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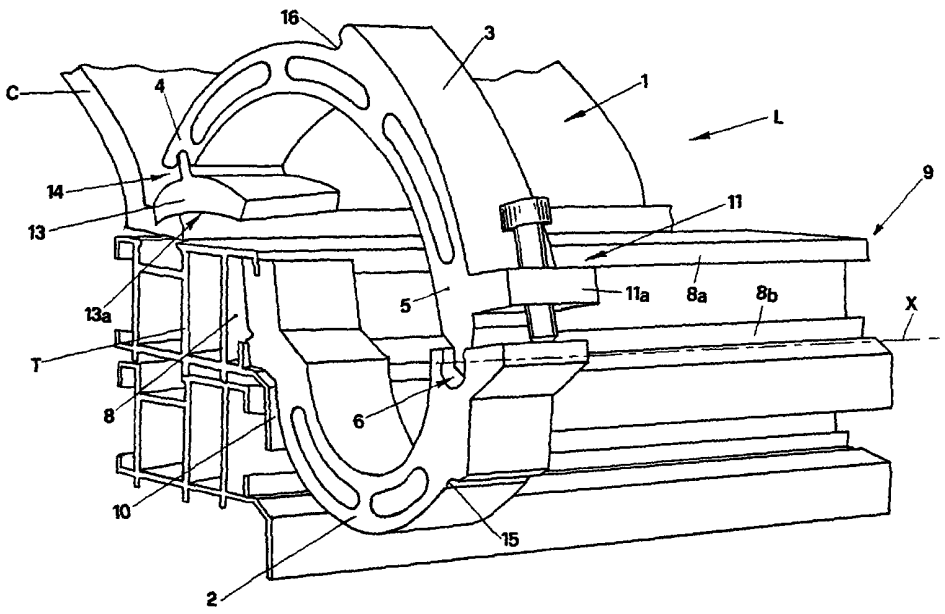
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(54) Title: CLAMP FOR SKYLIGHTS AND SMOKE EXTRACTORS



(57) Abstract: A clamp (1) suited to blocking together the dome (C) and the frame (T) which compose the cover (L) of a skylight or of a smoke extractor, comprising: a first element (2) connected to the frame (T); a second element (3) having the free end (4) resting externally on the dome (C) above the frame (T) and the opposite end (5) removably coupled to the first element (2) by means of fastening (6); and means of fixing (11) for blocking the second element (3) against the dome (C). The means of fastening (6) are composed of at least one hinge (6) which forms an axis of rotation (X) between the elements (2, 3), substantially parallel to the plain defined by the frame (T).

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CLAMP FOR SKYLIGHTS AND SMOKE EXTRACTORS

The invention concerns a clamp that is particularly suitable for blocking together the dome and the frame that compose the cover of a skylight or of a smoke extractor.

It is known that skylights and smoke extractors are substantially composed of a cover which, by means of one or more hinges, is connected to a base which marks off an opening made in the structure of a building and communicates with the outside environment.

The cover comprises a frame which supports a dome which is generally transparent and which is fixed to it by means of special clamps around the perimeter.

According to an embodiment of a known type which is shown in FIG. 1., a clamp, indicated overall with M, comprises a first element Ma having a first end Ea connected to the frame T of the skylight or of the smoke extractor and a second element Mb having the free end Eb resting on the outside of the dome C, above the frame T.

Both the elements Ma and Mb are connected to each other by means of fastening composed of knurls Za, Zb on the ends of each element, reciprocally in contact, and of a screw V passing through a slot A in the second element Mb and mating in a threaded hole F in the first element Ma.

The screw V tightening pressure and the interference between the knurls block the two elements together, securing the dome C to the frame T below.

A first inconvenience presented by the clamps of the type described lies in the fact that, to fasten them, the operator must apply pressure manually on the second element Mb, forcing it down in the direction indicated by the arrow F and sliding the knurls Za and Zb reciprocally until the desired degree of pressure is obtained between the dome C and the frame T.

He then fastens the screw V which holds the clamp elements tight in the desired position.

It may be understood that the degree of pressure with which the clamp M holds the dome C against the frame T depends on the regulation carried out by the operator, and therefore his experience and ability is decisive.

