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(54) **Access panel assembly for a false ceiling or firewall**

(57) An access panel (5) for a false ceiling or firewall (1), pivotally connected to a mounting frame (3) defining an access opening in the false ceiling or firewall (1) by a pair of laterally extending pins (13) which during opening and closing of the access panel (5) traverse cam guide slots (12) in the mounting frame (3). The access panel (5) is also connected to the mounting frame (3) by a double axis hinge assembly (11) which forces the pins (13) to traverse the cam guide slots (12) to prevent the front face or edge of the access panel (5) from fouling the supporting framework (3) of the false ceiling or firewall (1) as the access panel (5) pivots about those pins (13), and also prevents yawing of the access panel (5) during its pivotal movement.

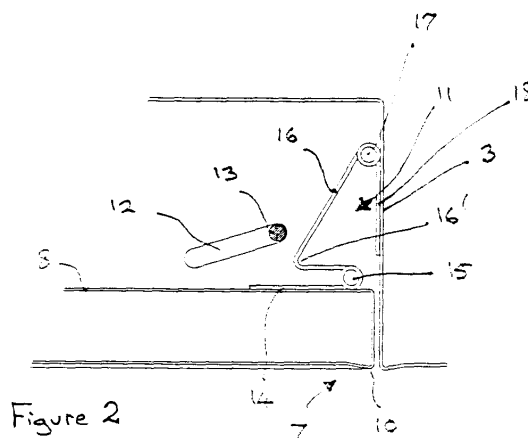


Figure 2

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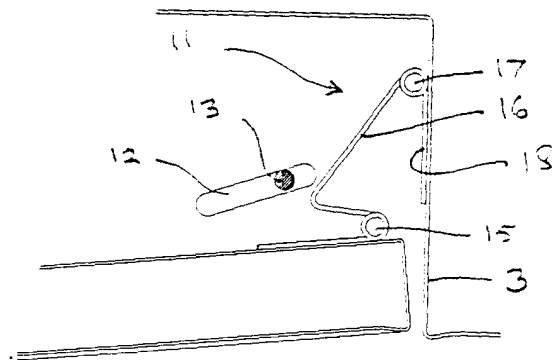


