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

(11) Publication number : **0 663 465 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **95300224.3**

(22) Date of filing : **13.01.95**

(51) Int. Cl.[6] : **D06F 57/04**

(30) Priority : **15.01.94 GB 9400521**

(43) Date of publication of application :
19.07.95 Bulletin 95/29

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

(71) Applicant : **Abru Aluminium Limited**
Pennygillam Industrial Estate
Launceston Cornwall PL15 7ED (GB)

(72) Inventor : **Oliver, David P.**
Orchard Leigh,
Fairmead Road
Saltash, Cornwall, PL12 4GJ (GB)
Inventor : **Redsell, Mark**
Saxons,
Higher Tremar Combe
Liskeard, Cornwall, PL14 5HS (GB)
Inventor : **Bassett, Stephen J.**
Koromiko,
North Petherwin
Launceston, Cornwall, PL15 8LR (GB)

(74) Representative : **Bryer, Kenneth Robert**
K.R. Bryer & Co.
Lewins House
Lewins Mead
Bristol BS1 2NN (GB)

(54) Improvements in clothes driers or airers.

(57) A line guide is described for an arm (22) or other support of a drier or airer (10) of the type having one or a plurality of flexible line sections spanning adjacent fixed arms (22) or other supports, comprising a body (33) having an opening (48, 49) therein for receiving a line to be guided, and a fixing leg (50, 51) which can be passed through an opening (30, 31) in the said arm (22) of the drier or airer (10), the fixing leg (50, 51) having means (52, 53) by which the said body (33) may be retained in the said opening (30, 31) in the said arm (22) or other support after having been introduced thereinto.

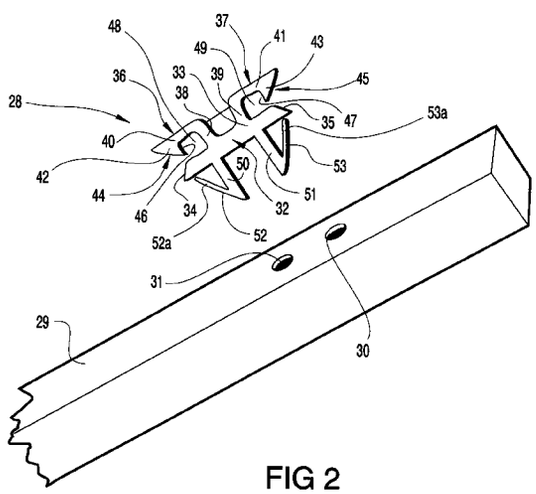

FIG 2

EP 0 663 465 A1

The present invention relates generally to clothes driers or airers, and particularly (but not exclusively) to driers of the type comprising a rigid support structure having arms or other supports spanned by one or a plurality of flexible lines.

The present invention finds particular utility in connection with a clothes drier or airer of the type comprising a central upstanding column from which projects a plurality of generally radially extending arms between which a line or plurality of lines are suspended. The present invention may also be employed, however, in connection with other forms of driers or airers, particularly those having separate supports attached or attachable to the walls of a room, or suspended from the ceiling, and between which one or a plurality of lines may be attached.

The above-mentioned driers or airers, commonly called "rotary driers" suffer from the disadvantage that, because for space reasons they are usually made collapsible by attaching the radially inner ends of the main arms to a slidable sleeve surrounding the column, when the assembly is collapsed the lines between the arms move between a relatively taut and a totally relaxed state (which they adopt when the arms are collapsed and folded alongside the column, the taut state being adopted when the arms are positioned in the radially-extending working position). In addition to this the weight of wet clothing suspended from the lines, and the variation between moist and dry conditions, can result in stretching of the lines causing individual line sections to become slack even when the drier or airer is in its erected condition.

Various attempts to counteract this problem have been proposed in the prior art, but none have satisfactorily solved the difficulty due to the fact that, if a single length of line is used to produce several line sections between adjacent radial arms, the connection between each radial arm and the line (usually in the form of an opening in the arm through which the line is passed, results in the necessity for a continual and repeated tensioning of the line sections, working circumferentially around the drier frame, from one end of the line to the other at which the surplus length of line may be removed and a termination, in the form of a knot or a clamp on the line may be fitted in place to react against the last arm. Such operations are tedious, time consuming, require physical skill in manipulating the lines and the frames, and frequently result in inadequately tensioning of the lines. Alternative configurations in which each line section between adjacent radial arms is made separate from its neighbours results in the difficulty that each line section has insufficient surplus to be manipulated readily, even if a locking clamp or some other form of tensioner is provided.

