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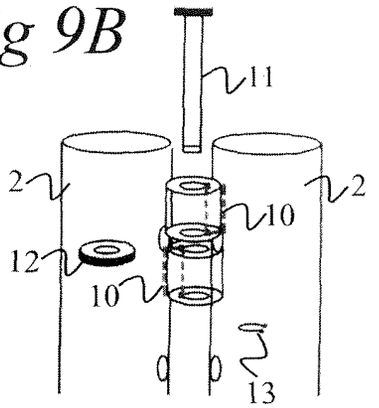
(54) A Screen System

(57) A screen system comprising multiple screen units with peripheral surrounding frames supporting a screening infill. The frames are connected by a hinge formed by bushes (4) which are attached to individual frames (2) by U-shaped spring clips (10). One arm of each clip fits into a hole (4A) in the frame whilst the other arm fits into a groove in the internal surface of the bush. This arrangement allows bushes (4) to be positioned optionally above or below the hole (2A) so that the bushes of adjoining frames (2) are offset longitudinally, allowing a hinge-pin (11) to pass through them. Preferably an additional hole (2C) is provided to attach further bushes associated with a third and possibly a fourth frame.

Fig 9B



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Description

[0001] This invention relates to a screen system comprising multiple screen units which are adapted to be connected in a variety of configurations so as to divide room space in different ways.

[0002] Users of office screen systems require installations of an almost infinite variety of configurations and designs and it is impracticable for stockists to hold a supply of screen meeting every possible customer requirement.

[0003] In one known partitioning system of the type referred to above, each panel is supported at opposite vertical edges by metal tubes to which bushes are welded. To assemble the system, the metal tubes to be joined are presented next to each other and then linked by passing hinge pins through respective bushes. Adjoining panels need to be different in the sense that the bushes on one panel need to be vertically offset relative to those of an adjoining panel so as to allow the pin to pass through both bushes. This doubles the number of panels which need to be stocked and the problem is compounded in situations where three or more panels edges are to be connected together. The inevitable requirement to supply screens having different colours and textures further multiplies the problem.

[0004] Another problem with partitioning structures of this type is that, in the interests of standardisation, all the vertical metal tubes have bushes welded to them.

[0005] Consequently these bushes are present even on those tubes which are not connected to another panel. They usually form projections at about ankle and shoulder height, presenting a significant danger of injury as well as being unsightly.

[0006] This invention was conceived in an endeavour to avoid the aforementiored problems and to design a partition system employing tubular supports which can be of identical construction, thereby providing economy of manufacture and adaptability of use whilst simultaneously avoiding dangerous protrusions.

[0007] The invention provides a screen system comprising multiple screen units each having a peripheral frame and a screening infill supported by the frame characterised in that:

a) the system includes connectors designed to project laterally from the frames at positions so that the connectors of respective adjacent frames are aligned with each other;

b) the system includes linking members serving to link together the aligned connectors of respective frames;

c) the frames are formed with holes and

d) the system includes attachment devices designed to fit into the holes and to attach the connectors to the frames with a clip, hook, snap or spring action.

[0008] Because the connectors are separate from the frames it will be appreciated that they can be attached selectively only to those frames which required to be connected together. Frames at the end of a series of panels forming a partitioning system do not need to be fitted with the connectors and this avoids both unsightliness and the safety problem previously mentioned. Furthermore the invention allows connectors to be fitted to different frames in different longitudinal positions so that the connectors of frames can be correctly aligned to receive the "linking members" referred to.

[0009] It is envisaged that the connectors will normally be bushes and that the "linking members" will be pins designed to pass through the bushes. However, alternative constructions may be possible; for example with pins acting as the aforementioned "connectors" and bushes serving as the "linking members."

[0010] In constructions where bushes are employed as the "connectors", these are preferably shaped to conform to the shape of frames. For example, where the frame is a tube of circular cross-section, the bush will preferably have a concave surface designed to complement the convex outer surface of the tube. This helps to locate it correctly.

[0011] The connectors can be connected to the frames in a wide variety of different ways, the only essential requirement being that it should be possible to attach a connector where required; and not to attach one in situations where it is not required and where it would present a safety hazard. In constructions where the connector is a bush, the connection can be affected using a U-shaped spring clip one arm of which is inserted through one of the holes in the tube or equivalent member whilst the other arm is inserted into the internal bore of the bush. This internal bore is preferably formed with a groove to receive one arm of the spring clip without obstructing passage of the linking pin. In alternative constructions the connector could be formed with an integral clip or spring which fits into the hole.

