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(71) Applicant: **GLYNWED FOUNDRY PRODUCTS LIMITED**
Risca, Gwent NP1 6YL (GB)

(72) Inventor: **Thompson, Keith**
Shropshire TF11 8HZ (GB)

(74) Representative: **Lucking, David John**
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
80801 München (DE)

(54) **Cover and frame assembly**

(57) A cover and frame assembly e.g. being so called roadway furniture, is provided wherein the frame (11) comprises a pair of end frame members (14,15) and a pair of side frame members (12,13; 12,17a, 17a,17b, 17b,13) which together provide an opening (16;16a-16c), the side members (12,13; 12,17a, 17a,17b, 17b,13) each comprising an inwardly extending formation (44,56) which provides an upwardly presented running surface (44a,56a) which extends between the end frame members (13,14) and includes a surface part (46,57) providing a recess (46a,57a) in the running surface (44a,56a), and the cover (21) having a pair of depending walls (71) which in use extend alongside the side frame members (12,13;12,17a, 17a,17b, 17b,13)

and which each comprise an outwardly extending formation (72) which provides a generally downwardly extending surface part (72a) which is received in a recess (46a,57a) of a corresponding running surface (44a,56a) of the adjacent side member (12,13;12,17a, 17a,17b, 17b,13) when the cover (21) is received in the frame (11), the arrangement being such that the cover (21) may be raised at one end and moved across the opening (16;16a-16c) such that the downwardly extending surface parts (72a) of the cover (21) ride up the respective surface parts (46,57) of the recesses (46a,57a) of the side frame members (12,13;12,17a, 17a,17b, 17b,13) and slide along the respective running surfaces (44a,56a) of the side frame members (12,13;12,17a, 17a,17b, 17b,13).

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Description

This invention relates to cover and frame assembly and more particularly but not exclusively to a cover and frame assembly being so called roadway furniture, which is adapted to close an access opening in a pavement, roadway or other ground surface, such as a man-hole or pit in the ground.

The cover may comprise a solid cover or may be a grating being a cover with openings provided therein for the drainage of water.

According to one aspect of the invention we provide a cover and frame assembly wherein the frame comprises a pair of end frame members and a pair of side frame members which together provide an opening, the side frame members each comprising an inwardly extending formation which provides an upwardly presented running surface which extends between the end frame members and includes a surface part providing a recess in the running surface, and the cover having a pair of depending walls which in use extend alongside the side frame members and which each comprise an outwardly extending formation which provides a generally downwardly extending surface part which is received in a recess of a corresponding running surface of the adjacent side member when the cover is received in the frame, the arrangement being such that the cover may be raised at one end and moved across the opening such that the downwardly extending surface parts of the cover ride up the respective surface parts of the recesses of the side frame members and slide along the respective running surfaces of the side frame members.

By virtue of the provision of such downwardly extending surface parts on the cover, and the running surfaces of the frame, it has been found that the cover can be slid from its frame more easily than with conventional slide-out arrangements. The arrangement is particularly suited to high load applications where the cover needs to be particularly heavy and it is not practical to lift the cover from the frame.

According to a second aspect of the invention we provide a cover for an assembly of the first aspect of the invention.

According to a third aspect of the invention we provide a frame for an assembly of the first aspect of the invention.

The invention has particularly, but not exclusively been developed for high load applications, such as air-fields.

The invention will now be described with reference to the accompanying drawings in which:

FIGURE 1 is a plan view of a frame of a cover and frame assembly in accordance with the invention.

FIGURE 2 is a plan view of a cover part for use with the frame of Figure 1.

FIGURE 2a is a side view of the cover part of Figure 2.

FIGURE 2b is an end view of the cover part of Figure 2.

FIGURE 3 is a front view of an end frame element of the frame of Figure 1.

FIGURE 3a is a view of the element of figure 3 taken on the line A.

FIGURE 3b is a cross sectional view taken on the lines B-B of Figure 3.

FIGURE 3d is a plan view of the end frame element of Figure 3.