Furthermore, by proceeding in this way it is difficult to ensure the same degree of tightness for all the clamps.

Another inconvenience of the clamps of the type described lies in the fact that

the first element Ma is fixed onto the frame T by means of a through screw Va which anchors the end Ea to the upper plate P.

The fixing of the clamp M therefore requires the drilling of the first element Ma, the drilling of the frame T and their reciprocal connection by applying the through screw Va.

The maker must therefore drill a series of holes on the frame and on the clamp which, once made, require him to apply the clamp always in the same position.

Using clamps of the known type, the clamp fixing position is therefore fixed and invariable and is defined before installation of the skylight or of the extractor.

A further inconvenience lies in the fact that, as the end Ea of the first element Ma is on the plate P of the frame T, it is covered by the sealing gasket S placed between the dome C and the frame T. This leads to a non homogeneous distribution of pressure along the frame perimeter and may cause deformation, with the result that closure is not hermetic.

This invention aims to overcome all the inconveniences listed.

In particular, a first aim of the invention is to realise a clamp which allows the installer to regulate the tightening force of the dome against the frame with greater precision.

Another aim of the invention is to realise a clamp which, as well as holding together the dome and the frame which make up the cover of a skylight or of a smoke extractor, can be applied on the frame without having to make a hole in it.

Another aim is that, when applied on the frame, the clamp shall not interrupt the linearity and flatness of the gasket inserted between the frame and the dome.

Another aim is that the clamp in the invention may be applied in any position on the frame.

The last but not the least aim is that the position of application of the clamp on the frame may be shifted as the installer wishes, even after installation of the skylight or smoke extractor.

These aims are achieved by realising a clamp suited to blocking together the dome and the frame which compose the cover of a skylight or of a smoke extractor and which, according to the principal claim, comprises:

- a first element connected to said frame;
- a second element having a free end resting externally on said dome above

said frame and the opposite end removably coupled to said first element by means of fastening;

- means of fixing suited to blocking said second element against said dome, and characterised in that said means of fastening are composed of at least one hinge which forms an axis of rotation of said elements, substantially parallel to the plain defined by said frame.

In a preferred embodiment, said at least one hinge is placed corresponding to the means of fixing and comprises a concave seat with a substantially C-shaped transverse profile, created in the first/second element, and a pin, created in the second/first element, having a transverse profile mating with the concave seat. The pin and the respective seat may be removably coupled by sliding them reciprocally in an axial direction following the common axis of rotation.

Preferably, at one end the first element presents means of coupling which couple removably by snapping into a longitudinal channel located in the edge on the outer side wall of the frame.

The means of coupling comprise a recess, created in the first element, which holds a corresponding first protruding edge belonging to the longitudinal channel and an angular heel, created in the first element on the part opposite the above-mentioned recess, which mates by interference and snaps into an angular seat in the frame itself.

The angular seat is located between a second protruding edge, also belonging to the longitudinal channel and facing the previous one, and a shaped appendix of the frame protruding from the above-mentioned channel.

In cross section, this channel has a C-shaped profile in which the free ends are composed of the protruding edges, facing each other.

The means of fixing are placed corresponding to the hinge and comprise a nut screw which belongs to the second element, in which mates a screw the end of which meets a contact surface belonging to the second element.

Advantageously, the hinged means of fastening and the screw means of fixing with which the clamp is provided enable the fitter to make sensitive and extremely precise regulation of the degree of compression with which the dome and the frame are reciprocally tightened.

Also advantageously, the clamp of the invention may be applied on the skylight or on the smoke extractor even after this has been put in place and in any

position along the outside edge of the frame.

The aims and advantages stated will be better shown in the description of a preferred embodiment of the invention, which is given as an example without limitation and which refers to the enclosed diagrams in which:

- FIG. 1 shows a cross section of a clamp made with the known technique;
- FIG. 2 shows an axonometric view of the clamp of the invention;
- FIG. 3 shows a cross section of the clamp of the invention shown in FIG. 2;
- FIG. 4 shows an exploded view of the clamp of the invention shown in FIG. 3;
- FIG. 5 shows a detail of the clamp of the invention during connection to the frame.

