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(54) A cover such as from metal, for a traffic road surface.

(57) A seat of rubber or the like (7) separates the facing support faces of the lid (3) and the frame (1) of the rectangular cover. This seat, which in the one case is attached to the frame (1) and in the other case to the lid (3), is provided with alternate cams (10) and recesses (11) corresponding to recesses and cams of the parts, to which the seat is not attached. After displacement of the lid (3) in the frame (1), the lid (3) is secured by these cams (10) and recesses (11). To counteract displacement in the secured position, a filling piece (4) can be applied.

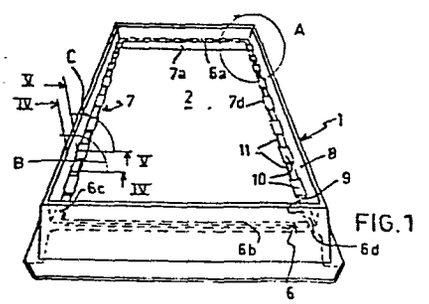

FIG. 1

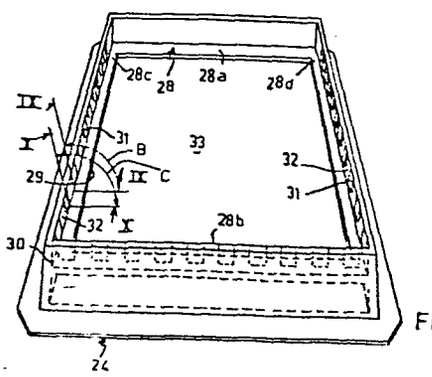

FIG. 6

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A COVER SUCH AS FROM METAL, FOR A TRAFFIC ROAD SURFACE

The invention relates a cover to be mounted in for instance a traffice road, such as from metal and having a seat from rubber or the like, with substantially reactangular cross section, which keeps the confronting support faces of lid and frame separated.

In an embodiment of the cover the seat can be attached to the support face of the frame, which has a rectangular shape, with rectangular opening and comprises, at the inwardly directed side, alternately mounted cams extending inwardly with respect to the enclosure face extending downwardly with respect to the support face of the frame and outwardly extending recesses. The matching lid comprises, at the enclosure face directed downwardly with respect to the support face thereof, mutually spaced outwardly extending cams such that in a determined position of the lid, this can be inserted in the frame or can be removed therefrom, but after shifting the lid in the direction of the longitudinal centre line thereof, over the dimension of the lid cam, the lid is secured in upward direction, i.e. it can not be lifted from the frame.

To counteract longitudinal shift of the lid, in the secured condition, according to the invention a filling piece, of hard wear-resistant material can be applied, which can mask the free space of the frame opening.

In another embodiment of the cover, of which the frame is rectangular with rectangular opening, the seat is attached to the support face of the rectangular lid and the seat comprises, at the outwardly directed side, alternately mounted cams extending outwardly with respect to the upwardly extending enclosure face of the lid and inwardly extending recesses. The molding frame comprises, at the enclosure face extending upwardly with respect to the support face thereof, mutually spaced cams such that in a determined position with respect to the frame the lid can be inserted therein or removed therefrom. After shifting of the lid in the direction of the longitudinal centreline thereof over a size of a seat cam, the lid is secured again in upward direction.

By means of a filling piece displacement of the cover can be counteracted in which the filling piece can mask the free space of the frame opening.

In a further embodiment of the cover, for instance of the second type, the lid can consist of a number of lid portions and at each end of the frame opening and possibly at larger values of the length thereof, between one set or various sets of lid portions, a filling piece can be used to counteract the shift of the lid portions, in their secured position, and to facilitate removal of the lid portions.

The invention will be further elucidated on the basis of some embodiments shown in the drawing.

Fig. 1 is a drawing in perspective of the frame of a rectangular cover according to a first embodiment, in which the seat is attached to the frame.

Fig. 1a shows on a larger scale a detail A of the frame of fig. 1.

Fig. 2 is a drawing in perspective of the lid belonging to the frame of fig. 1.

Fig. 3 is a filling piece, belonging to the frame of fig. 1.

Fig. 4 is a vertical cross section of the frame along the face B in fig. 1, and a certical cross section of the lid along

the face C in fig. 2, in the position for insertion or removal of the lid, shown on larger scale.

Fig. 5 is a vertical cross section of the frame along the face C in fig. 1, and of the lid along the face C in fig. 2, in secured position of the lid and shown on larger scale.

Fig. 6 is a drawing in perspective of the frame of a cover according to a second embodiment, in which the sheat is attached to the lid.

Fig. 7 is a drawing in perspective, of the lid belonging to the frame of fig. 6.

Fig. 8 is a filling piece belonging to the frame of fig. 6.

Fig. 9 is a vertical cross section of the frame along the face B in fig. 6, and a vertical cross section of the lid along the face C in fig. 7 during insertion or removal of the lid, shown on larger scale.

Fig. 10 is a vertical cross section of the frame along the face C in fig. 6, and of the lid along the face C in fig. 7, in secured position of the lid, shown on larger scale.

Fig. 11 is a drawing in perspective of the frame of a cover according to a third embodiment.

Fig. 11A shows a detail A of fig. 11, on larger scale.

Fig. 12 is a drawing in perspective of the lid portions with seat attached thereto and filling pieces belonging to the frame of fig. 11.

Fig. 12A shows a detail A, on larger scale, of the first and second lid portion of fig. 12, folded forwardly according to the arrow P, along a front edge. (The lower portion of detail A corresponds somewhat to the detail B of the lid of fig. 7, when it is folded rearwardly alond the rear edge).

Fig. 13 is a vertical longitudinal cross section along the line XIII-XIII in fig. 11 and 12.

Fig. 14 shows a lid portion of an amended embodiment, separately shown in perspective, which can be applied in a frame as in fig. 11.

