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

(11) EP 1 243 741 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.09.2002 Bulletin 2002/39

(51) Int Cl.[7]: **E06B 9/15**

(21) Application number: **01106855.8**

(22) Date of filing: **19.03.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **ITALSUD S.R.L.**
74100 Taranto (IT)

(72) Inventor: **Chiffi, Cosimo**
74100 Taranto (IT)

(74) Representative: **Tansini, Elio Fabrizio et al**
c/o BUGNION S.p.A.
Viale Lancetti 17
20158 Milano (IT)

(54) Roller shutter for windows, doors and the like comprising a plurality of slats

(57) It is disclosed a roller shutter for windows, doors and similar openings comprising a plurality of slats (2) each having a first attachment extension (6) comprising a hook-like arched final portion (6a) and a second attachment extension (7) comprising an arched end (7a) adapted to be housed in the hook-like arched final portion (6a) of an adjacent slat.

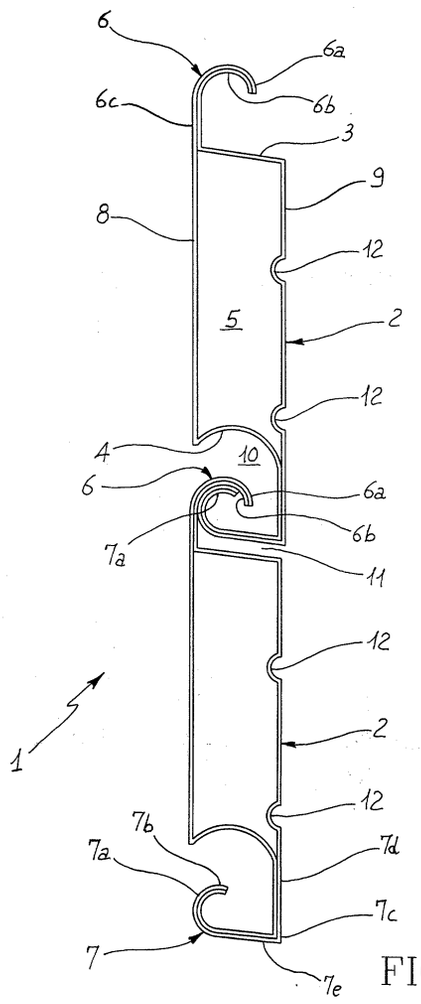

FIG. 1

EP 1 243 741 A1

Description

[0001] The present invention relates to a roller shutter for windows, doors and similar openings comprising a plurality of slats disposed in side by side relationship along minor longitudinal faces thereof which correspond to their thickness and each having at said minor longitudinal faces, attachment extensions adapted to form articulated connections with the respective attachment extensions of the adjacent slats.

[0002] It is known that roller shutters can be manufactured using either plastic or wood material or a metal material if particular features of sturdiness and resistance to illicit tampering are required.

[0003] Each roller shutter comprises a plurality of slats disposed in side by side relationship along their minor longitudinal faces corresponding to their thickness and each having attachment extensions at said minor longitudinal faces adapted to form articulated connections with respective attachment extensions of the adjacent slats so as to enable winding of the shutter itself on a roller.

[0004] Practically, in the case of roller shutters of metal material, each slat is formed of a main body consisting of a box-shaped element obtained from a pressure-bent sheet metal according to a preestablished shape that also defines the attachment extensions turned upwardly and downwardly in the operating position of the slat.

[0005] The known art of the standardized type generally provides for said upwardly-facing attachment extension to have a substantially arched configuration in the form of a hook, i.e. like an open eyelet, and for the downwardly-facing attachment extension to substantially consist of a sheet metal portion bent at an acute angle, i.e. having a starting flat length substantially in alignment with the main face of said slat with which a final flat length is integral, which final length is bent relative to the starting length so as to form a sharp edge therewith. Said final flat length is adapted to fit the concavity of the hook-like arched extension of the underlying slat.

