

A LOUVRE

The invention relates to a louvre and in particular, a louvre for fixing to a structure to screen the structure or an internal area of the structure from the effects of weather and/or noise.

It is common practice, especially in tropical climates, to fit external screens to a building to screen the building from the effects of weather and especially, to shade sections of the building such as windows, from direct sunlight.

Typically, the screens are normally in the form of metal louvres which are attached to a support frame which is fixed to a side of the building in front of the windows. The louvres are attached to the support frame so that the main surfaces of the louvres are at an oblique angle to the horizontal and vertical and the louvres provide shade from direct sunlight for the windows but still permit indirect light to enter the windows.

In tropical climates, the window may not have a glass closure. In which case the louvres also provide screening to help minimise rain and/or wind entering the building through the window.

Typically, the louvres are manufactured by extruding a

metal, such as aluminium into the shape of the louvre as an integrally formed hollow extrusion. An example of a typical prior art louvre 500 is shown in Figure 24. The louvre 500 is defined by two curved portions 501, 502 with the concave surfaces facing each other. The portions 501, 502 meet each other at an acute angle at edges 503, 504 and has internal sections 505, 506, 507 which are hollow.

However, this construction of louvre has a number of disadvantages. In particular, if it is desired to fill the internal sections 505, 506, 507 with insulating material, it is necessary to push the insulating material down the length of the louvre 500. Depending on the size of the louvre 500, this may not be straightforward and is usually time consuming. In addition, extruding a hollow cross-section is complicated and expensive.

In accordance with a first aspect of the present invention, a louvre comprises a number of sheet members, each sheet member comprising a surface portion having an external surface and engagement means, the engagement means coupling the sheet members together to form the louvre.

Preferably, when the engagement means are engaged together, the sheet members define a hollow cross-section enclosed by the members. In one example of the invention, the hollow cross-section may be filled with a material which absorbs sound waves incident on the louvre. Typically, the sound

absorbing material may be a fibrous material, such as mineral fibres.

However, in an alternative example of the invention, the members may be coupled to each other to form a louvre having one louvre surface formed from the individual external surfaces of each member.

Preferably, the louvre surface formed by coupling the members together is a curved surface or another non-planar surface, such as a number of planar and/or curved surfaces.

At least one surface portion may be perforated, so that the louvre surface, or a portion of the louvre surface, is perforated.

Preferably, when the members are coupled together so that the sheet members form a louvre with a hollow cross-section, the external surfaces define at least two louvre surfaces on opposite sides of the louvre. Typically, where there are only two louvre surfaces, the louvre surfaces meet each other at, or adjacent to, the edges of the louvre.

Preferably, where the sheet members define a hollow cross-section, the louvre surfaces are curved or another non-planar surface, such as a surface formed from a number of planar and/or curved surfaces. The members may be coupled

to each other such that, where there are two external surfaces, both louvre surfaces are generally convex or one louvre surface is generally convex and the other louvre surface is generally concave. Alternatively, one louvre surface may be generally convex and the other louvre surface may be a planar surface.

In accordance with a second aspect of the present invention, a method of forming a louvre comprises forming a number of sheet members, each sheet member comprising a surface portion, including an external surface, and an engagement means, and coupling the engagement means of the sheet members together so that the sheet members form a louvre having a louvre surface defined by the external surfaces.

Preferably, the sheet members are formed by extrusion. Typically, the members may be extruded from a metal material, such as aluminium. However, alternatively it is possible that the members may be formed, for example by extrusion, from a plastic material or any other suitable material.

Preferably, the engagement means are formed such that they can be coupled together by press fitting one of the engagement means into the other engagement means. Typically, the engagement means comprise a female formation and a male formation. In one example, the male formation

may be generally arrow-head shaped and the female formation is a complementary formation.