Fig. 14a shows a detail A, on larger scale of the lid portion of fig. 14.

Fig. 14b shows an other detail B, on larger scale, of the amended lid portion of fig. 14.

An embodiment of the cover according to the invention schematically shown in the fig. 1 through 3, comprises a rectangular frame 1, with rectangular opening 2 and a rectangular lid 3, both parts usually from cast iron. The lid 3 of the invented cover does not completely cover the frame, but leaves an opening at the one (front) end, which opening can be masked by means of a beam-like filling piece 4, from a heard wear-resistent material, for instance ebonite.

To facilitate the insertion of the filling piece 4 into the frame or the removal therefrom respectively, said filling piece is provided at the ends with an through opening 5, for receiving a not-shown insertion tool.

On the horizontal support face of the frame 1, generally indicated with 6, the seat, generally indicated with 7, from hard rubber, with substantially rectangular cross section is not circumferentially arranged; at a short rectangular side (rear side) of the frame a seat portion 7a is provided, on the portion 6a of the support face, and at both ends connected thereto, seat portions 7c and 7d respectively are provided extending partially on the support face portion 6c and 6d respectively, over a long rectangular side of the frame.

The seat 7 abutting the enclosure face 8 extending upwardly with respect to the horizontal support face 6 of the frame comprises cams 10 extending alternately inwardly with respect to the enclosure face 9 extending upwardly with respect to the support face 6 and outwardly extending recesses 11, at the location of which recesses, the thickness of the seat 7 is smaller than that of the cams to form a radial water discharge channel 7A at the upper surface (vide fig. 4).

The lid 3 comprises a support face, generally indicated with 12, which comprises only three support face portions just as the support face 6 of the frame 1, namely a support face portion 12a, at the short reactangular side of the lid and a support face portion 12c and 12d respectively connected thereto; said support face portion 12 comprising an enclosure face 13 extending upwardly with respect thereto and an enclosure face 14 extending downwardly.

The enclosure face 14 extending downwardly with respect to the support face 12 of the lid comprises mutually spaced outwardly directed cams 15. The longitudinal size of the support face portion, indicated with 16, is somewhat greater than the corresponding longitudinal size of a cam 15 for insertion and removal respectively of the lid.

In order to insert the cover 3, this should be moved downwardly into the frame opening 2 with the end face 18, forming the restriction of both end cams 15 at the long rectangular sides of the lid, at the rectangular side (front side) of the frame 1, where the free support face portions 6c, 6b and 6d of the frame are situated, the cams 15 at the downwardly directed enclosure face 14 of the lid being able to move downwardly between the recesses 11 of the seat 7 at the support face of the frame 1, until the lid with the support face 12 rests on the upper surface of the seat cams 10, after which the lid is shifted over the longitudinal size of the end cams 10 at the seat portions 7c, 7d in the direction of the other rectangular side and therewith, on the seat portion 7a at the support face 6a of the frame 1.

The cover 3 leaves then a portion of the frame opening 2 at the first-mentioned rectangular side (front side) of the frame 1, where the free support faces 6c, 6b, 6d are situated, said portion can be masked by means of the filling piece 4. The size of the lower surface 19 of the filling piece 4 can be such that this can cover said free portions of the support face 6 of the frame 1, in which the filling piece with the end faces 20, 21 and the side face

22 and 23 respectively can abut the facing portions of the enclosure face 8 of the frame, and the confronting end face 18 of the lid 3 respectively.

As, as is explained above, the cams 15 at the downwardly directed enclosure face 14 of the lid, when positioning this on the seat 7 of the frame 1, should be able to pass along the inwardly extending recess 11 at the seat, after which the lid with the support face 12 is displaced slidingly over the upper surface of the cams 10 of the seat, over the longitudinal size with a cam 10 to the other rectangular side of the frame opening 2 to have the cams 15 thereof engage beneath the cams 10 of the seat with the edge for "guarantying" the cover, the seat portions 7c and 7d of the frame comprise, at the free end thereof, preferably a cam 10 and the corresponding portions of the downwardly extending enclosure face of the lid, at the free end thereof, also a cam 15, in which the lenth of the seat portion 7c, 7d is the same as the corresponding length of the long rectangular side of the enclosure face 14.

In order to cover afterwards the free support face portions 6c, 6b and 6d at the frame opening, the rectangular lower surface of the filling piece 4 can comprise a long rectangular side, equal to the inner size of the support face 6 of the frame a and a short rectangular side, somewhat greater than the longitudinal size of one seat cam and the "free" support face portion 6c(6d) of the frame 1.

In fig. 4 on the basis of a cross section IV and V, along a face B of the frame 1 and a cross section V-V, along a face C of the lid, the situation is indicated, in which the lid can be lifted from the frame, or can be positioned in the frame. In fig. 5 on the basis of a cross section V-V, along a face C of the lid and the frame the situation is indicated, in which the lid is secured after shifting over the longitudinal size of a seat cam.

In fig. 5 the cams 15 at the downwardly extending enclosure face 14 of the lid 3 are situated just opposite the cams 10 at the seat 7 of the frame 1. The faces C of lid and frame coincide.

In fig. 4 the cams at the downwardly directed enclosure face 14 of the lid are situated just opposite the recesses 11 of the seat 7 at the frame 1, when the lid is for instance moved forwardly over a cam width and the face C of the lid coincides with the face B of the frame.

It is remarked, that in fig. 1a an angle portion A of the frame 1 of fig 1 is shown on larger scale, to indicate, that there an enlarged, Z-shaped cam 15A (vide fig. 2) extends outwardly with respect to the enclosure face 14 extending downwardly with respect to the lid to engage beneath the cam 10 of the seat portion 7a and of the seat portion 7d of the frame 1 extending inwardly at that location. The cams 15 at the enclosure face 14 at this short rectangular side of the lid do not slide in longitudinal direction, but in transverse direction thereof beneath the cams 10 at the seat portion 7a.

