



(51) International Patent Classification:
A47C 1/12 (2006.01)

(21) International Application Number:
PCT/GB2009/002933

(22) International Filing Date:
22 December 2009 (22.12.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0823426.2 23 December 2008 (23.12.2008) GB

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: SEATING ASSEMBLY

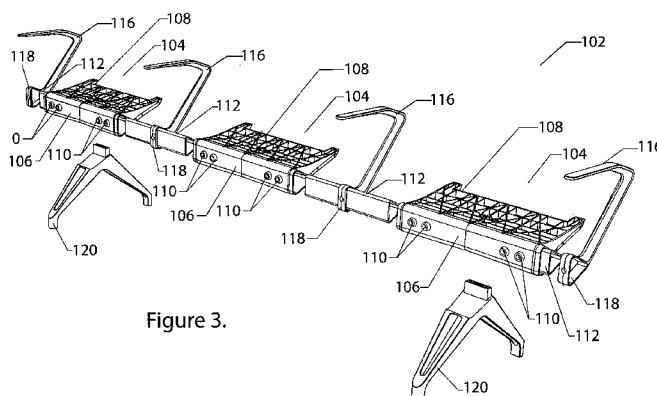


Figure 3.

(57) Abstract: A support assembly (12) for one or more seats (8) or the like is provided, the support assembly comprising supporting means (20) for supporting the support assembly and the at least one seat relative to the ground; and a support member (14) extending from the supporting means, the support member being adjustable in length, such that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied. A seating assembly comprising the support assembly and one or more seats or the like is also provided. A modular seating unit is also described.

SEATING ASSEMBLY

5 The present invention relates to a seating assembly, in particular a seating assembly that may be used to provide a wide range of seating patterns. The seating assembly is of very general use, being particularly advantageous in the provision of public seating, for example in theatres and auditoria, and public waiting areas such as in airports, stations and the like.

10 A wide range of seats and seating assemblies are known in the art for providing seating, in particular in public areas, such as theatres, auditoria, as well as public waiting areas, including airports, stations and the like. In many cases, the seating assemblies will be made to fit the specific location and their
15 intended use. In more recent years, it has become more common to provide seating assemblies as a range of units. The units are provided with specific seat arrangements and specific numbers of seats. To equip a particular space, it is known to employ several differently sized units of the same general design, the units differing in their size, in particular the number and
20 layout of the seats. In this way, a selection may be made from a range of different units to tailor the seating arrangement to the specific needs of the location.

25 A very common construction for the aforementioned seating units is to employ a beam on which the desired number and arrangement of seats are mounted. The beam is typically supported by a leg assembly extending to the ground or floor. The beams are generally of a fixed size, in particular a fixed length, in turn resulting in each unit being of a fixed length. While the number and arrangement of the seats in the seating unit may be varied, this variation
30 is limited by the overall length of the beam. As a result, such seating systems are provided with a range of seating units of differing beam length, the end

user selecting both the number and size of the units required to meet the desired seating arrangement. This requires the manufacturer and/or supplier to provide a wide range of seating units of different sizes to ensure that the possible requirements of the end user may be met. In addition, the end user,
5 having obtained the requisite units for one seating layout is severely limited in being able to use those units for an alternative layout, should the arrangement need to be changed or revised at some future time.

Several adjustable seating assemblies have been disclosed in the prior
10 art, in particular in relation to seats for aircraft. Thus, DE 1995099562 discloses a variable geometry seating assembly for aircraft. The seating assembly has a fixed support frame mounted to floor rails and supporting a row of seats. The seats are arranged to be adjustable on the fixed support frame, in particular to allow a middle seat of a row of three seats to be
15 adjustable in width. The overall number of seats in the row and the total width of the row of seats appears to be fixed.

EP 0 443 664 is similarly directed to aircraft passenger seats that are variable in configuration. Again, the seat assembly comprises a fixed support
20 frame supported on legs. A row of three seats is mounted to the support frame. The arrangement is adjustable, in particular to allow the width of the middle seat of the row of three to be adjusted. However, the total number of seats in the row is fixed at three seats.

25 EP 0 747 286 concerns a seating assembly and a mechanism for adjusting the arrangement of the seats. In particular, the assembly comprises a pair of fixed support members mounted on legs. Three seats are shown mounted to the fixed support member and are arranged to be adjustable. In particular, each seat is provided with a complicated mechanism for adjusting
30 the width of the seat back and the seat base. The mechanism is located

within the frame of each seat and is adjustable by means of a cranking handle. Once again, the total number of seats in the assembly is fixed.

EP 0 530 900 is a further document relating to adjustable seating for aircraft. Again, the seating assembly comprises a pair of fixed support beams mounted on legs. Three seats are arranged on the support beams, with the middle seat being adjustable in width. Each end of the assembly is adjustable to allow each end seat to be moved to accommodate the different widths of the middle seat. Again, however, the total number of seats is fixed to three seats in a row. A very similar arrangement is shown and described in EP 0 530 920.

Accordingly, there is a need for an improved seating assembly, in particular a seating assembly that increases the flexibility of the assembly to meet a wide range of seating requirements at an end user location. In particular, there is a need for a seating assembly that allows the total number of seats in the assembly to be adjusted to meet the needs of the end user location. It would be particularly advantageous if the seating assembly could function on a modular basis, that is comprise individual seat modules that may be combined with one another to meet a wide range of a seating demands.

Accordingly, in a first aspect, the present invention provides a support assembly for one or more seats or the like, the support assembly comprising:
supporting means for supporting the support assembly and the at least one seat relative to the ground; and
a support member extending from the supporting means, the support member being adjustable in length, such that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied.

In a further aspect, the present invention provides a seating assembly employing the support assembly of the present invention, that is a seating assembly comprising:

- a support assembly;
- 5 at least one seat mounted to the support assembly;
- the support assembly comprising supporting means for supporting the support assembly and the at least one seat relative to the ground;
- the support assembly further comprising a support member extending from the support means, the support member being adjustable in length, such
- 10 that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied.

