



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 719 620 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

08.11.2006 Bulletin 2006/45

(51) Int Cl.:

B41F 15/38 (2006.01)

(21) Application number: **06008849.9**

(22) Date of filing: **28.04.2006**

(84) Designated Contracting States:

**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

Designated Extension States:

AL BA HR MK YU

(30) Priority: **04.05.2005 IT MO20050114**

(71) Applicant: **TECNO - EUROPA S.R.L.**
41043 Formigine (MO) (IT)

(72) Inventor: **Fiandri, Giancarlo**
41048 Prignano sulla Secchia (MO) (IT)

(74) Representative: **Luppi, Luigi**
Luppi Crugnola & Partners S.r.l.
Viale Corassori 54
41100 Modena (IT)

(54) **Cylindrical printing screen**

(57) Tubular decorating means for decorating objects (18), comprises transferring means (2) arranged for transferring a product to said objects (18), first supporting means (3) embedded in said transferring means (2) and arranged for supporting said transferring means (2), and further comprising second supporting means (4) embedded in said transferring means (2) that is distinct from said first supporting means (3); an apparatus for decorating objects comprises tubular decorating means (1), pressing roller means (21, 22) arranged for pressing said tubular decorating means (1) against said objects (18), doctor means (24, 26) operating in contact with said tubular decorating means (1) for distributing a decorating product, said tubular decorating means (1) comprising supporting means (3, 4) structured in such a way as to counter the action of said doctor means (24, 26).

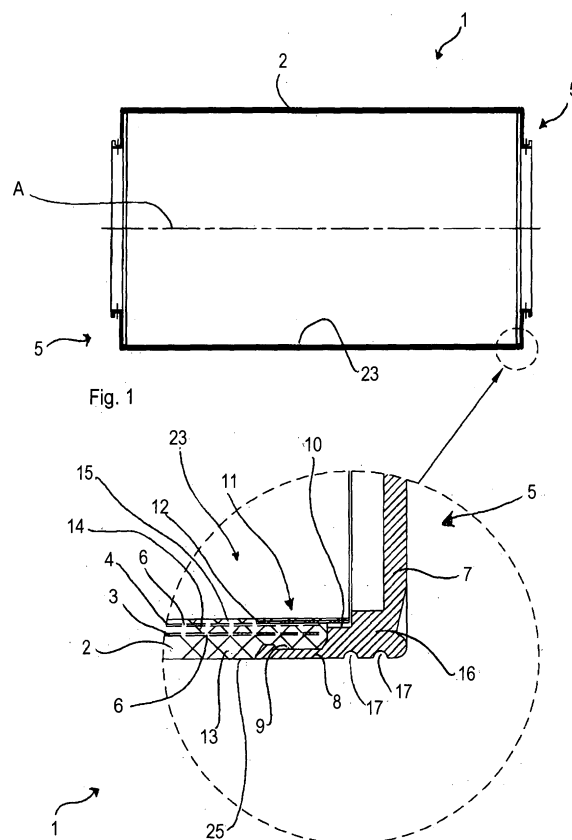


Fig. 2

EP 1 719 620 A1

Description

[0001] The invention relates to decorating means, in particular tubular decorating means for decorating ceramic products. Decorating apparatuses are known for decorating ceramic products comprising a conveyor that is used to convey ceramic products to be decorated in an advancing direction, and a printing roller that is rotatable around a longitudinal axis thereof, provided with a cylindrical support, to which an element of elastomeric material is fixed coaxially, arranged in such a way as to have a transferring surface facing the exterior to interact with ceramic products in transit. On the transferring surface, which is substantially smooth, a plurality of blind cavities are cut that are arranged together according to decorative patterns that, during operation of the apparatus, are impressed on the ceramic products.

[0002] A supply conduit is provided that deposits on the transferring surface a quantity of glaze that is received inside the aforementioned cavities. With the supply conduit a doctor is associated that is arranged for interacting with the transferring surface of the printing roller. The doctor is used to remove the glaze from the zones of the transferring surface not affected by the decorative patterns and to promote filling of the cavities with the glaze.