Figure 3

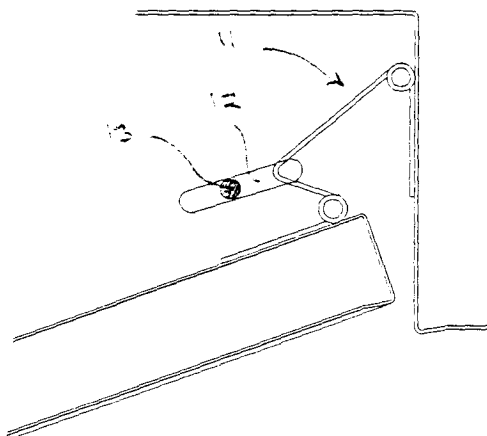


Figure 4

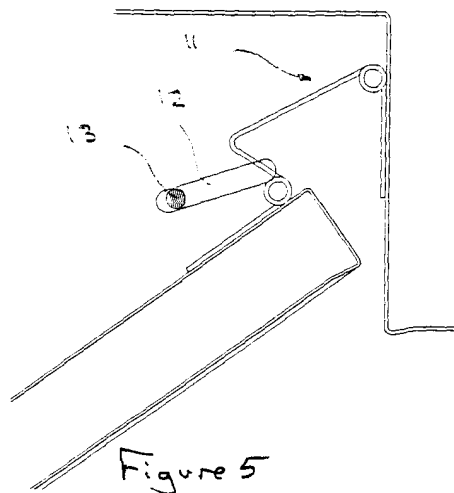


Figure 5

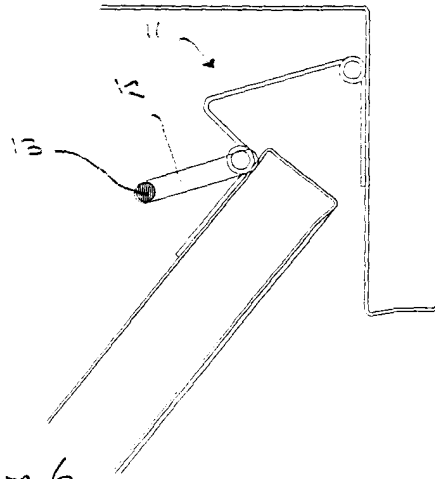


Figure 6

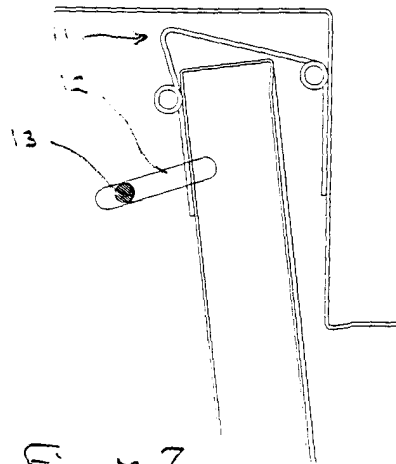


Figure 7

Description

Field of the Invention

[0001] The invention relates to suspended false ceilings or firewalls, and to the mounting of access panels as part of the false ceiling or firewall structure, to allow access to the void space immediately above the false ceiling or immediately behind the firewall. The invention provides a novel hinge arrangement for mounting such access panels, and to the access panels when so mounted.

Background Art

[0002] A suspended false ceiling typically comprises a metal framework suspended beneath the true ceiling, with ceiling panels supported by that framework to present a uniform and level ceiling appearance when viewed from the room below. Access is almost invariably required to the void space above the suspended ceiling, where the main service utilities such as electric cables, water pipes and air ducts are located. The access panels are generally pivotally mounted to the false ceiling framework, and can be lowered to permit access to the void space above the false ceiling. Similarly, in a firewall there is generally a void area behind the firewall where the main service utilities are provided, and access openings are needed to permit access to those utilities.

[0003] In some low-cost installations, the hinge is a simple continuous piano hinge aligned with its hinge axis in the plane of the bottom of the ceiling or in the plane of the exposed face of the firewall, so that as the access panel is opened it pivots around its bottom corner. Such a hinge arrangement is cheap and reliable, but does have the very severe disadvantage that the edge of the hinge is always clearly visible from the room, as a hinge line projecting from the exposed face of the false ceiling or firewall. This is regarded as extremely undesirable, since architects and end users prefer a finished suspended ceiling or firewall which has a completely uniform appearance, with the access panels being as far as possible indistinguishable from the remainder of the suspended ceiling or firewall. Many efforts have been made, therefore, to recess the pivotal axis of the false ceiling or firewall access panel until it is no longer visible from the room. This involves a more complex movement of the access panel than simple pivotal movement as it is opened and closed.

[0004] Our British Patent Specification No 2011519 discloses a false ceiling access panel assembly in which the access panel is mounted on pins positioned well above the plane of the ceiling, which pins traverse a guide slot in a supporting bracket as the panel is raised and lowered. The pin and guide slot arrangement enables the panel to slide as it is pivoted during its lowering, so that the lowermost corner of the access panel does not foul the supporting framework of the ceiling during

lowering. The arrangement is extremely satisfactory for most applications, but does have a disadvantage in that the access panel can be twisted out of true in a yawing motion during opening and closing, if the pins at the opposite sides of the access panel traverse their guide slots to different extents.

[0005] It is an object of the invention to provide an access panel which has a concealed hinge assembly which holds the access panel normal to the pivotal axis during all stages of panel opening and closing, thus avoiding the above twisting (yawing).

[0006] It is a further object of the invention to provide such a hinge assembly which controls the sliding movement of the pivoting edge portion of the access panel, to prevent the fouling of the access opening by that pivoting edge portion.

