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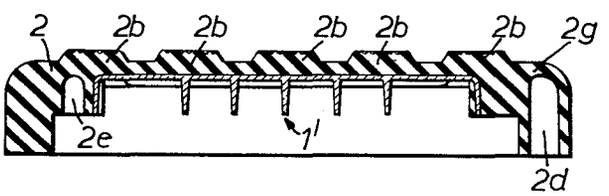
(54) Seats for swings.

(57) A seat for a swing, the seat being of composite structure comprising a first member (1′), which is sufficiently rigid to bear the weight of a user, and a second member (2) of a compressible polymeric material, the first member being of substantially laminar form and the second member covering at least part of the peripheral edge of the first member, in which the first member (1′) is made of a lightweight metal alloy and has a number of integrally-formed ribs (106′) depending from its underside.



EP 0 012 565 A1

This invention relates to an improvement over the swing seats described in the Complete Specification of our British Patent Application No. 9361/75 (Serial No. 1,535,728) and in the corresponding patents and applications in other countries.

Traditionally, swing seats were made of wood but it has been recognised for many years that wooden seats can inflict severe injury and a number of alternative constructions have been proposed. One alternative form of construction is to make the swing seat of rubber with a metal core and seats of this kind were proposed some thirty to forty years ago. The swing seats described in our earlier application are of this general type but the rubber at the periphery of the seat is moulded into a particular configuration to give enhanced safety by virtue of the impact force/deflection/energy absorption characteristic provided by the particular configuration. Swings seats in accordance with the description given in our earlier application have proved very successful in safety tests but it would naturally be desirable to have an even safer swing seat if that were possible.. On the other hand, safety is not the only consideration as one must also take into account cost of manufacture, strength, durability and resistance to vandalism. The problem therefore exists to improve upon the safety of our earlier swing seats whilst retaining their strength, durability and resistance to vandalism and at the same time keeping down manufacturing costs.

The present invention provides a seat for a swing, the seat being of composite structure comprising a first member, which is sufficiently rigid to bear the weight of a user, and a second member of a compressible polymeric material, the first member being of substantially laminar form and the second member covering at least part of the peripheral edge of the first member, characterised in

that the first member is made of a lightweight metal alloy and has a number of integrally-formed ribs depending from its underside.

The first member can be oblong with the ribs running parallel to the longitudinal axis of the oblong. There can be five or more, preferably, seven ribs provided.

The first member can be provided with a peripheral flange.

The first member can be rectangular and a respective rib can define the flange on each long side of the rectangle. A respective angle member can be provided at each short side of the rectangle to define the flange on each short side. The angle members can be riveted to the remainder of the first member.

The substantially laminar part and integrally-formed ribs can comprise an extrusion of aluminium alloy.

Each rib can be tapered and be thinnest at its distal part.

The second member can be as described or claimed in our earlier application.

By way of example only, an illustrative embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a section through an aluminium alloy extrusion,

Figure 2 shows an underneath scrap view of the extrusion,

Figures 3 and 4 show elevation and plan views of an angle member,

Figure 5 is a cut-away perspective view of the extrusion and angle member assembled into a core member,

Figure 6 is a section through a swing seat including the core member, and

Figure 7 is an underneath view of the swing seat.

United States Patent Specification 4,066,258 issued

3rd January 1978 corresponds to our British Patent Application No. 9361/75 (Serial No. 1,535,728) and provides a published description of the swing seats on which the present embodiment is based. The description contained in United States Patent 4,066,258 (or any other published equivalent to 9361/75) will therefore be taken as the starting point for the present description. The reader is assumed to have available a copy of United States Patent 4,066,258 or its equivalent and the disclosure thereof is incorporated herein by reference.

The present embodiment consists of a swing seat as described with reference to Figures 1 to 3 of United States Patent 4,066,258 with the exception that instead of the core member reference 1 of the earlier specification a different form of core member is used.

The core member 1 of the earlier specification is here replaced by a core member 1' shown in the accompanying drawings. Parts which differ from our earlier swing seat are given primed reference numerals, parts which correspond are given unprimed numerals. Parts with unprimed reference numerals will not necessarily be described again here.