FIGURE 4 is a side view of a main side frame member of the frame of Figure 1.

FIGURE 4a is a plan view of the main side frame member of Figure 4.

FIGURE 4b is a cross sectional view taken on the lines F-F of Figure 4a.

FIGURE 4c is cross sectional view taken on the lines G-G of Figure 4a.

FIGURE 5 is a side view of a dividing member of the frame of Figure 1.

FIGURE 5a is a plan view of the member of Figure 5.

FIGURE 5b is a cross sectional view taken on the lines H-H of figure 5a.

FIGURE 5c is a cross sectional view taken on lines C-C of Figure 5a. Referring to the drawings a cover and frame assembly comprises a frame 11 which includes a pair of main side frame members 12 and 13 and a pair of end frame members 14 and 15 which members 12 to 15 together provide, in this example a substantially rectangular, access opening 16 which is divided into three opening areas 16a, 16b and 16c each of substantially identical dimension and size, by means of a pair of dividing side frame members 17a and 17b.

The end frame members 14 and 15 each comprise three end frame elements 18, 19 and 20 which are connected together as hereinafter described so as to provide an end frame member 14, 15 of requisite length. The end frame elements 18, 19, 20, are each of substantially identical configuration and dimension.

In Figures 2, 2a and 2b there is shown a cover part 21 adapted to close one e.g. 16a of the three opening areas 16a, 16b and 16c of the access opening 16. Cover part 21 thus provides one cover part of a three part cover which completely closes the access opening 16. Other cover parts to close opening areas 16b and 16c may be identical.

Referring to Figures 3 to 3d, end frame element 19 is shown in isolation. End frame element 19 comprises a pair of side flanges 25 one at each end of an end wall 26. At the base of the end wall 26, interconnecting the flanges 25, there is provided a base flange 27 which is substantially perpendicular to the end wall 26.

Each of the side flanges 25 has provided therein a pair of openings 29 by means of which fasteners can be used to connect together end frame element 19 with adjacent end frame elements 18 and 20 to form an end

frame member 14, 15.

Extending inwardly of the access opening 16, from the end wall 26 of each of the end frame elements 19, is a flange 30 which comprises in this example, a pair of seating formations 32 each comprising a pair of downwardly converging walls 32a, 32b which formations 32 each receive a seating 75 provided on one of the cover parts 21, as hereinafter described.

The flange 30 also provides a pair of parts 35 of seating formations, one at each end of the end frame element 19.

When end frame element 19 is connected to end frame elements 18 and 20 by means of bolts passing through the openings 29, complete seating formations will be formed by the seating formation parts 35 of adjacent end frame elements as indicated at 35a in figure 1. The seating formations 35a formed by the parts 35 also each comprise a pair of converging walls 36 and 37 which are adapted to receive seatings 40 provided on the extreme ends of dividing members 17a, 17b. The dividing members 17a, 17b, each have seatings 40 (see figures 5 to 5c) of corresponding configuration to the complete seating formations 35a formed by the parts 35 provided by adjacent end frame elements 18-20. Thus the dividing members 17a and 17b can removably be connected in the frame 11 so as to extend between the end frame members 14, 15, as shown in figure 1 to divide the access opening 16 into the three opening areas 16a, 16b, 16c.

Each dividing member 17a, 17b, comprises a pair of surfaces 41, 42, either side of an upstanding rib 43, which surfaces 41 and 42 extend for substantially the full length of the dividing member 17a, 17b, between the end frame elements 18 to 20 beneath respective cover parts 21 which may or may not seat on the surfaces 41, 42. Extending sideways from beneath the surfaces 41 and 42, to either side thereof are downwardly extending formations 44 which each comprises, as seen in figure 5, an upwardly presented running surface 44a. Each running surface 44a includes a recess 46a provided by a curved surface part 46 for a purpose hereinafter explained.