The support assembly may be provided with one or more seats, to form a seating assembly. The seats may be simple in construction, for example

15 comprising a moulded or pre-formed seat base and seat back, either as a unitary component or as separate components, with a suitable support frame, if required, to mount the seat to the support member. In this regard, the term 'seat' as used herein is a reference to the seat comprising the seat base, seat back and the necessary seat frame to support the base and back and mount

20 the seat to the support member of the assembly of the present invention.

The seats may be accompanied by other components, such as tables and the like, which are also mounted to and supported by the assembly, in like manner. However, the support assembly may be used to support

25 components other than seats, for example to provide a table assembly without seating. The present invention is to be interpreted in this light and references to a 'seating assembly' to construed accordingly.

The seating assembly of the present invention employs a support

30 assembly, the function of which is to support one or more seats. The support

assembly is therefore arranged to support one or more seats as may be required by the end use of the assembly.

The support assembly comprises supporting means for supporting the
5 assembly and the seats relative to the ground or floor. Any suitable
supporting means may be employed and the general types of such means will
be known in the art. For example, the supporting means comprises one or
more supports extending from the support assembly to the floor or ground on
which the seat assembly is to rest. The supports extending from the ground
10 are preferably formed as one or more legs. Alternatively, or in addition, the
supporting means may mount or secure the support assembly to an adjacent
structure, such as a wall, pillar or the like.

A particularly preferred embodiment of the support and seating
15 assemblies of the present invention comprise one or more legs to support the
assembly above the floor or ground. This allows the assembly to be free
standing and capable of being arranged independently of other structures,
such as walls, pillars and the like. The legs may extend substantially vertically
from the support assembly to the floor or ground. Alternatively, the legs may
20 extend at an angle from the support assembly to the floor or ground.

The number of supporting means employed will be determined in part
by the design of the supporting means itself, as well as the overall length of
the seating assembly. Other factors, such as the number and arrangement of
25 seats and other components on the support assembly, will also have a
bearing on the design of the supporting means, the number employed and
their arrangement along the support assembly. While a single supporting
means may be employed for relatively short support assemblies, most
preferably at least two supporting means are employed. The maximum
30 acceptable distance between adjacent supporting means will be determined
by the overall strength and rigidity of the support assembly, the number and

arrangement of the seats and other components, and the general conditions of use of the seating assembly when in situ.

The support assembly further comprises a support member extending
5 from the supporting means. The support member is adjustable in length, in turn allowing the number of seats capable of being mounted on the support assembly to be varied and/or the spacing between the seats varied. In this way, the support assembly and the seating assembly may be varied in configuration to adapt to a wide range of requirements of the end user.

10

The support member extends from the supporting means. In the case of an assembly comprising two or more supporting means, the support member extends between the adjacent supporting means. In such a case, the support member is most preferably arranged to have its length between
15 the adjacent supporting means to be adjustable, thereby allowing the distance between adjacent supporting means to be varied.

The support member may be of any suitable configuration that allows its overall length to be adjusted. The support member preferably comprises
20 means allowing its length to be fixed, once the desired or appropriate length has been set. A particularly preferred arrangement for providing the adjustability of the support member is described below.

In the majority of configurations of the seating assembly when installed
25 and in use, the support member extends substantially horizontally and parallel to the floor or ground above which it is supported. However, arrangements in which the support member of the support and seating assemblies are at an angle to the horizontal and inclined may also be provided, again as determined by the configuration of seats required by the end user.

30

The support member is an elongate member providing the support for the one or more seats in the seating assembly. The seats may be mounted directly to the support member or indirectly, for example by means of a subframe or chassis, which in turn is mounted directly to the support member.

5

The support member may be arranged to be adjustable in length in any suitable manner. In one preferred embodiment, the support member comprises a plurality of elongate support components, the support components being moveable with respect to one another, in order to vary the length of the support member. In a particularly preferred embodiment, the support member comprises a plurality of elongate support components, one of each pair of adjacent support components extending within the other of each pair of adjacent support components, in particular in a telescopic manner. Fixing means are provided to lock each support component with respect to the or each adjacent support component. A particularly preferred embodiment of the support member is described below.

Reference has been made to the seating assembly comprising one or more seats. The seats may be of any suitable design and configuration, examples of which will be known in the art or readily apparent to the person skilled in the art. The seats are mounted to the support member, either directly or indirectly via a suitable frame or subchassis, as mentioned above. In addition to the one or more seats, the seating assembly may comprise further components, preferably also mounted either directly or indirectly to the support member. Examples of such further components include table assemblies for providing a table surface adjacent to the one or more seats. Such further component may also be one or more arm rests, typically disposed adjacent the one or more seats. Again, the arm rests may be mounted directly or indirectly to the support member. It is most preferably the case that the dimensions of the seats and the table assemblies are the same or sufficiently similar that the seats and the table assemblies are

30

interchangeable on the support assembly. This increases the ability of the configuration of the entire seating assembly to be changed to meet the needs of the end user.

5 The assembly of the present invention may comprise one or more support members, as required to support the seats. For example, the assembly may comprise a pair of support members arranged parallel to one another, in particular one support member extending along the front portion of the assembly and one support member to the rear of the assembly, as the
10 assembly is used by persons seated on the seats. However, it is a significant advantage of the assembly of the present invention that a single support member can be employed to support the seats and other components. This is in contrast to the assemblies of the prior art which, generally, employ a support structure having two support members, for example as disclosed in
15 the prior art documents discussed above.

Accordingly, in one embodiment, the present invention provides a seating assembly employing the support assembly of the present invention, that is a seating assembly comprising:

20 a support assembly;
 at least one seat mounted to the support assembly;
 the support assembly comprising supporting means for supporting the support assembly and the at least one seat relative to the ground;
 the support assembly further comprising a single support member
25 extending from the support means, the support member being adjustable in length, such that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied.

 As noted above, the support member may be of an especially preferred
30 embodiment, the support member comprising a plurality of elongate support

components, each support member engaging telescopically with the or each adjacent support member.

5 The support member of this particularly preferred configuration has a general application, being of particular advantage in the modular seating assembly of the present invention. Accordingly, the present invention, in a further aspect, provides a support member comprising a plurality of elongate support components, each support component engaging telescopically with the or each adjacent support member. In particular, the support member
10 comprises a first support component and a second support component, at least a portion of the first support component extending longitudinally within the second support component, preferably coaxially therein.