[0012] The connectors and linking members may beneficially be designed to define a hinge-like arrangement which allows the frames to be positioned at variable angles around a central axis of symmetry. Where the invention is implemented as a partitioning system, this allows the angle between the adjoining panels to be selected during assembly. It also allows a variable number of panels to be joined together at a common location as required.

[0013] The arrangement by which the connectors are attached to the frames, preferably allows each connector to be positioned optionally to one side or the other of the associated hole. In this way the connectors of adjoining members can be positioned in an offset relationship relative to each other, despite identical positioning of the holes, to allow the pins or other linking members to pass through them. In one preferred construction a pair of holes is provided suitably spaced in relation to the size of the bushes or other connectors so that three

or four frames can be connected together at a common point.

[0014] The frame design is preferably such that an infill selected according to customer requirements can be fitted to it by the stockist without the need to stock every configuration of the frame type and infill type.

[0015] Various ways of employing the invention will now be described with reference to the accompanying drawings in which:-

Fig 1 is a front elevation view of a two unit screen system constructed in accordance with the invention;

Fig 2 is a schematic horizontal cross-section through a screen system constructed in accordance with the invention showing a variety of different possible configurations:

Fig 3 is a perspective view of a foot for supporting one leg of a screen unit of the type shown on Fig 1;

Fig 4 is a perspective view of a foot for a joint between a pair of screen units;

Fig 5 is a perspective view of a foot for a joint between three screen units to be arranged to form a "T" or a "Y" shape;

Fig 6 is a perspective view of a foot for a joint between four screen units to be arranged to form an "X" shape

Fig 7 is a perspective view of a foot similar to that of Fig 2 but for use when joining units which are not aligned with each other;

Fig 8 is cross-section through a connecting bush forming part of a connecting device used to link screen units;

Figs 9A and 9B show how connecting bushes like that shown on Fig 7 are used to connect two screen units;

Fig 10 shows how connecting bushes like that shown on Fig 7 are used to connect three screen units; and

Fig 11 shows how connecting bushes like that shown on Fig 7 are used to connect four screen units.

[0016] Referring to Figure 1 there is shown a screen system comprising two identical units 1 each having a tubular metal frame 2 and an infill 3. The units are shown connected together by connectors which clip into holes in the frame as will be described later. The frame has welded flanges 2B which are located on the inside of the inverted "U" shape defined by the frame. The infill 3 is connected by bolts (not shown) to the flanges 2B. The units 1 are supported by feet 5 which will be described in more detail later.

[0017] In this particular embodiment the infill 3 is made from a board which is relatively thin as compared with the panels of traditional screens. This board 3 would not have sufficient strength to support itself in the upright position without the metal frame. Thus, in this structure the panel 3 is supported by the peripheral frame in contrast with former designs where the outer frame or trim was supported by the panel. For this reason, the panel 3 could be replaced by an entirely flexible sheet of fabric or plastics or a thin sheet of perforated or expanded sheet metal etc.

[0018] Referring now to Fig 2 there is shown a schematic plan view of a screen system designed to illustrate the flexibility of the system. It will be seen that, because of the rounded cross-sections of the frames 2 they are able to nest together at various hub points. At point 6 two frames are linked together; at point 7 three are linked in a Y shape, at point 8 three are linked in a T shape; and at point 9 four are linked in an X shape.

[0019] The bottom ends of the screen units are linked and/or supported by special feet 5. Fig 3 shows the simplest form of foot which comprises a base plate 5A to which a short tube 5B is welded. The tube 5B is of a diameter such as to fit snugly inside a tubular frame 2.

[0020] Fig 4 shows a construction similar to Fig 3 but with two tubes for linking two units e.g. at point 6 on Fig 2.

[0021] Fig 5 shows a foot construction for linking three units. It can be used to support units at a variety of different angles eg in the shape of a "Y" as shown at 7 on Fig 2, or in the shape of a "T" as shown at 8.

[0022] The arrangement of Fig 6 is for linking four units eg as shown at hub-point 9 of Fig 2.

[0023] Where a foot is used for linking together two units which are not aligned with each other, the base plate 5 is not needed because the non-linear arrangement itself provides the necessary degree of support. Therefore, at hub points like this, a foot construction such as shown on Fig 7 can be used, where the base plate 5A serves only to join together the tubes 5B and does not extend substantially beyond the perimeter of the tubes.

