(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 696 671 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.02.1996 Bulletin 1996/07

(51) Int. Cl.[6]: **E06B 9/02**, E04D 13/03

(21) Application number: **95202210.1**

(22) Date of filing: **14.08.1995**

(84) Designated Contracting States:
BE DE DK FR GB LU NL SE

(30) Priority: **12.08.1994 NL 9401309**

(71) Applicant: **SECUSTRIP B.V.**
NL-2153 GG Nieuw-Vennep (NL)

(72) Inventor: **Zijlstra, Gijs**
NL-1077 BO Amsterdam (NL)

(74) Representative: **de Bruijn, Leendert C. et al**
NL-2502 LS Den Haag (NL)

Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

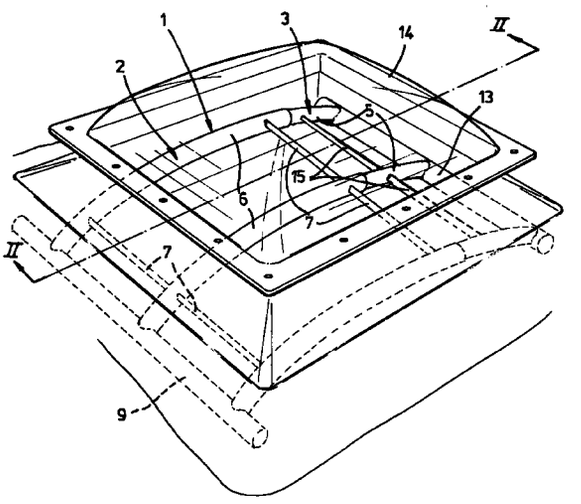
(54) Device for protecting an opening

(57) Device (1) for protecting an opening, such as an opening made in a ceiling, which is closed off with the aid of a transparent cover (14).

According to the invention, it is proposed to fit a grating (2) between the boundaries (4) of the opening. Said grating (2) comprises longitudinal bars (5,6) which are movable with respect to one another in order to provide simple adjustments to openings of different dimensions.

Particularly high strength is obtained by constructing an assembly of longitudinal bars (5,6) in such a way that said bars (5,6) have a shape which is convex as a whole. When subjected to load from above, for example during an attempt to break in, the ends of the longitudinal bars (5,6) will be jammed against the boundary (4) of the opening.

Fig-1



EP 0 696 671 A1

Description

The present invention relates to a device for protecting an opening, comprising a first part and a second part, wherein the first part comprises a number of longitudinal bars located some distance apart and joined by a number of transverse bars in order to form a grating, the longitudinal bars being provided at one free end thereof with fixing means for fixing to the boundary of the opening, and which second part comprises a number of longitudinal bars corresponding to the number of longitudinal bars in the first part, wherein the free ends of the longitudinal bars of the second part are provided with fixing means for fixing to the boundary of the opening, the other free ends of the longitudinal bars of the first part and the other free ends of the longitudinal bars of the second part being designed so as slidably to accommodate one another.

A device of this type is generally known in the prior art and is described, for example, in US Patent 5 283 976. This publication discloses a grating to be fitted in an opening such as a window, skylight and the like. In this device the longitudinal bars are arranged so as to be slidable into one another in order to provide for adjustment to openings of different dimensions.

Moreover, locking means are provided in order to fix the longitudinal bars with respect to one another, after they have been slipped into a certain position, so as, in this way, to obtain a rigid construction.

Although a device of this type suffices, it has the disadvantage that it is of relatively heavy construction and is complex because of the presence of the locking means.

The aim is to provide a device, for protecting an opening, which does not require locking means of this type and which can be of relatively lightweight construction, especially in respect of the fixing to the surrounding peripheral edge.

This aim is achieved with a device as described above in that the longitudinal bars of the first and the second part are of such curved shape that convex longitudinal bars are formed when the first and second parts are in the assembled position.