[0003] The decorating apparatus furthermore comprises a pressing roller positioned inside the printing roller, mounted on an adjusting device and arranged for interacting with an internal surface of the printing roller so as to promote the transfer of the glaze from the cavities of the transferring surface to the ceramic product.

[0004] Inside the printing roller a further pressing roller must be provided, mounted on a respective adjusting device and arranged for pressing from the interior the printing roller against the doctor, so that the latter can remove the glaze from the zones of the transferring surface that are not affected by the decorative patterns and carry out filling of the cavities with the glaze.

[0005] In the decorating apparatuses the printing rollers, owing to the great compliance, are subject to great deformation that causes rapid deterioration thereof.

[0006] An object of the invention is to improve known decorating apparatuses.

[0007] Another object of the invention is to obtain a structurally simpler decorating apparatus.

[0008] A further object of the invention is to obtain a decorating apparatus provided with a printing roller that is at the same time very light and has great stiffness.

[0009] In a first aspect of the invention, tubular decorating means is provided for decorating objects, comprising transferring means arranged for transferring a product to said objects and first supporting means embedded in said transferring means and arranged for supporting said transferring means, characterised in that it further comprises second supporting means embedded in said transferring means that is distinct from said first supporting means.

[0010] In a second aspect of the invention, an appa-

ratus is provided for decorating objects comprising tubular decorating means, pressing roller, means arranged for pressing said tubular decorating means against said objects, doctor means operating in contact with said tubular decorating means for distributing a decorating product, characterised in that said tubular decorating means comprises supporting means structured in such a way as to counter the action of said doctor means.

[0011] Owing to the invention it is possible to obtain a structurally simpler apparatus for decorating ceramic products which results in low production costs, and which is provided with tubular decorating means that has great stiffness and at the same time great lightness. In particular, the apparatus does not require further pressing roller means arranged for pressing the decorating means against the doctor means. Owing to the invention it is, in fact, possible to obtain tubular decorating means that is sufficiently rigid as not to substantially undergo variations in shape through forces that are exerted by the doctor means. In this case the tubular decorating means enables the doctor means to effectively remove the glaze from the zones of the transferring surface that are not affected by the decorative patterns and to perform filling of the cavities with the glaze.

[0012] Owing to the invention it is further possible to obtain an apparatus for decorating ceramic products that can be provided with printing rollers that is able to maintain high efficacy over time and to withstand wear deterioration.

[0013] The invention can be better understood and implemented with reference to the attached drawings, that illustrate some non-limitative embodiments thereof by way of example:

Figure 1 is a longitudinal section of tubular decorating means;

Figure 2 is an enlarged detail of the decorating means in Figure 1;

Figure 3 is a partially sectioned and fragmentary side view of a decorating apparatus comprising the decorating means in Figure 1;

Figure 4 shows schematically in section a portion of decorating means in an operating configuration.

[0014] With reference to Figures 1 and 2, decorating means 1 is shown, extending along a longitudinal axis A, comprising tubular transferring means 2 of cylindrical shape, for example made of elastomeric material, supported coaxially to a first laminar element 3 in flexible and substantially unextendable material. A second laminar element 4 is provided that is surrounded by the first laminar element 3 and is arranged coaxially with respect to the latter and with respect to the transferring means 2. The first laminar element 3 and the second laminar element 4 are embedded in the transferring means 2 and are separated from one another by a certain distance. In the transferring means 2 there are thus defined a first layer 13 of elastomeric material, further from the longitu-

dinal axis A, a second layer 14 of elastomeric material, arranged between the first laminar element 3 and the second laminar element 4, and a third layer 15 of elastomeric material that is nearer the longitudinal axis A.

[0015] The first laminar element 3 and the second laminar element 4 are provided with holes 6 that act as lightening means and promote cohesion between the first laminar element 3 and the second laminar element 4 with the transferring means 2.