15 The term 'telescopically' is used herein to denote that one elongate support component extends longitudinally within an adjacent elongate support component, thereby allowing the overall length of the support member to be varied by adjusting the relative longitudinal positions of the adjacent support components.

20 Each of the first and second support components can provide support for a seat and have a seat mounted thereto. Alternatively, the support member may comprise a plurality of first and second support components, with the seats being mounted to either the first or second components. In this case, the other of the first and second components can serve to connect
25 adjacent components supporting the seats.

The second support component is generally tubular in form, with the first support component also being generally tubular in form, with appropriate dimensions to extend longitudinally within the second support member. The
30 elongate support components may have any suitable cross-sectional shape. For the first support component, a portion of which extends longitudinally

within the second support component, the critical cross-sectional shape is the outer cross-section. For the second support component, adapted to receive a portion of the first support component therein, the critical cross-sectional shape is the inner cross-sectional form, which should compliment the outer
5 cross-sectional form of the first support component.

When the first and second support components are engaged, the outer surface of the first support component engages with the inner surface of the second support component. The support components are most preferably
10 sized relative to one another to ensure that the support member is substantially rigid and unable to flex or bend. In addition, the engaging surfaces of the first and second support components are preferably formed so as to resist torsional or twisting forces, that is forces urging the first and second support components to rotate relative to one another about their
15 longitudinal axes, when engaged. In general, such resistance to torsional or twisting forces can be achieved using support components that are non-circular, at least in the portions of the adjacent components that interact. For example, to resist torsional or twisting forces, the outer form of the portion of one support component that extends within a second support component is
20 non-circular, and the inner form of the portion of the second component receiving the first component is similarly non-circular.

In a further embodiment, the present invention provides a seating assembly employing the support assembly of the present invention, that is a
25 seating assembly comprising:
a support assembly;
at least one seat mounted to the support assembly;
the support assembly comprising supporting means for supporting the support assembly and the at least one seat relative to the ground;
30 the support assembly further comprising a support member extending from the support means, the support member being adjustable in length, such

that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied; wherein the support member comprises a plurality of interlocking support components, the support components being formed to interlock so as to resist torsional or twisting
5 forces.

The outer surface of the first support component and the inner surface of the second support component may have any suitable shape, when viewed
10 in cross-section. Preferably, they are both substantially the same general shape. The shape may be any suitable shape that allows the components to be engaged with one another and which allows the components to be easily moved with respect to each other. In one embodiment, the first and second support components have curved or arcuate surfaces that contact one
15 another, when the components are engaged. However, in order to provide torsional rigidity to the support member, the outer surface of the first support component and the inner surface of the second support component are preferably formed with at least a portion having a multi-faceted cross-section, that is a cross-section comprising two or more surfaces, such that the
20 complimentary surfaces can contact one another, to prevent relative rotation between the first and second support components about their longitudinal axis. Preferably, the first and second support components are each provided with a plurality of complimentary surfaces that contact one another when the components are engaged, preferably at least two such surfaces. However,
25 three or more such surfaces may be provided, as required. One preferred form for the first support component is generally triangular in cross-section. A preferred form for the second support component has a generally triangular inner cross-section, to compliment and engage the triangular cross-section of the first support component. However, other cross-sectional forms may also
30 be employed, for example those with four, five, six or more surfaces.

As noted above, the support member is preferably provided with means to lock the support components together when engaged. Most preferably, the locking means are releasable, allowing the support components to be unlocked, moved with respect to one another and locked. In this way, the
5 length of the support member may be adjusted, as required, and then fixed.

A particularly preferred form of locking means is a clamp assembly. A preferred clamp assembly has a thrust member moveable with respect to the second support component to bear upon the outer surface of the first support
10 component located within the second support component. The thrust member preferably has a thrust surface to bear upon the outer surface of the first support component. A larger thrust surface will spread the load applied to the first support component by the thrust member, in turn reducing the potential
15 damage to the first support component as a result of overtightening. In addition, the use of a larger thrust surface improves the resistance of the support member to flexing and torsional forces. The thrust member is preferably a plate.

To better resist the forces of the thrust member, the portion of the first
20 support component on which the thrust member bears may be of increased strength, for example by having a relatively thicker wall thickness. The bearing surface of the first support component is preferably formed to closely compliment the surface of the thrust member. For example, in embodiments in which the thrust member is a plate, the first support component preferably
25 has a bearing surface that accepts and compliments the plate, to improve the transfer of load from the thrust member to the first support component, in turn improving the engagement of the first support component with the second support component.

The thrust member may be moved within the second support component by any suitable means, preferably by a bolt or the like extending through a threaded bore in the second support component.

- 5 The thrust member is preferably moveable within the second support component between a retracted position, in which the force applied by the thrust member to the first support component is low or substantially zero, and a second, engaging position, in which the thrust member applies a force to the bearing surface of the first support component. With the thrust member in the
- 10 retracted position, the first support component is free to be moved longitudinally within the second support component. With the thrust member in the engaging position, the first support component is held in engagement with the interior of the second support component and the length of the support member fixed or locked. The inner surface of the second support
- 15 component may be provided with a cavity or recess to accommodate the thrust member when in the first, retracted position, so as to allow the first support component to move freely within the second support component.

- The support components may be formed from any suitable material.
- 20 The selection of the material will be determined by such factors as the ease of forming the components, the strength required, in turn determined by the load expected to be applied to the support assembly and the seating assembly, when in use. Metals, such as steel and aluminium, as well as alloys thereof, may be used. One preferred range of materials are the high performance
- 25 engineering polymers that function as metal-replacement materials. An example of suitable engineering polymers are thermoplastics, in particular fibre-reinforced thermoplastics. One preferred material is a nylon-based thermoplastic with glass fibre reinforcement and comprising a partially aromatic polyamide matrix. Such materials are known in the art and
- 30 commercially available, for example the Grivory GV-5HTM range of polymers commercially available from EMS-Grivory.

As noted above, the seating assembly of the present invention may be provided in a modular form, the support assembly allowing the overall size and configuration of the seating assembly to be tailored to the needs of the end user. In particular, the support assembly, by relying upon the combination of the first and second support components, which may be connected together as required to provide a support member of variable length, allows for the system to be modular.