The invention is based on the insight that, as a result of the convex shape, when a load is applied from the "convex" side the longitudinal bars which are movable with respect to one another initially "jam together". On increasing the load, one part thereof is converted by the curved shape of the longitudinal bars into a force which is directed outwards, that is to say the free ends of the longitudinal bars are pushed against the peripheral boundary of the opening, as a result of which the grating according to the invention becomes jammed into the opening. Consequently, the fixing to the boundary edge of the opening can be of relatively lightweight construction. Moreover, as can be seen from the above, no retaining means are required in order to fix the longitudinal bars, which can be slid into one another, with respect to one another.

It will be understood that by this means an appreciable simplification is achieved, whilst the grating obtained in this way has a more aesthetic appearance.

The device described above is preferably used in skylights and the like in which the convex shape is towards the outside. Especially in the case of skylights, the load exerted by, for example, burglars or other undesired persons will be directed downwards, with the result that the jamming effect is optimum.

However, it must be understood that the device according to the invention can likewise be used in a non-horizontal or even a vertical position.

The fixing for the longitudinal bars by one of their free ends, that is to say those ends of the longitudinal bars which are not intended to slide into one another, can comprise any construction disclosed in the prior art.

According to an advantageous construction, the longitudinal bars are hingeably fixed at least on one side to the peripheral edge. By this means it is possible to close the grating according to the invention simply on initial assembly and, on the other hand, it is possible simply to fold the grating out of the way for maintenance work or in the event of fire and the like.

The parts of the hinge fixed to the peripheral edge of the opening can be fitted by means of screws or by any other connection disclosed in the prior art. According to an advantageous embodiment, protection means are provided which expose such screws in the non-functional position of the device according to the invention and conceal said screws in the functional position of said device. This is achieved in that the protection moves with the grating according to the invention.

The opposing free ends of the device according to the invention are preferably provided with retaining means which interact with the retaining means fitted to the peripheral edge of the opening. Locks or the like can optionally be provided to ensure that releasing can be carried out only by authorised persons.

The invention will be explained in more detail below with reference to an illustrative embodiment shown in the drawing. In the drawing:

Fig. 1 shows a perspective view of the device according to the invention used in combination with a skylight;
Fig. 2 shows the device according to Fig. 1 in cross-section along the line II-II, in various positions;
Fig. 3 shows two details of the device according to Fig. 2;
Fig. 4 shows a cop view of the details shown in Fig. 3 and
Fig. 5 shows a detail of a modified embodiment of the lock construction and
Fig. 6 shows a cross-section along the line VI-VI in Fig. 5.

In the figures, the device according to the invention is indicated in its entirety by 1. This device is designed to be fitted beneath a skylight 14 fitted in, for example, a

flat roof. Device 1 consists of a first part 2 and a second part 3. The first part 2 consists of a number of spaced longitudinal bars 6 and joined by transverse bars 7. The second part 3 consists of a number of longitudinal bars 5 arranged some distance apart and joined by transverse bars 15. It can be seen from the figures that the longitudinal bars 5 are able to slide into longitudinal bars 6 (see, in particular, Fig. 2). As a result of this slidability, it is possible to provide for optimum adjustment to openings of different widths.

Although a grating with three longitudinal bars has been shown in the above example, it must be understood that any other number of bars can be used. For wider openings it is, moreover, possible to incorporate a number of devices according to the invention alongside one another.

The opening in which the device according to the invention is fitted is indicated by 4. The boundary edge thereof is indicated on one side by 16 and on the other side by 17. Edge 16 and part 2 are fixed by means of a hinge construction which will be explained in more detail with reference to Fig. 3.

It can be seen from this figure that the longitudinal bars 6 are joined together by a continuous transverse bar 9. This transverse bar 9 is provided with openings or recesses 18. Transverse bar 9 is hingeably fitted around a smaller inner bar 8. The latter is likewise provided with openings 10 for, for example, fitting therethrough a screw 11, which can be firmly fixed into boundary edge 16.

As can be seen from Fig. 3, recess 18 is not located in front of opening 10. That is to say, screw 11 is not accessible in the position shown in Fig. 3.

If, however, part 2 is swung into the position shown in broken lines in Fig. 2, opening 18 will come to lie in front of opening 10 and screw 11 will become accessible.

