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(54) Busbar assembly

(57) Protected multipolar terminal block, characterized by connecting parts, hook 4.11 and neck 42.1 integrated on insulators 4, and by holding dents 9.1 and 13.1 on parallel platters 3. Such a parts allow the rapid and easy assembling and disassemble of connecting bars 42 in cages 3.1d, 3.1s, and so on, of parallel platters 3, without screws, but moving connecting bars 42 in parallel throughout the directions α, β, γ, and δ.

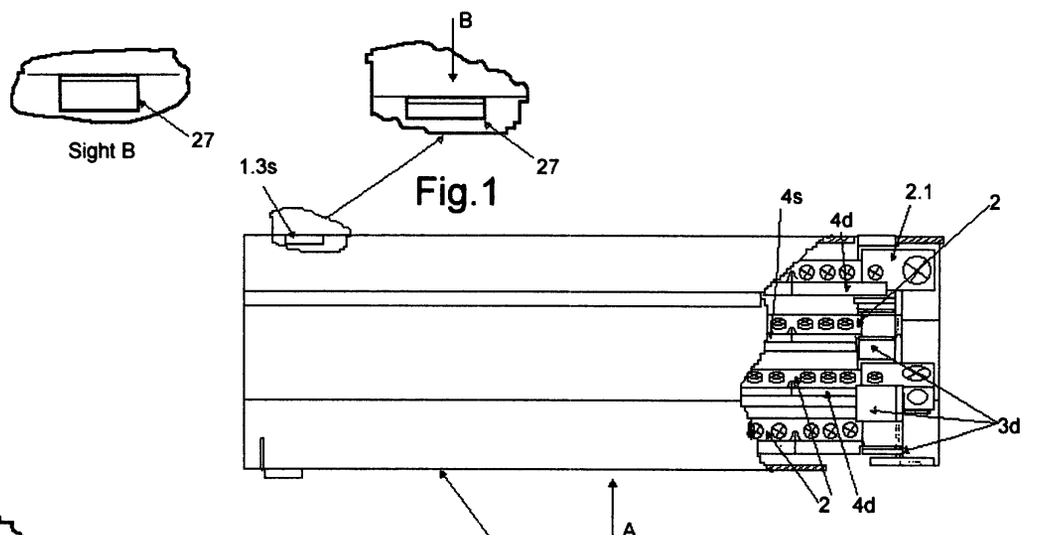

Fig.1

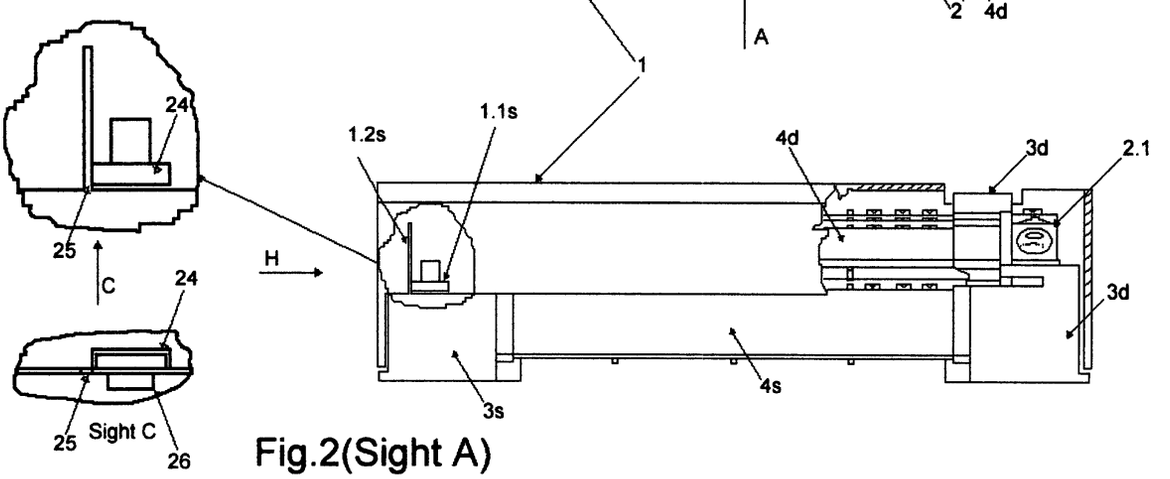

Fig.2(Sight A)

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Description

[0001] The present invention lies in a protected multipolar terminal block for electrical panels.

[0002] Terminal blocks aim at distributing the electrical power to countless conductors which by means of it they are wired inside any electrical panel or distributing system.

[0003] The terminal blocks used at present are made of two plane plates of plastic material, that, specularly shaped, run parallel through the assembling of metal connecting bars which doubly act as wiring bars or connecting terminals and connecting bars of the above said side plates.

[0004] For considerable power levels the main conductors that dispense energy to the bars/terminal posts have big sections and at convenience a bigger supplementary connector is supplied for each phase placed on the front side of the plastic plates opposed to where the connecting bars join; in particular, such supplementary connector is provided with an end which inserts into the plastic side plates, from the opposite side to the one where the connecting bars join, up to reach and connect to the corresponding bar/terminal post by means of a screw in order to guarantee electrical continuity to the wiring system.