The clamp of the invention is shown in an axonometric view in FIG. 2 and in a cross section in FIG. 3 where it is indicated overall with 1 and its purpose is to block together the dome C and the frame T which compose the cover, indicated overall with L, of a skylight or of a smoke extractor.

It may be observed, referring also to FIG. 4, that the clamp 1 comprises a first element 2 connected to the frame T and a second element 3 having the free end 4 resting externally on the dome C above the frame T and the opposite end 5 coupled to the first element 2 by means of fastening.

According to the invention the means of fastening are composed of at least one hinge 6 which forms an axis of rotation X of the elements 2, 3 substantially parallel to the plain defined by the frame T.

More precisely the hinge 6 comprises a concave seat 6a having a substantially C-shaped transverse profile, created in the first element 2 and a pin 6b created in the second element 3 having a transverse profile mating with the concave seat 6a.

The seat and the pin may be coupled in a stable but removable manner by sliding them reciprocally in an axial direction following the common axis of rotation X stated above, which they define when they are reciprocally coupled.

Corresponding to the hinge 6 there are also means of fixing, indicated overall with 11, which, as may be seen in greater detail in the exploded view shown in FIG. 4, comprise a nut screw 11a belonging to the second element 3 and a contact surface 11b belonging to the first element 2, combined with a screw 12 which mates with the nut screw 11a and which presents a manoeuvring head 12a and an end 12b which cooperates by contrast against the contact surface

11b.

It may also be seen that the nut screw 11a is located just upstream from the pin 6b and that, in the contact surface 11b, there is a concave seat 6a into which fits the above-mentioned pin 6b.

One edge of end 11c made in relief and protruding at a right angle to the contact surface 11b, laterally catches the end 12b of the screw 12 holding it in place corresponding to the contact surface 11b.

The first element 2 has means of coupling at one end 2a, indicated overall with 7, which couple removably by snapping into a longitudinal channel 8 located in the edge on the outer side wall 9 of the frame T.

In particular it may be seen in FIG. 4 that the means of coupling 7 comprise a recess 7a which holds a first protruding edge 8a belonging to the longitudinal channel 8 and an angular heel 7b, on the part opposite the recess, 7a, which snaps into an angular seat 8b located between a second protruding edge 8c of the longitudinal channel 8 and a shaped appendix 10 of the frame T protruding from the longitudinal channel 8.

It may also be seen that the free end 4a of the second element 3 supports a flexible element 13 with a concave surface 13a facing the dome C, coupled in an articulated manner to the free end by means of a hinge element, indicated overall with 14 and substantially the same as the hinge element that forms the means of fastening 6 between the elements 2 and 3.

As regards the operation for securing the dome C on the frame T it is first of all necessary to connect the first element 2 of the clamp 1 to the frame T.

For this purpose, as may be seen in FIG. 5, the first element 2 is tilted and brought closer to the frame T so as to insert the first protruding edge 8a of the channel 8 into the recess 7a. Then, forcing the first element 2 in a substantially horizontal direction as indicated by the arrow F, the angular heel 7b is pushed into the angular seat 8b until it snaps into place.

The protruding profile 7c of the first element 2 to which the angular heel 7b belongs, thus rests on the corresponding shaped profile 10a of the shaped appendix 10.

The flexible element 13 then snaps onto the free end 4 of the second element 3 and the elements 2 and 3 are connected to each other, coupling the pin 6b by sliding it along the axis X into the corresponding concave seat 6a.

To force the dome C against the frame T, the operator adjusts the head 12a of

the screw 12 and, screwing it into the respective nut screw 11a, forces the end 12b against the contact surface 11.

The second element 3 therefore tends to turn around the axis X following the anticlockwise direction indicated by the arrow R in FIG. 3, forcing the dome C against the frame T.

Preferably, a gasket G is inserted.

The operator can perform sensitive regulation of the thrust of the dome C against the frame T by tightening or slackening the screw 12 in the respective nut screw 11a.

The advantages offered by the use of the clamp described above may be understood.

Above all it is not necessary to drill a hole in the frame T or even in the elements that make up the clamp, since the connection is guaranteed by the snap closure of the means of coupling 7.