In the fig. 6, 7 and 8 resp. the frame, the lid and the filling piece respectively generally indicated with 24, 25 and 26 resp. of a second embodiment of the invented cover are shown, in which the seat generally indicated with 27 is not attached to the frame, as in above-described embodiment, but to the lid 25.

As is shown in fig. 6 the horizontal support face, generally indicated with 28, is provided circumferentially on the frame 24 and it comprises a downwardly directed peripheral edge 29 surrounding the opening 33 of the frame. The enclosure face 30 of the frame extending upwardly with respect to the horizontal support face 28 comprises mutually spaced cams 31 extending inwardly with respect to said enclosure face (vide also fig. 10 and 9 resp.), said cams being mounted on both long rectangular sides of the opening 33 of the frame 24 and one short rectangular side of the edge opening 33.

As is shown in fig. 7 outwardly extending cams 36 and inwardly extending recesses 37 (dottedly indicated in fig. 10) are provided on the seat 27 which is mounted here around the support face 34 of the lid 25 (vide also fig. 9 and 10) with respect to the

enclosure face 35 extending upwardly with respect to the horizontal support face 34 at the location where the thickness of the seat 27 is smaller to form a radial channel 27A at the lower surface for letting the rain water pass.

To cover the opening 33 of the frame 24 (vide fig. 6) the lid 25 should first be positioned in the vicinity of the rear side of the frame on the support face 28 thereof, in which the seat cams 36 at the lid 25 can freely pass downwardly along the upwardly extending enclosure face 30 of the frame, after which the lid, to be able to "guaranty" this with respect to the france 24, is moved forwardly over the longitudinal size of a cam 31 extending inwardly with respect to the enclosure face with the seat 27 sliding over the horizontal support face 28 at the long rectangular sides of the frame and then the seat cams 36 engage beneath the cams 31 at the upwardly extending enclosure face 30 of the frame. Therewith the seat cams 36 move at the facing short rectangular side of the lid in transverse direction with respect to the cams 31 of the frame.

The remaining portion of the frame opening, at the location of the portions 28a (at the complete short rectangular side of the frame 24) and 28c, 28d (at the rear end of both the long rectangular sides of the support face 28 of the frame) can be masked by means of a filling piece 26.

The lower surface 38 of the filling piece can have a longitudinal size, practically equal to the inner size of the frame 24 at the support face portion 28a, and a transverse size, somewhat greater than that of a cam 31 and the free support face portion 28c(28d) of the frame 24. The end surfaces 39, 40 and the side surfaces 41, 42 of the filling piece can be adapted to the sizes of the frame. The longitudinal side surface 42 preferably supports with a certain pressure against the seat cams 36 at the confronting side face of the upwardly directed enclosure face 35 of the lid. The advantage thereof is, that rattling of the filling piece in the frame 24 is counteracted.

Fig. 9 shows a cross-section IX-IX along the face B of the

frame 24 and a cross section X-X along the face C of the lid 25, in which the lid can be lifted from the frame or can be positioned in the frame.

Fig. 10 shows a cross section X-X along a face C of lid and frame to show the situation in which the lid, is secured after displacement over the longitudinal size of a seat cam 36.

In fig. 10 the seat cams 36 projecting outwardly with respect to the enclosure face 35 extending upwardly with respect to the horizontal support face 34 of the lid 25 are situated just beneath the cams 31 at the upwardly extending enclosure face 30 of the frame 24, the faces C of the frame and lid coincide in that case (guarantied position).

In fig. 9 the seat cams 36 extending outwardly with respect to the upwardly extending enclosure face 35 of the lid 25 are situated just opposite a portion of the enclosure face 30 extending upwardly with respect to the horizontal support face 28 of the frame 24. The lid 25 is in the position for removal in that case.

In the fig.11, 11a, 12, 12a and 13 a third embodiment of the cover according to the invention is shown, in which the rectangular frame generally indicated with 42 is covered by a lid generally indicated with 43 comprising various identical lid portions 43a, 43b.....43n.

The frame opening 44 is, for enclosing the lid portions in the frame 42, furthermore masked at both ends by a filling piece 45a and 45b resp. of identical shape.

The embodiment of a lid portion, for instance 43a appears more clearly from fig. 12a, indicating the lid portions 43a and 43b in reversed condition, i.e. after these portions are folded forwardly from the position shown in fig. 12 in the direction of the arrow P and separated somewhat thereafter.

As in the lid 25 of fig. 7 in the earlier described second embodiment of the cover, the seat, generally indicated with 46 (vide fig. 12a) is mounted circumferentially extending at the support face 47 of the lid portion (for instance 43b) and accordingly alternately

provided with cams 48 extending outwardly with respect to the enclosure face extending upwardly with respect to the support face 47 and radially extending recesses 49 and the seat is recessed in the shape of a gutter at the location of a recess 49 for the removal of rain water.

However, different from the seat 27 according to fig. 7, in fig. 12a the cams 48b and the cams 48a respectively, of the seat 46 are somewhat shortened or enlarged at the transverse sides of the lid portions 43b and 43a confronting each other (this will be further elucidated in due course) so that when pushing on the lid portion the row of cams 48a partially extends beneath the lid portion 43b, in that an additional "quaranty" is obtained at said transverse sides of the lid portions.

Both longitudinal sides of the frame 42 (fig. 11) are provided at the enclosure face 51 extending upwardly with respect to the support face 50 with mutually spaced inwardly extending cams 52, between the cam 52 at both ends of the longitudinal sides, in the vicinity of a transverse side of the frame 42 between said cam 52 and the enclosure face 51 of said transverse side (vide also fig. 13) a space is provided for arranging the filling piece at said end of the frame 42, in this case the filling piece 45a. The upwardly extending enclosure face 51a at that transverse side of the frame 42, is provided with an inwardly extending cam 52a extending over the complete size of the transverse side, beneath which an outwardly extending cam extending over the complete size of the filling piece 45a can engage, when this filling piece is positioned in the frame 42. The same is in force for the other filling piece 45b.