This is a particularly effective guarantee against misuse because screws 11 and other fixing means are accessible only when the grating according to the invention is in the open position.

The other free end of the grating is provided with a transverse bar 13. Peripheral edge 17 is provided with a number of protruding lips 19 which are arranged on a common support 20, which can be fixed to edge 17 in any manner disclosed in the prior art. Lips 19 are provided with openings for accommodating therein locks 12 which are able to interact with plates arranged in longitudinal bar 13.

In this way, part 3 can be secured to boundary edge 17.

It must be understood that the construction shown here can be reversed, that is to say that part 2 is fixed by some sort of retaining means to edge 17 and part 3 is hingeably mounted on edge 16.

Because longitudinal bars 5 and 6 slide into one another, during assembly the user is able, in a particularly simple manner, automatically to provide for optimum sizing for the opening 4 concerned. After sliding the longitudinal bars into one another, the convex shape of the device according to the invention which is shown in Fig. 2 is obtained. When a load is applied, any play which exists between longitudinal bars 5 and 6 will first be taken up by said bars engaging in one another at their ends. When the load applied is increased, part of the force component will push the grating according to the invention against the boundary edges 16 and 17. As a result, the fixings on either side will be subjected to as little stress as possible and, for example, screw 11 and lock 12 will be subjected to hardly any load.

A further embodiment of the lock construction according to the invention is shown in Fig. 5. In this figure the support is now indicated by 21, which support consists of an essentially flat plate provided on one side with openings 22 for accommodating screws 23 and provided on the other side with mushroom-shaped parts 24. Said mushroom-shaped parts 24 consist of a pin 25 and an enlarged head 26.

In this embodiment, transverse bar 13 is provided with openings 27 at the location of mushroom-shaped parts 24. Incidentally, it must be understood that in practice more such mushroom-shaped parts 24 are arranged on support 21 in the lengthwise direction of transverse bar 13 and that a corresponding number of openings 27 is also present in transverse bar 13. These openings 27 are circular or somewhat elongated in the perpendicular direction, as is shown in Fig. 6. A tube 28 is located inside transverse bar 13. This tube 28 is slidable and rotatable backwards and forwards with some play inside transverse bar 13.

At the location of the mushroom-shaped parts 24, tube 28 is provided with slots 29. These slots consist of a relatively narrow section 30 and a larger section 32. With this arrangement, head 26 is able to pass through the opening in the larger section 32, but not through the opening in narrower section 30. On the other hand, pin 25 is able to move both through the larger section 32 and through the narrower section 30. A lock is arranged at the end of tube 28, which lock is shown diagrammatically and indicated by 33. The lock is provided with a cam 34 which can be moved inwards by means of the key and which engages behind the connection between transverse bar 13 and longitudinal bar 5.

The above construction functions as follows. With the cam brought inwards, that is to say with pipe 28 freely movable, this pipe 28 is positioned with respect to transverse bar 13 such that the0 larger section of slot 29 is located in front of opening 27. (Lock in the position brought towards the outside). In this position the first and second parts of the device 1 are in a position in which they are slid inwards with respect to one another to some extent. Transverse bar 13 with opening 27 is then brought in front of head 26. The first and the second parts are then moved outwards with respect to one another, so that head 24 moves successively through openings 27 and 32.

This is a stable position for the device. Only after this position is reached does the user have to provide for securing, which can be effected by moving tube 28 with the lock to the right in the drawing, as a result of which

the narrow section 30 of slot 29 comes into a position below head 26. On actuating the lock, cam 34 drops behind the connection between longitudinal bar 5 and transverse bar 13 and securing takes place.

Releasing takes place in the reverse direction.

With this construction it is possible in a particularly simple manner, using a single lock, to achieve various retaining mechanisms with the aid of different mushroom-shaped parts and slots and openings.

It can be seen from the above that many different variants of lock construction are possible.

Moreover, it will be understood that the greater the longitudinal dimension of the opening, the greater can be the radius of curvature of the grating because the effect of pushing outwards becomes greater.

Although the invention has been shown above with longitudinal bars which have an elongated cross-section, it will be understood that any other shape can be used. Similarly, it is possible for bars 5 to slide over bars 6.