[0006] In addition, in the known art the minor longitudinal face of the slat corresponding to the downwardly-facing attachment extension, generally extends according to a shape adapted to define a substantially concave hollow space intended for housing the upper attachment extension of the downwardly disposed slat. Such a concave hollow space is laterally confined, on the side of the main slat face designed to be turned outwardly, by a final flat portion of the minor longitudinal face itself, which is substantially opposite to the starting flat length of the lower attachment extension. Said final flat portion forms a beak-shaped endpiece with an end band of the adjacent main face, which is adapted to cover the upper attachment extension of the underlying slat.

[0007] The known art briefly described above appeared to be inadequate to solve the task of supplying a sufficient safety degree against breaking-down and knocking out attempts.

[0008] In fact, by introducing a screwdriver, a jemmy or a similar tool under the above mentioned beak-shaped endpiece disposed at the lower part of the main face of each outwardly-turned slat, a thrust action can be exerted against the outer surface of the upper attachment extension that will bend and, in turn, will tend to widen the acute angle included between the starting length and final length of the lower attachment extension of the underlying slat. This final length therefore can become disconnected from the concavity of the upper attachment extension thereby causing disengagement between the two respective adjacent slats.

[0009] Under this situation the technical task underlying the present invention is to conceive a roller shutter for windows, doors and similar openings capable of substantially obviating the above mentioned drawbacks.

[0010] Within the scope of this technical task it is an important aim of the invention to devise a roller shutter for windows, doors and similar openings which is very safe, i.e. capable of offering an important resistance to effraction attempts.

[0011] The technical task mentioned and the aim specified are substantially achieved by a roller shutter for windows, doors and similar openings, comprising a plurality of slats disposed in side by side relationship along minor longitudinal faces thereof that correspond to their thickness and each having, at said minor longitudinal faces, a first attachment extension which is integral with a first minor longitudinal face of the slat and has a final arched portion in the form of a hook, and a second attachment extension which is integral with the second minor longitudinal face of the slat, characterized in that it has an arched end adapted to be housed in said hook-like arched final portion of an adjacent slat.

[0012] Description of a preferred but not exclusive embodiment of a roller shutter in accordance with the invention is now given hereinafter by way of non-limiting example, with the aid of the accompanying drawings, in which:

- Fig. 1 is a cross-sectional view of two slats in engagement with each other belonging to a roller shutter in accordance with the invention; and
- Fig. 2 shows the behaviour of the slats in Fig. 1 in the case of a shutter-breaking attempt.

[0013] With reference to the drawings, a portion of the roller shutter in accordance with the invention has been generally identified by reference numeral 1.

[0014] It comprises a plurality of slats 2 disposed in side by side relationship along minor longitudinal faces thereof that correspond to their thickness and comprising, for each slat, a first minor longitudinal face 3 turned upwardly when the shutter is in an operating position, and a second minor longitudinal face 4 turned downwardly.

[0015] Each slat 2 is formed of a box-shaped element obtained through pressure-bending of a sheet metal

which is preferably externally plasticized, and comprising a main body 5 advantageously filled with foamed material. Projecting from said main body is a first attachment extension 6 integral with the first minor longitudinal face 3 and a second attachment extension 7 integral with the second minor longitudinal face 4.

[0016] Practically, the first attachment extension 6 of each slat is adapted to form an articulated connection with the second attachment extension 7 of the slat overlying it in an operating position.

[0017] In an original manner, both attachment extensions 6 and 7 have an arched shape. More specifically, the first attachment extension 6 comprises a hook-like arched final portion 6a substantially defining an arc of a circumference corresponding to an angle not exceeding 180°, and the second attachment extension 7 comprises an arched end 7a substantially defining an arc of a circumference corresponding to an angle not exceeding 270° and adapted to be housed in said arched final portion 6a. The arched end 7a has a convex outer surface 7b the shape of which matches the shape of the concave inner surface 6b of the final portion 6a at least partly, and is suitably oriented from a base portion 7c of the second attachment extension 7 itself so that it makes the convex surface 7b abut against said concave surface 6b of the first attachment extension 6 of the overlying slat.