[0016] A pair of supporting flanges 5 is provided that are arranged coaxially at ends of the decorating means 1 that are opposite one another and which are shaped so as to support the transferring means 2. In particular, each flange 5 comprises a substantially disc-shaped base portion 7, to which an annular portion 16 is fixed peripherally, provided with two collecting grooves 17 that are arranged circumferally. From the base portion 7 an anchoring portion 8 projects inside the decorating means 1 and parallel to the longitudinal axis A. The anchoring portion 8 is provided with a groove 9 and with an abutting surface 10 facing inside decorating means 1 and arranged for coupling with a shaped fixing portion 11 of the transferring means 2. In each fixing portion 11 a strap element 12 is embedded that confers greater stability to the shape of the decorating means 2 and promotes fixing of the latter on the flanges 5. The first layer 13 is provided externally with a smooth transferring surface 25, into which a plurality of blind cavities (not shown) is cut, arranged together to define decorative patterns that are impressed onto ceramic products 18 during operation of the apparatus.

[0017] Figure 3 shows an apparatus 19 for decorating ceramic products 18 provided with decorating means 1 that is rotatable in a direction R. The apparatus 19 comprises a conveyor 20 that advances the ceramic products 18 in an advancing direction F to an operating zone B.

[0018] A cooperating device 21 is provided that is arranged inside the region defined by the decorating means 1. The cooperating device 21 is provided with a pressing roller 22, having a radius that is much smaller than the internal radius of the decorating means 1, arranged for operating in contact with an internal surface 23 of the transferring means 2.

[0019] With the apparatus 19 there is associated dispensing means (not shown) suitable for dispensing onto the transferring surface 25 a quantity of glaze that has to be received in the blind cavities. A further cooperating device 24 is provided that is arranged for cooperating with the decorating means 1 and with the dispensing means, comprising a doctor 26 shaped in such a way as to interact with the transferring surface 25. The doctor 26 can be positioned appropriately with respect to the transferring surface 25. This enables the manner in which the doctor removes the glaze from the zones not affected by the decorative patterns and the manner with which the blind cavities are filled with the glaze to be monitored. Furthermore, the transferring means 2 has rigidity such as to enable the doctor 26 to perform the function proper

to it correctly. In this way it is not necessary to provide auxiliary devices that are suitable for cooperating with the doctor 26 and with the transferring means 2, for example pressing rollers interacting with the internal surface and arranged near the doctor 26.

[0020] During operation, whilst the conveyor 20 advances the ceramic product 18 in the advancing direction F, the decorating means 1 is rotated in the direction R and the dispensing means pours the glaze onto the transferring surface 25. The doctor 26 acts by promoting filling of the cavities that define the decorative patterns that it is desired to generate on the face 27 of the ceramic product 18 and to remove the quantity of excess glaze, conveying the latter through the collecting grooves 17, to a recovery container for glaze.

[0021] The decorating means 1 is rotated in the direction R in such a way that the blind cavities near the operating zone B are appropriately positioned to interact with a face 27 of the ceramic product 18 and enables the decorative patterns to be impressed correctly.

[0022] The transferring means 2, during operation, receives compressing forces X, as shown schematically in Figure 4, that are due to interaction with the ceramic product 18. The compressing forces X tend to compress portions of transferring means 2 that are arranged between the pressing roller 22 and the ceramic product 18. The first layer 13 is compressed, and tends to bend the first laminar element 3 towards the inside of the decorating means 1. The second layer 14, in turn pushed by the first laminar element 3 towards the inside of the decorating means 1 but is counteracted by the second laminar element 4 that bends to a much lesser extent than the first laminar element 3 and exerts a counteracting force on the compressing forces. This enables the bending of the first laminar element 3 to be significantly limited and thus enables transferring surface 25 to be kept well in contact with the face 27 to be decorated so as to impress the decorative patterns with more precision. The operating principle that has just been disclosed further reduces significantly the deterioration of the transferring means 2 caused by the deformations and thus enables the latter to be preserved for a longer time.