The Invention

[0007] The invention provides an access panel for allowing access to a void space beyond a false ceiling or firewall, comprising a front face which in use lies flush with the exposed face of the false ceiling or firewall and a rear face displaced from the front face by the thickness of the access panel; and a mounting assembly for mounting the access panel on the false ceiling or firewall for pivotal movement generally about a pair of pins extending from opposite sides of the access panel and adjacent a pivoting edge portion thereof, each pin traversing an associated cam guide slot in the supporting framework of the false ceiling or firewall during the pivotal opening and closing movement of the access panel; wherein the mounting assembly further comprises a double axis hinge comprising a support plate fast to or integral with the rear face of the access panel; a guide plate pivotally connected to the support plate about a first hinge axis coincident with or parallel to the rear face of the access panel; and a mounting plate pivotally connected to the guide plate about a second hinge axis spaced from and parallel to the first hinge axis, the mounting plate being provided with means for connection to an edge of an access opening in the false ceiling or firewall displaced from the exposed face in the direction of the void space beyond; whereby when the access panel is installed in a false ceiling or firewall and is moved between its open and closed conditions, the double axis hinge forces the pins to traverse the cam guide slots to prevent the front face or edge of the access panel from fouling the supporting framework of the false ceiling or firewall as the access panel pivots about those pins, and also prevents yawing of the access panel during its pivotal movement.

[0008] The invention also provides a false ceiling or firewall access panel assembly, in which a false ceiling or firewall access panel according to the invention is mounted to the frame of a false ceiling or firewall to be movable pivotally to open or close an access opening.

[0009] In use, as the access panel is moved from its

closed to its open condition, the guide plate of the hinge assembly holds the access panel square to the frame of the access opening and forces the pins to traverse the cam guide slot to ensure that the bottom corner edge of the access panel moves in a controlled path without swinging into and fouling the corresponding edge of the frame of the access opening.

[0010] The guide plate may be a simple flat plate connecting the two pivotal axes of the double axis hinge, in which case the first hinge axis should be along the rear pivoting edge of the access panel. Advantageously however the guide plate is shaped to allow the first hinge axis to be displaced inwardly from the rear pivoting edge of the access panel. The shaping of the guide plate in this way makes it possible to provide a positive stop to the maximum pivotal opening movement of the access panel by inter-engagement between the guide plate and the rear surface of the access panel. Such a positive stop prevents fouling of the front face of the access panel against the supporting framework of the false ceiling or firewall by movement of the access panel beyond its intended maximum range of opening movement.

Drawings

[0011]

Figure 1 is a perspective view from below of a suspended false ceiling incorporating an access panel according to the invention;

Figures 2 to 7 are vertical sections through one pivoting edge portion of the access panel identified by the broken line circle **A** in Figure 1, but showing the access panel in progressive sequential stages of its opening movement, from fully closed (Figure 2) through partially open (Figures 3 to 6) to fully open (Figure 7); and

Figure 8 is a perspective view from above of that same corner **A** of Figure 1, providing a fuller illustration of the pivot pin, associated guide cam slot and double axis hinge assembly which together control the pivotal movement of the access panel.

[0012] Referring first to Figure 1, there is shown a suspended false ceiling indicated generally as 1 comprising an array of ceiling tiles 2 supported by a suspended grid of supporting rails 3. The suspension of the grid is by any conventional means. For the purpose of illustration only, Figure 1 shows three of the ceiling tiles 2 removed, so as to permit sight of the rails 3 of the grid, and to permit sight of the void space 4 above the false ceiling.

[0013] Also illustrated in Figure 1 is an access panel 5 for allowing access to the void space above the false ceiling. The access panel 5 is shown partially open, and a double-headed arrow 6 illustrates the opening and closing movement of the access panel 5 which is a generally pivotal movement around one pivoting edge portion 7 of the access panel 5. One corner of the pivotal

edge portion 7 is encircled and marked **A**, and it is that corner which is shown in greater detail in Figures 2 to 8.

[0014] Figures 2 to 8 illustrate the pivotal mounting of the access panel 5. The access panel 5 comprises a metal top plate 8 which is the size of the access opening and a bottom face 9 which, when the access panel 5 is closed, lies flush with the remainder of the suspended ceiling 1. Since the terms 'top' and 'bottom' are specific to false ceilings whereas this invention is generic to false ceilings and firewalls, the metal plate 8 will hereafter be referred to as the rear plate 8, and the opposite face 9 will be referred to as the front face 9. It is the front faces of the false ceiling or firewall and of the access panel 5 which are visible from the room.