After for instance first the filling piece 45a being mounted at its location in the frame 42, the first lid portion 43a can be positioned in the frame,in which the end cam 48 of the seat 46 at that lid portion (vide fig. 12a) can pass via the portion of the enclosure face 51 behind said end cam 52, after which the lid portion 43a can be moved toward the transverse side of the frame. According to fig. 13, showing this situation "schematically", at the

facing transverse side of the lid portion 43a on the contrary (shorter) cams 48b are provided at the seat 46 of the lid portion (which cannot cooperate with an adjacent lid portion by an guarantying action). The filling piece 45a moreover comprises at the facing transverse side a recess 54. The recess formed by the shorter cam 48b of the seat 16 on the lid portion 43a is schematically shown (fig. 13).

Thereafter the lid portions 43b etc can be subsequently inserted,after insertion of the last lid portion 43n, the filling piece 45b can be snapped at its location, in which it snaps with the cam 53 beneath the cam 52a of the other transverse side of the frame 42. The lid portion 43n is also guarantied at the transverse side thereof, by means of further outwardly extending cams 48a at the seat 46 thereof.

The lid portions 43 as well as the filling pieces 45 can be exchanged.

Finally there is also an other embodiment, according to fig. 14, 14a and 14b, for a lid portion of the above described frame of fig. 12 and 13.

There the lid portion 60 only comprises at the longitudinal edges a beam-shaped seat 61 with outwardly extending cams 62; at the transverse sides only mutually spaced recesses are provided at the upwardly extending enclosure face.

CLAIMS

1. A cover to be mounted in for instance a traffic road such as from metal, and having the seat of rubber or the like which is attached to the frame, or the lid respectively and comprises a substantially rectangular cross section, said seat at the inner or the outer side respectively having alternately arranged at the enclosure face extending downwardly with respect to the support face of the frame or upwardly with respect to the support face of the lid, inwardly or outwardly directed cams and inwardly or outwardly directed recesses and the lid or the frame respectively comprising at the enclosure face extending downwardly with respect to the support face or upwardly with respect to the support face, mutually spaced outwardly or inwardly directed cams, characterized in that the frame is rectangular and the seat is mounted at least at two opposite rectangular sides, at the support face of the frame, the also rectangular lid, in the position in which the outwardly directed cams at the enclosure face extend downwardly with respect to the support face at the corresponding rectangular side, corresponding to the location of the recesses of the seat at the support face of the frame, can be inserted in the frame, and the lid, after longitudinal displacement over the size of a cover cam,is secured against vertical removal, or the frame is rectangular and the inwardly directed cams at the enclosure face extending upwardly with respect to the support face thereof, are arranged at at least two opposite rectangular sides, in which the also rectangular lid, in the position, in which the outwardly directed cams of the seat, at the corresponding rectangular sides, at the support face of the lid correspond to the location of the portions of the enclosure face extending upwardly with respect to the support face of the frame, can be inserted in the frame and the lid, after longitudinal displacement over the size of a seat cam, is secured against vertical removal.

2. A cover according to claim 1, the seat being attached

to the support face of the lid and the lid, at two opposite longitudinal rectangular sides, at the enclosure face extending upwardly with respect to the support face, comprising inwardly directed cams characterized in that the lid comprises a number of identical lid portions (fig. 14).

3. A cover according to claim 2, characterized in that of each lid portion the support face, the seat attached thereto, and the enclosure face extending upwardly and downwardly, are continued at the opposite, transverse rectangular sides of the lid portion, with in relation to the enclosure face extending upwardly with respect to the support face of the lid portion, outwardly directed cam and inwardly directed recesses, the outwardly directed cams at the one transversely directed ractangular side extending further, and at the other transversely directed rectangular side extending less far outwardly than the seat cams at the longitudinal rectangular side (fig. 12a).

4. A cover according to claim 3, characterized in that only the support face, and the enclosure wall extending upwardly with respect thereto are preceded at a transverse rectangular side of the frame and the space between the lid portion in the vicinity of this rectangualr side and said rectangular side can be masked by means of a filling piece from ebonite or such a wear-resistant material, the side face at the side facing the lid portion, having a recess over the complete length for receiving seat cams at the confronting transverse rectangular side of the lid portion, furthermor a cam (52a) extending inwardly over the length of the upwardly directed enclosure face (51a) of this rectangular side of the frame being able to engage above a projection (53) mounted over the complete length of the confronting surface on the filling piece.