The main side frame members 12 and 13 are shown in figures 4a to 4d and each comprise a side wall 50 having at a base thereof, a flange 51 to give the main side frame members 12, 13, rigidity. The main side frame members 12, 13, each comprise a pair of openings 52 corresponding in position to the openings 29 provided in the side flanges 25 of the end frame elements 18-20. Thus the end frame elements 18-20 can be connected to their corresponding main side frame members 12 and 13 by means of further bolts. The openings 52 are provided in a flange 53 which is a continuation of the side wall 50.

Extending inwardly of the access opening 16 from the side walls 50 of the main side frame members 12 and 13, are seating formations 55 which are adapted to extend beneath the edges of the cover parts 21 of the

assembly and on which the cover parts may or may not seat.

Extending further inwardly of the access opening 16 are further inwardly extending formations 56 which each comprises an upwardly presented running surface 56a. Each running surface 56a includes a recess 57a provided by a curved surface part 57 substantially identical in configuration to the curved surface parts 46 provided on the dividing members 17a and 17b.

The main side frame members 12 and 13 include triangular fillet strengthening ribs 60 towards either end of the end frame member 12, 13, again for rigidity.

Referring now to figures 2, 2a and 2b, there is shown a cover part 21 comprising in this example, a generally solid cover part top surface 70 from which depend a pair of parallel cover part walls 71. The walls 71 in this example extend for substantially the full length of the cover part 21 between the end frame members 14 and 15 and add significant rigidity to the top cover part surface 70.

Extending outwardly from each of the walls 71, there are provided a pair of outwardly extending formations 72 which each includes a curved surface part 72a corresponding in position and to the configurations of the curved surfaces 46 and 57 of the dividing members 17a, 17b and the main side frame members 12 and 13 respectively.

At each end of the cover part 21, there is provided a pair of seatings 75 which each comprise a pair of downwardly converging walls 75a, 75b which are adapted to seat in corresponding seating formations 32 of the respective end frame member elements 18, 19 or 20.

It can be seen that the top cover part surface 70 extends both outwardly sideways beyond the curved surface seatings 72, and beyond the seatings 75 at the end of the cover part 21 and that the thickness t of the top cover surface part 70, corresponds generally to the height of the step between formations 55 which extend beneath the edges of the cover part 21 and the top surfaces of the main side frame members 12 and 13, which is also substantially the distance between the top surface of upstanding rib 43 and the surfaces 41 of the dividing members 17a, 17b which extend beneath the edges of the inner part and the step between the top of the end frame elements 18 to 20 and surfaces 38 provided thereon which also extend beneath the edges of the cover part 21.

Hence the cover part 21 may be received into any of the opening areas 16a, 16b, 16c of the access opening 16 substantially to close the respective opening area, with the outwardly extending formations 72 of the cover part 21 received in recesses 46 and 57 as appropriate, and the seatings 75 received in seat formations 32 of the respective end frame elements 18-20.

Preferably when the cover part 21 is received in the frame 11, the curved surface parts 72a of the cover part 21 are maintained out of engagement with the respective curved parts 46, 57 of the recesses 46a, 57a, but the curved surfaces come into engagement as the cover

part 21 is slid from the frame 11 as hereinafter described.

It can be seen that in the underside of the lip of the cover part top surface 70 which extends outwardly beyond the respective seatings 72 and 75, there is provided a groove 80 which thus extends around substantially the entire periphery of the underside of the cover part 21. The groove 80 may be provided with a suitable sealing member such as a neoprene seal or alternatively sealing between the cover part 21 and the formations 55, and surfaces 41 and 38 of the frame 11 may be achieved by some other means.

If desired, the cover part 21 may be bolted down relative to the frame 11 by means of inter-engaging fastening means, but generally, particularly where the cover part 21 is heavy, the weight of the cover part 21 will be sufficient to maintain it in position, and sufficiently to compress a sealing member in groove 80 when provided.

When it is desired to remove the cover part 21 from the frame 11, the cover part 21 is raised at one end. To achieve this, if desired a prising tool may be inserted between the cover top surface 70 and an end wall 26 of an appropriate end frame element 18-20.