[0018] In addition, the arched final portion 6a is disposed in the continuation of a flat starting segment 6c of the first attachment extension 6 in alignment with a first main face 8 of slat 2 designed to define the inner surface of the slat, whereas the base portion 7c of the second attachment extension 7 extends starting from a second main face 9 opposite to the first main face 8 and designed to define the outer surface of the slat.

[0019] The base portion 7c of the second attachment extension 7 comprises a first flat length 7d in alignment with the second main face 9 and a second flat length 7e bent at an angle relative to the first length 7b. The second length 7b advantageously looks slightly inclined downwardly, away from the first main face 8, to enable outflow of rainwater to the outside. For the purpose, an inclination angle included between 6° and 8°, preferably of 7° is provided.

[0020] The second minor longitudinal face 4 preferably has a concave shape with a bending radius substantially corresponding to that of the arched final portion 6a of the first attachment extension 6. The first flat length 7d of the second attachment extension extends in a convenient manner so as to form a space 10 sufficient to enable articulation between the slats, which space is confined between the second minor longitudinal face 4 and said arched final portion 6a of the underlying slat.

[0021] The starting segment 6c too of the first attachment extension 6 has a development adapted to define a hollow space 11 of appropriate sizes for operation of the roller shutter, which space is interposed between the second length 7e of the second attachment extension 7 and the first minor longitudinal face 3 of the underlying slat 2.

[0022] Finally, in the second main face 9 defining the outer surface there is the presence of at least one stiffening rib 12.

[0023] Preferably two ribs are present that extend in parallel to the longitudinal axis along the whole surface of the second main face 9. Such ribs are made up of substantially circular recessed grooves of a radius substantially corresponding to the distance between the length 7e of a slat and the first minor longitudinal face 3 of the adjacent slat at the region where said slats are in engagement with each other.

[0024] The ribs that are substantially spaced apart the same distance from each other have a camouflaging function with the hollow space 11 to which they seem to be almost identical when seen from the outside.

[0025] The behaviour of a possible effraction attempt carried out on the roller shutter in accordance with the invention is the following.

[0026] Insertion of a screwdriver 13, a lever or a similar tool into the hollow space 11 between two adjacent slats that is visible towards the outer surface of the roller shutter can bring to two different results depending on whether the mentioned tool, once fitted in the hollow space 11, is pushed upwardly or downwardly.

[0027] In the former case a compression occurs and, as a result, deformation of the sharp edge included between the first flat length 7d and the second flat length 7e of the second attachment extension 7a takes place which, by further upward rotation of the tool, is followed by a curl-like squashing of the arched final portion 6a giving rise to an increase in tightening between the first and second attachment extensions 6 and 7.

[0028] In the latter case, i.e. when the pointed tool used is rotated downwardly, the arched end 7a of the second attachment extension 7 is compressed and squashed against the concave inner surface 6b of the first attachment extension which, in turn, is externally contained by the base portion 7c.

[0029] Practically, the more the effraction tool is pushed downwardly, the greater the penetration of the arched end 7a of the arched final portion 6a and the steadier the hooking between the two adjacent slats.

[0030] In addition, the presence of ribs 12 that, above all at night, may be confused with the hollow space 11 achieve the effect of misleading a burglar or at all events creating difficulties to said burglar at the time of the effraction because the screwdriver cannot penetrate thereinto.

[0031] The invention achieves important advantages.

[0032] In fact the roller shutter in accordance with the invention enables a very high safety to be achieved due to the fact that all slats forming the roller shutter are hooked together very strongly. As a result, use of roller shutters of metal material appears to be quite appropriate because the invention makes it possible to fully exploit the greater capacities of resisting breaking or bur-

glary that these roller shutters have as compared with those made of other different materials.