[0024] At each of the hub points 6, 7, 8 and 9, the screen units are connected, at about shoulder height, by connecting bushes 4. A cross-section through one of these bushes is shown in Fig 8. Its exterior has a concave surface 4A shaped to conform to the convex curvature of the frames 2; whilst an inner bore 4B of the bush has a groove 4C for a purpose which will become apparent later.

[0025] Figs 9 and 9A are detailed views of a connection formed by two bushes 4 attached to their respective tubes 2. Each bush 4 is anchored to an identical hole

2A of its associated tube by U-shaped clips 10 made from spring steel. Each clip 10 has one arm which fits through the hole 2A and extends into the interior of the tube 2 whilst its other arm clips inside the bore 4B of the bush and fits into a recess 4C. Fig 9A shows how, in this way, one bush is clipped below the hole 2A whilst the other bush is similarly held in position above the corresponding hole of the other tube 2. This allows the two tubes to be presented to each other as shown in Fig 9B with the two bushes offset so that their internal bores are co-axial. They can then be connected together by a pin 11. A washer 12 fits between the bushes and the pin 11 is prevented from slipping out by a circlip 13. This arrangement allows the two panels to be positioned at a variety of different angles or in a straight line.

[0026] It is to be noted that, although the clip 10 holds the bush with a spring action against the tube, and although the effect of the curved surface 4A bearing against the curved surface of the tube provides some degree of rotational positioning, the bush can easily be twisted around by hand so as to point upwardly or downwardly as required. Only after the pin 11 has been inserted does the connection become secure.

[0027] Referring now to Fig 10, this shows, in detail, the three-way connection, indicated generally at 7 in Fig 2. This three-way connection is essentially similar to the two-way connection but makes use of a second hole 2C for attachment of a third bush 4 attached to a third panel. The third bush is clipped at a position above the hole 2C. The distance between the holes 2A and 2C is equal to twice the length of a bush plus an allowance for a washer and the thickness of the spring clips. This allows the three bushes associated with respective panels to be offset relative to each other so that they can be aligned axially to receive a pin 11A. This pin 11A needs to be sufficiently long to pass through all three bushes

[0028] Fig 11 is a detailed view of the four-way connection indicated generally at 9 on Fig 2. In this arrangement a fourth bush, associated with a fourth panel is clipped in position below its hole 2C so that all four bushes of respective panels can be aligned with each other with the interposition of washers and connected by a long hinge pin 11 B and circlip.

[0029] Many variations to the illustrated embodiment are possible within the scope of the invention. However, it will be noted that the illustrated construction allows partitioning arrangements with many different variations to be constructed using a relatively small stock of standard frames, infills, connecting bushes and spring clips. Furthermore the vertical tubular components 2 exposed at the free ends of a partition arrangement like that of Fig 2, although formed with holes 2A and 2C (not visible on Fig 1) do not have any projecting bushes or other hinge like elements likely to cause a safety hazard.

Claims

1. A screen system comprising multiple screen units (1) each having a peripheral frame (2) and a screening infill (3) supported by the frame **characterised in that**:

   a) the system includes connectors (4) designed to project laterally from the frames (2) at positions so that the connectors (4) of respective adjacent frames are aligned with each other;
   b) the system includes linking members (11) serving to link together the aligned connectors of respective frames (2);
   c) the frames are formed with holes (2A) and
   d) the system includes attachment devices (10) designed to fit into the holes and to attach the connectors (4) to the frames (2) with a clip, hook, snap or spring action.

2. A system according to claim 1 **characterised in that** the connectors (4) are designed so that a variable number of frames (2) can be connected together by suitable linking members (11).

3. A system according to claim 1 or 2 **characterised in that** the connectors are bushes (4).

4. A system according to claim 3 **characterised in that** the linking members are pins (11) designed to pass through the aligned bushes (4).

5. A system according to claim 3 or 4 **characterised in that** each bush (4) is shaped to conform to the shape of the frame (2).