The core member 1' consists of an extruded section 100' of aluminium alloy and two aluminium alloy angle members 102' riveted thereto. A preferred alloy is one in accordance with British Standard BS1474 Grade HE30 TF to provide lightness, strength and corrosion-resistance.

Figure 1 shows a cross-section through the part 100'. The extruded section defines a laminar body portion 104' with seven ribs 106' depending therefrom. The outermost of the ribs define peripheral flanges 108', 109' and each rib is tapered being thinnest at its distal end.

The following are suitable dimensions for the section 100', the reference letters being marked in Figure 1.

A = 6.9 inches,

B = 0.75 inches, C = 1.65 inches, D = 0.9 inches, E = 0.1 inches (E being the thickness at the top of each of the five central ribs), F = 0.075 inches (F being the thickness at the distal end of each of the five central ribs), G = 0.125 inches, and H = 0.1 inches.

Four holes 3 of $7/16$ inches diameter are formed in the section 100' and the dimensions I and J relating thereto are respectively 0.825 inches and 5.25 inches. Although the dimension I, for example, is given to three decimal places it is not intended to imply that great precision in construction is essential.

Figure 2 is a scrap view of the underneath of the section 100' and introduces three further dimensions K, L and M equal, respectively, to 15.16, 14 and 0.58 inches.

Figures 3 and 4 show elevation and plan views of one of the angle members 102'. Each angle member 102' is an extruded right-angle section of aluminium alloy and has two $7/16$ inch diameter holes 110' formed therein to correspond to the holes 3. The following dimensions are suitable : N = 6.7 inches, O = 0.85 inches, P = 1.2 inches, Q = 0.585 inches, R = 0.1 inches, S = 0.725 inches, T = 5.25 inches.

The core member 1' is assembled by riveting a respective one of the angle members 102' to each end of the section 100' with the holes 110' and 3 aligned as indicated in the perspective sketch Figure 5. Aluminium rivets (not shown), two per angle member, are used and located for example, between the second and third and the fifth and sixth ribs. The angle members together with the first and seventh ribs define a peripheral flange about the core member.

The assembled core member 1' has the cushioning member 2 described in United States Patent 4,066,258 bonded to it,

Figure 6 showing a section through the bonded structure corresponding to Figure 2 of our prior specification. The peripheral flange of the core member 1' is completely embedded in the cushioning member 2 but the central part 112 of the underside of the core member is left exposed as shown in the underneath view Figure 7.

The swing seat with the core member 1' is even safer than our earlier swing seat because the present core member has a substantially smaller mass than the steel core member of our earlier seat so reducing force applied in impact. Moreover, the present configuration achieves this reduced mass whilst enhancing the strength and durability, retaining the resistance to vandalism of our earlier seat and keeping manufacturing costs down.

The present core member can be used with other cushioning members besides that described, for example, with the cushioning member described with reference to Figures 4 to 6 of United States Patent 4,066,258, the given dimensions being modified as necessary.

Claims:

1. A seat for a swing, the seat being of composite structure comprising a first member (1'), which is sufficiently rigid to bear the weight of a user, and a second member (2) of a compressible polymeric material, the first member being of substantially laminar form and the second member covering at least part of the peripheral edge of the first member, characterised in that the first member is made of a lightweight metal alloy and has a number of integrally-formed ribs (106') depending from its underside.

2. A seat as claimed in claim 1, further characterised in that the first member (1') is oblong with the ribs (106') running parallel to the longitudinal axis of the oblong.

3. A seat as claimed in claim 1 or 2, further characterised in that there are five or more ribs (106').

4. A seat as claimed in claim 3, further characterised in that the number of ribs (106') is seven.

5. A seat as claimed in any preceding claim, further characterised in that the first member (1') is provided with a peripheral flange (102' 108', 109').

6. A seat as claimed in any preceding claim, further characterised in that the first member (1') is rectangular and a respective rib (108' 109') defines the flange on each long side of the rectangle.

7. A seat as claimed in claim 6, further characterised in that respective angle member (102') is provided at each short side of the rectangle to define the flange on each short side.