This leads to a reduction of workshop processes and allows the clamp to be fitted in any position along the frame, even on site, when the skylight or smoke extractor has already been installed.

Moreover the operator receives an advantage in tightening operations, because the closing thrust of the dome against the frame may be very precisely regulated with the screw torque, if necessary using a torque wrench.

Moreover the arrangement of the clamp fastening at the side of the frame means that the contact between the dome C and the frame T takes place continuously along the whole plate P of the frame T. A uniform distribution of pressure is thus obtained in all points of the frame, guaranteeing the same degree of hermetic seal in every point.

For greater safety, each of the elements 2 and 3 which compose the clamp presents a seat respectively 15, 16 between which is secured a tie rod 17 which guarantees lasting stability of the closure, even if the screw 12 should accidentally work slack.

In particular the tie rod 17 may be composed, for example, of a screw passing through the elements 2, 3, against which it is tightened by nuts placed at the end.

In another embodiment the tie rod may also be composed of a snap-on metal collar fitted with suitable means of manoeuvring to keep it tight.

It may therefore be understood that the clamp in the invention achieves all the

set aims.

Although the clamp in the invention has been described with reference to the enclosed figures, it may present different shapes and dimensions from those illustrated.

Also as regards the means of coupling and fastening, these too may be made with different shapes and dimensions from those illustrated and described.

It is therefore understood that any variations in execution made to the clamp that are not mentioned and described, in so far as they fall within the field covered by the following claims, are all to be considered protected by this patent.

CLAIMS

1) Clamp (1) suited to blocking together the dome (C) and the frame (T) which compose the cover (L) of a skylight or of a smoke extractor, comprising:

- a first element (2) connected to said frame (T);
- a second element (3) having the free end (4) resting externally on said dome (C) above said frame (T) and the opposite end (5) removably coupled to the first element (2) by means of fastening (6);
- means of fixing (11) suited to blocking said second element (3) against said dome (C), characterised in that said means of fastening (6) are composed of at least one hinge (6) which forms an axis of rotation (X) of said elements (2, 3), substantially parallel to the plain defined by said frame (T).

2) Clamp (1) according to claim 1) characterised in that said at least one hinge (6) is placed corresponding to said means of fixing (11) and comprises a concave seat (6a) with a substantially C-shaped transverse profile, created in said first/second element (2, 3) and a pin (66) created in said second/first element (3, 2) having a transverse profile mating with said concave seat, said pin (6b) and said seat (6a) being removably coupled by sliding them reciprocally in an axial direction following the common axis of rotation (X).

3) Clamp (1) according to claim 2) characterised in that said means of fixing (11) comprise at least one nut screw (11a) belonging to said first/second (2, 3) element and at least one screw (12) coupled to said nut screw (11a) and having the end (12b) opposite the manoeuvring head (12a) which cooperates by contrast against the contact surface (11b) belonging to said second/first element (3, 2).

4) Clamp (1) according to claim 3) characterised in that said nut screw (11a) is located just upstream from said pin (6b).

5) Clamp (1) according to claim 3) characterised in that in said at least one contact surface (11b) there is said concave seat (6a).

6) Clamp (1) according to claim 3) characterised in that said at least one contact surface (11b) presents one edge of the end in relief (11c) suited to catching laterally against the end (12b) of said screw (12).

7) Clamp (1) according to claim 1) characterised in that said first element (2) presents at one end (2a) means of coupling (7) which couple removably by snapping into a longitudinal channel (8) located in the edge on the outer side wall (9) of said frame (T).

8) Clamp (1) according to claim 7) characterised in that said means of coupling (7) comprise at least one recess (7a) which holds a corresponding first protruding edge (8a) belonging to said longitudinal channel (8) and at least one angular heel (7b) on the part opposite said at least one recess (7a) which snaps into an angular seat (8b) located between a second protruding edge (8c) of said longitudinal channel (8) and a shaped appendix (10) of said frame (T) protruding from said channel (8).

9) Clamp (1) according to claim 8) characterised in that said longitudinal channel (8) presents a cross section having a C-shaped profile in which the free ends are composed of said protruding edges (8a, 8c) facing each other.

