of the drawings.

[0047] As best illustrated in FIGS. 4a-b, 7 and 9 of the drawings, a plurality of cavities 26 extend into the inner surface of the rear wall 24 of the partition member 20 for increasing the sound absorbing capabilities of the partition member 20. The plurality of cavities 26 may have varying depths, widths, shapes and designs as can be appreciated to further increase the sound absorption capabilities of the partition member 20.

[0048] Each partition member 20 is formed for allowing interlocking to adjacent partition members 20. In a first embodiment, an upper slot 30 and a lower tongue 40 is utilized within the partition member 20 for allowing for the interlocking of the partition members 20 with one another as illustrated in FIGS. 1 and 6 of the drawings. The lower tongue 40 is inserted and retained within an upper slot 30 of a lower partition member 20.

[0049] In a second embodiment, a pair of side slots 50 are positioned adjacent to the upper slot 30 for receiving a corresponding pair of side tongues 60 that are positioned adjacent the lower tongue 40 as shown in FIGS. 7, 9 and 10 of the drawings. As shown in FIGS. 7 and 9 of the drawings, the rib members 22 may be attached to the lower portion of the outer perimeter instead of the rear wall 24 thereby creating a space between the rib members 22 and the rear wall 24.

[0050] As shown in FIGS. 11 through 15 of the drawings, a pair of support members 70 are positioned about the distal ends of the plurality of partition members 20 for retaining the partition members 20 in the desired vertical structure. The support members 70 are each comprised of a pair of opposing receiving grooves 72 for receiving the distal further of the partition members 20 as best illustrated in FIG. 14 of the drawings. The support members 70 preferably include a tapered front 74 for deflecting the sound waves into the inner portion of the partition members 20 as further shown in FIG. 15 of the drawings.

[0051] In use, a pair of support members 70 are inserted into a ground surface in the location desired to create a sound barrier wall. A first partition member 20 is then positioned within the upper portion of the receiving grooves 72 between the support members 70 and then the first partition member 20 is lowered between the support members 70 as shown in FIG. 13 of the drawings. Additional partition members 20 are inserted between the support members 70 similar to the first partition member 20 as further shown in FIG. 13 until the sound barrier wall is created by the adjacent and vertically aligned partition members 20.

[0052] As to a further discussion of the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation will be provided.

[0053] With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed to be within the expertise of those skilled in the art, and all equivalent structural varia-

tions and relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

[0054] Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

I claim:

1. A sound barrier wall system comprised of, comprising:
   a plurality of partition members having an elongate structure, wherein each of said plurality of partition members includes a rear wall and a plurality of rib members; and
   a plurality of support members having a vertically elongate structure formed for receiving opposing distal end portions of said plurality of partition members.

2. The sound barrier wall system of claim 1, wherein said plurality of support members have at least one receiving groove for receiving said distal end portion of said plurality of partition members.

3. The sound barrier wall system of claim 1, wherein said plurality of support members have a pair of opposing receiving grooves.

4. The sound barrier wall system of claim 2 or 3, wherein said plurality of support members each include a tapered front.

5. The sound barrier wall system of claim 1, wherein said plurality of rib members within said partition member define a concave shape.

6. The sound barrier wall system of claim 1, wherein said plurality of rib members within said partition member define a convex shape.

7. The sound barrier wall system of claim 1, wherein an inner surface of said rear wall includes a plurality of cavities.

8. The sound barrier wall system of claim 7, wherein said plurality of cavities have differing depths, widths and shapes from one another.

9. The sound barrier wall system of claim 8, wherein said plurality of partition members are each comprised of a sound absorbing material.

10. The sound barrier wall system of claim 1, wherein said plurality of partition members are each comprised of a sound absorbing material.

11. A sound barrier wall system comprised of, comprising:
   a plurality of partition members having an elongate structure, wherein each of said plurality of partition members includes a rear wall and a plurality of rib members;
   an upper slot within an upper portion of each of said plurality of partition members;
   a lower tongue extending from a lower portion of each of said plurality of partition members formed for being snugly received by said upper slot; and
   a plurality of support members having a vertically elongate structure formed for receiving opposing distal end portions of said plurality of partition members.
12. The sound barrier wall system of claim 11, wherein said plurality of support members have at least one receiving groove for receiving said distal end portion of said plurality of partition members.

13. The sound barrier wall system of claim 11, wherein said plurality of support members have a pair of opposing receiving grooves.

14. The sound barrier wall system of claim 12 or 13, wherein said plurality of support members each include a tapered front.

15. The sound barrier wall system of claim 11, wherein said plurality of rib members within said partition member define a concave shape.

16. The sound barrier wall system of claim 11, wherein said plurality of rib members within said partition member define a convex shape.

17. The sound barrier wall system of claim 11, wherein an inner surface of said rear wall includes a plurality of cavities.

18. The sound barrier wall system of claim 17, wherein said plurality of cavities have differing depths, widths and shapes from one another.

19. The sound barrier wall system of claim 11, including:

a pair of side slots within an upper portion of each of said plurality of partition members positioned about said upper slot; and

a pair of side tongues extending from a lower portion about said lower tongue of each of said plurality of partition members formed for being snugly received by said pair of side slots; and

20. The sound barrier wall system of claim 11, wherein said plurality of partition members are each comprised of a sound absorbing material.