[0015] As illustrated in Figures 2 to 7, the front face 9 of the access panel 5 is a metal plate. It should be understood however that any suitable cladding may be supported by the access panel 5, typically one or more acoustic tiles. The pivoting edge portion 7 of the access panel 5 has one exposed corner 10 which must be protected by preventing it from fouling the corresponding edge of the frame 3 of the access opening. This is achieved according to the invention by means of a double axis hinge assembly 11 in association with pins 13 received in associated cam guide slots 12 which will be described in greater detail below.

[0016] The double axis hinge assembly 11 comprises a support plate 14 which in use is secured to the rear face of the metal plate 8, for example by spot-welding, by bolts or by rivets. The support plate 14 defines a first hinge axis 15 which in use is parallel to and in this embodiment displaced slightly inwardly from the exposed corner 10 of the pivoting edge portion 7 of the access panel 5 when the access panel 5 is in its closed condition. Hinged to the support plate and thus to the top face of the access panel along that pivoting edge portion 7 is a guide plate 16 which is kinked or angled as illustrated by means of a longitudinal fold 16' parallel to the first hinge axis 15. The reason for this shaping of the guide plate 16 will become apparent later. The longitudinal edge of the guide plate 16 remote from the first hinge axis 15 defines a second hinge axis 17 spaced from and parallel to the first hinge axis 15. A mounting plate 18 is hinged to the guide plate 16 about the second hinge axis 17. The mounting plate 18 is secured fast to the supporting rail 3 which defines one edge of the access opening, for example by spot welding, by bolts or by rivets (not shown).

[0017] The double axis hinge 11 is preferably a continuous hinge extending substantially the entire width of the access panel 5. Alternatively however a linear array of two or more discrete hinges 11 could be provided, spaced apart along the width of the access panel 5, provided that their respective hinge axes 15 and 17 are in mutual alignment. At opposite ends of the hinge 11 or of the array of hinges 11 are mounting brackets 19 as shown in Figure 8, each of which carries a laterally projecting pin 13 about which pivotal movement of the ac-

cess panel 5 takes place during opening and closing. The pins 13 are received in cam guide slots 12 formed as illustrated in the side walls 3 of the access opening or in plates (not illustrated) secured to those side walls 3. The cam guide slots 12 are enclosed slots in which the pins 13 move, and the shape of the slots is variable. Preferably the slots 12 are inclined downwardly in the general direction from the pivoting edge portion 7 towards the opening edge of the access panel 5 as shown, so that the weight of the access panel assists in moving the pins 13 along and down the slots 12 as the panel 5 is moved from the closed to the open condition (see Figures 2 to 7). The slots 12 may be linear as shown or non-linear. What is most important about the shapes of the slots 12 is that they must extend away from the pivoting edge portion 7 of the access panel 5 and away from the exposed corner 10, so that as the panel is moved from a closed condition (Figure 2)) to an open condition (Figure 7) the pins 13 move laterally in the slots 12 and draw the pivoting edge portion 7 of the access panel 5 away from the corresponding edge of the access opening. The front face or exposed corner 10 of the access panel 5 thus does not foul the supporting framework 3 of the false ceiling.

[0018] The mounting brackets 19 are retained by screws 20 received in the rear face of the access panel 5, with slots 21 allowing adjustment in the direction of the double-headed arrow **B** to permit assembly.

[0019] The double axis hinge 11 forces the pins 13 to perform the necessary traverse of the slots 12, and also prevents yawing of the access panel 5. Figures 2 to 7 illustrate the sequential stages of movement. Pivotal movement of the panel 5 at all stages is about the pins 13, but as the panel pivots the pins 13 are forced to move longitudinally along the slots 12. The maximum traverse of the pins 13 down or along the slots 12 is when the axis of the pins 13, the first hinge axis 15 and the second hinge axis 17 are in a straight line (at the stage of opening shortly after that of Figure 6) and after that the pins move slightly back along the slots 12.