Examples of a louvre in accordance with the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a cross-sectional view through a one member single surface louvre;

Figure 2 is a cross-sectional view through a three member single surface louvre;

Figure 3 is a cross-sectional view through a five member single surface louvre;

Figure 4 is a cross-sectional view through a two member double surface louvre;

Figure 5 is a cross-sectional view through a four member double surface louvre;

Figure 6 is a cross-sectional view through a nine member double surface louvre;

Figure 7 is a cross-sectional view of a one member single surface louvre with a gutter;

Figure 8 is a cross-sectional view of a three member single surface louvre with two gutters;

Figure 9 is a cross-sectional view of a four member single surface louvre with a gutter;

Figure 10 is a cross-sectional view of a four member double surface louvre having one enlarged rounded edge;

6

Figure 11 is a cross-sectional view of a nine member double surface louvre having two enlarged rounded edges;

Figure 12 is a cross-sectional view of a ten member double surface louvre having one enlarged rounded edge;

Figure 13 is a detailed view of section A in Figure 6;

Figure 14 is a detailed view of section B in Figure 6;

Figure 15 is a cross-sectional view of a nineteen member louvre for use in a covered walkway;

Figure 16 is a cross-sectional view of another example of a nineteen member louvre for use in a covered walkway;

Figure 17 is a cross-sectional view of three inter-connected eleven member double surface louvres;

Figure 18 shows a cross-sectional view of a canopy system using a number of the inter-connected louvres shown in Figure 17;

Figure 19 is a cross-sectional view of a first example of a luminaire;

Figure 20 is a cross-sectional view of a second example of a luminaire;

Figure 21 is a perspective view of a single surfaced louvre mounted on support posts;

Figure 22 is a perspective view of a number of louvres mounted on a frame for fixing to a support surface;

Figure 23 is a perspective view of a single surface perforated louvre mounted on a building; and

Figure 24 is a cross-sectional perspective view of a typical prior art louvre.

Figure 1 shows a louvre 10 which includes one member 5 having a curved surface 2 with female engagement portions 3 at each end of the curved surface 2. The member 5 is typically an aluminium extrusion. The louvre 10 also has a central engagement portion 4. The engagement portions 3 and the engagement portion 4 permit the louvre 10 to be mounted on a support frame using a suitable fixing bracket.

Figure 2 shows a cross-section of a louvre 20 which comprises two members 21 and a member 28 with a surface 29. The members 21 include engagement recesses 22 at one end and an arm portion 23 at the opposite end. The recesses 22 and the arm portion 23 are interconnected by a sheet surface 24. The arm portion 23 includes male engagement portions 25, 27 and a female engagement portion 26. The member 28 couples the two members 21 together, as shown in Figure 2 by engaging the male and female engagement portions 25, 26 on the member 28 with the female and male engagement portions 26, 25 on the arm portions 23 of each member 21. When the members 21, 28 are assembled to form the louvre 20, the surfaces 24, 29 form a single external surface for the louvre 20. Typically, the members 21, 28 are aluminium extrusions.

Figure 3 shows a cross-sectional view of a five membered

single surface louvre 30. The louvre 30 includes two of the members 21 and the member 28 interconnected by two members 31. The members 31 have a curved surface 32 such that when the members 21, 28, 31 are coupled together to form the louvre 30, the surfaces 24, 29, 32 form a single external surface of the louvre 30. The members 32 include a male engagement portion 25 which engages with the female engagement portions 26 in the member 28 and female engagement portions 26 which engage with the male engagement portion 25 on the members 21.

Figure 4 shows a louvre 40 which comprises two members, the member 5 shown in Figure 1 and a member 41. The member 41 has a curved surface 2 which is identical to the curved surface 2 of the member 5. At either end of the member 41 are male engagement portions 42 which engage with the female engagement portions 3 in the member 5 to form the louvre 40. Therefore, the louvre 40 has two external surfaces, one external surface comprising the surface 2 of the member 5 and the other external surface comprising the surface 2 of the member 41. The members 5, 41 enclose and define a void 43 within the louvre 40.

Figure 5 shows a cross-sectional view of a double surface louvre 50 which is constructed from two of the members 21 and two members 51. The members 51 have a surface 52 with a male engagement portion 53 along one edge of the surface 52 and a female engagement portion 54 along the opposite

edge of the surface 52.