Claims

1. Tubular decorating means for decorating objects (18), comprising transferring means (2) arranged for transferring a product to said objects (18) and first supporting means (3) embedded in said transferring means (2) and arranged for supporting said transferring means (2), **characterised in that** it further comprises second supporting means (4) embedded in said transferring means (2) that is distinct from said first supporting means (3).
2. Tubular decorating means according to claim 1, wherein said first supporting means (3) and said sec-

ond supporting means (4) are arranged coaxially with respect to a longitudinal axis (A) of said transferring means (2).

3. Tubular decorating means according to claim 2, wherein said first supporting means (3) and said second supporting means (4) define in said transferring means (2) a first layer (13) further from said longitudinal axis (A), a second layer (14) interposed between said first supporting means (3) and said second supporting means (4) and a third layer (15) nearer said longitudinal axis (A).
4. Tubular decorating means according to any one of claims 1 to 3, wherein said first supporting means (3) and said second supporting means (4) are made of substantially unextendable material.
5. Tubular decorating means according to any one of claims 1 to 4, wherein on said first supporting means (3) and on said second supporting means (4) there is obtained a plurality of holes (6).
6. Tubular decorating means according to any one of claims 1 to 5, wherein said first supporting means comprises a first plastic laminar element (3).
7. Tubular decorating means according to any one of claims 1 to 6, wherein second supporting means comprises a second plastic laminar element (4).
8. Tubular decorating means according to any one of claims 1 to 7, wherein said transferring means (2) comprises an elastomeric material.
9. Tubular decorating means according to claim 8, wherein said elastomeric material comprises silicone rubber.
10. Tubular decorating means according to any one of claims 1 to 9, wherein at opposite ends of said transferring means (2) there are fixed flange elements (5) that are parallel to one another.
11. Tubular decorating means according to claim 10, wherein said flange elements (5) comprise coaxial anchoring portions (8) with a substantially annular shape that project towards one another.
12. Tubular decorating means according to claim 11, wherein each of said coaxial anchoring portions (8) comprise fixing surfaces (9, 11) facing the inside of said decorating means (1) and shaped so as to receive shaped fixing portions (11) of said transferring means (2).
13. Tubular decorating means according to claim 12, and further comprising strap elements (12) associ-

ated with said transferring means (2) and arranged for stiffening said shaped fixing portions (11).

14. Tubular decorating means according to any one of claims 10 to 13, wherein on each of said flange elements (5) there are obtained receiving grooves (17) arranged peripherally and circumferally for receiving part of said product.
15. Apparatus for decorating objects comprising tubular decorating means (1), pressing roller means (21, 22) arranged for pressing said tubular decorating means (1) against said objects (18), doctor means (24, 26) operating in contact with said tubular decorating means (1) for distributing a decorating product, **characterised in that** said tubular decorating means (1) comprises supporting means (3, 4) structured in such a way as to counter the action of said doctor means (24, 26).
16. Apparatus for decorating objects according to claim 15, wherein said supporting means (3, 4) is embedded in transferring means (2) of said tubular decorating means (1).
17. Apparatus for decorating objects according to claim 16, wherein said supporting means comprises first supporting means (3) and second supporting means (4) that are distinct from one another.
18. Apparatus for decorating objects according to claim 17, wherein said first supporting means (3) and said second supporting means (4) are arranged coaxially with respect to a longitudinal axis (A) of said transferring means (2).
19. Apparatus for decorating objects according to claim 18, wherein said first supporting means (3) and said second supporting means (4) define in said transferring means (2) a first layer (13) further from said longitudinal axis (A), a second layer (14) interposed between said first supporting means (3) and said second supporting means (4) and a third layer (15) nearer said longitudinal axis (A).
20. Apparatus for decorating objects according to any one of claims 17 to 19, wherein said first supporting means (3) and said second supporting means (4) are made of substantially unextendable material.
21. Apparatus for decorating objects according to any one of claims 17 to 20, wherein on said first supporting means (3) and on said second supporting means (4) there is obtained a plurality of holes (6).
22. Apparatus for decorating objects according to any one of claims 17 to 21, wherein said first supporting means comprises a first plastic laminar element (3).