[0005] Purpose of the present invention is that of supplying a new model of terminal block which make assembling easy and reducing the costs, but also simple to disassemble for an easier access to the conductors in the occasion of adjustments to the electrical installation.

[0006] The terminal block, according to the invention, is described in detail as follows and shown by the drawings of the following tables:

1) Front sight of the terminal block with partially removed parts
2) Bottom sight of the terminal block with partially removed parts
3) Face 3.8s of the left plate 3s sight
4) Face 3.9s of the left plate 3s sight
5) Face 3.8d of the right plate 3d sight
6) Face 3.9d of the right plate 3d sight
7) Enlargement of Fig. 5) with parts in evidence
8) Connecting cage 3.2d with relevant sight C and section DD
9) Connecting cage 3.3d with relevant sight E
10) Sight A of the right plate 3d
11) Sight B of the Plate 3d with in evidence the housing of the little holding plate 21 with relevant sights F and G
12) Holding plate 21
13) Sight H of the single cover 1 of the terminal block
14) Sight of the insulating plate 30 with relevant sight I
15) Sight in succession of the insulator 4d, 4s from the direction where the metal connectors 2 and relevant section LL is inserted, sight M, sight N, section PP and sight O
16) Front sight of the connectors 2 and relevant over sight Q
17) Left connecting bar 42 made of the connectors 2 inserted in the insulator 4s.

[0007] The present invention provides with a terminal block easy to assemble and disassemble preventing the operator from being obliged to part the main conductors connector from the second conductors connectors.

[0008] Such invention, in a preferred execution, is made of two parallel plates 3d and 3s, equipped with the same number of connecting cages, for instance, 3.1d, 3.2d, 3.3d, 3.34d and so 3.1s, 3.2s 3.3s, 3.4s; moreover, it is made of plastic insulators 4s and 4d identical and specular with each other,

[0009] Fig. 15); inserting the terminal metal connectors 2, already complete with connectors for main conductors, in the insulators we obtain the connecting bars 42 whose ends are apt to join solidly with the connecting cages on the plates 3d and 3s constituting a single body; the terminal block develops in case with the removable cover 1 and the insulating plate 30.

[0010] The insulating cages are all made of four straight sides, of which three adjacent and perpendicular with each other and to the plate surface where they belong, and one laying in such plane and adjacent to the former three. The inserting of the connecting bars 42, Fig 17) in the correspondent cages is performed by an action that moves them simultaneously parallel to each other along the respective directions α,β,γ e δ, as can be seen in Figs. 3) and 4). The big cages 3.1d and 3.3d are identically shaped, with all the sides and correspondent angles of equal measure but angularly offset with the intent to keep the connecting bars 42, and consequently the metal bars 6, differently inclined for an easier inserting of the conductors in the connectors. Similarly we can say for the couple 3.2d and 3.4d.

[0011] Furthermore the big cages 3.1d and 3.3d are specular and identically made of correspondent sides and angles measuring the same as the cages 3.2s and 3.4s, but differing for the directions of inserting of the connecting bars 42 that come out to be respectively δ and β for the former two and γ and α for the others. Similarly it can be said for the small cages 3.2d, 3.4d, 3.1s and 3.3s.

[0012] To a big type cage, for instance 3.1d on the plate 3d, it corresponds in parallel a small cage, then, 3.1s on the plate 3s; furthermore the cages alternate on the same plate, i.e. a cage, for instance, small has adjacent big cages and vice versa; in the small cages the hooked ends 4.1 of the insulators 4 are inserted, whereas in the big cages it must be the ends 4.2, such that the connectors 2.1 for main conductors are with each other maximally distant on the faces 3.9s and 3.9d.

[0013] Given the mentioned equalities we limit ourselves to analyse in detail a single small cage and a sin-

gle big cage, for instance, the 3.2d and the 3.3d. The cage 3.2d, Fig. 8) is made of two parallel sides 7 and 9 and of a side 8 adjacent and perpendicular to the former two and characterized of a rounded zone 8.1 and of a hole 8.2 of rectangular shape. It is made also of side 10, adjacent and perpendicular to the former three and constituted from the same plate 3d whom the cage belongs to. The only free border of the side 10) has a straight longitudinal concavity 10.2 transversal and adjacent to the side 9, see Sec. DD of Fig. 8) and Fig. 6). The side 9 has a holding dent 9.1 on the face directed towards the inside of the cage that has the purpose to prevent the connecting bar to slip off towards the opposite side when inserting along the direction γ.

[0014] The big cage is made of the parallel sides 11 and 13 and of a side 12 adjacent and perpendicular to the former two and characterized of a rounded zone 12.1. It is made of a side 14 too, adjacent and perpendicular to the former three and formed by the same plate 3d whom the cage belongs to. The side 13 has a holding dent 13.1, directed towards the inside of the cage, that has the purpose of preventing the connecting bar 42 to slip off towards the opposite side when inserting along the direction β. The side 11 is characterized of a transversal fold 11.1 apt to house the thickening 2.11 of the metal bar 2 close to the connector 2.1 as main conductor, Fig. 16).

[0015] The side 14 has the only free rim characterized of a straight convexity 14.1 transversal and adjacent to side 13, Figs. 6) and 9).

[0016] The sides 3.5d, 3.6d and 3.7d are specular to the respective 3.5 s, 3.6s and 3.7s, see Figs. 3), 4), 5) and 6).