[0020] When the access panel 5 hangs freely under gravity, its centre of gravity lies directly beneath the pins 13. It can however be pushed further, to the position shown in Figure 7 for example, at which stage contact between an edge wall 20 of the access panel and the guide plate 16 defines a stop position for panel movement and protects the front of the panel from damage by the supporting framework of the false ceiling. Alternatively that stop position could be defined by contact between the rear face of the panel 5 and the short portion of the guide plate 16 beneath the longitudinal fold 16' as shown in Figure 7.

[0021] Because the cam tracks 12 are enclosed double-sided slots, the panel closing movement is controlled in an entirely analogous manner.

Claims

1. An access panel (5) for allowing access to a void space (4) beyond a false ceiling or firewall (1), comprising a front face which in use lies flush with the exposed face of the false ceiling or firewall and a rear face displaced from the front face by the thickness of the access panel; and a mounting assembly for mounting the access panel on the false ceiling or firewall for pivotal movement generally about a pair of pins (13) extending from opposite sides of the access panel (5) and adjacent a pivoting edge portion (7) thereof, each pin (13) traversing an associated cam guide (13) slot in the supporting framework (3) of the false ceiling or firewall (1) during the pivotal opening and closing movement of the access panel (5);

characterized in that the mounting assembly further comprises a double axis hinge (11) comprising

a support plate (14) fast to or integral with the rear face of the access panel (5);

a guide plate (16) pivotally connected to the support plate (14) about a first hinge axis (15) coincident with or parallel to the rear face of the access panel (5); and

a mounting plate (18) pivotally connected to the guide plate (16) about a second hinge axis (17) spaced from and parallel to the first hinge axis (15), the mounting plate (18) being provided with means for connection to an edge (3) of an access opening in the false ceiling or firewall (1) displaced from the exposed face in the direction of the void space (4) beyond;

whereby when the access panel (5) is installed in a false ceiling or firewall (1) and is moved between its open and closed conditions, the double axis hinge (11) forces the pins (13) to traverse the cam guide slots (12) to prevent the front face or edge of the access panel (5) from fouling the supporting framework (3) of the false ceiling or firewall (1) as the access panel (5) pivots about those pins (13), and also prevents yawing of the access panel (5) during its pivotal movement.

2. An access panel according to claim 1, wherein the pins (13) project one from each side edge of the access panel (5) in the general region of the pivoting edge portion (7) of the access panel (5) but displaced slightly from both the rear face and the pivoting edge.
3. An access panel according to claim 2, wherein each cam guide slot (12) is a slot formed in the supporting

framework (3) of the false ceiling or firewall (1).