The louvre 50 is constructed by engaging the male engagement portion 25 of one member 21 with the engagement portion 26 of the other member 21 and then engaging the male engagement portion 53 of each member 51 with the female engagement portion 22 of one of the members 21 and engaging the female engagement portions 54 of the members 52 with the respective male engagement portion 27 on the members 21. Therefore, the louvre 50 has two external surfaces, each external surface being defined by one of the surfaces 24 and one of the surfaces 52.

In the louvre 50, each pair of the members 21, 51 defines a generally triangular shaped void 55.

Figure 6 shows a cross-section through a double surface louvre 60 which is constructed from two of the members 21, one member 28, two of the members 51 and four members 61. The members 61 have a surface 62 such that one external surface of the louvre 60 is formed by the two surfaces 24 and two of the surfaces 62 and the other external surface of the louvre 60 is formed by the two surfaces 52 and the other two surfaces 62. The louvre 60 contains four voids, two voids 55 formed by the members 21, 51 and two central voids 63. Each central void 63 is formed from two members 61, the member 28 and the arm portion 23 of each member 21.

The sections A and B of the louvre 60 are shown in more detail in Figures 13 and 14, respectively. It can be seen that the male engagement portions 25 and the female engagement portions 26 are formed in complementary shapes which when engaged with each other minimise the possibility of the members 21, 28, 61 inadvertently becoming detached from each other, as to engage the portions 25, 26 with each other requires the portions to be snapped together. Similarly, the male engagement portions 27 and the female engagement portions 54 are also shaped to minimise inadvertent disconnection of the member 51 from the member 21. Preferably, the engagement portions 25, 26, 27, 54 are shaped and the material of the members 21, 28, 61, 51 is chosen such that the engagement portions may be engaged with each other by a press fit to enable manual assembly without specialist tools. The engagement portions 22, 53 typically also engage with each other in a similar manner. Also, the louvres 10, 20, 30, 40, 50 described above and shown in Figures 1 to 5 and louvres 70, 80, 90, 100, 110, 120, 150, 160, 170 described below and shown in Figures 7 to 17 have similarly shaped engagement portions which fit together in a similar manner.

Figure 7 shows a cross-section of a louvre 70 which comprises one of the members 21 engaged with a member 71. The member 71 has a surface 72 which is generally semi-circular in one section and planar in another section. The member 71 also includes an arm portion 73 with engagement

portions 74, 75 which engage with the engagement portions 25, 26 respectively on the member 21.

The louvre 70 has the advantage that the member 71 forms a gutter when the louvre 70 is mounted at an appropriate angle such that rain water striking the surface 24 drains into the member 71 and is carried to the edge of the louvre 70 where it drains off the louvre 70. This minimises the possibility of rain water being blown from a leading edge of the louvre 70 under the louvre and into an area which the louvre 70 is designed to shield from rain water.

Figure 8 is a cross-sectional view of a single surfaced louvre 80 which includes two members 71 coupled together by two of the members 32 and one member 28. In this example, the surfaces 32 form a single external surface of the louvre 80 and the members 71 form channels at opposite edges of the louvre surface to collect rain water from the louvre surface.

Figure 9 shows a cross-sectional view of a single sided louvre 90 similar to louvre 70 except that the members 71, 21 have three interconnected members 32 located between them to increase the surface of the louvre 90 compared with the louvre 70. Hence, the single external surface of the louvre 90 is formed by the surfaces 24, 32.

Figure 10 shows a cross-sectional view of a double surface

louvre 100 which is similar to louvre 70 except that it also includes a member 51 and a member 101. Therefore, the louvre 100 has two external surfaces defined by surfaces 24, 102 and surfaces 52, 72 respectively.

Figure 11 shows a cross-sectional view of a double surface louvre 110 which is similar to the louvre 80 except that the louvre 110 also includes two members 101 and two additional members 31. Therefore, the louvre 110 has two external surfaces and two enclosed voids 111 and two enclosed voids 112.