[0017] The side 3.6 is made of a plane plate perpendicular to the plate plane 3 and equipped with a rectangular horizontal slot 15, which becomes itself a hole of rectangular section as the thickness of the plate 3 has just been overtaken, see Figs 7) and 10).

[0018] The side 3.5 is a plane plate perpendicular to the plate 3d and characterized of a tooth 16, see Figs. 3) and 5). The side 3.7d, see Fig. 7), is a plane plate characterized of two straight folds 17 and 18, in order to make, in its profile, a straight concavity apt to house the standard supporting bar ISO (DIN). The little tooth 19, together with the end 21.1 of the locking movable plate 21 prevent the unhooking of the plates 3 from the supporting bar ISO (DIN), alternatively there is a hole 31 for the wall mounting.

[0019] The locking plate 21 goes in the proper housing arranged on the side 3.7 along the direction ε. The housing is made of an inverted bridge 22 and of two hooks 23, see Fig. 11).

[0020] The elastic wings 21.2 of the plate 21 are apt to warp conveniently, permitting the plate 21 to slide, if pulled from the end 21.4 towards the opposite side of that of insertion, on purpose to permit the unhooking of the bar ISO (DIN) connectors, though not letting the plate 21 slip off completely from its housing.

[0021] The metal connectors 2, Fig. 16) are all the same and characterized of a succession of connectors whose inserting holes of the conductors have conveniently different and alternate diameters such that the adjacent connectors, as being overturned in the alternate insulators 4 right and left, have not big diameter holes lined with big diameter holes on the adjacent bars, for a better distribution of the conductors inside the terminal block.

[0022] The ends 4.1 of the insulators 4 are characterized of an hook 4.11 such to match with the longitudinal slot 10.1 of side 10 of the small cage, in addition the rung 4.13 is apt to go in the hole 8.2 of side 8, such to prevent the slipping off of the connecting bar towards the normal direction to the side plates 3. The hole 4.12 is fit to house the holding tooth 9.1 apt to prevent the slipping off of the bar in the same direction of insertion α or β or γ or δ .. The end 4.2 of the insulator is characterized of a hole 4.23 fit to house the end of the connectors 2 equipped of connector 2.1 as main conductor. The insertion of the connecting bar in the cages brings about the insertion of side 14 of the big cage in the neck 42.1 and the holding dent 13.1 in the hole 4.22, such that the slipping off by the end 4.2 from the big cage is avoided both in the normal direction to the plate and in the same direction of insertion into the same.

[0023] The side 4.6 has three cusps 4.62 with respective strengthening threads 4.61 apt to better contain the metal connector 2 in the insulator, see Fig. 15) Sec. LL.

[0024] The side 4.7 has other three strengthening threads 4.71 in correspondence of the threads 4.61.

[0025] Last, the side 4.8 has always three strengthening threads 4.81 in correspondence of the 4.61 and 4.71, though inside the insulator and also a strengthening thickening 4.21 which prolongs externally on side 4.3 of the thickening 4.31.

[0026] The cover 1 locks on the connectors, to cover the wirings, by means of the holes 27 that couple with the teeth 16 of the plates 3 and by means of the teeth 26 which insert in the holes 15 of the plates 3, see Figs. 1), 2), 3) and 5). The removal of the cover occurs by disengaging the teeth 26 through an action on the handles 24 made easy from the cuts 25 that increase the elasticity of the material.

[0027] Finally, the insulating plate 30, Fig. 14), works to prevent the possible contact of a scratched cable with the supporting metal bar ISO (DIN), in addition it has a structure apt to get stuck between the two plates 3 by means of the prolongations 28 of the sides 3.7, see Figs. 11).

Claims

1. Rapid assembling protected multipolar terminal block concerning connecting bars/ protected terminal posts for electrical cables wiring; as being made of two parallel plates 3 and of an appropriate

number of connecting bars 42, made of metal connectors 2 inserted in the insulators 4: as being the connectors 2 supplied, each one on its end, with a big section connector 2.1 for the main conductor; as being the connecting bars 42, joinable at their front in the connecting cages 3.1d, 3.1s, 3.2d, 3.2s, 3.3d, 3.3s, 3.4d, 3.4s integral with the plates 3d and 3s, moving the connecting bars parallel to each other along the directions α,β,γ e δ, and blocking into the cages through the holding dents 9.1 and 13.1, by means of the hooked ends 4.11 and by means of the neck 42.1 in which the side 14 of the big cages inserts, without the assistance of screws.

2. Terminal block, as claimed in claim 1), equipped with connecting bars 42, constituted by inserting of the connectors 2 in the right insulators 4d and left ones 4s; as being, in working conditions, they are angularly offset even remaining all reciprocally parallel on different planes in order to permit an easy inserting of the conductors into the connectors.

3. Connecting bars 42, whose connecting parts on an end match with the connecting parts placed on the end 4.1 of the insulators 4 whereas, on the other end, they are made of both the shape of the metal connectors 2, equipped with neck 42.1, and the inserting parts of the end 4.2 of the insulator, equipped with hole 4.22; as being the bars shaped such that the insertion into the cages determines the coupling of the hook 4.11 with the straight longitudinal concavity 10.1, the inserting of the rung 4.13 in the hole 8.2 and the insertion of the holding dent 9.1 in the hole 4.12 such that the end 4.1 becomes absolutely integral with a small cage; as being the bars such shaped that, the insertion into the cages determines the coupling of the holding dent 13.1 with the hole 4.22 and the insertion of the side 14 into the neck 42.1, such that the end 4.2 becomes absolutely integral with the big cage.