8. A seat as claimed in claim 7, further characterised in that the angle members (102') are riveted to the remainder of the first member.

9. A seat as claimed in any preceding claim, further characterised in that the substantially laminar part (104') of the first member (1') and the integrally-formed ribs (106') comprise an extrusion of aluminium alloy.

10. A seat as claimed in any preceding claim, further characterised in that each rib (106') is tapered and is thinnest at its distal part.

11. A seat as claimed in any preceding claim, wherein the compressible polymeric material (2) has substantial depth and thickness surrounding the periphery of the core member, and a multiplicity of apertures (2c) are arranged side-by-side in the compressible polymeric material about the periphery of the core member, the compressible polymeric material and apertures together defining (i) a first wall adjacent to the edge of the core member and transverse to the plane of the core member, (ii) a second wall generally parallel to the first wall forming a pliant peripheral skin at the periphery of the said seat, and (iii) relatively thin struts acting substantially as Euler buckling struts connecting the first and second walls, the struts being formed by the material remaining between adjacent apertures, and the walls and struts providing a deflection characteristic such that on impact of the periphery of the seat with an object there is an initial deformation with little absorption of energy in which the shape of the impacted object is taken up by the pliant peripheral skin defined by said second wall and a subsequent deformation in which substantially all of the impact energy is absorbed in buckling struts.

12. A swing seat as claimed in claim 1, further characterised in that the apertures (2d, 2e, 2f) are blind apertures and extend along, and adjacent to, the periphery of the core member (1'), the axes of the apertures being substantially perpendicular to the plane of the core member.

13. A swing seat as claimed in claim 12, further characterised in that the core member (1') and the swing seat are generally of rectangular configuration, in that the apertures (2d, 2e, 2f) extend in rows along the side of the seat, and in that the long sides of the rectangle each include a respective further row of blind apertures (2e) parallel to the corresponding first-mentioned row of aperture (2d).

14. A swing seat as claimed in claim 13, further characterised in that each of the apertures (2d, 2e, 2f) is of circular cross-section, the apertures (2d, 2e) extending along the long sides of the rectangle have the same diameter, the apertures (2f) extending along the short sides of the rectangle have the same diameter, and the apertures (2f) extending along the short sides have a greater diameter than the apertures (2d, 2e) extending along the long sides.

15. A swing seat as claimed in claim 13 or 14, further characterised in that in each long side of the rectangle the said first-mentioned row of apertures (2d) is provided in a part (2g) of the compressible polymeric material (2) of first predetermined depth, the said further row of blind apertures is provided in a part (2h) of second predetermined depth, and the first predetermined depth is substantially greater than the second predetermined depth.

16. A swing seat as claimed in claim 14 or 15, further characterised in that the apertures (2d, 2e, 2f) in any row are equispaced, the distance between the centres of each pair of adjacent apertures in any row is not greater than 1.33 times the diameter of the apertures in that row, and the distance between the centre of each aperture in any given row, or any given outermost row

where a further row of blind apertures is provided, and the adjacent edge of the swing seat is not greater than 0.75 times the diameter of the apertures in that row.

17. A swing seat as claimed in any preceding claim, further characterised in that the compressible polymeric material (2) has a hardness lying within the range of from 40 to 50 International Rubber Hardness Degrees and is compression-moulded to the core member (1').

18. A swing seat as claimed in any of claims 11 to 17, further characterised in that the core member (1') has a peripheral flange (108') contiguous with the first wall means.

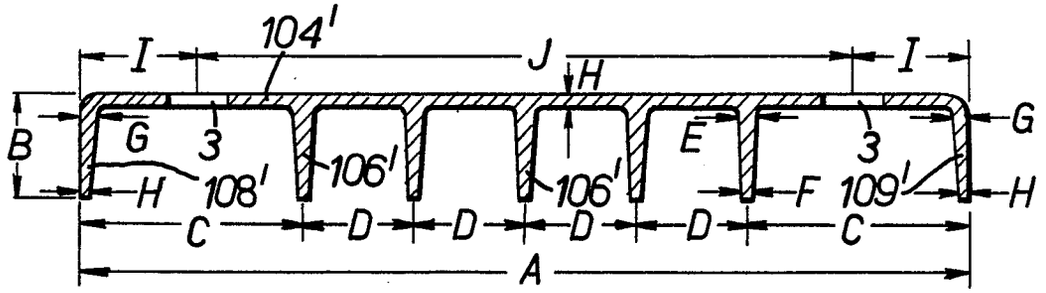


FIG. 1.