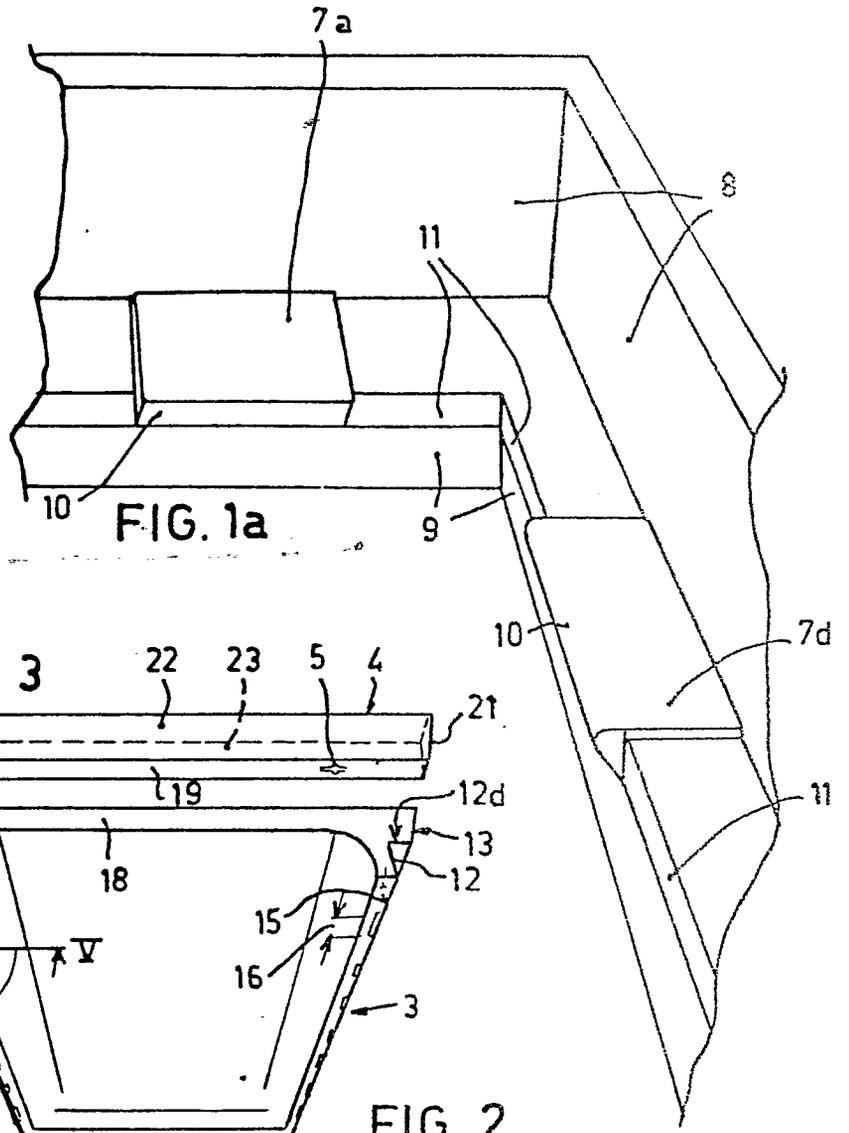


FIG. 1a

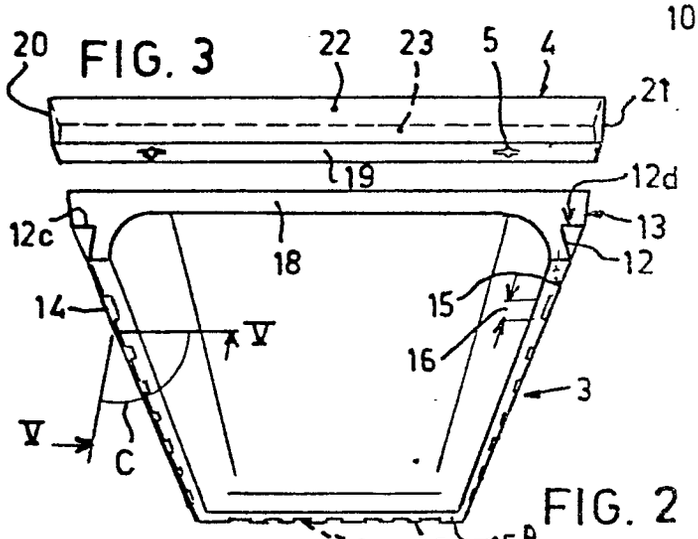


FIG. 3

FIG. 2

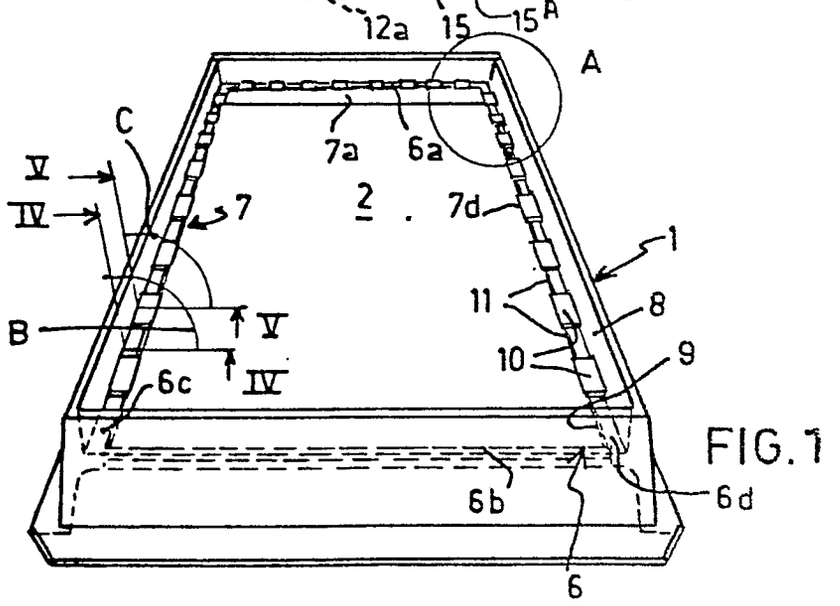


FIG. 1

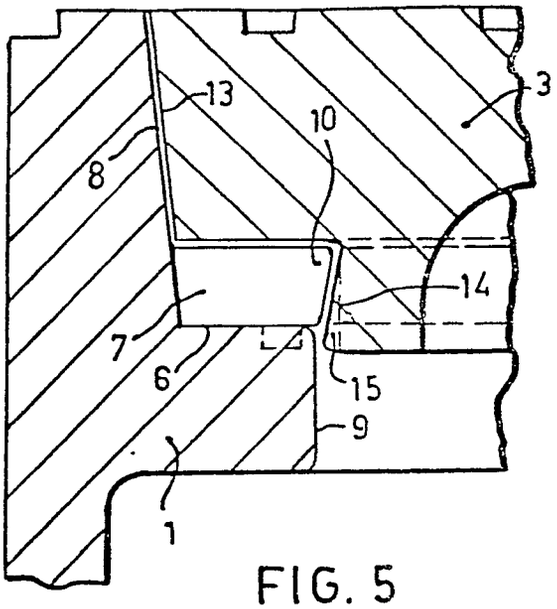


FIG. 5

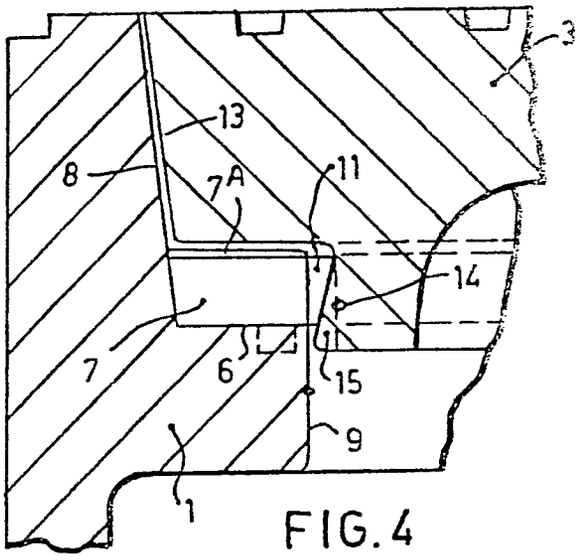


FIG. 4

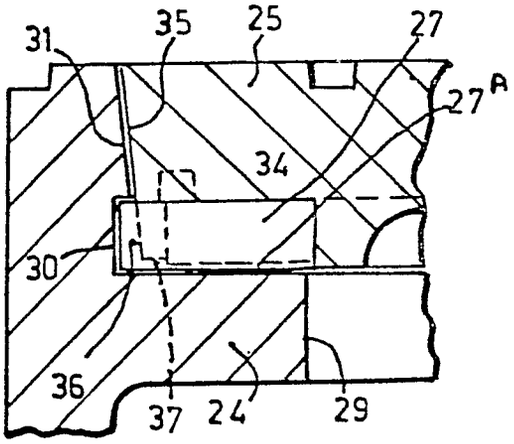


FIG. 10

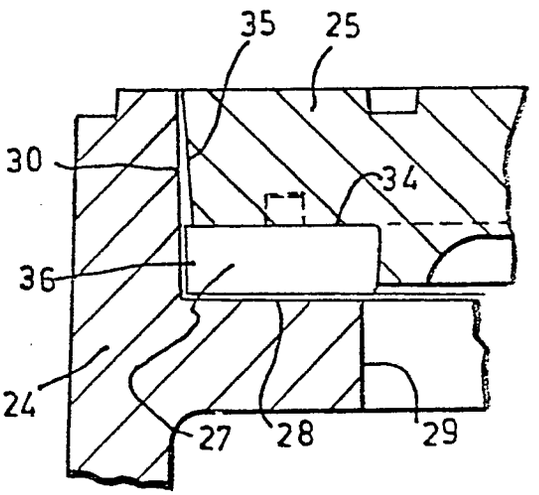