As the cover part 21 is raised at one end, and moved across the respective opening area 16a, 16b, 16c, e.g. by pulling, the curved surface parts 72a of the outwardly extending formations 72 of the cover part 21 will be brought into engagement with corresponding curved surface parts 46a, 57a of the recesses 46 and 57 provided respectively by the adjacent dividing member 17a, 17b and main side frame member 12, 13. Thus, the outwardly extending formations 72 of the cover part 21 will ride up the respective recesses 46, 57 and run along the respective running surfaces 44a, 55a provided by the respective inwardly extending formations 44 and 56 to facilitate removal of the cover part 21 from the frame by sliding.

It will be appreciated that in the present example, three cover parts 21 are required completely to close the access opening 16, but in another example where dividing members 17a, 17b are not provided the cover may be provided by a single cover part to close access opening 16. Where the frame 11 is longer than that shown, and comprising more than three modular end frame elements 18-20, more than three cover parts 21 may be provided completely to close the access opening 16.

In any event, the frame may comprise no dividing members, or one or more than two dividing members to divide the access opening 16 into individual opening areas 16a to 16c.

Where no dividing member is provided, it will be appreciated that a single cover part 21 may comprise the cover and that outwardly extending formations of the cover may co-operate with corresponding recesses of the two opposite main side members 12 and 13. Where one or more dividing members such as shown at 17a

and 17b are provided, each such dividing member may in effect provide a side frame member for each of a pair of cover parts such as cover parts 21, located in opening areas to either side of the dividing member.

Although in the present example, the fasteners which interconnect the end frame elements 18-20 and the main side members 12, 13, to the respective end frame elements 18, 20, are bolts, other kinds of fasteners which interconnect the end frame elements 18-20 together and with respective side frame members 12-13, may be provided or other fastening means altogether. If desired, at least the side frame members 12-13 may have integral threaded studs adapted to co-operate with the first 18 or second 20 in the line of the end frame elements 18-20.

The or each of the dividing members 17a and 17b where provided, need not be of the configuration described, although preferably seatings 40 such as those described are provided to enable the dividing elements 17a and 17b removably to be attached to the end frame members 14, 15 of the frame 11 to provide a substantially rock free seating for the dividing members 17a and 17b in the frame 11.

Although it is preferred for two adjacent end frame elements 18 and 19 for example each to provide part of a seat formation 35a to receive a seating 40 of a dividing member 17a, 17b, other configurations are no doubt possible, for example, the end frame members 14, 15 need not be modular as described.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A cover and frame assembly characterised in that the frame (11) comprises a pair of end frame members (14, 15) and a pair of side frame members (12, 13; 12, 17a; 12, 17b; 17b, 13) which together provide an opening (16b; 16a - 16c, the side frame members each comprising an inwardly extending formation (44, 56) which provides an upwardly presented running surface (44a, 56a which extends between the end frame members (13, 14) and includes a surface part (46, 57) providing a recess (46a, 57a) in the running surface (44a, 56a), and the cover (41) having a pair of depending walls (71) which in use extend alongside the side frame members (12, 13; 12, 17a, 12, 17b; 17b, 13) and which each comprise an outwardly extending formation (72) which provides a generally downwardly extending surface part (72a) which is received in a recess (46a 57a)

of a corresponding running surface (44a, 56a) of the adjacent side member when the cover (21) is received in the frame (11), the arrangement being such that the cover (21) may be raised at one end and moved across the opening (16, 16a- 16c) such that the downwardly extending surface parts (72a) of the cover ride (41) up the respective surface parts (46a, 57a) of the recesses of the side frame members and slide along the respective running surfaces (44a, 56a) of the side frame members.

2. An assembly according to claim 1 characterised in that the frame includes a pair of main side frame members (12, 13) which together with the end frame members (14, 15) provide a structural frame unit which affords an access opening, and a side frame member comprising a removable dividing member (17a, 17b) which divides the access opening (16) into individual opening areas (16a, 16b, 16c), the cover (41) comprising at least two cover parts which are each received in a respective opening area (16a, 16b, 16c) and the dividing side frame (17a, 17b) member comprising a formation (44) which extends inwardly into each of the opening areas (16a, 16b, 16c) to either side thereof, to provide a running surface (44a) with a recess for each cover part to either side of the dividing member (17a, 17b).

