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(54) **Exterior acoustic louvre**

(57) An exterior acoustic louvre (10) comprises a louvre body (12) which defines major upper and lower surfaces (22, 24) and minor side surfaces (20). The louvre body (12) includes a support element (38), a sound-energy absorption element (40) supported by the support element (38), and a flexible plastics watertight element

(50) for watertightly encasing the sound-energy absorption element (40). The louvre body is arranged so that the watertightly encased sound-energy absorption element (40) can receive sound energy in the directions of both the upper and lower major surfaces (22, 24) of the louvre body (12).

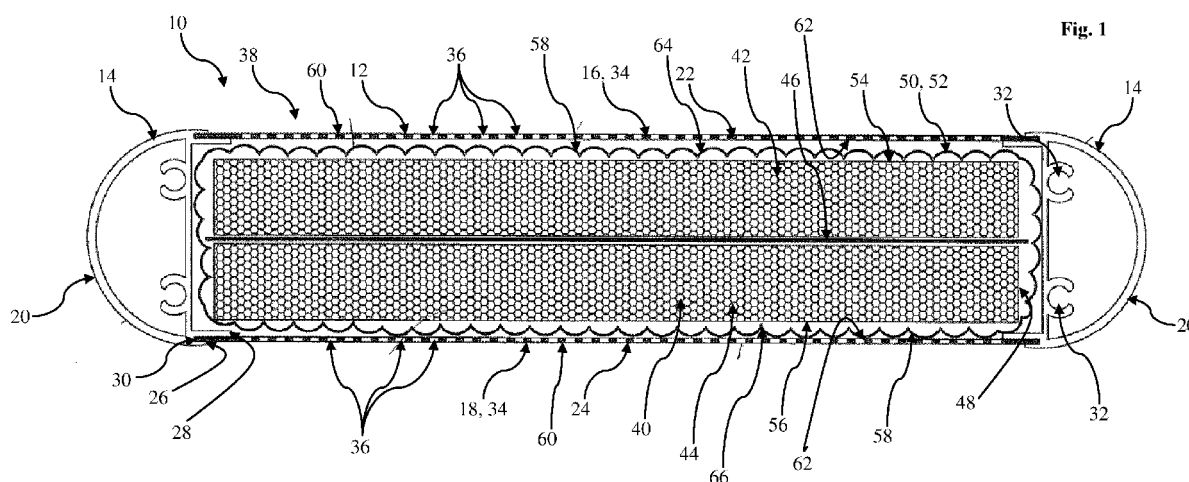


Fig. 1

Description

[0001] The present invention relates to an exterior acoustic louvre, for example, for deadening or damping sound emanating from exterior fan units.

[0002] Exterior acoustic louvres are known and as mentioned above commonly used to deaden or damp noise being generated by exteriorly placed electromechanical units, such as fans, whilst also providing adequate ventilation and shielding against ambient environmental conditions, such as sun and rain.

[0003] However, to date known exterior acoustic louvres including internal sound-insulating material are only open on a lower surface to absorb incident sound energy. The upper surface is fully closed by the louvre body to prevent or limit the ingress of rain and other precipitation.

[0004] This is problematic, since in use any sound energy which is reflected from the lower surface of the louvre is immediately reflected by the solid upper surface of the neighbouring louvre below.

[0005] The present invention seeks to provide a solution to this problem.

[0006] According to the present invention, there is provided an exterior acoustic louvre comprising a louvre body defining major upper and lower surfaces and minor side surfaces, the louvre body including a support element, a sound-energy absorption element supported by the support element, and a flexible plastics watertight element for watertightly encasing the sound-energy absorption element, whereby the watertightly encased sound-energy absorption element is accessible in the directions of both the upper and lower major surfaces of the louvre body.

[0007] Consequently, incident sound energy, whether it arrives from above or below the louvre, can be attenuated by the sound-energy absorber after it passes through the substantially noise-transparent watertight housing encasing the sound-energy absorber.

[0008] Preferable and/or optional features of the invention are set forth in claims 2 to 14, inclusive.

[0009] The invention will now be more particularly described, by way of example only, with reference to the accompanying drawing, in which :

Figure 1 shows a diagrammatic lateral cross-sectional view of one embodiment of an exterior acoustic louvre, in accordance with the present invention.

[0010] Referring to the drawing, there is shown one embodiment of an exterior acoustic louvre 10 which comprises a louvre body 12 connectable to an exterior support system (not shown). Preferably, the exterior support system includes a plurality of brackets for engaging a plurality of the said acoustic louvres 10 in spaced apart relationship. Furthermore, the brackets may locate a lateral extent of the or each said acoustic louvre 10 at an angle to a horizontal plane or a vertical plane.

[0011] The louvre body 12 includes opposing longitu-

dinal capping elements 14, lateral end caps (not shown) for interengaging the capping elements 14, and upper and lower cover elements 16, 18 which extend between the longitudinal capping elements 14 and the lateral end caps. The capping elements 14 and the end caps define minor side surfaces 20 of the louvre body 12, whereas the cover elements 16, 18 define at least a major portion of the upper and lower major surfaces 22, 24 of the louvre body 12.