FIG. 9

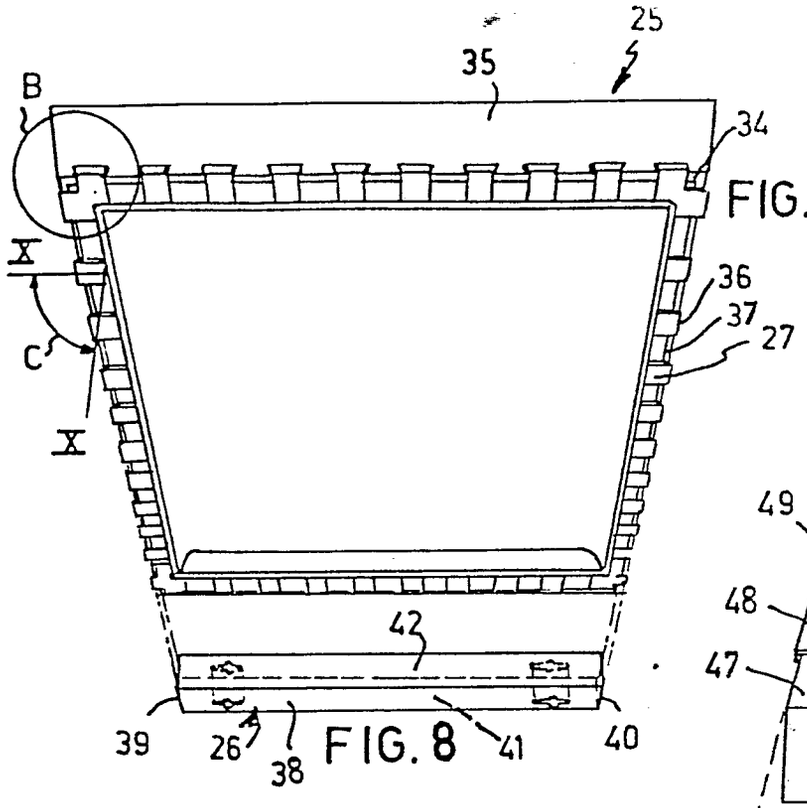


FIG. 7

FIG. 8

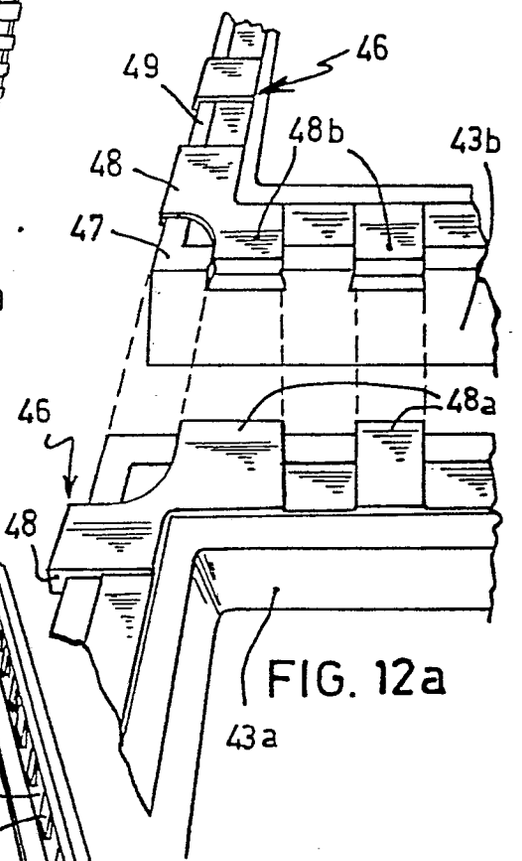


FIG. 12a

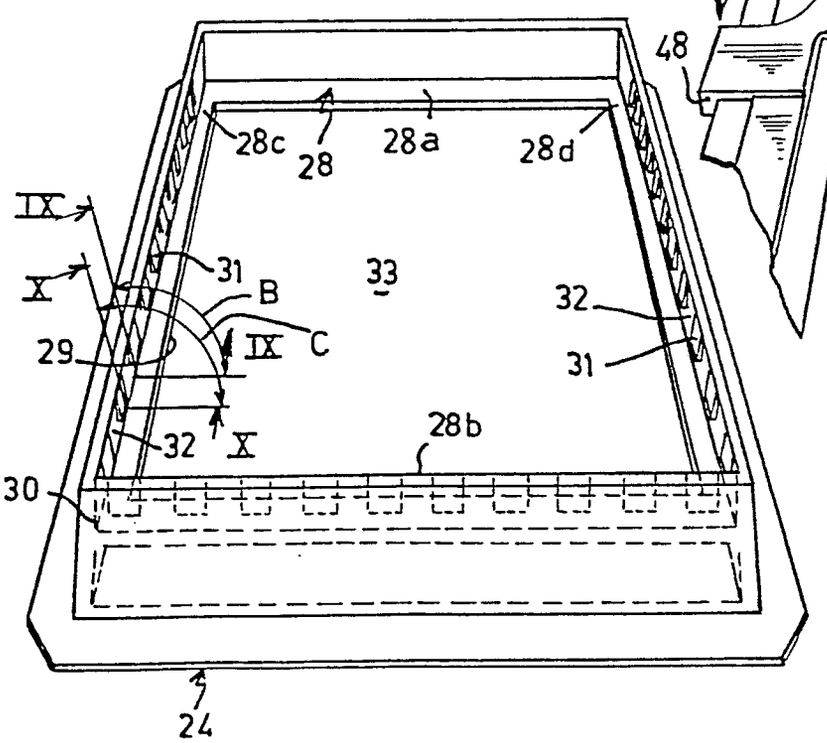


FIG. 6

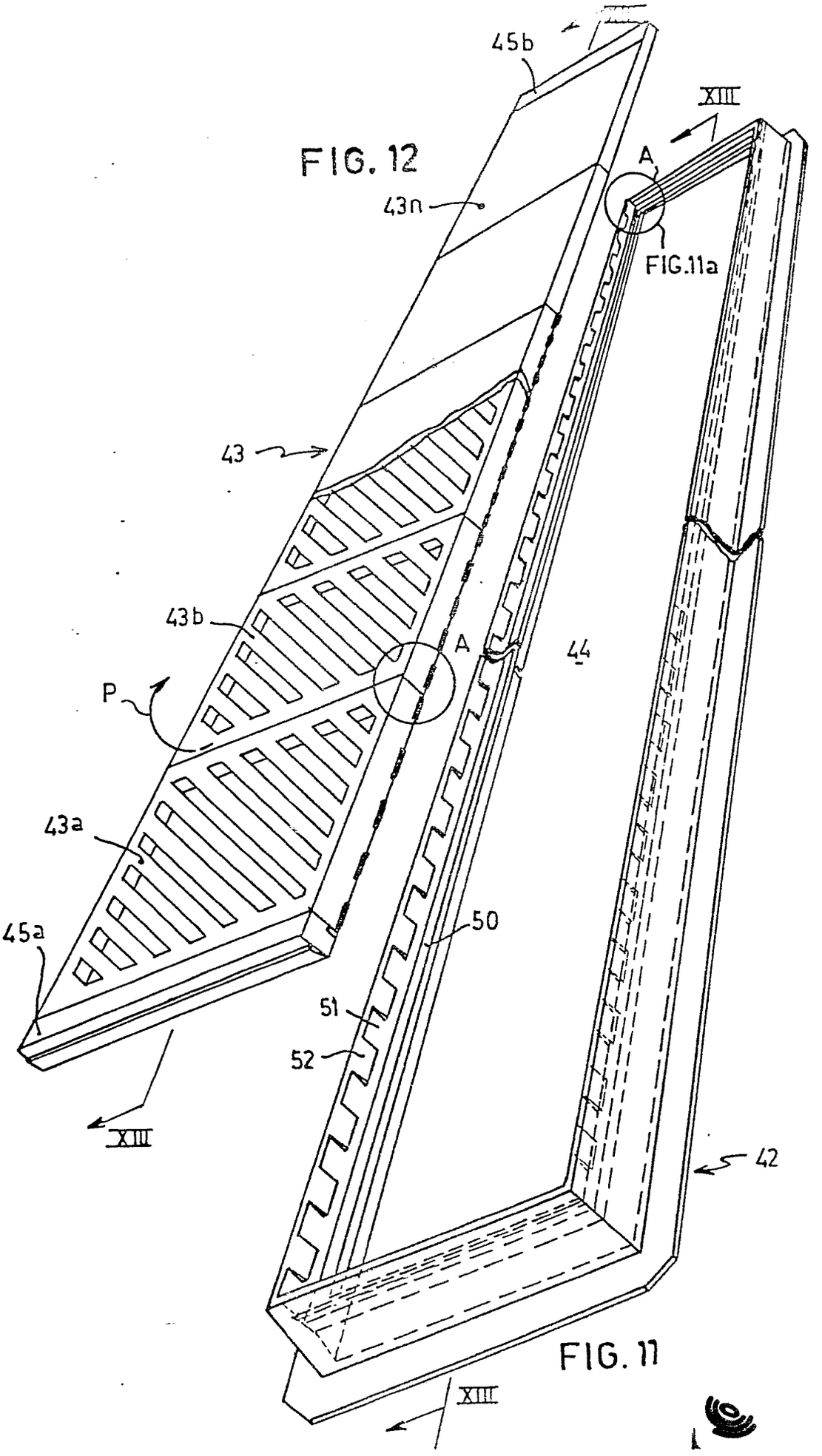


FIG. 12

FIG. 11

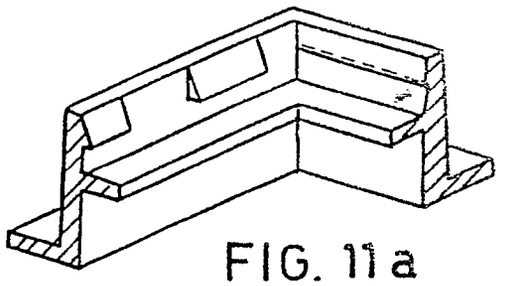


FIG. 11a

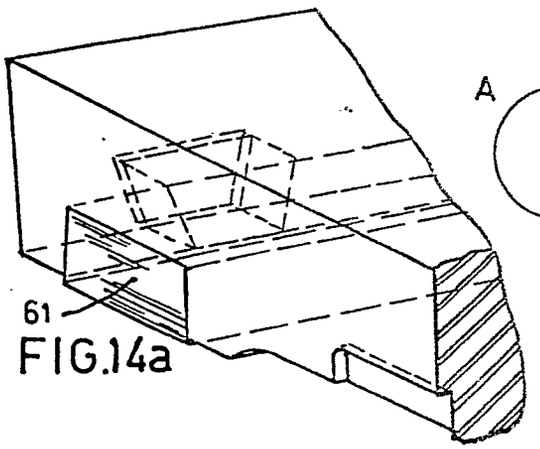


FIG.14a

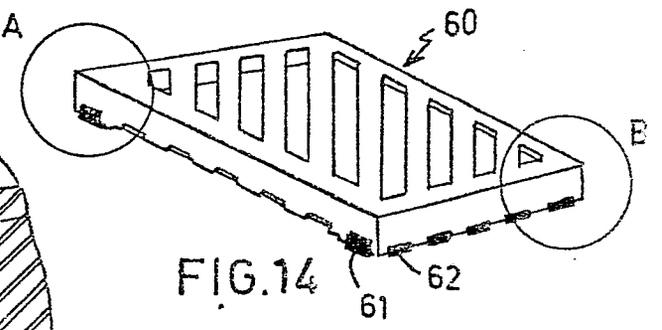