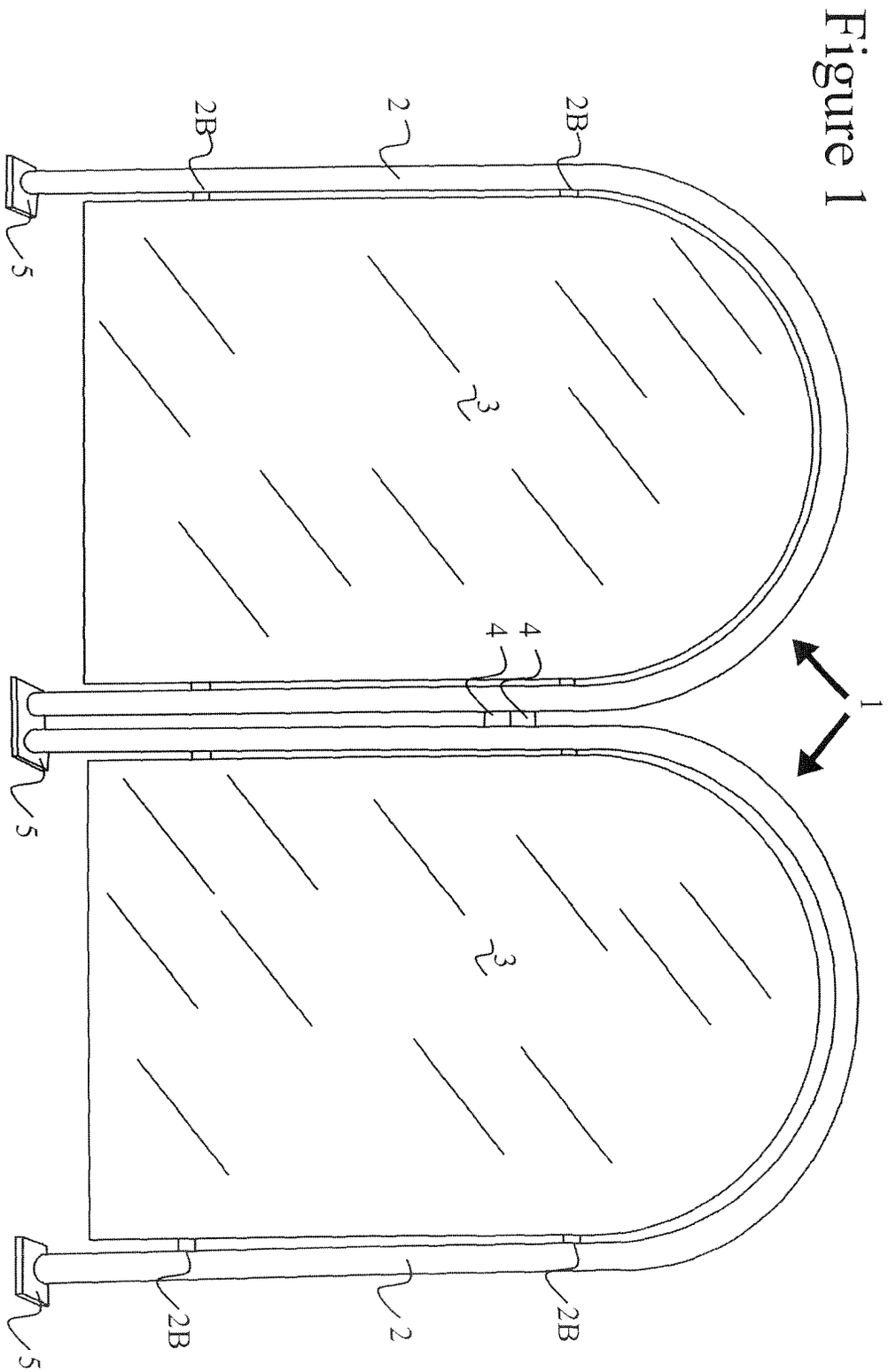
6. A system according to any one of claims 3 to 5 **characterised by** a groove (4C) formed on the inner surface of the bush (4), and in that each attachment device (10) has an arm which fits into the groove (4C).

7. A system according to claim 6 **characterised in that** each attachment device (10) is a U-shaped spring clip

8. A system according to any preceding claim **characterised in that** the connectors (4) and the linking members (11) co-operate to form a hinge, allowing the frames (2) to be positioned variably relative to each other around a longitudinal axis.

9. A system according to any preceding claim **characterised in that** each clipping or hooking device (10) allows a connector (4) to be positioned optionally to one side or the other of a hole (2A) so that the connectors (4) of adjoining frames (2) are offset, allowing alignment with each other.