Accordingly, the present invention also provides a modular seating unit, the unit comprising:

a seat;

a support assembly module, the seat being mounted on the support assembly module;

wherein the support assembly module is connectable to the support assembly module of a second unit, such that the assembly modules combine to form a support assembly capable of supporting a plurality of seats, the assembly modules being connectable in a manner that allows the overall length of the support assembly to be varied.

20

The modular system allows for the overall length of the support assembly to be varied, in particular to allow the overall number of seats in the finished assembly to be varied, in order to meet the needs of the end user location. In particular, as each seat is provided with a respective support assembly module, the number of seats is varied by adding or removing one or more modular seating units.

25

The present invention also provides a seating assembly comprising a plurality of modular seating units as hereinbefore described.

30

The components of the support assembly modules and the support assembly provided when a plurality of modules are combined are preferably as hereinbefore described. Each support assembly module comprises a support member portion, that may be engaged with the support member
5 portion of an adjacent support assembly module. In this way, the support assembly modules are combined to form an elongate support member, as hereinbefore described, with the length of the support member being adjusted by increasing or decreasing the number of support modules comprised therein. In this way, each seat is provided with a respective portion of the
10 support member.

In particular, it is preferred that the support assembly module may be connected to a second support assembly module by a first support component as hereinbefore described, the support assembly module comprising a second
15 support component as hereinbefore described, the first and second support components engaging telescopically, as detailed above.

Embodiments of the present invention will now be described, by way of example only, having reference to the accompanying drawings, in which:
20

Figure 1 is a perspective view of a seating assembly of the present invention in a first configuration;

Figure 2 is a perspective view of a seating assembly of the present invention in a second configuration;
25

Figure 3 is an exploded view of a support assembly of the present invention for use in a seating assembly shown in Figure 1 or Figure 2;

Figure 4 is a cross-sectional view of a second component of the support assembly of Figure 3;
30

Figure 5 is a cross-sectional view of a first component within but not engaged with the second component of Figure 4; and

5 Figure 6 is a cross-sectional view of the first and second components of Figure 5 when fully engaged.

Referring to Figure 1, there is shown a seating assembly, generally indicated as 2. The seating assembly 2 comprises a plurality of seating
10 modules 4. Each seating module comprises a seat 6, having a seat portion 8 and a back portion 10 of generally conventional design. The seating modules 4 each comprise a support assembly module 12, which have been combined to form an elongate support member 14 extending substantially horizontally beneath each seat portion 8. The seating modules 4 have been arranged in a
15 configuration as shown in which two seats are adjacent one another, with a further seat displaced along the support member and separated from the two adjacent seats by a table assembly 16. Arm rests 18 are mounted to extend from the support member 14, such that each seat has two adjacent arm rests. Supporting means in the form of leg assemblies 20, each comprising two legs
20 22, are mounted to and extend downwards from the support member 14, as viewed in Figure 1, to support the seats above the floor or ground.

Referring to Figure 2, there is shown a second seating assembly, generally indicated as 2a. The seating assembly of Figure 2 is formed from
25 the same components as the seating assembly of Figure 1, identified by the reference numerals used in Figure 1 and described above. However, in the seating assembly 2a of Figure 2, the seating modules have been arranged to provide a configuration of four adjacent seats, each provided with two adjacent arm rests, and a table assembly on the end of the support assembly.

It will be appreciated that the configurations shown in Figures 1 and 2 are just two examples of the very many configurations that may be formed using the system of the present invention. The configurations may differ in terms of the number and arrangement of seats and, if present, tables.

5 Further, spacing between the adjacent seats may be varied, such that the overall length of the support member and the seating assembly may be varied. The means by which this is achieved using the system of the present invention will now be described, having reference to Figures 3 to 6.

10 Referring to Figure 3, there is shown an exploded view of a support assembly, generally indicated as 102. The support assembly 102 is of use in providing a seating assembly, such as those shown in Figures 1 and 2 and described above. The support assembly 102 comprises a plurality of seat subframes 104. The function of each subframe 104 is to provide direct
15 support to a seat, such as the seats 6 shown in Figures 1 and 2. Similar subframes may be provided for supporting other components, such as tables and the like, as required in the final assembly. Each subframe 104 comprises a support tube 106, having a generally triangular cross-section, and a support frame 108 extending laterally from the support tube 106.

20

The support tube 106 is an elongate member open at each end to receive a connecting member, as described hereinafter. The support tube 106 may be formed as a single tubular member, as shown in Figure 3. Alternatively, the support tube 106 may be formed from two tubular members
25 that are longitudinally aligned, with the two tubular members being either adjacent one another or spaced apart, provided that the tubular members provide two open ends each for receiving a connecting member. Each support tube 106 is provided with a plurality of clamp assemblies 110, details of which are described below.

30

The support assembly 102 further comprises a plurality of elongate connecting members 112. Each connecting member 112 is generally tubular, having a generally triangular cross-section. The outer dimensions of each connecting member 112 are such that the member may slide within an open
5 end of the support tube 106 of a seat subframe 104. In particular, the relative dimensions of the connecting members 112 and the support tubes 106 are such that the connecting members 112 are a sliding or telescopic fit within the support tubes 106 and their respective positions can be adjusted with the clamp assemblies 110 released. In this way, the overall length of the support
10 tubes 106 and connecting members 112 may be adjusted. The connecting members 112 are locked in position within the support tubes 106 by means of the clamp assemblies 110.

In terms of the present invention, the connecting members 112 and the
15 support tubes 106 form the first and second support components described above. It will be understood that the connecting members 112 could alternatively be incorporated into the support tubes 106, such that each support tube 106 can engage directly with an adjacent support tube 106, without the need for a separate connecting member.

20

The support assembly 102 further comprises a plurality of arm rests 114. Each arm rest has a portion 116 for supporting the arms of persons using the assembly, extending from a generally triangular connector 118. The connector 118 is sized to fit over the connecting members 112 and is provided
25 with a clamp for locking the arm rest 114 in place. The position of each arm rest 114 may be adjusted by loosening the clamp and sliding the arm rest along the respective connecting member.