4. Terminal block, as claimed in claim 1), supplied with cover 1 and insulating plate 30; being equipped, for each plate 3, with inserting parts 15 and 16 apt to couple with parts 26 and 27 of the cover 1 in order to fix the latter to cover the wirings; being, the terminal block, supplied, for each plate 3, with a tooth 19 and hooking/unhooking system from the supporting bar ISO (DIN), made of the end 21.1 of the plate 21 and relevant housing on the front side 3.7 of the plate 3 made of the bridge 22 and hooks 23; being the terminal block supplied with hole 31 for the wall mounting; being, this hooking/unhooking system apt to guarantee, if necessary, mobility to the plate 21 in the direction ε without the disengaging of the plate from the same housing; being the terminal block supplied, for each plate 3, with prolongations 28 of the front sides 3.7, apt to permit the inserting of the insulating plate 30.

5. Metal connectors 2, all identical, **characterized by** a succession of connectors whose conductors inserting holes are with different proper diameters and alternate such that, following to the overturn of the connectors 2 in the right and left insulators, the big diameter holes are not lined with the big diameter holes of the adjacent bars, for a better distribution of the conductors inside the terminal block.

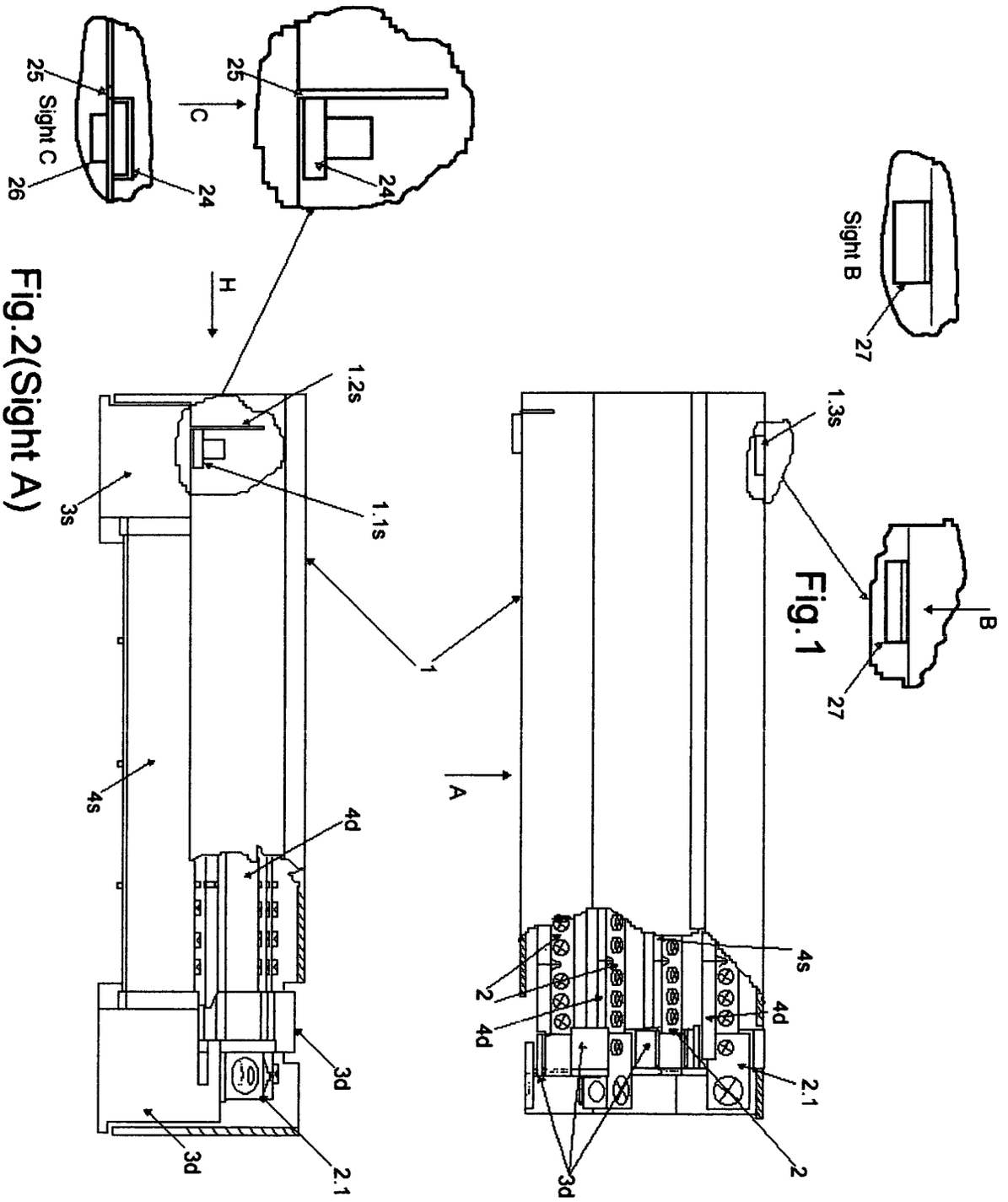
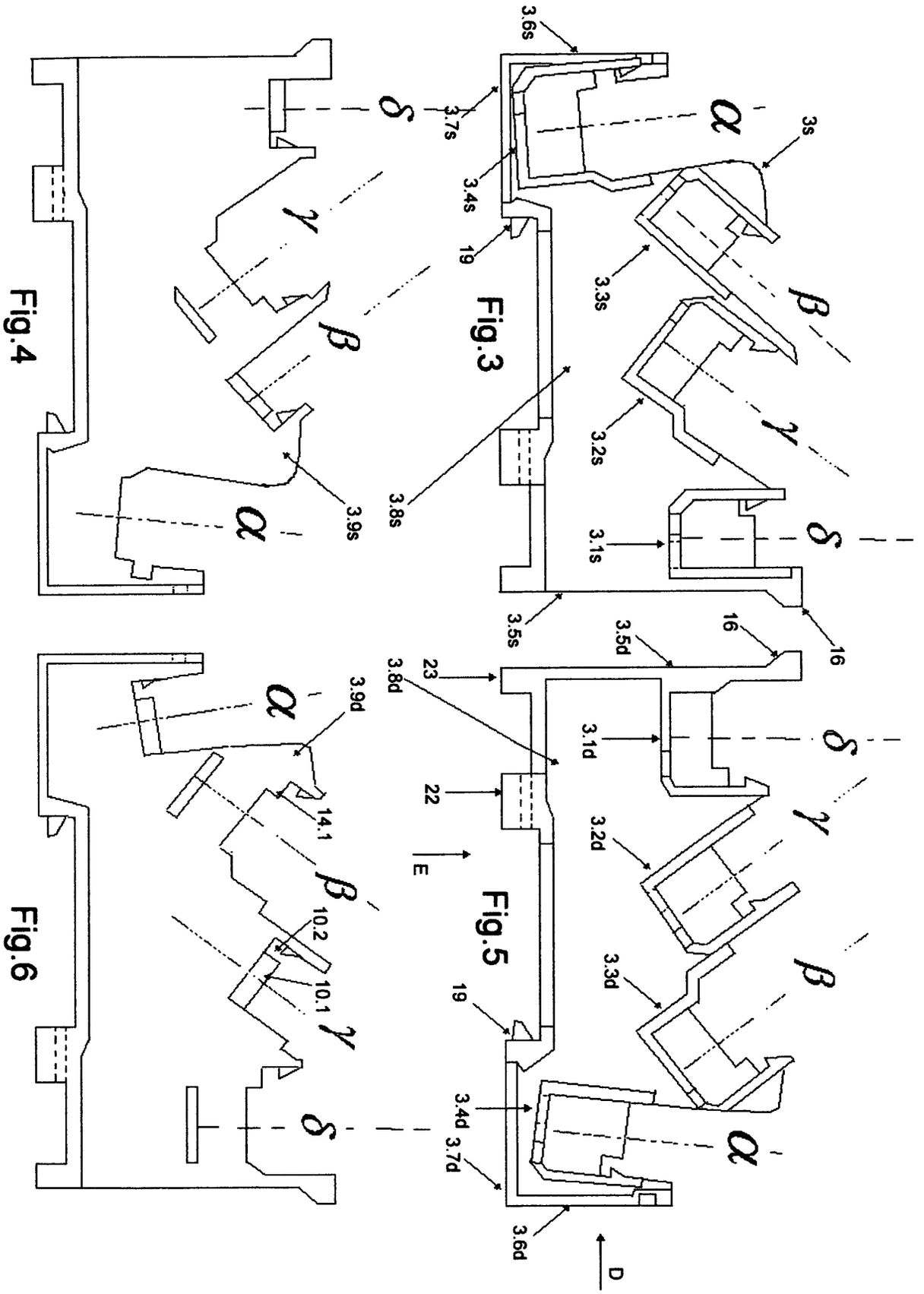

Sight B
27
1.3s
B
27
Fig.1
1
A
4s
2
4d
4d
2.1
2
3d
25
Sight C
26
24
C
25
24
H
1.2s
1.1s
3s
4s
4d
3d
3d
2.1

Fig.2(Sight A)


3.6s
3.7s
3s
3.4s
19
3.3s
3.2s
3.8s
3.1s
3.5s
16
16
3.9s
Fig.4
Fig.3
3.5d
16
23
3.8d
3.9d
3.1d
22
14.1
3.2d
E
10.2
10.1
19
3.3d
3.4d
3.7d
3.6d
D
Fig.6
Fig.5