3. An assembly according to any one of the preceding claims wherein each recess (46a, 57a) of each running surface (44a, 56a) comprises a curved surface part and the cover (21) or each cover part has a respective corresponding curved downwardly extending surface part (72a) for each.

4. An assembly according to any one of the preceding claims characterised in that a pair of recesses (46a, 57a) are provided along each running surface (44a, 56a) and the cover (46) or each cover part has a corresponding downwardly extending surface part (72a) for each, and a recess (46a, 57a) is provided towards each end of each side frame (12, 13; 12, 17a, 17a, 17b; 17b, 13) so that the cover (41) part may be raised at either end and moved across the opening (16; 16a- 16c) with the downwardly extending surface parts (72a) at the opposite ends of the cover (45) or cover part, sliding along the running surfaces (44a, 56a).

5. An assembly according to any one of the preceding claims characterised in that the cover (21) or each cover part, and the or each dividing member (17a, 17b) where provided, is located in the frame by means of seating formations (32) provided by the end frame members (14, 15) which receive seatings (75) provided on the cover (21) or each cover part or on the dividing member (17a, 17b) and each seating formation (32) of the frame (11) comprises

a pair of downwardly converging seating walls (32a, 32b) and the cover (21) or each cover part, and the or each dividing member (17a, 17b), where provided, comprises a corresponding seating.

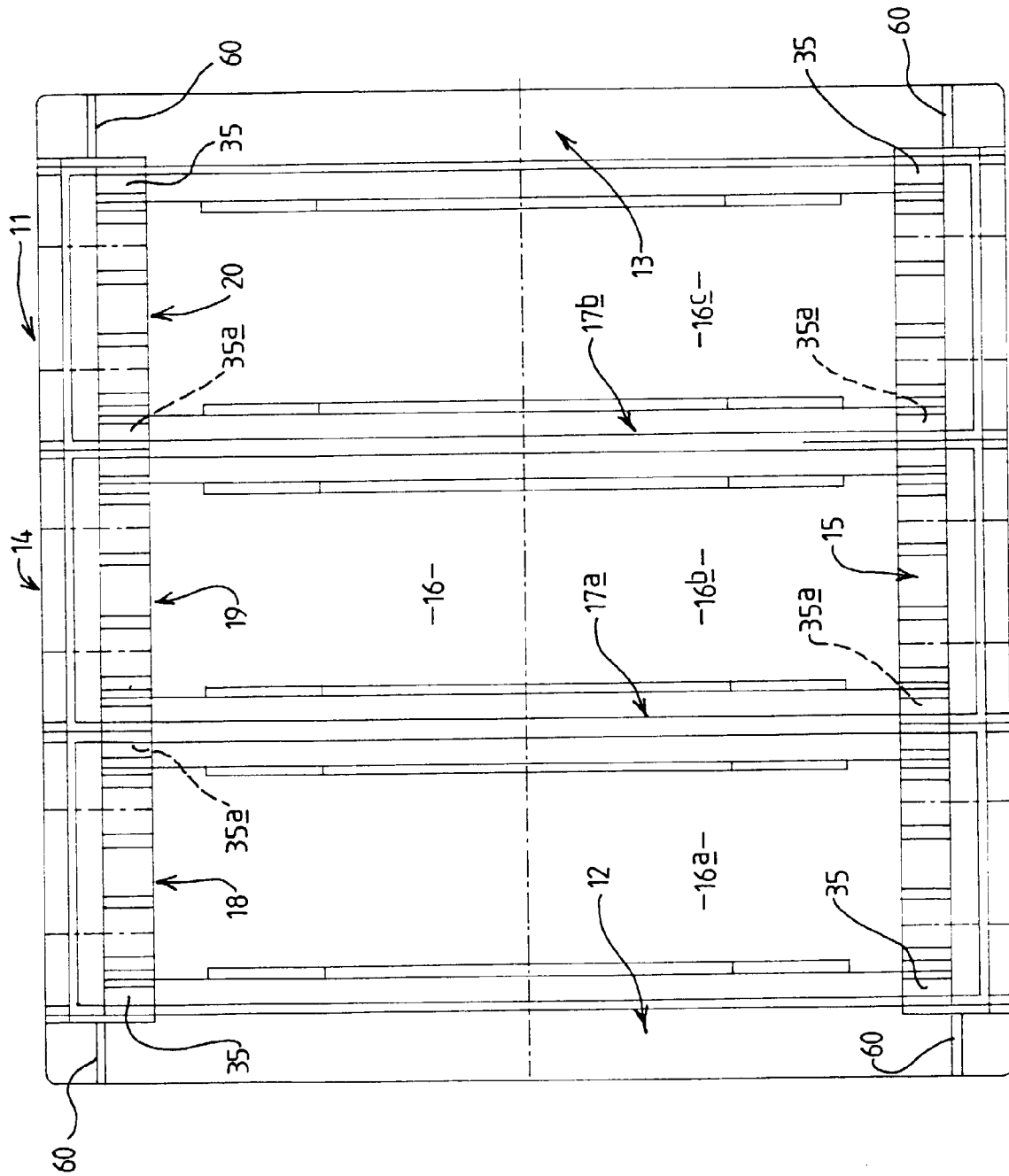
6. An assembly according to claim 5 characterised in that the downwardly extending surface parts (72a) of the cover (21) or each cover part, are maintained out of engagement with the respective recesses (46a, 54a) of the frame (11) when the cover (21) or the respective cover part is received in the frame (11) such as to close the or its respective opening (16; 16a - 16c).