Furthermore, the retaining means which in the present invention are shown as lock means can be constructed in any other manner known from the prior art.

These and other constructions are considered to fall within the scope of the present invention as given in the claims.

Claims

1. Device for protecting an opening, comprising a first part (2) and a second part (3), wherein the first part comprises a number of longitudinal bars (6) located some distance apart and joined by a number of transverse bars (7) in order to form a grating, the longitudinal bars being provided at one free end thereof with fixing means for fixing to the boundary of the opening, and which second part (3) comprises a number of longitudinal bars (5) corresponding to the number of longitudinal bars (6) in the first part (2), wherein the free ends of the longitudinal bars (5) of the second part are provided with fixing means for fixing to the boundary of the opening, the other free ends of the longitudinal bars (6) of the first part and the other free ends of the longitudinal bars (5) of the second part being designed so as slidably to accommodate one another, characterised in that in that the longitudinal bars of the first and the second part are of such curved shape that convex longitudinal bars are formed when the first and second parts are in the assembled position.

2. Device according to Claim 1, wherein the fixing means for the free ends at one side comprise hinge means, which hinge means are connected on one side to said free ends and on the other side are provided with screws or the like for fixing to the boundary of the opening.

3. Device according to Claim 2, wherein the free ends at one side are provided with protective means (9) which prevent access to the seat (10) in the use position of the device.

4. Device according to one of the preceding claims, wherein the fixing means for the free ends at one side comprise retaining means comprising a retainer part (13) to be fixed to the boundary of the opening and a retainer part which interacts with retainer part (13) and is attached to the free ends at one side.

5. Device according to Claim 4, wherein the retaining means are provided with a lock (12).

Amended claims in accordance with Rule 86(2) EPC.

1. Device for protecting an opening, comprising a first part (2) and a second part (3), wherein the first part comprises a number of longitudinal bars (6) located some distance apart and joined by a number of transverse bars (7) in order to form a grating, the longitudinal bars being provided at one free end thereof with fixing means for fixing to the boundary of the opening, and which second part (3) comprises a number of longitudinal bars (5) corresponding to the number of longitudinal bars (6) in the first part (2), wherein the free ends of the longitudinal bars (5) of the second part being designed so as slidably to accommodate each other and realize connected longitudinal bars, characterized in that, the longitudinal bars of the first and second parts are of such a curved shape that the connected longitudinal bars extend in the position of use from the free extremities of the longitudinal bars convexly curved in upward direction.

2. Device according to Claim 1, wherein the fixing means for the free ends at one side comprise hinge means, which hinge means are connected on one side to said free ends and on the other side are provided with screws or the like for fixing to the boundary of the opening.

3. Device according to Claim 2, wherein the free ends at one side are provided with protective means (9) which prevent access to the seat (10) in the use position of the device.

4. Device according to one of the preceding claims, wherein the fixing means for the free ends at one side comprise retaining means comprising a retainer part (13) to be fixed to the boundary of the opening and a retainer part which interacts with retainer part (13) and is attached to the free ends at one side.