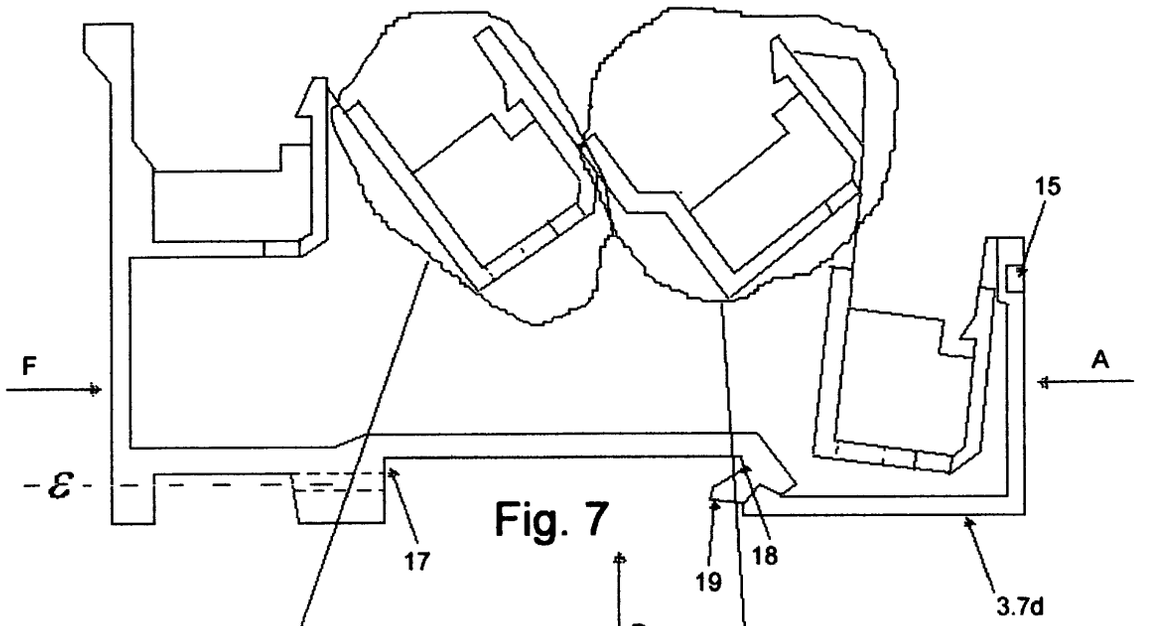


Fig. 7

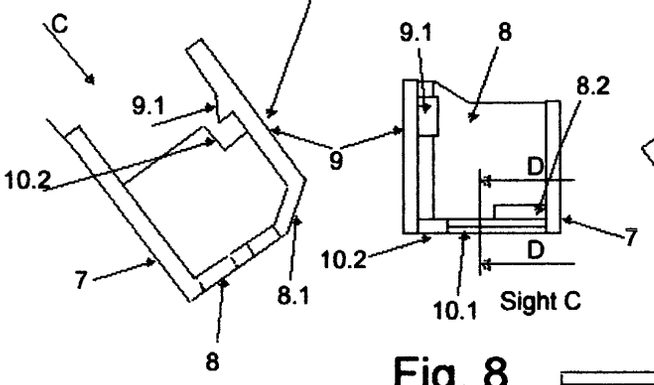


Fig. 8

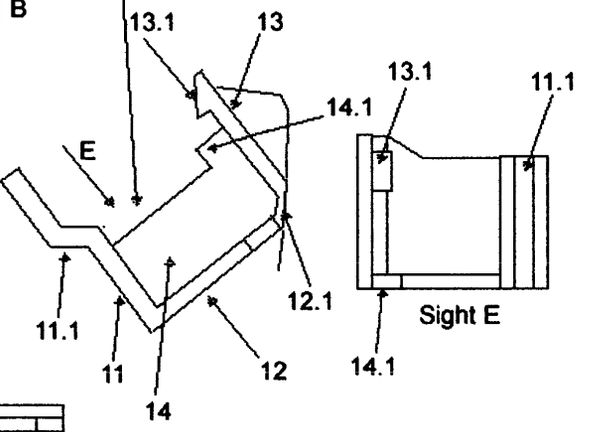
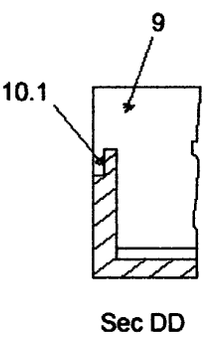


Fig. 9



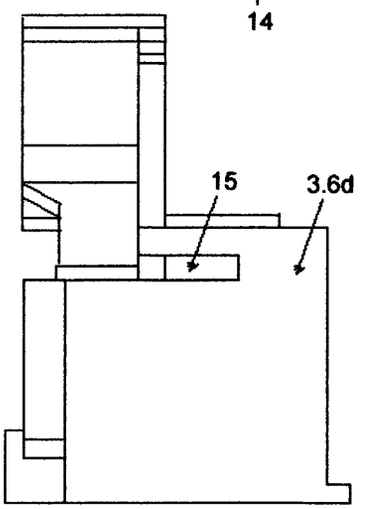


Fig. 10 (SightA)