The support assembly 102 further comprises a plurality of leg
30 assemblies 120, each having two legs. Each leg assembly 120 is mounted to the underside of a seat subframe 104. Two leg assemblies are shown in

Figure 3. However, the number and location of the leg assemblies will be determined by the end use and overall configuration of the completed assembly.

5 The length of the support tubes 106 as provided are generally the same, such that the seat subframe 104 is of a fixed form. In this way, the manufacture and supply of the subframe 104 is made particularly simple, which is an advantage given that the subframe is a complex component to form and manufacture. In contrast, the connecting members 112 are
10 relatively simple, tubular members that are easy to form. The connecting members 112 may be provided in a variety of lengths, such that the distance between adjacent seat subframes 104 in the completed support assembly 102 may be varied. For example, the two endmost connecting members 112 shown in Figure 3 are relatively short, with sufficient length extending from the
15 respective support tube 106 to accommodate only an arm rest 114.

 When one or more support tubes 106 and connecting members 112 are combined and engaged, as shown in Figure 3, they together form an elongate support member, such as support member 14 shown in Figures 1
20 and 2, the overall length of which can be varied.

 Referring to Figures 4 to 6, there is shown in cross-section the engagement between a connecting member 112 and a support tube 106 of the assembly of Figure 3. Referring to Figure 4, the support tube 106 is
25 shown in cross-section. As can be seen, the support tube 106 has a generally triangular interior, which can be considered to have two surfaces 130 and 132 for engaging with complimentary surfaces on the connecting member. The clamp assembly 110 of the support tube 106 is shown in Figure 4 and comprises a thrust plate 134 moveable within the support tube by means of a
30 bolt 136 threadably engaged with a threaded boss 138 on the support tube. The thrust plate 134 is moveable between a retracted position and an

engaging position. The retracted position is shown in Figure 4, in which the thrust plate is accommodated in a recess 140 formed in the interior surface of the support tube 106 opposing surfaces 130 and 132. In the engaging position, the thrust plate 134 is moved towards the opposing interior surfaces
5 130 and 132, by action of the bolt 136, as shown in Figure 6.

The support tube 106 is shown in Figures 4 to 6 as having an interior with a triangular cross-section, to compliment and engage with the connecting member 112. The outer configuration of the support member 106 is not
10 important for the formation of the support member and can have any required form for supporting the seats, tables or other components of a seating assembly.

The support tube 106 may be formed from any suitable material. A particularly preferred material is an engineering polymer employed as a metal replacement, such as Grivory GV-5H, a commercially available fibre-reinforced nylon composite. Such polymers are particularly advantageous on forming support tubes that are complex in shape, for example when forming part of a larger subframe, such as the subframe 104 in Figure 3, which may
20 be formed as a single component.

A shown in Figure 4, a connecting member 112 extends within the support tube 106. The connecting member 112 is a tube having a generally triangular cross-section. The connecting member 112 has two outer surfaces
25 142 and 144 opposing the complimentary interior surfaces 130 and 132 of the support tube 106. The third outer surface 146 of the connecting member 112 faces the thrust plate 134.

Two sets of complimentary opposing surfaces 130, 142 and 132, 144
30 are shown on the support member and connecting member in the figures, arising from the triangular forms employed. The triangular form is particularly

preferred, as it provides a very high torsional rigidity to the completed assembly. It will be appreciated that the connecting member and support tube may be formed with different cross-sectional shapes, with fewer or more complimentary and opposing forces.

5

The connecting member 112 may be formed from any suitable material. As the connecting member 112 is generally a simple triangular tube, it may be formed from suitable metals, to provide the required strength, in particular to resist the forces applied to the member by the clamp 110.

10

In operation, the connecting member 112 is slid into the open end of the support tube 106, with the thrust plate 134 in the retracted position, as shown in Figure 3. The relative position of the connecting member 112 and the support tube 106 may thus be adjusted telescopically. When in the required position, the clamp assembly 110 is operated to move the thrust plate 134 inwards to bear upon the outer surface 146 of the connecting member 112. This, in turn urges the connecting member 112 away from the clamp assembly 110 and forces the surfaces 142, 144 of the connecting member into contact with the opposing surfaces 130 and 132 of the support tube. Tightening the clamp assembly 110 locks the connecting member 112 in position within the support tube 106.

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The system shown in Figures 4 to 6 has been described and shown in use in a seating assembly. However, it will be appreciated that the system may be employed in a wide range of applications, where an adjustable support member is required.

30

CLAIMS

- 5 1. A support assembly for one or more seats or the like, the support assembly comprising:
supporting means for supporting the support assembly and the at least one seat relative to the ground; and
a support member extending from the supporting means, the support
10 member being adjustable in length, such that the number of and/or spacing between the seats capable of being mounted to the support assembly may be varied.
- 15 2. The support assembly according to claim 1, wherein the supporting means comprises one or more supports extending to the floor or ground, in particular one or more legs.
- 20 3. The support assembly according to either of claims 1 or 2, wherein the supporting means is arranged to mount the assembly to an adjacent structure, in particular a wall, pillar or the like.
4. The support assembly according to any preceding claim, comprising two or more supporting means.
- 25 5. The support assembly according to claim 4, wherein the support member is adjustable in length so as to allow the distance between adjacent supporting means to be varied.
- 30 6. The support assembly according to any preceding claim, wherein means are provided to fix the length of the support member.

7. The support assembly according to any preceding claim, wherein the support member is disposed substantially horizontally.

8. The support assembly according to any preceding claim, further
5 comprising a subframe mounted to the support member for receiving each seat or the like.

9. The support assembly according to any preceding claim, wherein the support member comprises a plurality of elongate support components.

10

10. The support assembly according to claim 9, wherein adjacent elongate support members engage with one another telescopically.

11. The support assembly according to any preceding claim, wherein the
15 support member comprises a first support component and a second, generally tubular support component, the first support component extending longitudinally within the second support component.

12. The support assembly according to claim 11, wherein the first and
20 second support components are shaped to provide torsional rigidity to the support member, when engaged.

13. The support assembly according to claim 12, wherein the first support component is provided with a plurality of surfaces that contact opposing
25 complimentary surfaces of the second support component when the first and second components are engaged.

14. The support assembly according to claim 13, wherein the first and second support components are each provided with two such surfaces.