Figure 1



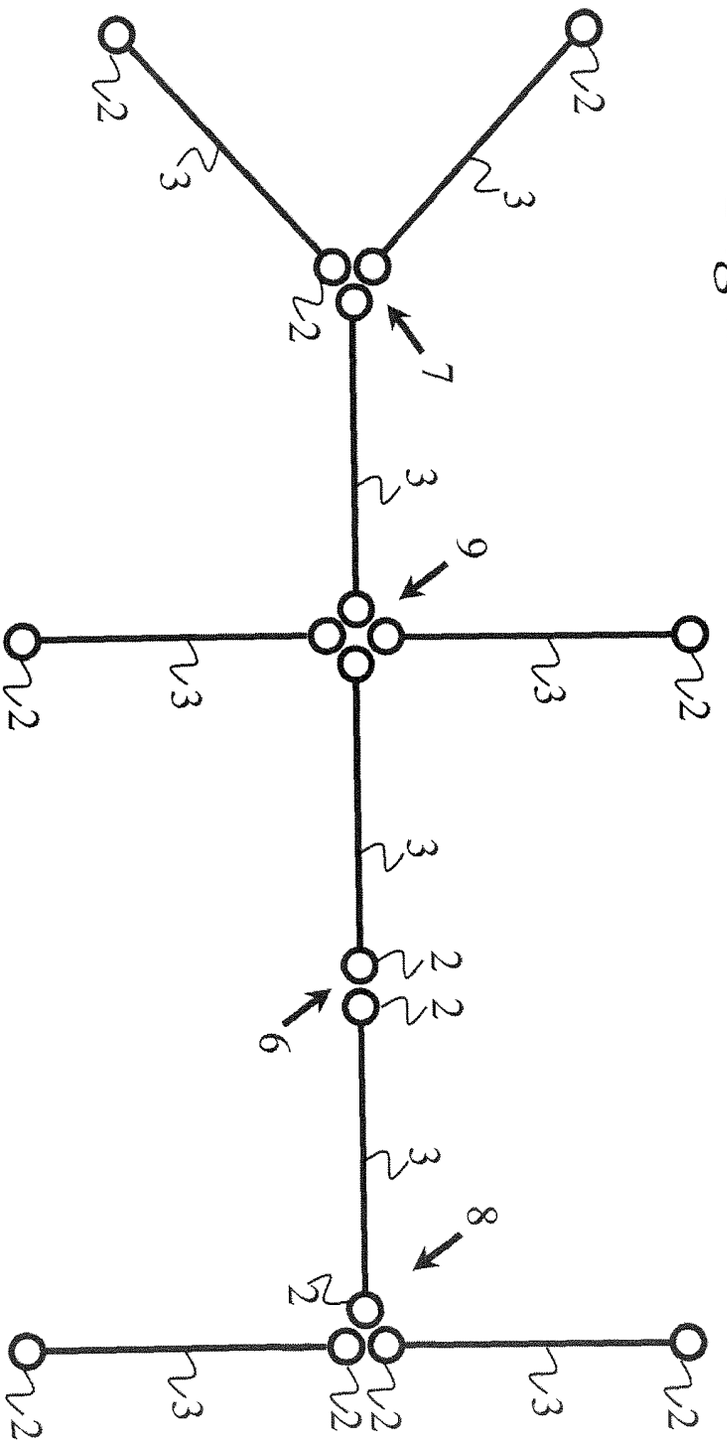


Fig 2

Fig 3

Fig 6

Fig 5

Fig 4

Fig 7

Fig 8

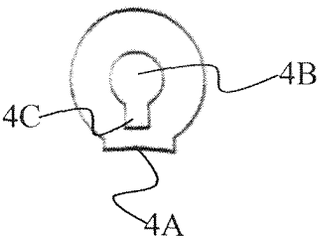


Fig 9A

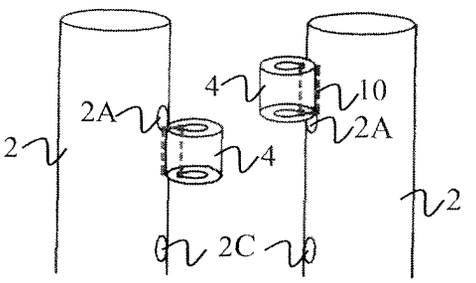


Fig 9B

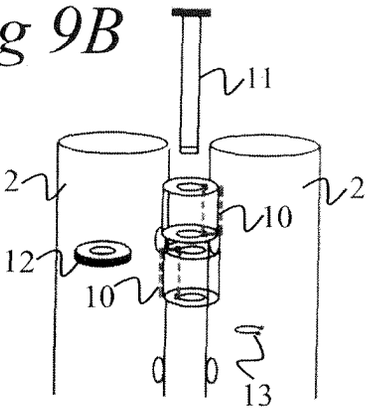


Fig 10

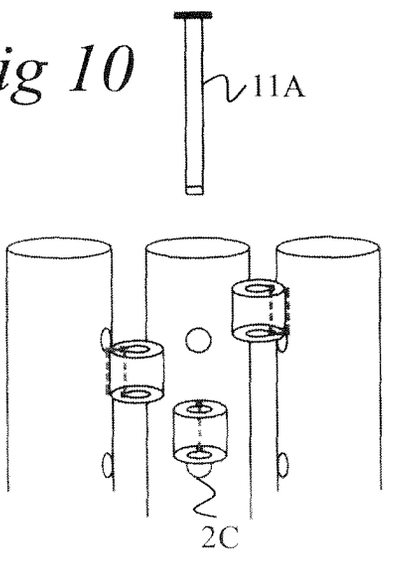
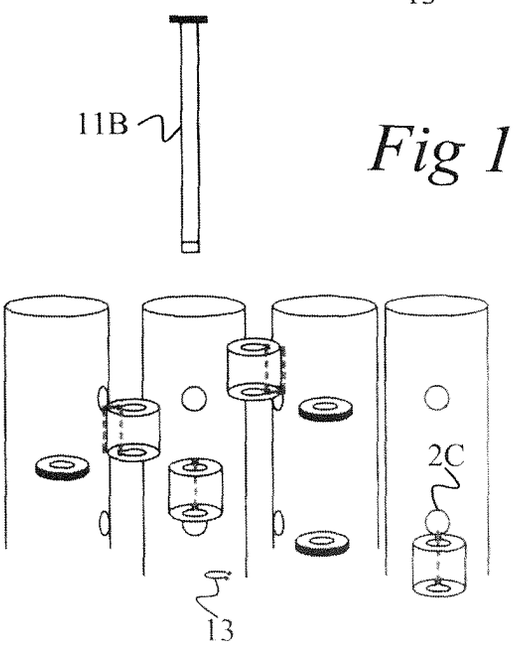


Fig 11



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EUROPEAN SEARCH REPORT

Application Number
EP 04 10 6490

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 28 57 450 A1 (GASSLER,KURT; GASSLER, KURT, 7050 WAIBLINGEN, DE) 21 August 1980 (1980-08-21) * claim 1; figures 21,23 *	1,2,4,5, 8	E04B2/74
X	FR 2 079 731 A (DESIGNERS REPRESENTATIVE) 12 November 1971 (1971-11-12) * figures 1-4 *	1,3,4,8, 9	
X	US 4 637 178 A (NIMMO ET AL) 20 January 1987 (1987-01-20) * figures 1,2,10,9 *	1-3,8	
A	DE 88 15 358 U1 (MEZ AG, 7800 FREIBURG, DE) 26 January 1989 (1989-01-26) * figure 7 *	3	
A	GB 2 286 410 A (MING-FENG * TAI) 16 August 1995 (1995-08-16) * figures 17-19 *		