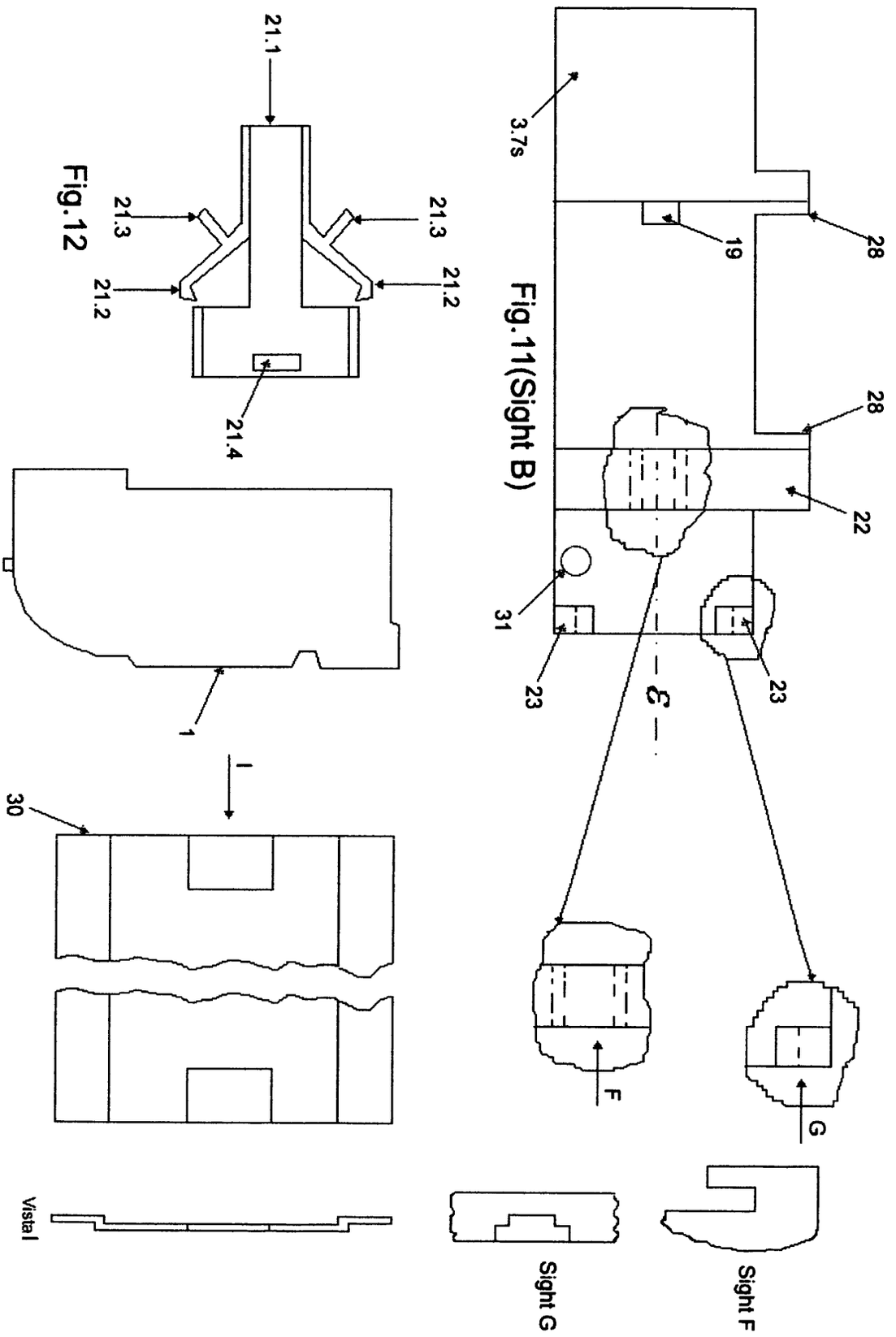


Fig.11(Sight B)

Fig.12

Fig.13

Fig.14

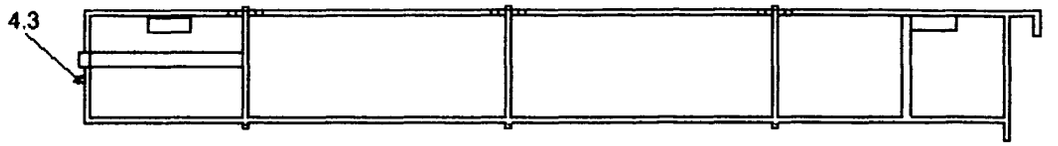
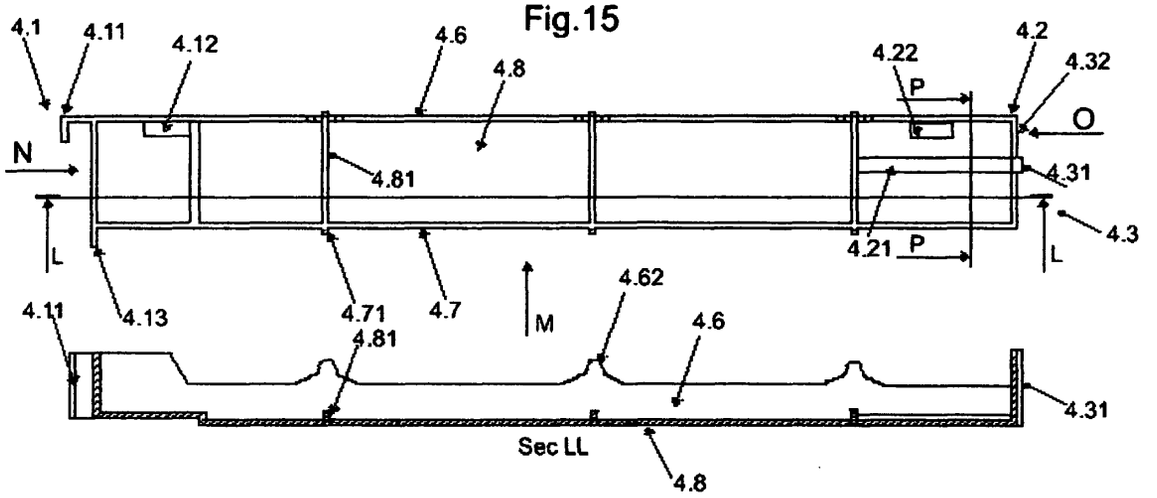
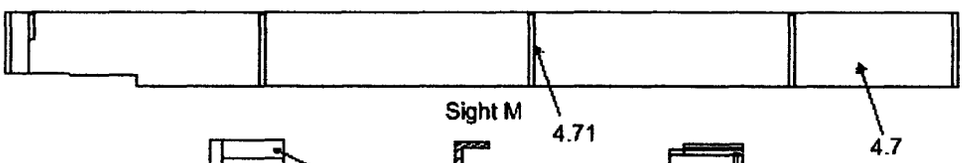
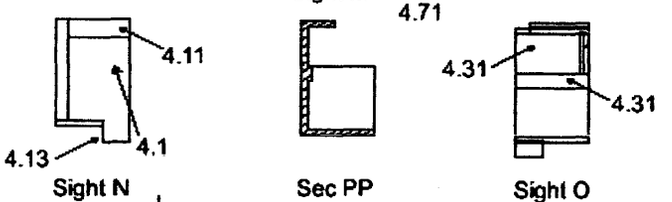