23. Apparatus for decorating objects according to any one of claims 17 to 22, wherein said second supporting means comprises a second plastic laminar element (4). 5
24. Apparatus for decorating objects according to any one of claims 16 to 23, wherein said transferring means (2) comprises an elastomeric material. 10
25. Apparatus for decorating objects according to claim 24, wherein said elastomeric material comprises silicone rubber. 15
26. Apparatus for decorating objects according to any one of claims 16 to 25, wherein at opposite ends of said transferring means (2) there are fixed flange elements (5) that are parallel to one another. 20
27. Apparatus for decorating objects according to claim 26, wherein said flange elements (5) comprise coaxial anchoring portions (8) with a substantially annular shape that project towards one another. 25
28. Apparatus for decorating objects according to claim 27, wherein each of said coaxial anchoring portions (8) comprises fixing surfaces (9, 11) facing the inside of said decorating means (1) and shaped so as to receive shaped fixing portions (11) of said transferring means (2). 30
29. Apparatus for decorating objects according to claim 28, and further comprising strap elements (12) associated with said transferring means (2) and arranged for stiffening said fixing portions (11). 35
30. Apparatus for decorating objects according to any one of claims 26 to 29 wherein on each of said flange elements (5) there are obtained receiving grooves (17) arranged peripherally and circumferally for receiving part of said product. 40