10) Clamp (1) according to claim 8) characterised in that said angular heel (7b) belongs to a shaped profile (7c) of said first element (2) and rests against the corresponding shaped profile (10a) of said shaped appendix (10) when said longitudinal channel (8) receives the coupling of said first element (2).

11) Clamp (1) according to claim 1) characterised in that it comprises at least one flexible element (13) coupled in an articulated manner to the free end (4) of said second element (3), suited to resting against said dome (C).

12) Clamp (1) according to claim 11) characterised in that said flexible element (13) presents a curved profile with the concave part (13a) facing said dome (C).

13) Clamp (1) according to claim 1) characterised in that said first element (2) and said second element (3) each present at least one seat (15, 16) for holding a safety tie rod (17).

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Prior Art

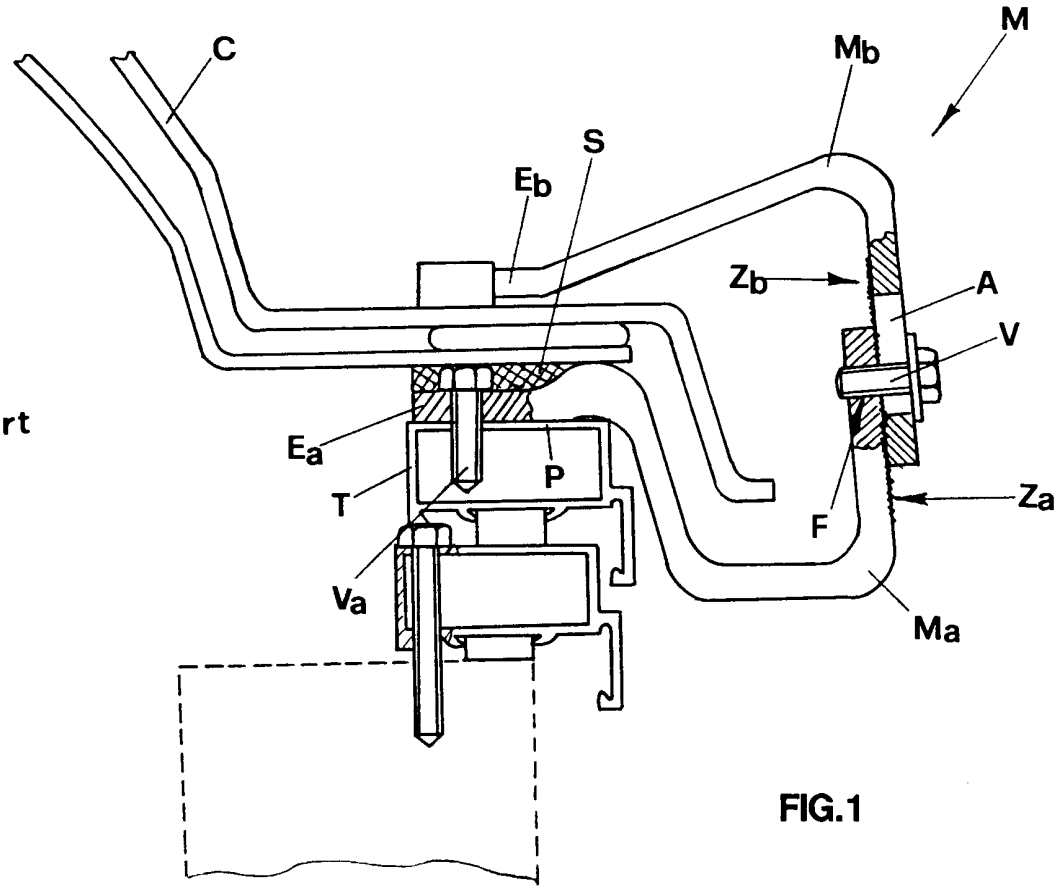


FIG.1

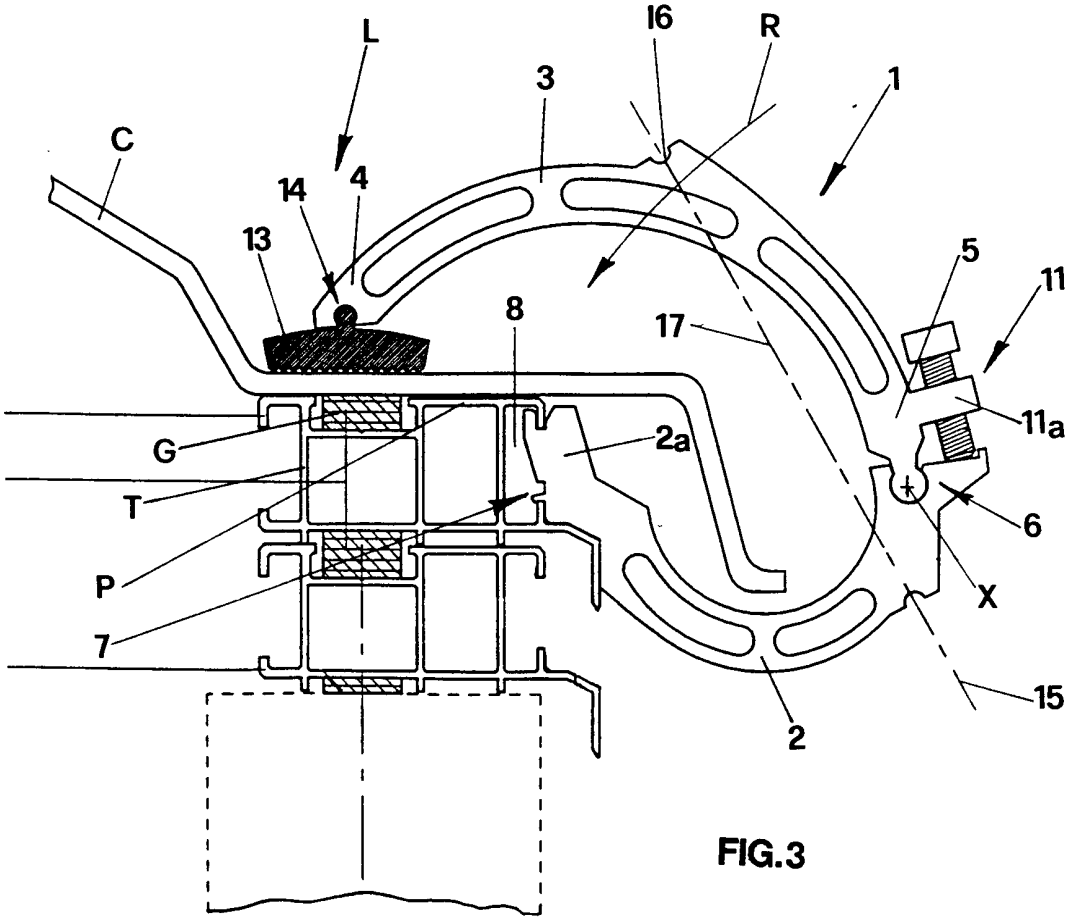


FIG.3

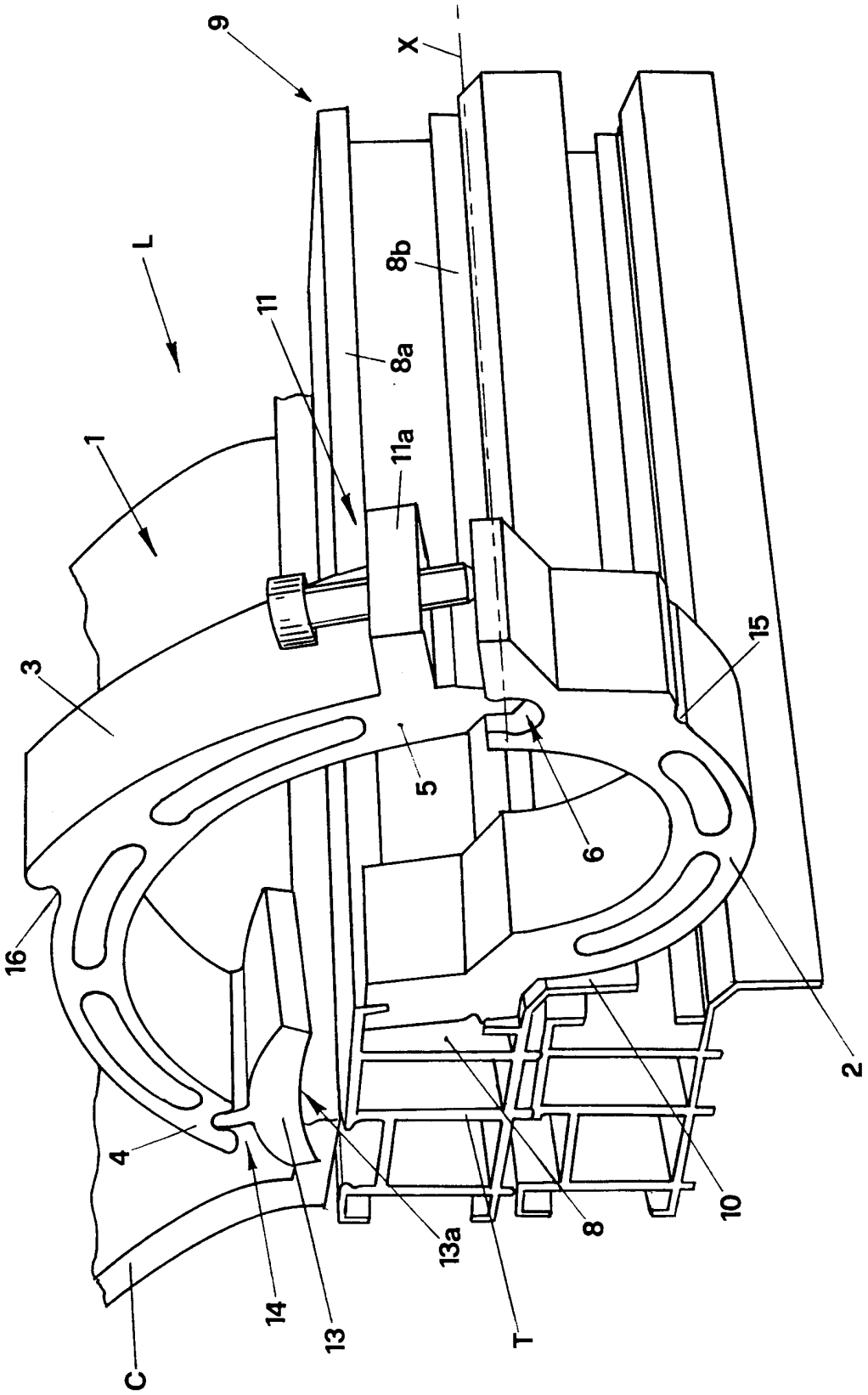


FIG.2

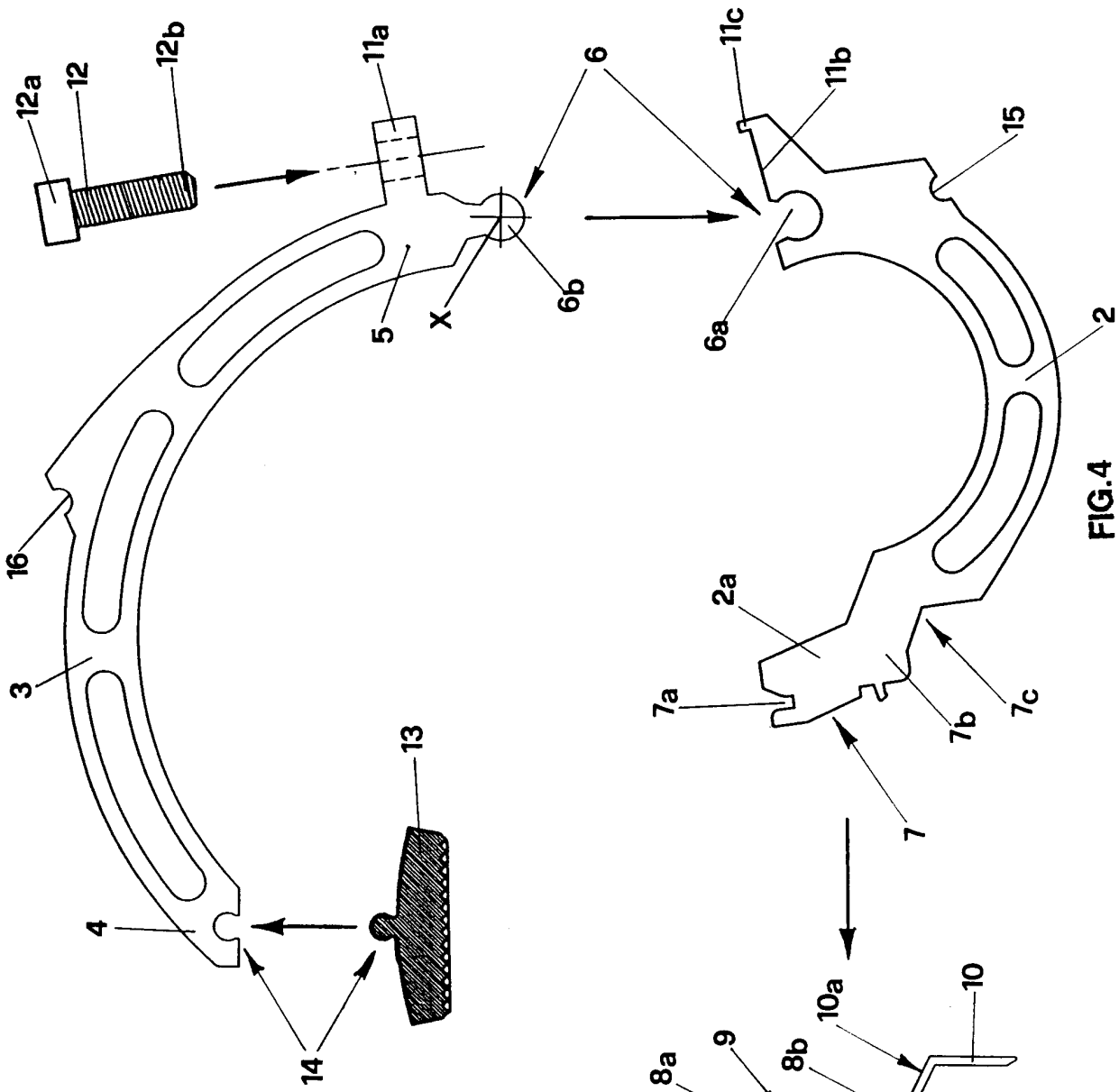