30

15. The support assembly according to claim 14, wherein the first support component is generally triangular in cross-section.

16. The support assembly according to claim 15, wherein the interior of the
5 second support component is generally triangular in cross-section.

17. The support assembly according to any of claims 11 to 16, wherein locking means are provided to hold the first and second support components in engagement to fix the length of the support member.

10

18. The support assembly according to claim 17, wherein the locking means comprises a clamp assembly.

19. The support assembly according to claim 18, wherein the clamp
15 assembly comprises a thrust member disposed within the second support component and moveable to bear upon the outer surface of the first support component.

20. The support assembly according to claim 19, wherein the thrust
20 member comprises a thrust plate.

21. The support assembly according to either of claims 19 or 20, wherein the thrust member is moveable between a retracted position, in which little or no force bears upon the first support component, and an engaging position, in
25 which the thrust member bears on the first support component to lock the first and second support components in position.

22. The support assembly according to any of claims 19 to 21, wherein the inner surface of the second support component comprises a recess for
30 receiving the thrust member when in the retracted position.

23. A seating assembly comprising a support assembly according to any preceding claim and one or more seats and/or other components.

24. A modular seating unit, the unit comprising:

5 a seat;
a support assembly module, the seat being mounted on the support assembly module;

wherein the support assembly module is connectable to the support assembly module of a second unit, such that the assembly modules combine
10 to form a support assembly capable of supporting a plurality of seats, the assembly modules being connectable in a manner that allows the overall length of the support assembly to be varied.

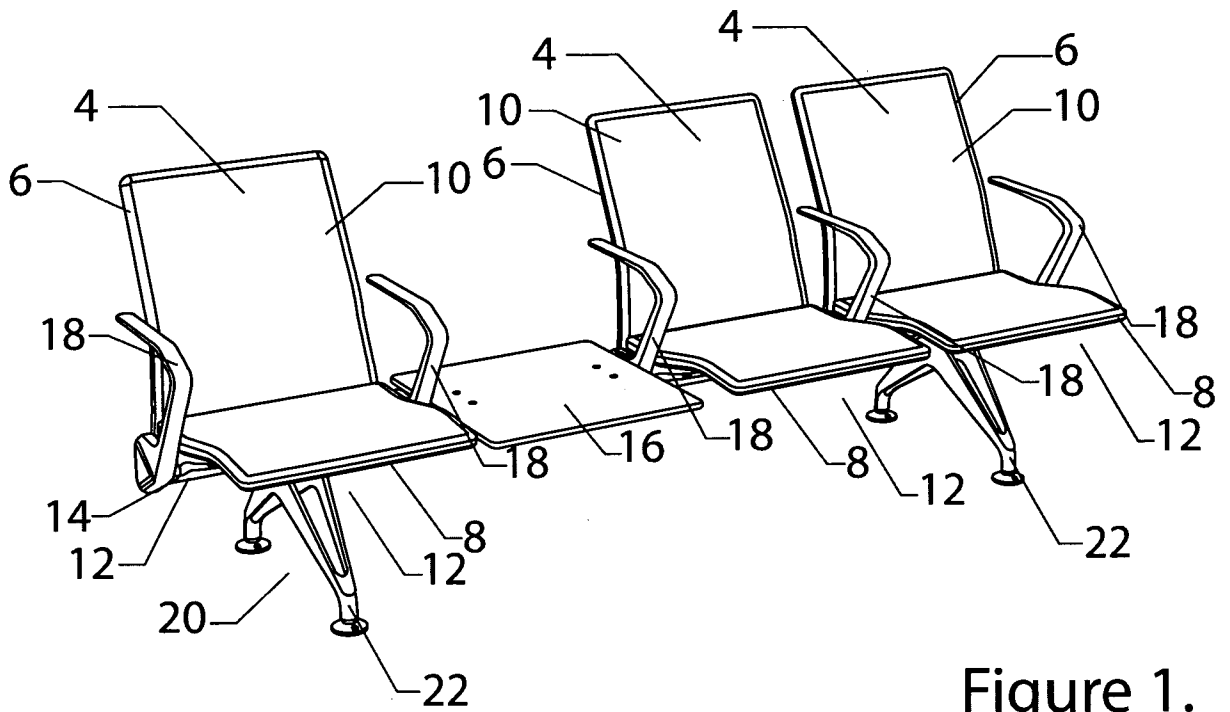


Figure 1.

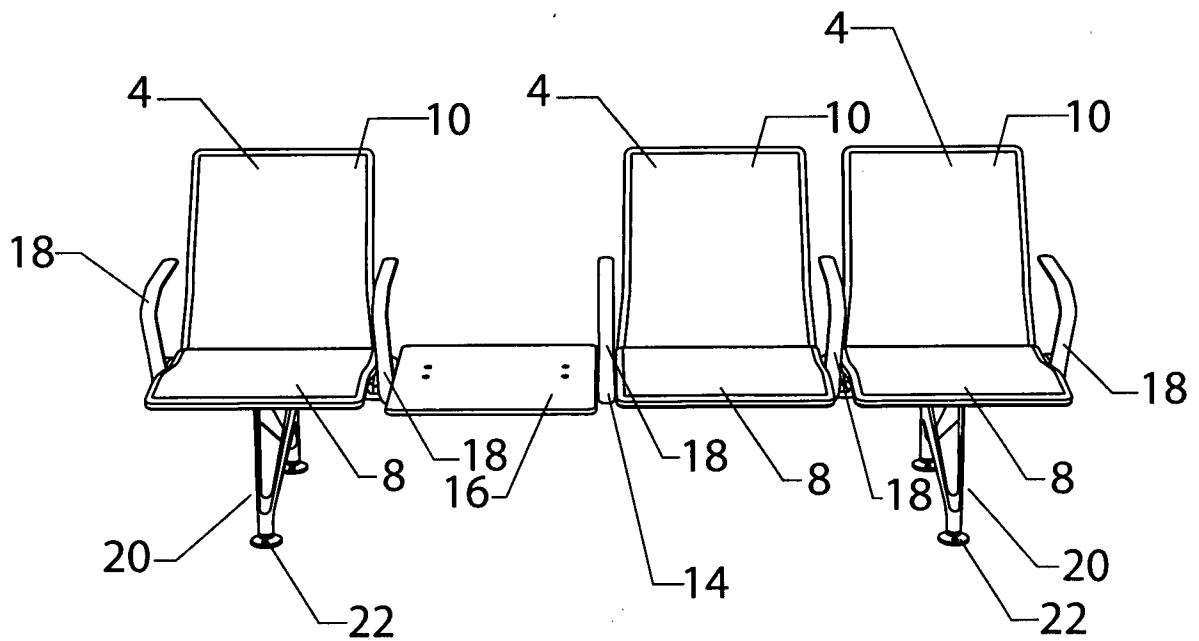


Figure 2.