Figure 12 shows a cross-sectional view of a double surface louvre 120 which is an enlarged version of the louvre 100. The louvre 120 comprises a member 21 and a member 51 connected together and the member 101 and the member 71 connected together. However, the members 21, 71 are not connected directly to each other but are coupled together by three members 31, two members 121 and one member 122.

Figures 15 and 16 show cross-sectional views of a louvre 150 and a louvre 160, respectively. The louvre 150 is constructed from two of the members 21, two of the members 51, ten of the members 31 and five of the members 28 to form a single sided louvre 150 with a curved surface which may be used, for example, as a roof or part of a roof for a covered walkway or to form another type of canopy. The louvre 160 is similar to the louvre 150 but does not

include the members 51 and has two additional members 31. The louvre 160 may be used for a similar purpose as the louvre 150.

Any of the louvres described above may be mounted on a suitable support structure using a suitable bracket which can be engaged with any of the engagement portions 22, 25, 26, 27 or mounted using any other suitable attachment means. For example, Figure 21 shows a typical mounting arrangement in which a seven membered single surfaced louvre 220 is mounted on support posts 221. The support posts 221 may, for example, be fixed to a wall of a building. Further louvres 220 may also be mounted on the posts 221 above and below the louvre 220.

Figure 22 shows another mounting arrangement in which five double sided louvres 230 are mounted on a support frame 231 which may be fixed via a suitable fixing bracket (not shown) at ends 232 to a support surface, such as a wall of building. Optionally, the support frame 231 may also include support wires 233 which may be fixed to the support surface above the louvres 230 by a fixing bolt 234 to provide additional support.

Louvres constructed using the members described above in the louvres 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120 may also be used to construct canopies, roofs for covered walkways, or for other roofing applications.

For example, Figure 17 shows three louvres 170 coupled together to form a roof, canopy or portion of a roof or canopy. The louvres 170 are identical to the louvre 120 described above and shown in Figure 12, except that the louvres 170 include an additional member 31 and have two additional members 121 which replace the member 122. In addition, the member 101 is omitted from the louvre 170 and member 51 is replaced with a member 171. Hence, each louvre 170 is formed by one member 21 and one member 71 coupled to each other by four of the members 31 and four of the members 121. The member 171 has a male engagement portion which engages with the female engagement portion 22 and the member 21 and along opposite edge a female engagement portion 173 which engages with a male engagement portion 76 on the member 71 to couple the louvres 170 to each other, as shown in Figure 17.

Therefore, the surface of the member 21 and the surfaces 32 of the members 31 form an external surface of the louvre 170 and the members 71 form channels into which rain water can drain from the external surface of the louvre 170.

An example of the louvre 170 used in a canopy system is shown in Figure 18 in which a canopy 180 includes two sets of three louvres 170 mounted on a frame 181 which is mounted on a post 182 which is fixed to a ground surface 183. The canopy 180 also includes a central covering 184 to which the upper end of each set of three louvres 170 is

attached. Situated around the bottom of the post 182 is a table 185 with chairs 186. Hence, the canopy 180 provides protection for the tables and chairs any person using them from the effects of weather. For example shade from the sun and protection from rain.

In addition, any of the single surface louvres 10, 20, 30, 70, 80, 90 may be perforated, if desired, to allow more light penetration. Furthermore, the louvres 40, 50, 60, 100, 110, 120, 170 may have the respective voids filled with a suitable sound absorbing material, such as mineral fibres, to minimise transmission of sound past the louvres.

Other advantages of louvres according to the invention is that, as they use a number of separate members, they do not require to be formed as a hollow extrusion. This permits the surfaces of the louvre to be perforated, if desired. It is not possible to perforate the surfaces of the prior art louvres formed by a hollow extrusion, such as the louvre 500, as to attempt to do so would deform the surfaces of the louvre.