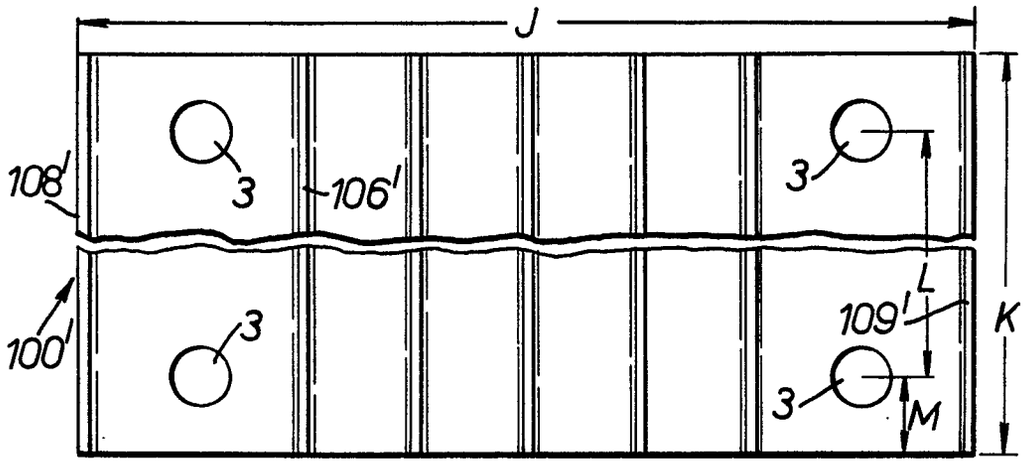


FIG. 2.

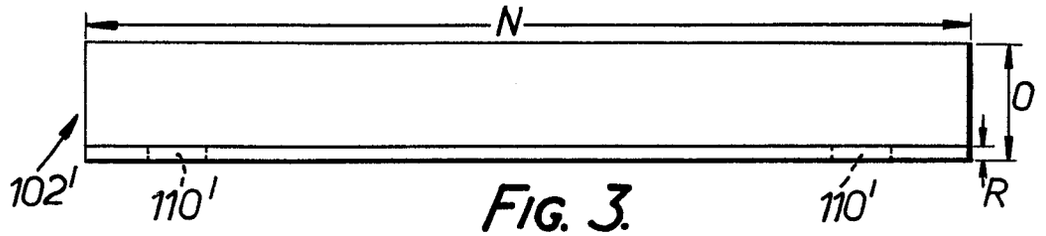


FIG. 3.

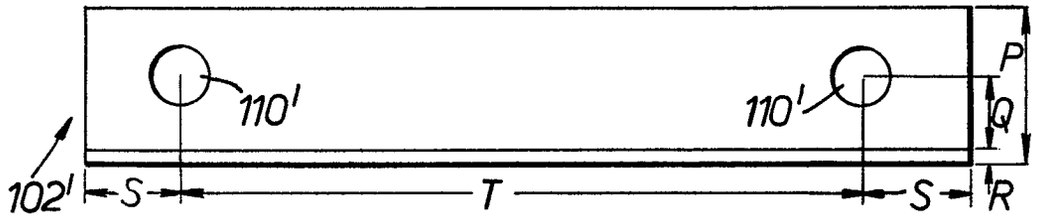


FIG. 4.