A	GB 2 245 019 A (RAYMOND * GUTHRIE) 18 December 1991 (1991-12-18) * claim 1; figures 1,2 *		TECHNICAL FIELDS SEARCHED (Int.Cl.7) E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 February 2005	Rosborough, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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08-02-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2857450 A1	21-08-1980	DE 2836504 A1	28-02-1980
FR 2079731 A	12-11-1971	FR 2079731 A5	12-11-1971
US 4637178 A	20-01-1987	GB 2126309 A ,B	21-03-1984
		AT 30619 T	15-11-1987
		AT 50323 T	15-02-1990
		AU 568599 B2	07-01-1988
		AU 1861083 A	08-03-1984
		CA 1264547 A1	23-01-1990
		DE 3374331 D1	10-12-1987
		DE 3381206 D1	15-03-1990
		EP 0104804 A1	04-04-1984
		EP 0213381 A2	11-03-1987
		HK 45589 A	16-06-1989
		HK 65790 A	31-08-1990
		JP 1684202 C	31-07-1992
		JP 3048803 B	25-07-1991
		JP 59065830 A	14-04-1984
		SG 75087 G	04-03-1988
DE 8815358 U1	26-01-1989	NONE	
GB 2286410 A	16-08-1995	NONE	
GB 2245019 A	18-12-1991	NONE	

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