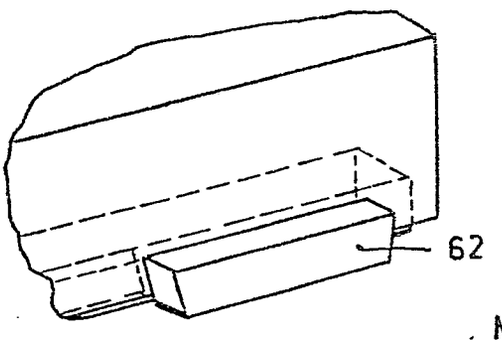


FIG.14

FIG.14b



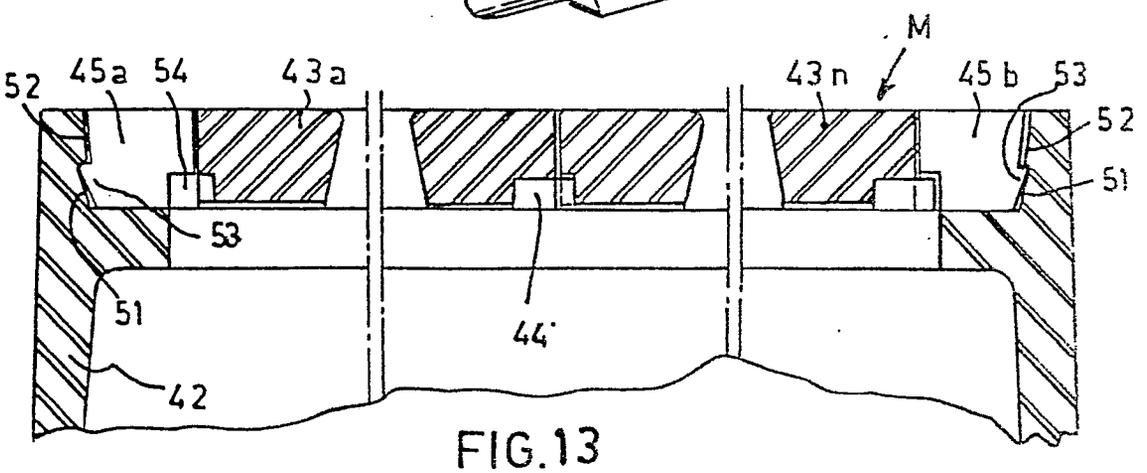


FIG.13

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 79 20 0523

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	FR - A - 2 192 580 (PONT-A-MOUSSON) * Page 1, lines 13-24, 40; page 2, lines 1-19, 32-40; page 3, lines 8-10; figures 1-5 *	1,2,4
A	GB - A - 535 209 (DUDLEY AND DOWELL)	

CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)

E 02 D 29/14

TECHNICAL FIELDS SEARCHED (Int.Cl ³)

E 02 D
E 03 F

CATEGORY OF CITED DOCUMENTS

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

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18-12-1979	RUYMBEKE

EPO Form 1503.1 06.78