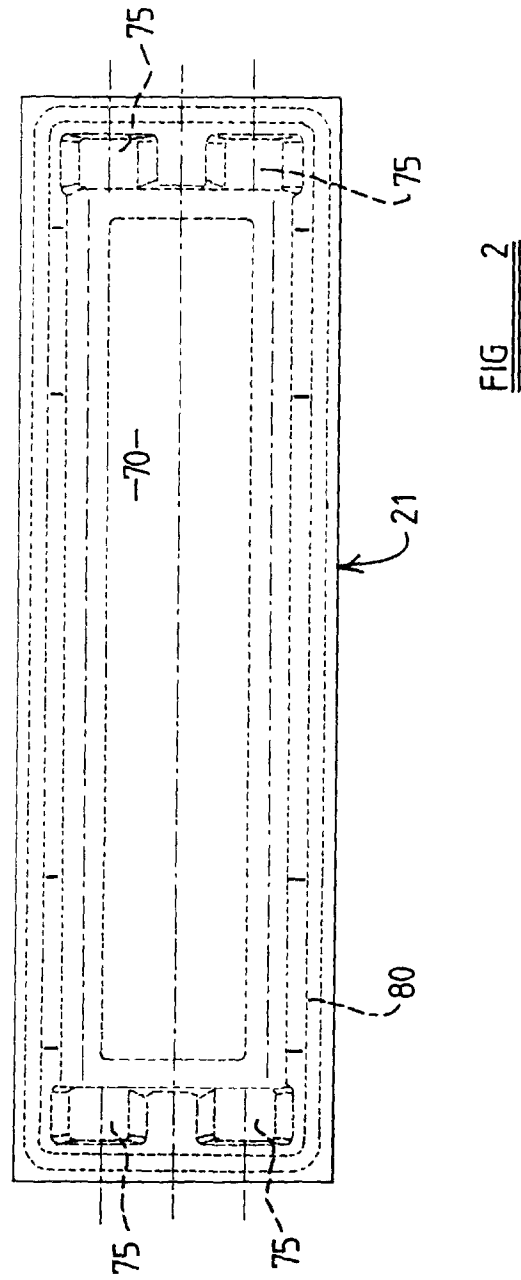
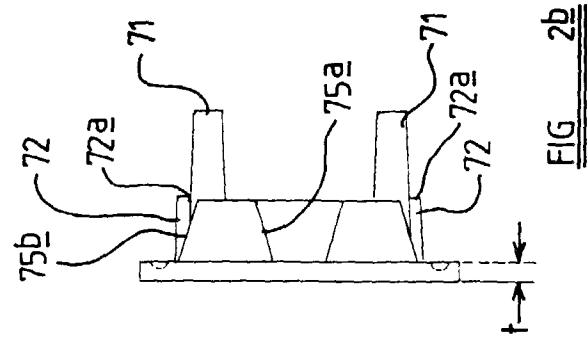
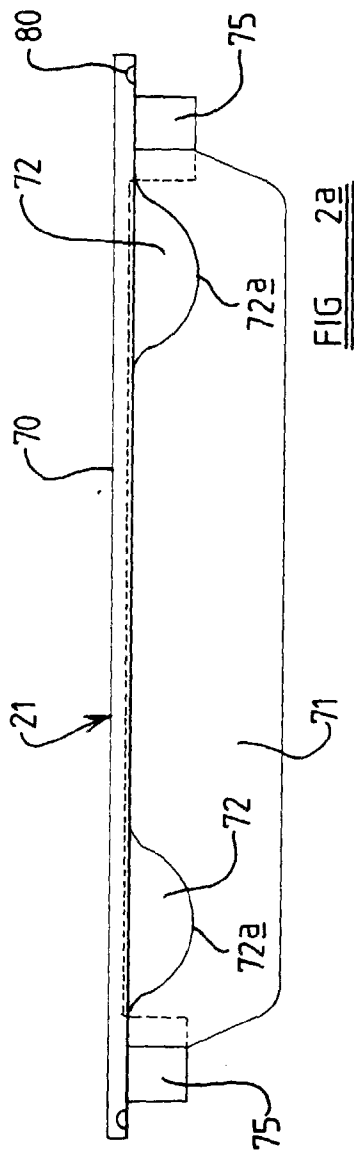
7. An assembly according to any one of the preceding claims characterised in that the end frame members (14, 15) each comprises at least two end frame elements (18-20) connected together end to end to provide an end frame member (14, 15) of a requisite length and the end frame elements (18 - 20) are each of modular length such that when the access opening (16) is divided into more than two openings (16a - 16c), each opening is of generally similar dimension.