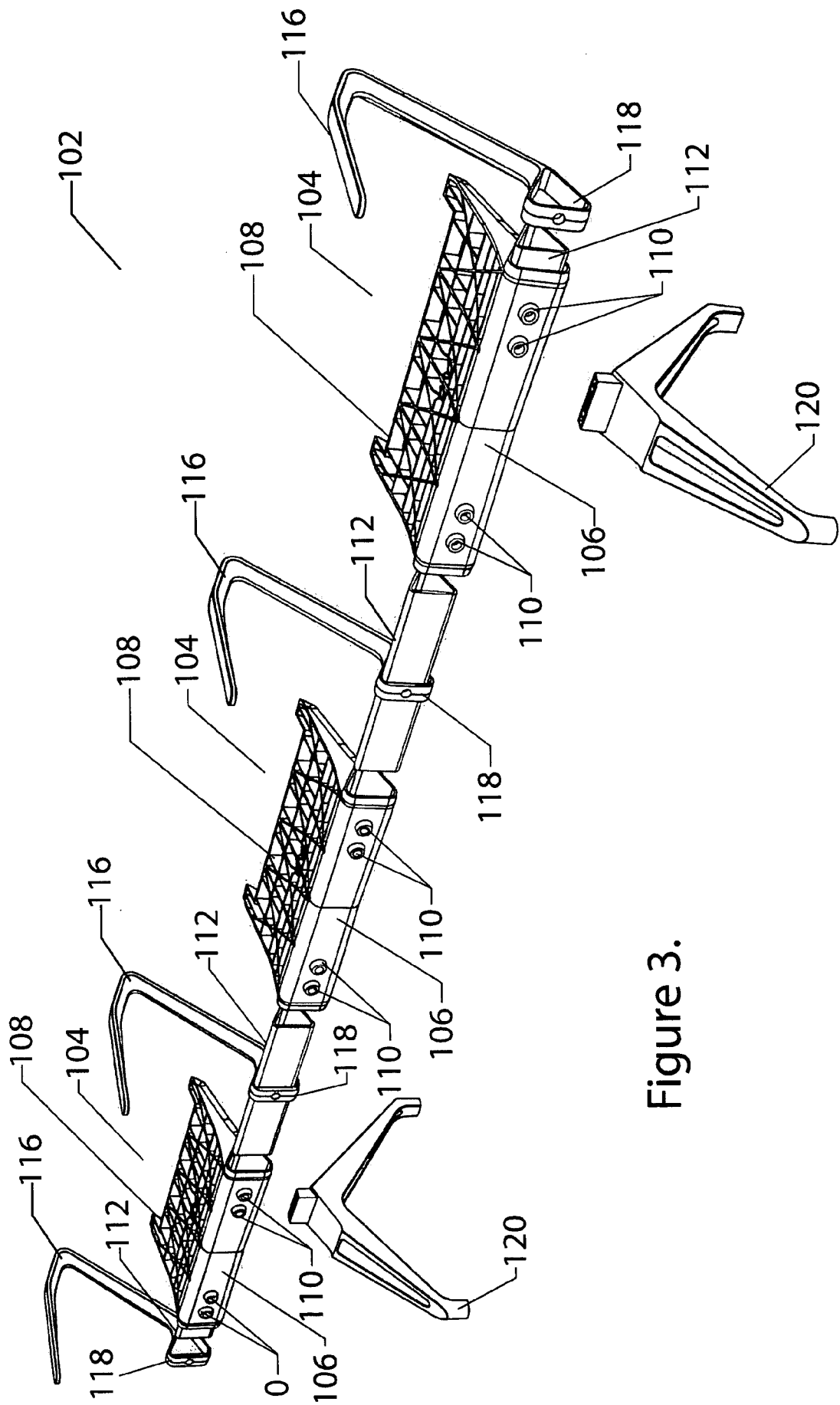


Figure 3.

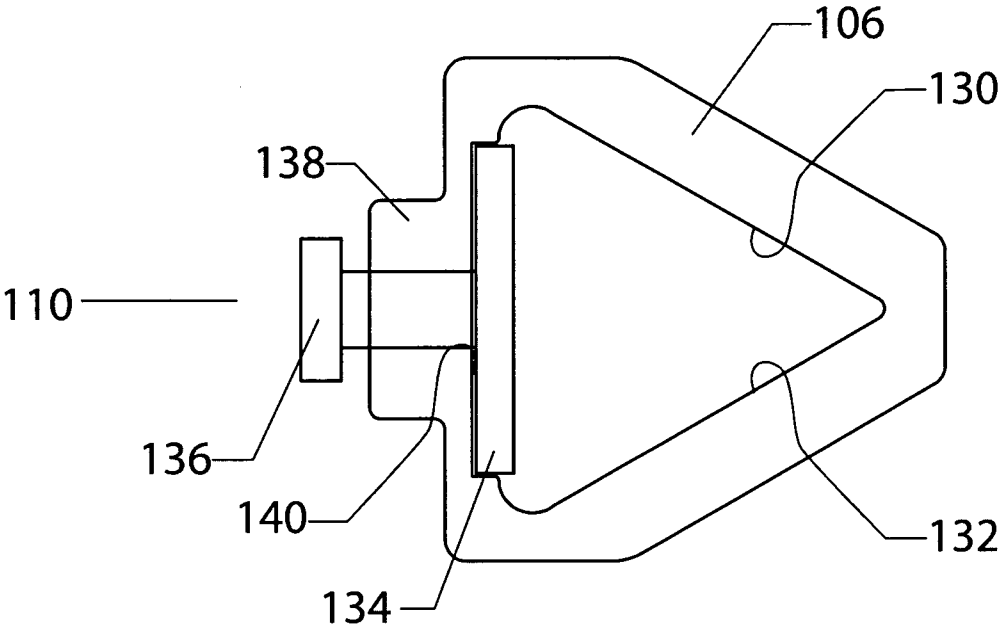


Figure 4.