[0012] The capping elements 14 are preferably metal or plastics extrusions, and may for example be aerodynamically profiled to reduce wind resistance when in use. Each capping element 14 includes a slot 26 along its upper and lower rear-facing longitudinal edges 28 for receiving a longitudinal edge 30 of the respective cover element 16, 18.

[0013] The end caps may also be metal or plastics, and are preferably fastened via screw-threaded fasteners to screw-ports 32 of the capping elements 14. Additional or alternative fastening means can also be considered, such as welding and bonding.

[0014] The cover elements 16, 18 are also preferably metal or plastics planar plates 34. In this case, each plate 34 is perforated with a multiplicity of small spaced-apart apertures 36. However, fewer and larger apertures may be considered. It is even possible that only a single large aperture may be utilised whereby the cover element 16, 18 forms a perimeter border interconnecting the capping elements 14 and the end caps.

[0015] The longitudinal capping elements 14, the lateral end caps, and the upper and lower cover elements 16, 18 form a support element 38 in which is housable a sound-energy absorption element 40. The sound-energy absorption element 40 is preferably an insulator, such as rockwool or open-cell polyurethane foam, for example. An advantage of utilising substantially rigid polyurethane foam board as the insulator will be described hereinafter.

[0016] In this embodiment, the sound-energy absorption element 40 includes upper and lower sound-energy absorption parts 42, 44 interposed between which is a baffle element 46. The baffle element 46 is a preferably solid sheet of metal, such as aluminium, or plastics and to which the upper and lower sound-energy absorption parts 42, 44 are mounted or abut.

[0017] The sound-energy absorption element 40 extends substantially fully between the capping elements 14 and the end caps, and substantially fully between the upper and lower cover elements 16, 18.

[0018] The baffle element 46, similarly, extends substantially fully between the capping elements 14 and the end caps, and may extend slightly beyond the outer side faces 48 of the upper and lower sound-energy absorption parts 42, 44.

[0019] To protect or shield the sound-energy absorption element 40 from the elements, the louvre body 12 includes a, preferably soft and/or tactile, flexible plastics watertight element 50 which fully encases the sound-energy absorption element 40 and the baffle element 46.

The watertight element 50 is preferably a lightweight membrane 52, for example, formed from rubber, silicon or plastics, which extends along the minor side surfaces 48 and the upper and lower major surfaces 54, 56 of the sound-energy absorption element 40.

[0020] Optionally, instead of utilising a single membrane 52 to cover both upper and lower sound-energy absorption parts 42, 44, each sound-energy absorption part 42, 44 may be separately encased, and then mounted on the baffle element 46.

[0021] Furthermore, the watertight membrane or element 50 may be double skinned for improved durability.

[0022] The watertight membrane 52 may be a bag, and/or may be a vacuum formed or pressure formed layer or film. Preferably, the sound-energy absorption element 40 may be coated with a base layer of adhesive prior to the membrane being applied. This would provide greater puncture resistance.

[0023] In any event, the watertight element 50 is sufficiently thin to allow substantially unobstructed passage of sound energy into the sound-energy absorption element 40, whilst being sufficiently robust or resilient to protect against being punctured, for example, from flying debris or detritus. Preferably, the watertight element 50 is drawn tightly across the sound-energy absorption parts 42, 44, so that at least the outer surfaces 58 are smooth and at least substantially uncreased or unwrinkled.

[0024] Beneficially, the watertight element 50 is coloured to match or substantially match at least the outer surface 60 of the adjacent cover element 16, 18. This is particularly important from an aesthetic perspective, since architects and designers are not inclined to specify parts or features which detract from the overall appearance of a building or installation. By colour matching the watertight element 50 to the cover element 16, 18, the watertight element 50 becomes barely noticeable through the apertures 36 of the upper and lower cover elements 16, 18, especially at distance.

[0025] In use, the exterior acoustic louvre 10 can thus be utilised to absorb incident sound energy directed onto both the upper and lower major surfaces 22, 24 of the louvre body 12. The baffle element 46 prevents or limits the passage of unabsorbed sound energy through and back out of the louvre body 12, and by having open upper and lower major surfaces 22, 24, any reflected sound energy is typically directed to an adjacent major surface 22, 24 of a neighbouring like exterior acoustic louvre 10, whereby it is absorbed or dissipated.

[0026] The watertight element 50 prevents the ingress of moisture, precipitation and other particulate matter into the sound-energy absorption element 40, thereby maintaining its integrity and functionality.

[0027] The apertured upper and lower cover elements 16, 18 aid in protecting the watertight element 50 and the sound-energy absorption element 40 from environmental conditions, and disguise the watertight element 50 especially when formed with the same or similar colour.