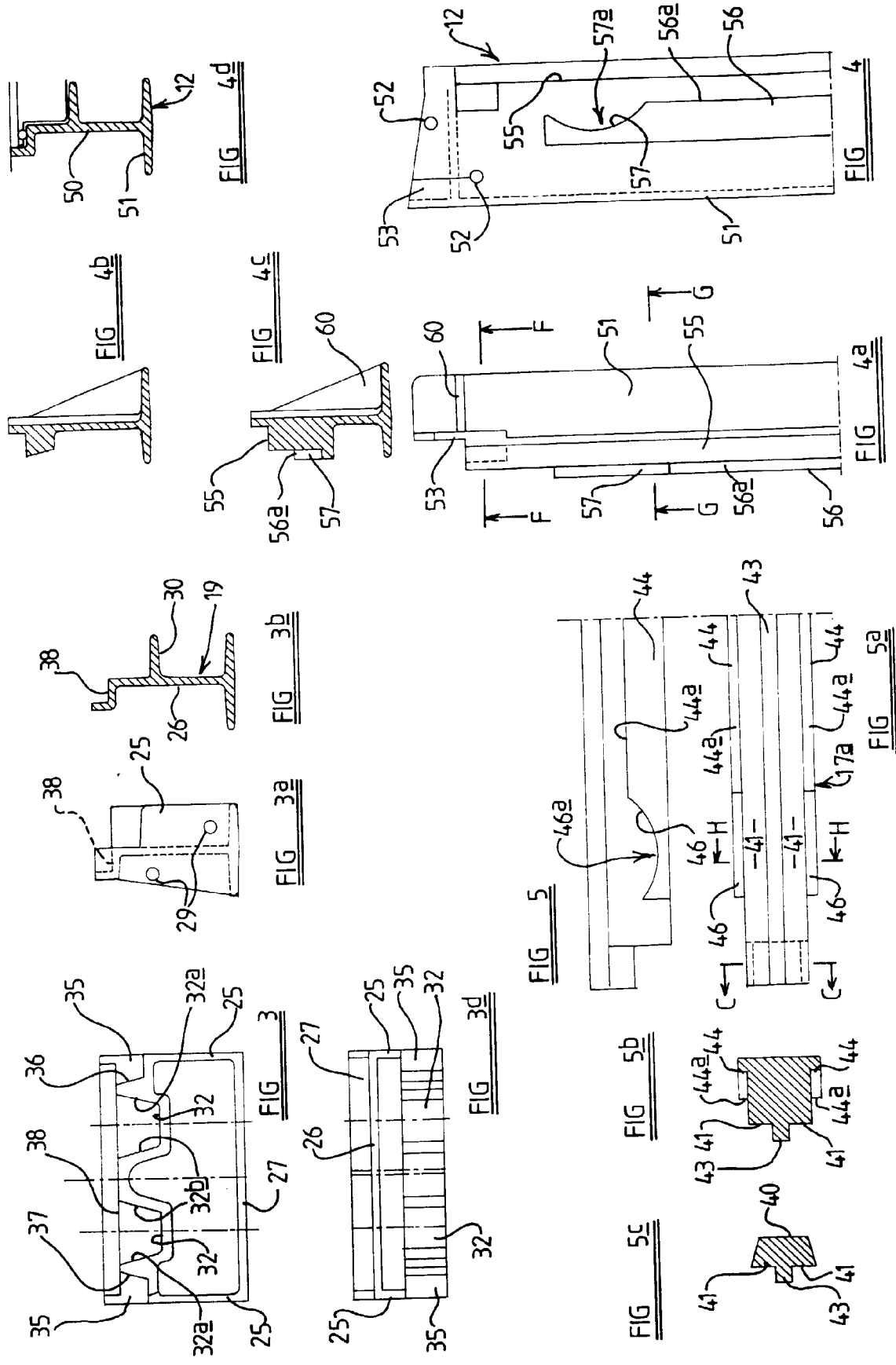
8. An assembly according to claim 7 characterised in that each end frame element (18-20) provides part of a part seating formation (32) which co-operates with a part seating formation provided by the or another end frame element (18-20) to which it is connected end to end, to provide a seating formation (32) to receive a seating provided on a removable dividing member (17a- 17b).