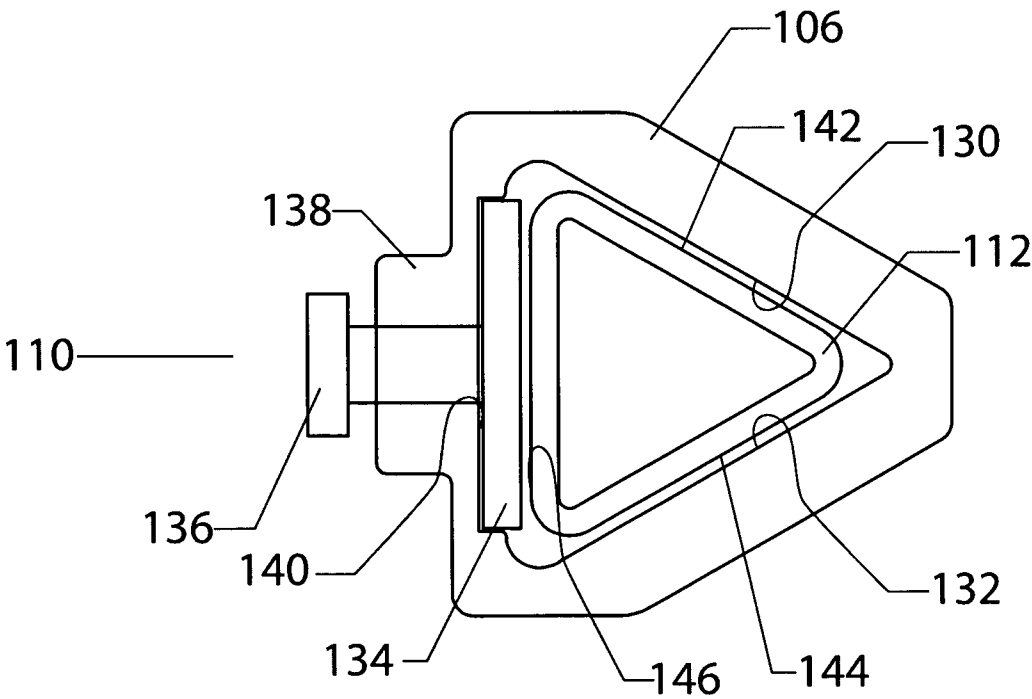


Figure 5.

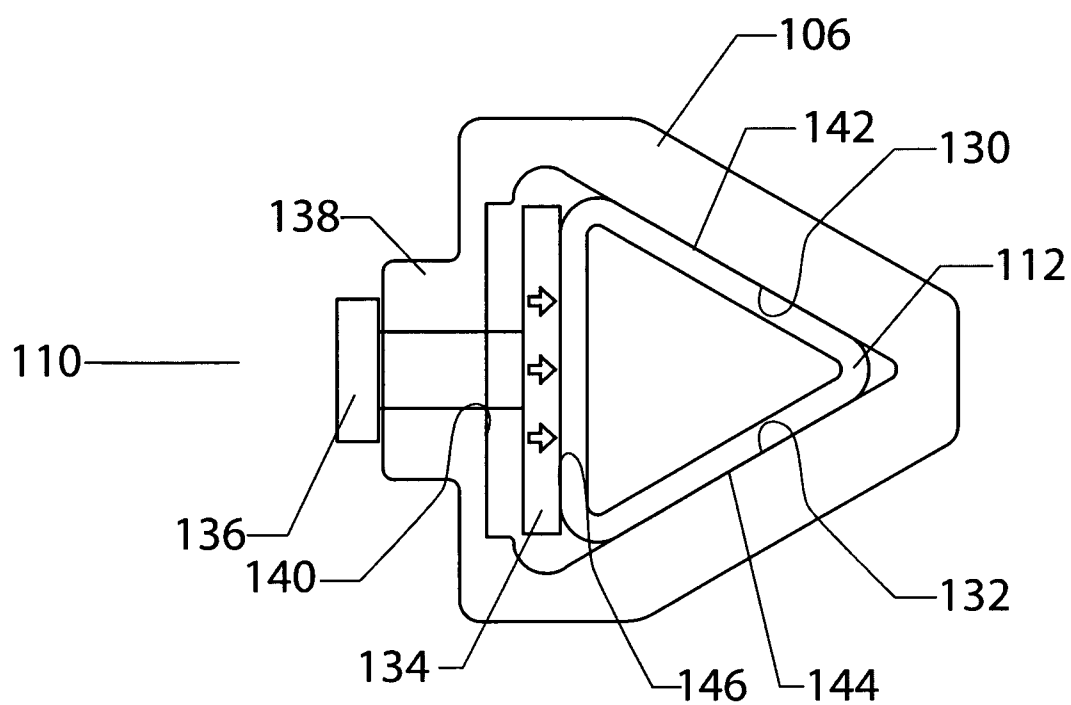


Figure 6.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/002933

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47C1/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/069799 A2 (MULTIPLE LLC D B A SERIES USA [US]; OLARTE ALVARO MAURICIO [US]) 4 August 2005 (2005-08-04) abstract; figures paragraph [0064]	1-2, 4-14, 23-24
A	US 4 790 594 A (TEMOS ULIS J [US]) 13 December 1988 (1988-12-13) abstract; figures	1-24
A	US 2005/146180 A1 (FISHER DAVID J [AU] ET AL FISHER DAVID JOHN [AU] ET AL) 7 July 2005 (2005-07-07) abstract; figures	1-24
A	EP 0 470 036 A1 (FIGUERAS IND SA [ES]) 5 February 1992 (1992-02-05) abstract; figures	1-24

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

25 March 2010

Date of mailing of the international search report

06/04/2010

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2009/002933

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			DE 69106076 T2 03-08-1995
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