4. An access panel according to claim 1 or claim 2, wherein each cam guide slot (12) comprises a plate with a cam slot (12) formed therein. 5
5. An access panel according to claim 6, wherein each cam guide slot (12) has one end which in use is closer to the pivoting edge portion (7) of the access panel (5) than the other end, the said one end receiving the associated cam follower pin (13) when the access panel (5) is in its closed condition. 10
6. An access panel according to any preceding claim, wherein the access panel (5) comprises a shallow steel tray which in use receives one or more wall or ceiling tiles, the tiles providing the front face of the access panel and the steel tray surface providing the rear face. 15
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7. An access panel according to any preceding claim, wherein the double axis hinge assembly (11) extends continuously over substantially the complete width of the access panel (5). 25
8. A false ceiling or firewall (1) having an access opening that is filled by an access panel (5) according to any preceding claim, with the mounting plate (18) of the double axis hinge assembly (18) being secured to the edge of the access opening with its second hinge axis (17) displaced from the exposed face of the false ceiling or firewall (1) by a distance which brings the front face of the closed access panel (5) precisely into alignment with the exposed face of the false ceiling or firewall (1). 30
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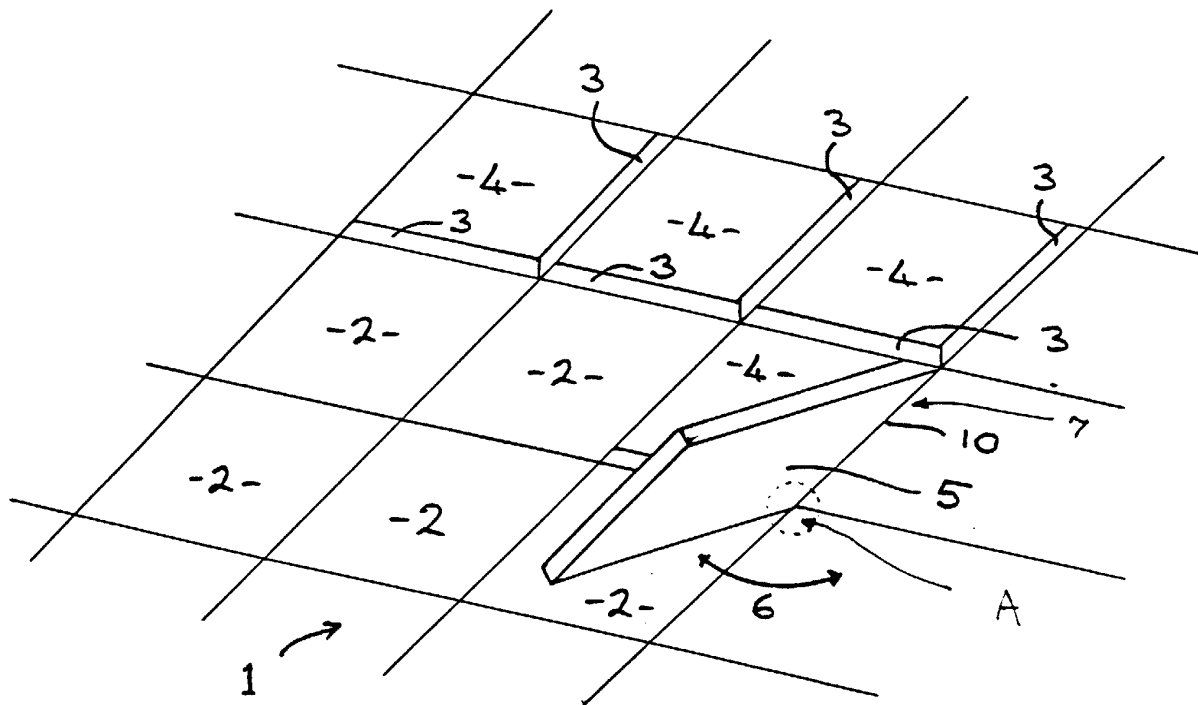
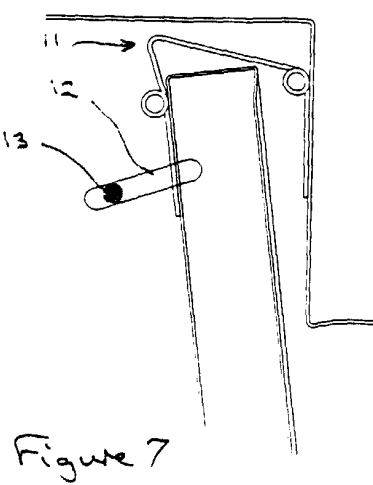
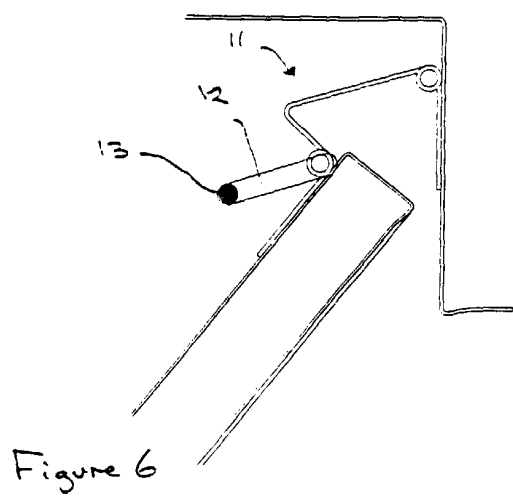
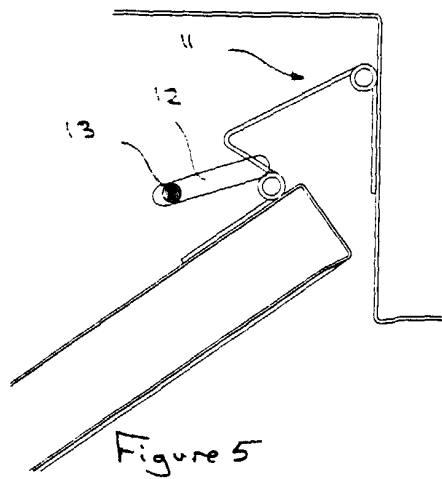
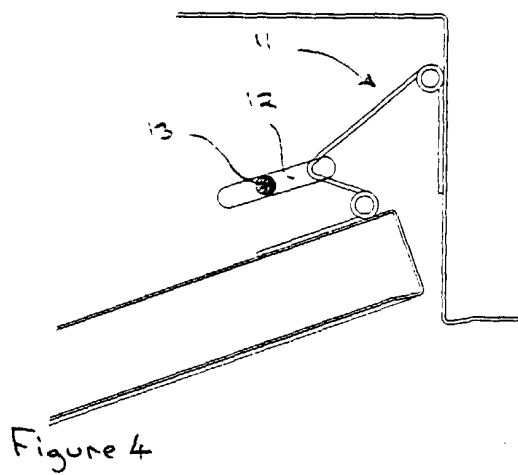
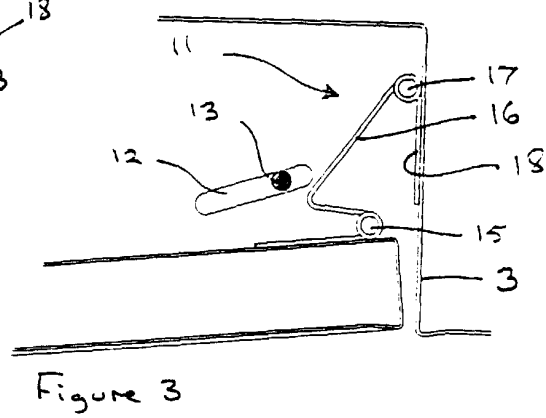
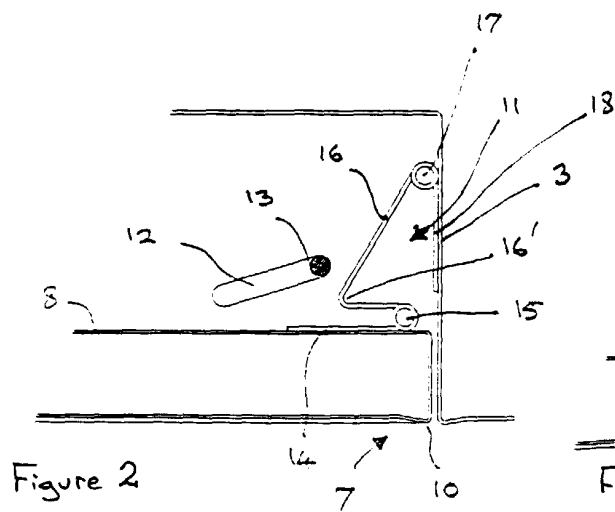