12a
12
12b
11a
6
11c
11b
15
6a
6b
5
X
2
16
3
4
13
14
2a
7a
7b
7c
7
10a
10
9
8a
8b
8
8c
T

FIG.4

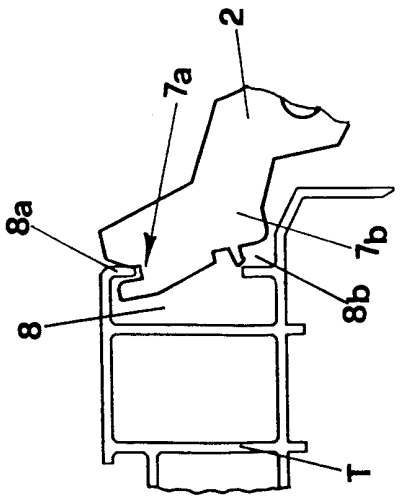

2
7a
8a
7b
8b
8
T

FIG.5

INTERNATIONAL SEARCH REPORT

Intern ıal Application No
PCT/EP 00/09852

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04D13/03

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E04D F16B

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 15 09 096 B (KLAUS ESSER KG) 4 September 1969 (1969-09-04) the whole document	1
A	US 2 144 140 A (BATCHELLER) 17 January 1939 (1939-01-17) the whole document	1

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

☒ Patent family members are listed in annex.

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

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Date of the actual completion of the international search	Date of mailing of the international search report
17 January 2001	26/01/2001

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern ıal Application No
PCT/EP 00/09852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1509096 B	04-09-1969	BE 644725 A	01-07-1964
US 2144140 A	17-01-1939	NONE	