Fig.15







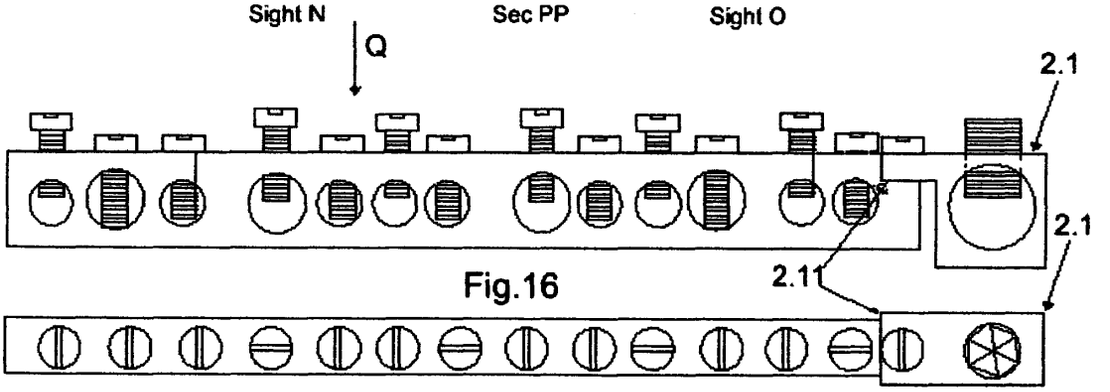


Fig.16

Sight Q

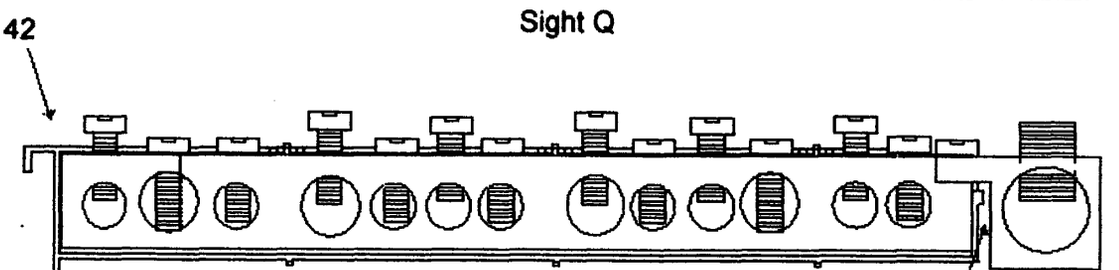


Fig.17

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EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5737

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	DE 85 26 328 U (LICENTIA) 7 November 1985 (1985-11-07) * page 6, line 18 - page 8, line 37 *	1,2	H01R9/24
A	FR 2 405 565 A (SAREL) 4 May 1979 (1979-05-04)		
A	EP 0 478 469 A (MERLIN GERIN) 1 April 1992 (1992-04-01)		
A	EP 0 779 679 A (LEGRAND SNC ; LEGRAND SA (FR)) 18 June 1997 (1997-06-18)		

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H01R
H02B
H02G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 November 2004	Bertin, M

CATEGORY OF CITED DOCUMENTS

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17-11-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 8526328 U	07-11-1985	DE 8526328 U1	07-11-1985
FR 2405565 A	04-05-1979	FR 2405565 A1	04-05-1979
EP 0478469 A	01-04-1992	FR 2667455 A1	03-04-1992
		DE 69108658 D1	11-05-1995
		DE 69108658 T2	30-11-1995
		EP 0478469 A1	01-04-1992
		ES 2073142 T3	01-08-1995
		PT 99079 A ,B	29-10-1993
EP 0779679 A	18-06-1997	FR 2742586 A1	20-06-1997
		AT 191103 T	15-04-2000
		DE 69607308 D1	27-04-2000
		DE 69607308 T2	13-07-2000
		EP 0779679 A1	18-06-1997
		ES 2143739 T3	16-05-2000

EPO FORM P0459

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