5. Device according to Claim 4, wherein the retaining means are provided with a lock (12).

Fig -1

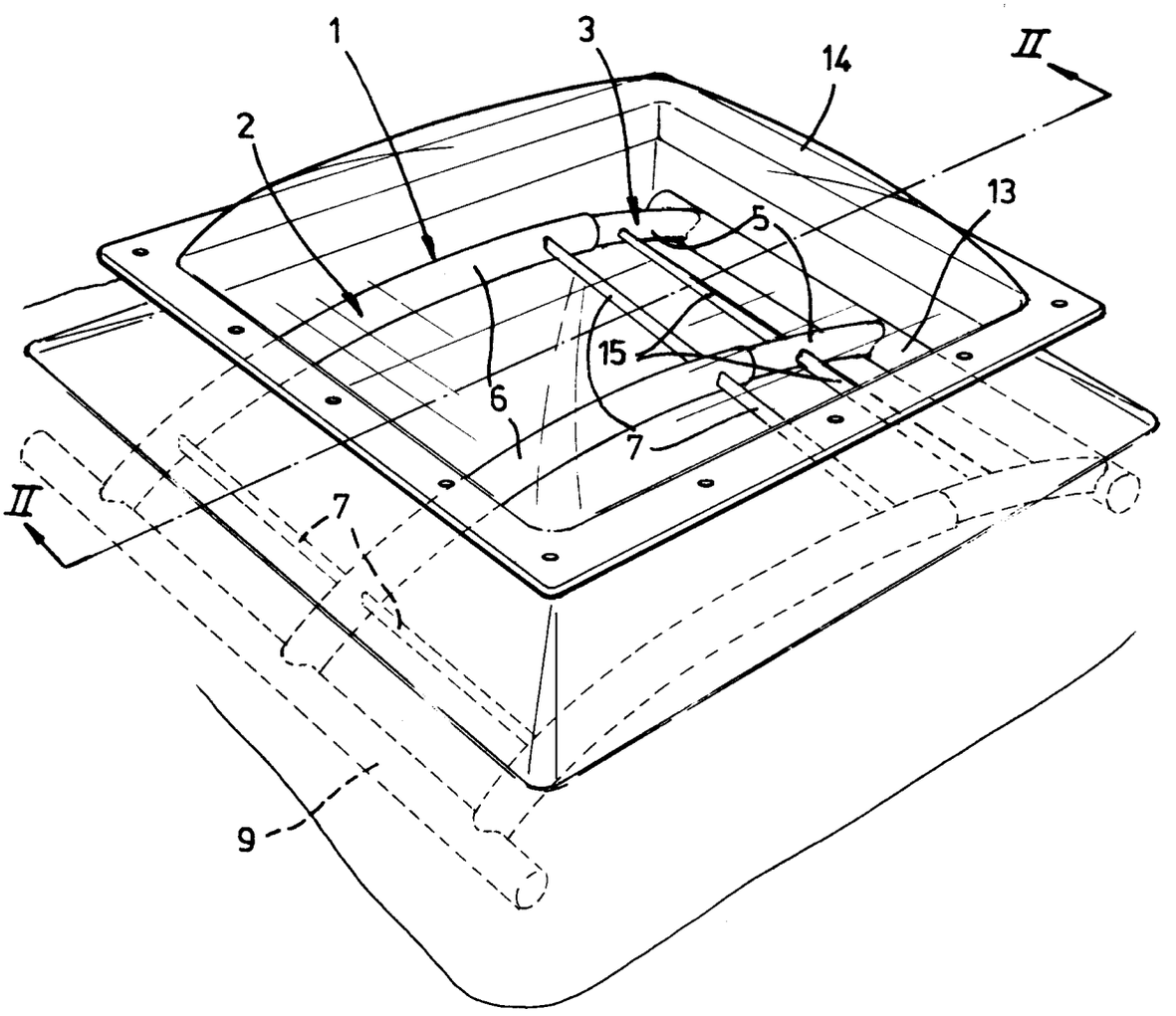


Fig-2

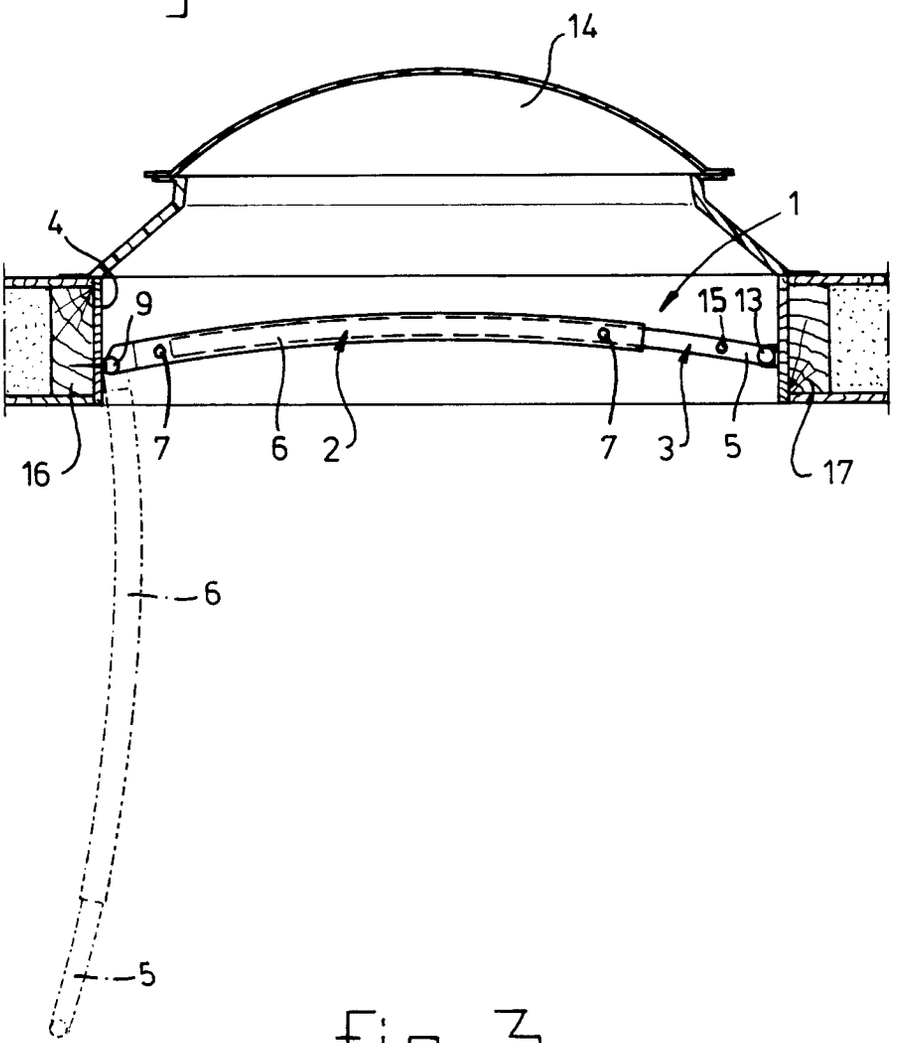


Fig-3

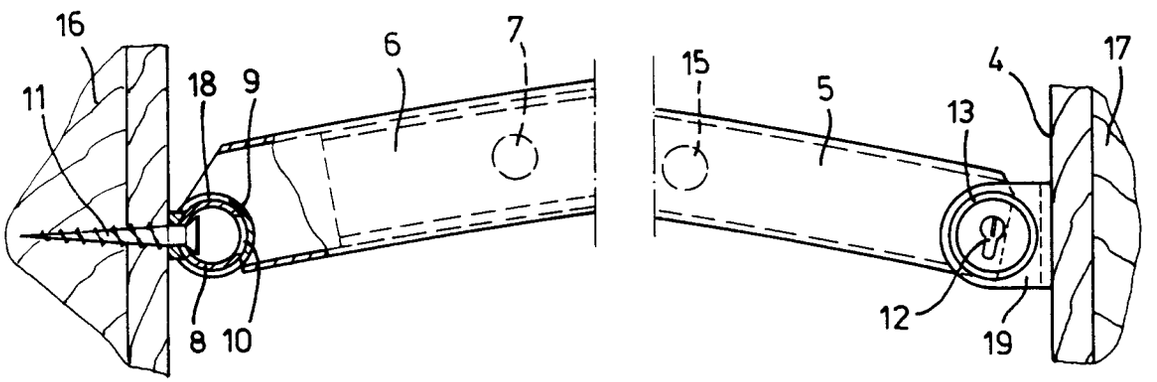


Fig-4

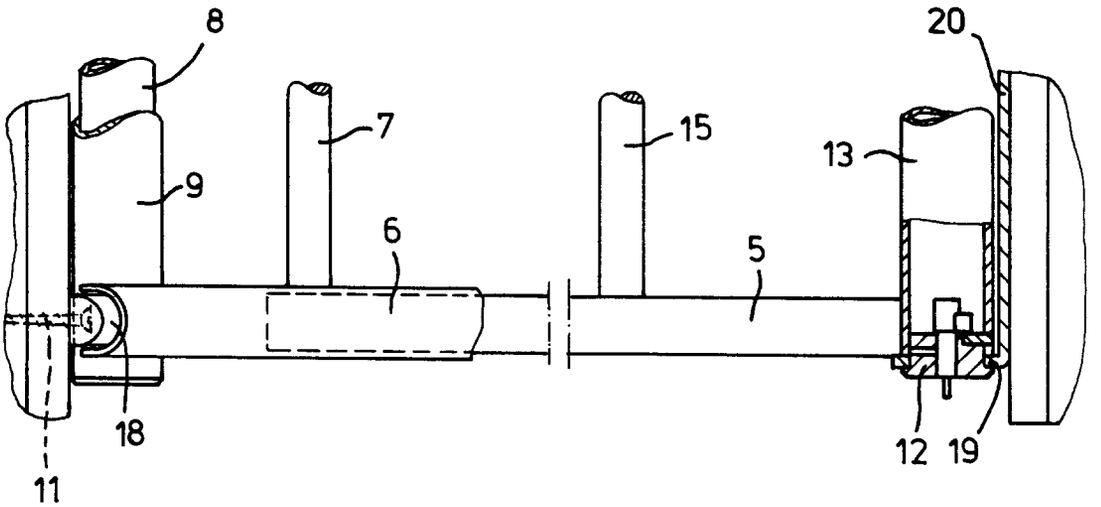


Fig-5

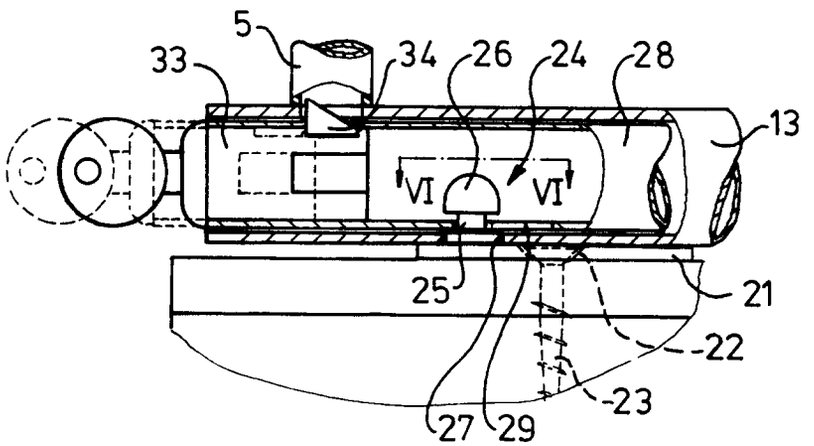
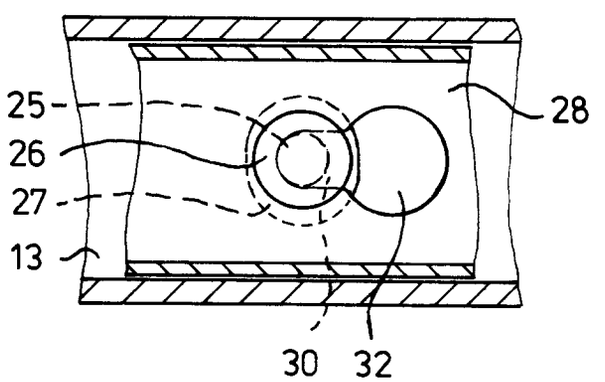


Fig-6



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 20 2210

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)
D,A	US-A-5 283 976 (LA MONT) * the whole document *	1	E06B9/02 E04D13/03
A	US-A-4 624 072 (ZILKHA) * column 2, line 12 - line 20; figures *	1	
A	DE-B-11 46 630 (BOCAMA S.A.R.L.) * column 3, line 42 - line 48 * * column 4, line 24 - line 32; figures *	1,2	
A	US-A-5 237 788 (SANDOW) * the whole document *	1,4	
A	DE-U-83 03 624 (FA. J. EBERSPÄCHER)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E06B
E04D
E04G
E03F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 October 1995	Peschel, G

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

EPO FORM 1503 03.82 (P04C01)