[0028] In a modification to the embodiment described

above, the watertight element 50 may be non-uniformly planar, for example, by including a rippling or sinusoidal wavy outer surface. This may be beneficial in dispersing or dissipating reflected sound energy. In this case, any reflected sound energy may be incident on an underside surface 62 of the adjacent cover element 16, 18, and thus be reflected again back to the watertight element 50 and into the sound-energy absorption element 40.

[0029] In a further modification, the cover elements 16, 18 may be dispensed with, whereby the upper and lower surfaces 64, 66 of the watertight element 50 thus at least in part define the upper and lower major surfaces 22, 24 of the louvre body 12. In this case, the longitudinal capping elements 14 hold the watertight element 50 and the sound-energy absorption element 40, creating a rigid or substantially rigid louvre body 12. The watertight element 50 would need to be suitably resilient to withstand environmental conditions without being punctured or perforated.

[0030] To promote better drainage either with or without the cover elements 16, 18, the watertight element 50 and/or the sound-energy absorption element 40 may have at least one major surface, typically being the upper major surface 64, which is sloped or ramped to promote runoff. The sloping or ramped surface may be planar, multifaceted, curved or domed, by way of example. Other non-uniform cross-sectional profiles along one or more dimensional axes can also be considered to improve the aerodynamics of the louvre body 12, drainage, airflow and pressure drops thereacross.

[0031] Although preferably planar, the cover elements 16, 18 may also be non-planar in at least one dimension or direction as necessity dictates.

[0032] It may also be feasible that the watertightly encased sound-energy absorption element 40 defines, fully or at least in part, the minor and major outer surfaces of the louvre body 12. This would be particularly achievable by utilising the aforementioned polyurethane foam board. This may enable the longitudinal capping elements 14 and/or the lateral end caps to be dispensed with. In this case, the baffle element 46 may be utilised to provide a hidden or discrete bracket for supporting the exterior acoustic louvre 10 and for connection to the supports of the exterior louvre system.

[0033] It is thus possible to provide an exterior acoustic louvre whereby the watertightly encased sound-energy absorption element is accessible by incident sound energy in the directions of both the upper and lower major surfaces of the louvre body.

[0034] The embodiments described above are provided by way of examples only, and various other modifications will be apparent to persons skilled in the field without departing from the scope of the invention as defined by the appended claims.

Claims

1. An exterior acoustic louvre (10) comprising a louvre body (12) defining major upper and lower surfaces (22, 24) and minor side surfaces (20), the louvre body (12) including a support element (38), a sound-energy absorption element (40) supported by the support element (38), and a flexible plastics watertight element (50) for watertightly encasing the sound-energy absorption element (40), whereby the watertightly encased sound-energy absorption element (40) is accessible in the directions of both the upper and lower major surfaces (22, 24) of the louvre body (12). 5
2. An exterior acoustic louvre (10) as claimed in claim 1, wherein the flexible plastics watertight element (50) is colour coordinated to match or substantially match a colour of the support element (38). 10
3. An exterior acoustic louvre (10) as claimed in claim 1 or claim 2, wherein the flexible plastics watertight element (50) is a membrane (52). 15
4. An exterior acoustic louvre (10) as claimed in any one of claims 1 to 3, wherein the flexible plastics watertight element (50) is vacuum formed around the sound-energy absorption element (40). 20
5. An exterior acoustic louvre (10) as claimed in any one of claims 1 to 4, wherein the flexible plastics watertight element (50) has non-smoothly planar upper and lower major surfaces (22, 24), so as to disperse reflected incident sound-energy. 25
6. An exterior acoustic louvre (10) as claimed in any one of claims 1 to 5, wherein the sound-energy absorption element (40) has a non-uniform cross-section in at least one direction. 30
7. An exterior acoustic louvre (10) as claimed in claim 6, wherein the sound-energy absorption element (40) is at least in part ramped. 35
8. An exterior acoustic louvre (10) as claimed in any one of claims 1 to 7, further comprising a baffle element (46) interposed between two parts of the sound-energy absorption element (40). 40
9. An exterior acoustic louvre (10) as claimed in claim 8, wherein the baffle element (46) forms at least part of the support element (38). 45
10. An exterior acoustic louvre (10) as claimed in any one of claims 1 to 9, wherein the support element (38) of the louvre body (12) includes cover elements (16, 18) which define at least in part the major upper and lower surfaces, each cover element (16, 18) including at least one opening providing access to the sound-energy absorption element (40). 50
11. An exterior acoustic louvre (10) as claimed in claim 10, wherein each cover element (16, 18) is a plate (34). 55
12. An exterior acoustic louvre (10) as claimed in claim 10 or claim 11, wherein each cover element (16, 18) has a plurality of apertures (36) therethrough.
13. An exterior acoustic louvre (10) as claimed in any one of claims 10 to 12, wherein each cover element (16, 18) is perforated.
14. An exterior acoustic louvre (10) as claimed in any one of claims 10 to 13, wherein the support element (38) includes longitudinal end caps, the cover elements (16, 18) being engagable with the longitudinal end caps.