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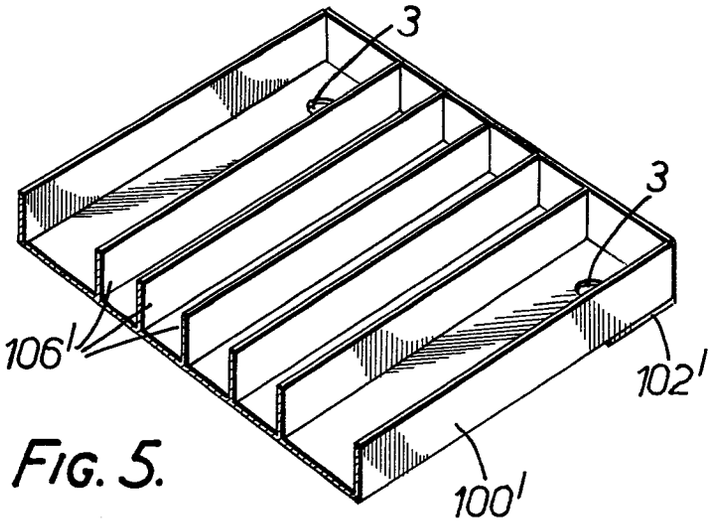

FIG. 5.

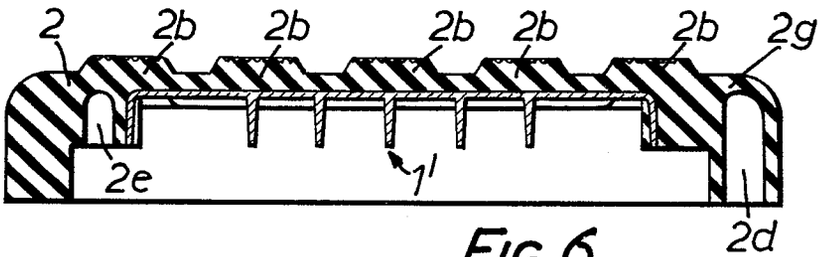

FIG. 6.

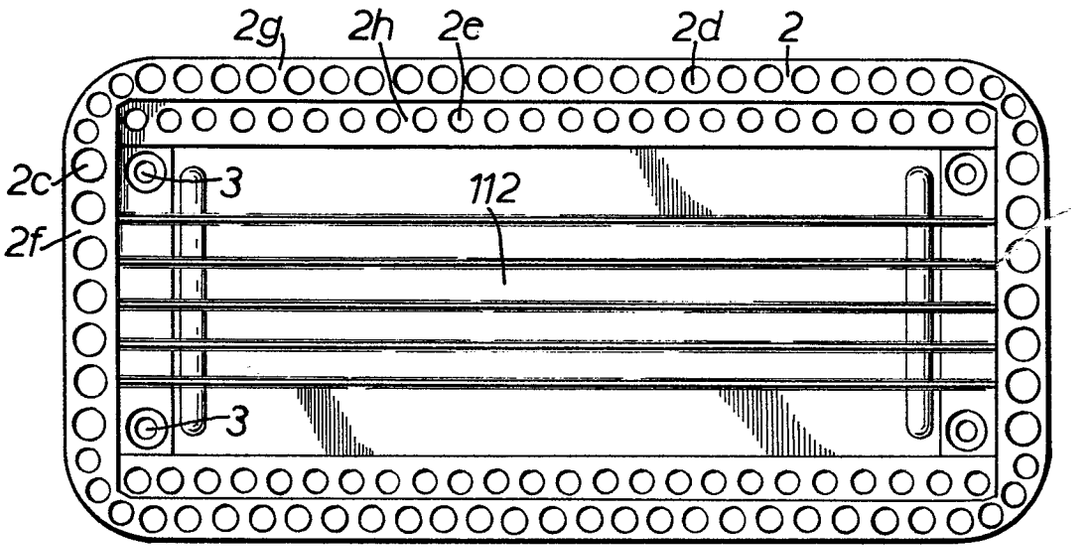

FIG. 7.

European Patent Office

EUROPEAN SEARCH REPORT

0012565
Application number
EP 79 30 2799

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	DE - A - 2 608 195 (THE SUTCLIFFE ENGINEERING HOLDINGS LTD.) * Page 12, claim 1; figures; page 4, lines 29-38 * & GB - A - 1 535 728	1,2,5, 6,12-15,17, 18
A	US - A - 3 261 607 (HOROWITS) * Figures; column 3, lines 10-30 *	1-7

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

A 63 G 9/00

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

A 63 G

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19-03-1980	STEENBAKKER

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