An example of a perforated louvre 240 in use is shown in Figure 23. The louvre 240 is mounted onto an outside wall 241 of a building by fixing brackets 242 and is located above a window opening 243 to shield the window opening 243 from the sun. The louvre 240 is a single surfaced six membered louvre with the surfaces of five of the members

perforated. The member nearest the wall 241 is not perforated. The perforations have the advantage of permitting more light to enter the window opening 243 while still providing some shade.

Perforated members may also be used to permit the louvres to be used as luminaires, as shown in Figures 19 and 20. Figure 19 shows a luminaire 200 which is constructed from two members 201, four members 202 and two of the members 28. The members 201 are identical to the members 21 except that the members 201 have perforations 203. The luminaire 200 also includes light fittings (not shown) located within channels 204 which permit fluorescent tubes 205 to be mounted within the luminaire 200.

Figure 20 shows a luminaire 210 which is constructed from two of the members 201, two members 202, two members 28, two members 211 and a member 212. The members 211 are identical to the members 202 except that the members 211 are perforated with perforations 203. Member 212 is similar to the members 28 except that member 212 only includes male engagement portions 25 to couple the members 202 together. The luminaire 210 also includes light fittings (not shown) which permit four fluorescent tubes 205 to be mounted within the luminaire 210, as shown in Figure 20. Light from the two central tubes 205 is reflected from the surfaces of members 202, 28 adjacent to the central tubes 205 downwards and light from the two

outer fluorescent tubes 205 passes downwards through the perforations 203 in the members 211.

The luminaires 200 and 210 can be mounted within covered walkways to illuminate the area of the walkway during darkness. Alternatively, luminaires 200 and 210 could be used in any other suitable lighting application.

In addition, a modular construction makes it easier to change the configuration of the louvres and to insert filling materials, such as sound absorbing materials.

Furthermore, different members forming the louvre may be constructed from different materials. For example, this would enable some members of a louvre to be transparent or translucent and the other members to be opaque. The transparent or translucent members may be formed from glass or a plastics material such as acrylic or polycarbonate. The opaque members may be formed from a metal such as aluminium.

Claims

1. A louvre comprising a number of sheet members, each sheet member comprising a surface portion having an external surface and engagement means, the engagement means coupling the sheet members together to form the louvre.
2. A louvre according to claim 1, wherein the external surfaces define a louvre surface.
3. A louvre according to claim 2, wherein the louvre surface comprises a non-planar surface.
4. A louvre according to claim 3, wherein the non-planar surface comprises a curved surface.
5. A louvre according to any of the preceding claims, wherein at least one surface portion is perforated.
6. A louvre according to any of claims 2 to 4, wherein the external surfaces define two louvre surfaces.
7. A louvre according to claim 6, wherein the two louvre surfaces are on opposite sides of the louvre.
8. A louvre according to claim 7, wherein the two louvre surfaces adjoin each other adjacent to opposite edges of the louvre.

9. A louvre according to claim 8, wherein the sheet members define a hollow cross-section.
10. A louvre according to claim 9, wherein the hollow cross-section is filled with a sound absorbing material.
11. A louvre according to claim 10, wherein the sound absorbing material is a fibrous material.
12. A louvre according to any of claims 6 to 11, wherein one louvre surface is convex.
13. A louvre according to any of claims 6 to 12, wherein one louvre surface is concave.
14. A sheet member for forming a part of a louvre in accordance with any of the preceding claims.
15. A method of forming a louvre, the method comprising forming a number of sheet members, each sheet member comprising a surface portion, including an external surface, and an engagement means, and coupling the engagement means of the sheet members together so that the sheet members form a louvre having a louvre surface defined by the external surfaces.
16. A method according to claim 15, wherein the sheet members are formed by extrusion.

17. A method according to claim 15 or claim 16, wherein the engagement means are formed such that they can be coupled together by press fitting one of the engagement means into another engagement means.

18. A method according to any of claims 15 to 17, further comprising placing a sound absorbing material on a non-external surface of one sheet member and subsequently coupling the one sheet member to at least one other sheet member to form a louvre with an enclosed cross-section containing the sound absorbing material.