45

50

55

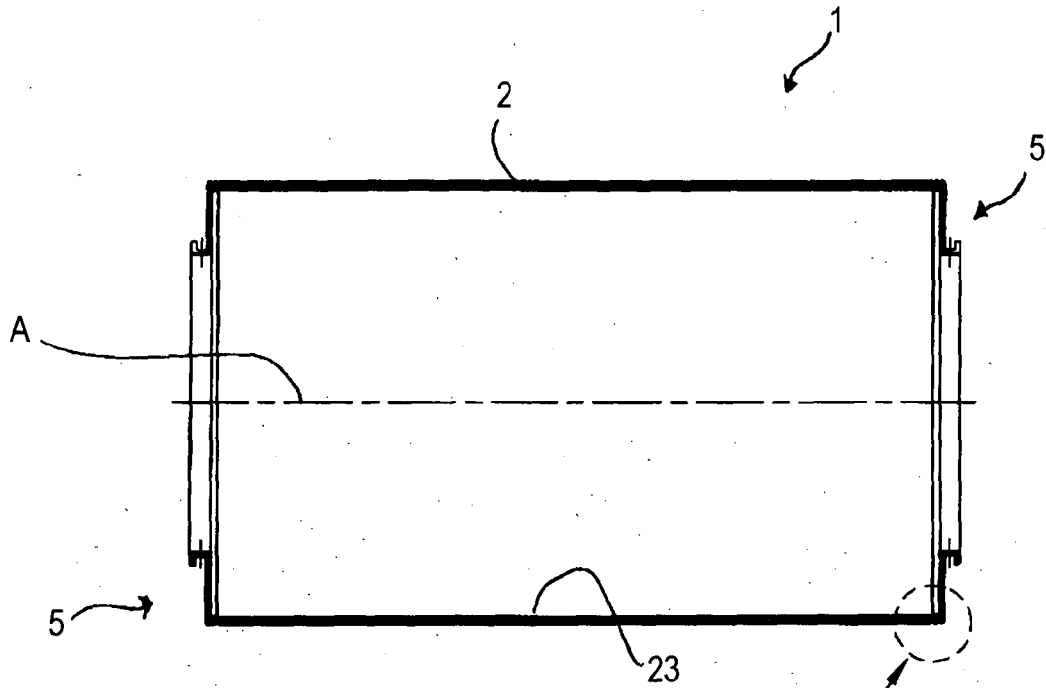


Fig. 1

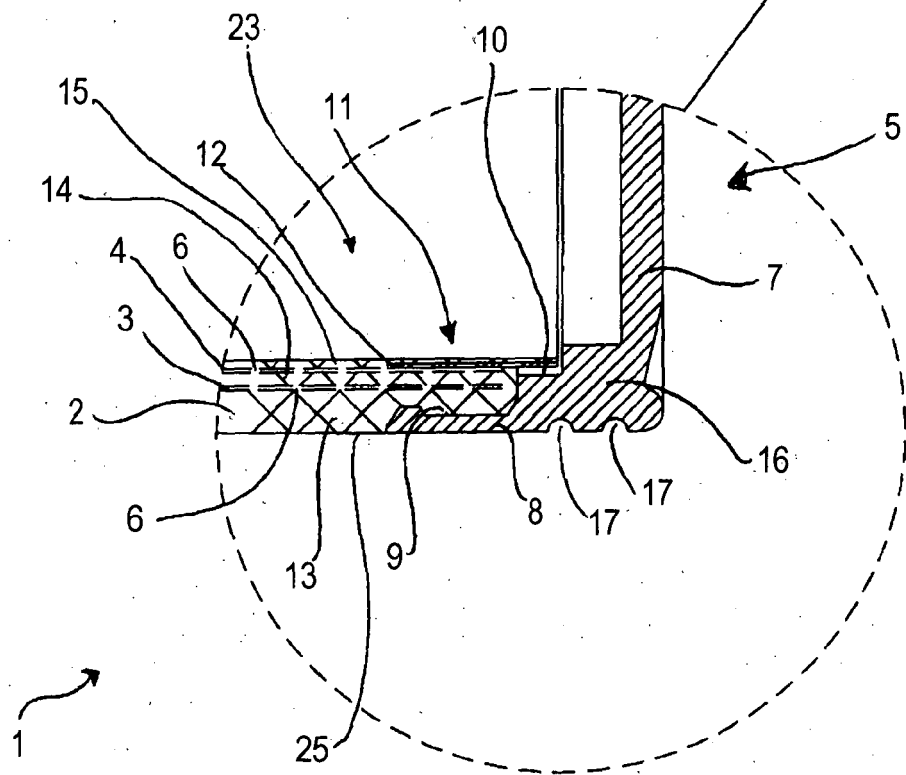


Fig. 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 00 8849

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 058 635 A (MARTINEZ JOSE) 28 May 1971 (1971-05-28) * page 4, line 1 - page 4, line 30; figure 1 *	1-14	INV. B41F15/38
A	----- EP 1 418 048 A (STORK PRINTS B V [NL]) 12 May 2004 (2004-05-12) * the whole document *	1-14	
A	----- EP 1 147 891 A (ASSOPRINT S.P.A) 24 October 2001 (2001-10-24) * paragraph [0047] - paragraph [0055] *	1-14	
A	----- DE 27 28 084 A1 (STORK BRABANT B.V) 12 January 1978 (1978-01-12) * the whole document *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			B41F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		10 July 2006	Sartor, Michele
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			

3
EPO FORM 1503 03.02 (P04-C01)



European Patent
Office

Application Number

EP 06 00 8849

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☒ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

11-14

- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 00 8849

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.

10-07-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2058635	A	28-05-1971	NONE	

EP 1418048	A	12-05-2004	CA 2446846 A1	08-05-2004
			CN 1500631 A	02-06-2004
			JP 2004160999 A	10-06-2004
			NL 1021874 C2	11-05-2004
			US 2004089183 A1	13-05-2004

EP 1147891	A	24-10-2001	AT 330795 T	15-07-2006
			IT RE990062 A1	14-11-2000

DE 2728084	A1	12-01-1978	BR 7704225 A	28-03-1978
			CH 621516 A5	13-02-1981
			ES 460361 A1	01-04-1978
			GB 1550269 A	15-08-1979
			IT 1078899 B	08-05-1985
			NL 7607139 A	02-01-1978
			US 4107003 A	15-08-1978