9. A cover (21) for a cover and frame assembly according to any one of the preceding claims.

10. A frame (11) for a cover and frame assembly according to any one of the preceding claims.









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EUROPEAN SEARCH REPORT

Application Number
EP 96 30 1734

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.6)
Y	GB-A-447 063 (ELKINGTON) 11 May 1936 * page 3, line 38 - page 4, line 118; figures 1-14 *	1-4,9,10	E02D29/14
Y	US-A-4 567 697 (HAHNE) 4 February 1986 * column 2, line 19 - column 4, line 14; figures 1-7 *	1-4,9,10	
A	AU-B-526 870 (SELF-LEVEL COVERS AKTIENGESELLSCHAFT) 3 February 1983 * page 5, line 22 - page 10, line 28; figures 1-9 *	1,2,9,10	
A	GB-A-2 109 844 (SELFLEVEL COVERS LIMITED) 8 June 1983 * page 1, line 107 - page 2, line 46; figures 1-3 *	1,2,4,5, 9,10	
A	FR-A-2 520 027 (SELFLEVEL COVERS JERSEY LTD) 22 July 1983 * page 5, line 15 - page 11, line 22; figures 1-5 *	1,2,5	
A	FR-E-96 073 (USINES ET ACIERIES DE SAMBRE-ET-MEUSE) 19 May 1972 * page 3, line 30 - page 5, line 14; figures 1-9 *	1	E02D B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 June 1996	Examiner Tellefsen, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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