Claims

1. A roller shutter for windows, doors and similar openings comprising a plurality of slats (2) disposed in side by side relationship along minor longitudinal faces (3, 4) thereof which correspond to their thickness and each having, at said minor longitudinal faces, a first attachment extension which is integral with a first minor longitudinal face (3) of the slat (2) and has a hook-like arched final portion (6a) and a second attachment extension (7) which is integral with the second minor longitudinal face (4) of the slat (2), **characterized in that** said second extension has an arched end (7a) adapted to be housed in said hook-like arched final portion (6a) of an adjacent slat.

2. A roller shutter as claimed in claim 1, **characterized in that** said hook-like arched final portion (6a) is substantially defined by an arc of a circumference corresponding to an angle not exceeding 180° and said arched end (7a) is substantially defined by an arc of a circumference corresponding to an angle not exceeding 270°.

3. A roller shutter as claimed in claim 1 or 2, **characterized in that** said arched end (7a) of said second attachment extension (7) has a convex outer surface (7b) the shape of which matches that of the concave inner surface (6b) of the arched final portion (6a) of said attachment extension (6) at least partly, said second attachment extension (7) comprising a base portion (7c) adapted to cause abutment of said convex outer surface (7b) against said concave inner surface (6b) of the first attachment extension (6) of an adjacent slat.

4. A roller shutter as claimed in claim 3, **characterized in that** the hook-like arched final portion (6a) of said first attachment extension (6) extends from a first main face (8) of the slat (2) designed to define the inner surface of the roller shutter, and **in that** the base portion (7c) of said second attachment extension (7) extends from a second main face (9) of the slat opposite to a first main face (8) and designed to define the outer surface of the roller shutter.

5. A roller shutter as claimed in claim 4, **characterized in that** said base portion (7c) of said second attachment extension (7) comprises a first flat length (7d) in alignment with said second main face (9) of the slat (2) and a second flat length (7e) bent at an angle relative to said first length (7d) and substantially extending in parallel to said first minor longitudinal face (3).

6. A roller shutter as claimed in claim 5, **characterized in that** said first attachment extension (6) has a flat starting segment (6c) in alignment with said first main face (8) of the slat and extending in such a manner that it defines a hollow space (11) interposed between the first minor longitudinal face (3) and said second flat length (7e) of the second attachment extension (7) of an adjacent slat.

7. A roller shutter as claimed in claim 5 or 6, **characterized in that** said first minor longitudinal face (3) and said second flat length (7e) both have a downward inclination away from the first main face (8).

8. A roller shutter as claimed in claim 7, **characterized in that** said first minor longitudinal face (3) and second flat length are inclined by an angle included between 6° and 8° relative to the transverse axis of the longitudinal faces.

9. A roller shutter as claimed in claim 8, **characterized in that** said angle is of 7°.

10. A roller shutter as claimed in claim 1, **characterized in that** said second minor longitudinal face (4) has a concave shape with a bending radius substantially corresponding to that of said first arched final portion (6a).

11. A roller shutter as claimed in claim 10, **characterized in that** said second main face (9) has at least one stiffening rib longitudinally extending along the whole slat.

12. A roller shutter as claimed in claim 11, **characterized in that** said stiffening rib is formed of a groove of a size substantially corresponding to the distance between the length or stretch (7e) of a slat and the first minor longitudinal face (3) of the adjacent slat at the region where said slats are in mutual engagement.