Figure 1



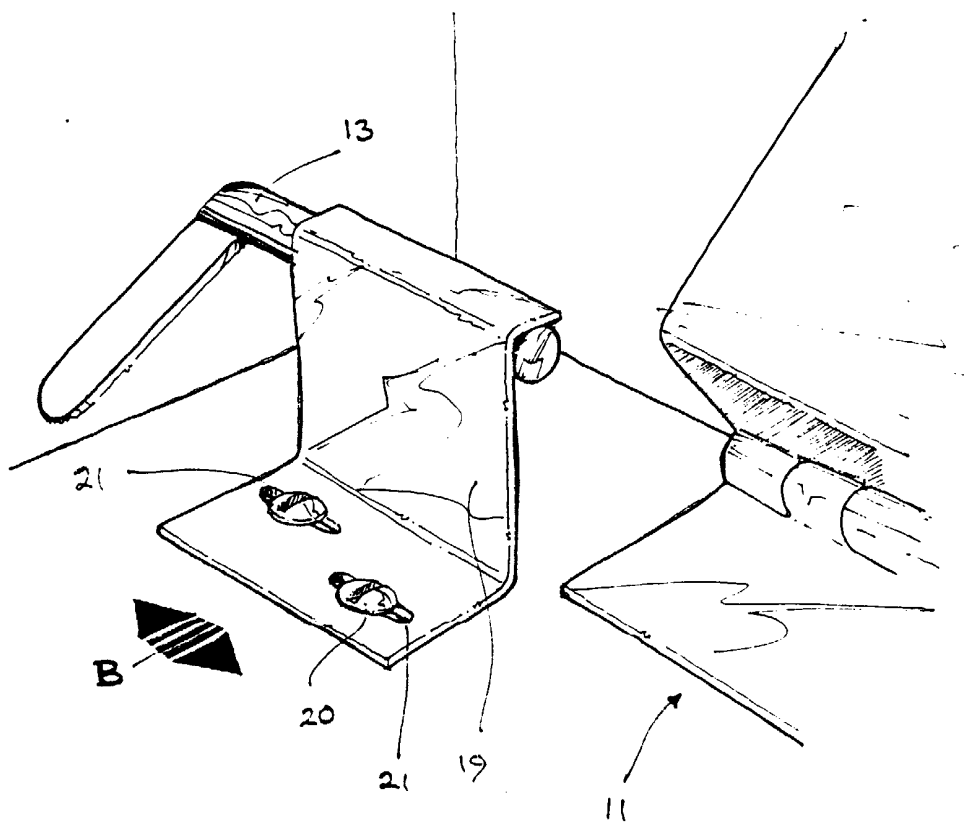


Figure 8



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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 5566

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)
Y	FR 2 397 509 A (BOSCH-SIEMENS) 9 February 1979 (1979-02-09)	1	E04B9/00 E05D3/06
A	* page 5, line 16 - page 8; figures * ---	2-8	
Y	GB 2 209 558 A (UNIVERSAL PANELS) 17 May 1989 (1989-05-17) * abstract; figures *	1	
A	US 2 102 291 A (SOSS) 14 December 1937 (1937-12-14) * the whole document *	1,4	
A	WO 94 13899 A (FLEERACKERS) 23 June 1994 (1994-06-23) * abstract; figures *	1	
A	US 4 593 493 A (NAKA ET AL.) 10 June 1986 (1986-06-10) * abstract; figures *	1	
A	US 4 486 919 A (SHOENKE) 11 December 1984 (1984-12-11) * abstract; figures *	1,7	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 29 15 385 B (ZIERINGER MBH) 10 July 1980 (1980-07-10) * figures *	1,6	E04B E05D
A	DE 32 10 589 A (ROTH) 6 October 1983 (1983-10-06) * abstract; figures *	1,6	
A	EP 0 448 846 A (HUNTER-DOUGLAS) 2 October 1991 (1991-10-02) * abstract; figures * -----	1-6	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 October 1999	Examiner Righetti, R
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 5566

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18-10-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2397509 A	09-02-1979	DE 2731608 A CH 631231 A IT 1097021 B	25-01-1979 30-07-1982 26-08-1985
GB 2209558 A	17-05-1989	NONE	
US 2102291 A	14-12-1937	NONE	
WO 9413899 A	23-06-1994	DE 69322098 D DE 69322098 T EP 0674737 A	17-12-1998 01-04-1999 04-10-1995
US 4593493 A	10-06-1986	JP 1631688 C JP 2061586 B JP 60005964 A	26-12-1991 20-12-1990 12-01-1985
US 4486919 A	11-12-1984	NONE	
DE 2915385 B	10-07-1980	NONE	
DE 3210589 A	06-10-1983	NONE	
EP 448846 A	02-10-1991	DE 9005977 U	09-08-1990

EPO FORM P0459

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