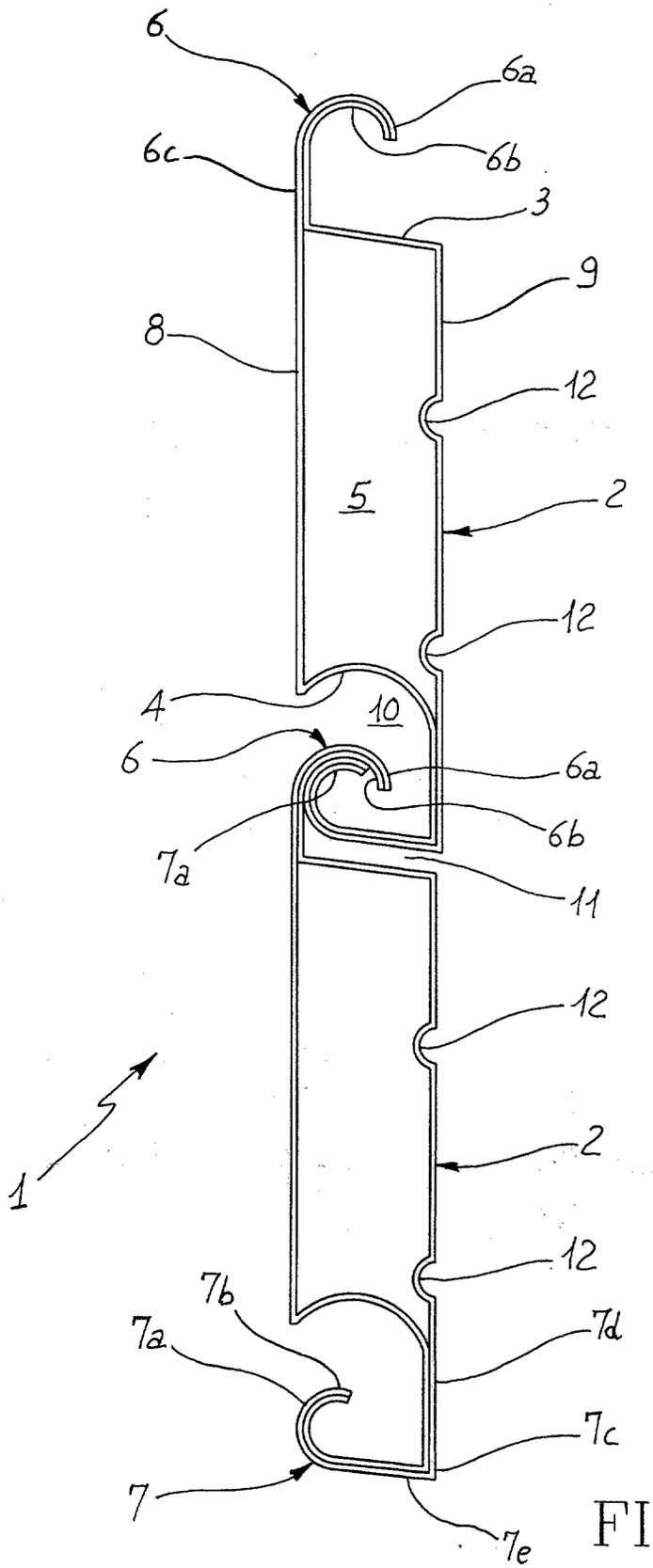

FIG. 1

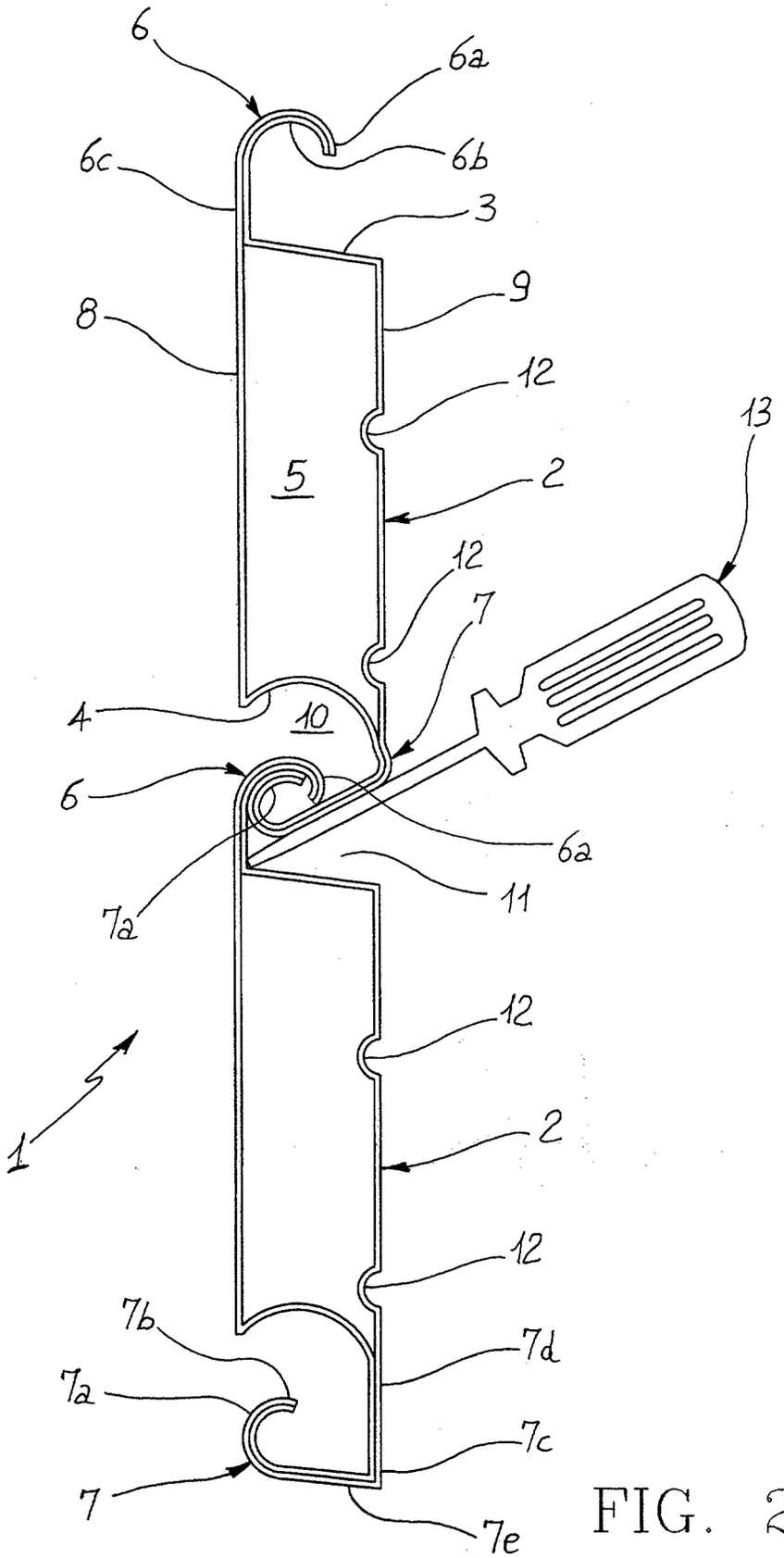

FIG. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 10 6855

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y	DE 195 23 349 A (RIEXINGER TUERENWERKE GMBH) 9 January 1997 (1997-01-09) * the whole document * ---	1-7 8-12	E06B9/15
X Y	EP 0 806 540 A (RIEXINGER TUERENWERKE GMBH) 12 November 1997 (1997-11-12) * figures 2-4 * ---	1,3-6 8-10	
Y	DE 93 10 826 U (CITEA SRL) 25 November 1993 (1993-11-25) * figure 1 * ---	11,12	
A	FR 2 075 080 A (VANGHELUWE JOZEF) 8 October 1971 (1971-10-08) * figure 2 * -----	11,12	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	8 August 2001	Kofoed, P

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)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 10 6855

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-08-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19523349 A	09-01-1997	NONE	
EP 0806540 A	12-11-1997	DE 19618912 A	11-12-1997
DE 9310826 U	25-11-1993	IT 227611 Y	15-12-1997
		ES 1025761 U	01-02-1994
FR 2075080 A	08-10-1971	BE 745196 A	01-07-1970

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82