The present invention seeks, therefore, to provide a line guide which whilst providing a support and guidance for a flexible line on a fixer support such as the radial arm of a clothes drier or airer, will also allow the line to be secured against longitudinal movement, or free to move longitudinally at will, and without requiring a complex structure or mechanism.

The present invention also seeks to provide a drier or airer suitable for clothes in which a line can be fitted and positioned quickly and easily, its tension adjusted without difficulty, and without requiring special tools or any great manipulative skills.

The present invention also seeks more generally to provide a line guide for a drier or airer of the type having two or more support arms spanned by adjacent flexible lines, in which the line guide is readily fixable to the arm or other support without requiring complex manipulation for orientation, and without requiring special equipment for attaching it to the arm or other support.

According to one aspect of the present invention, therefore, there is provided a line guide for an arm or other support of a drier or airer of the type having one or a plurality of flexible line sections spanning adjacent fixed arms or other supports, comprising a body having an opening therein for receiving a line to be guided, and a fixing leg which can be passed through an opening in the said arm of the drier or airer, the fixing leg having means by which the said body may be retained in the said opening in the said arm or other support after having been introduced thereinto.

In one embodiment of the invention the said fixing leg has a resilient finger for retaining the leg in position on the arm.

Preferably the said resilient finger lies at an acute angle to the leg such as to be resiliently flexed towards the leg upon insertion of the leg into an opening in the support arm, the length of the finger and its position on the leg being such that it is carried entirely through the opening in the arm when the leg is fully inserted.

In this way, upon insertion of the leg into a preformed opening, such as a drilled or punched hole in the arm or other support, the finger springs out from a compressed or flexed position so as to engage the under surface of the arm and prevent withdrawal of the leg.

Various embodiments of the present invention may be envisaged in which the leg is provided with more than one finger of different length in order to make it suitable to be fitted in to material of different thicknesses, those fingers too long to spring out because they have not passed right through the thickness of the material being unused for retention purposes, but serving to locate the leg within the hole.

The resilient finger may be mounted on the leg in a position such so that it is carried entirely through the opening in the support arm only upon slight compression of the line guide body so that, after having sprung out from its stressed position, it retains the line guide securely in position on the arm or other support with

substantially no or insignificant play. Fitting of such line guides to a support arm can be achieved by applying a light impact to the body after it has been pressed into the opening to push the leg as far as it will travel without compression. The light impact then compresses the body moves the root of the leg further into the hole allowing the stressed finger to flex out, and then when the lightly compressed body returns to its original shape the finger is pressed (or rather pulled) against the under surface of the arm or other support so that the line guide is held securely in position against withdrawal.

The said opening in the body for receiving a line to be guided is, in a preferred embodiment of the invention, defined by line retainer means of the body. The said line retainer means may comprise at least one cleat arm, and it is preferable that the said body comprises a stem portion from which project oppositely directed cleat arms.

The or each said cleat arm may have a tapered free end portion and a transverse projection defining, with the said body, a tapering entrance to a line housing recess (constituting the said opening in the body) in to which a line can be introduced laterally of its length .

The said line guide body may have more than one fixing leg (preferably two fixing legs) for introduction into respective openings in a support arm of a drier or airer. By providing two legs the line guide is held against rotation on the support arm. Embodiments made having both two legs and two cleat arms are also effectively symmetrical so that they can be fitted in position in either of two orientations equally satisfactorily, simplifying the mounting operations.

The present invention also comprehends a drier or airer having one or a plurality of line guides as herein defined mounted on one or more arm or support.

One embodiment of the present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of a rotary drier of the general type to which a line guide of the present invention may be fitted; and

Figure 2 is a perspective view of a section of a fixed arm or support showing a line guide of the present invention in a relative juxt position adopted immediately before fitting.

Referring now to the drawings, the rotary drier shown comprises a central column generally indicated 11 comprising two telescopic components, namely an upper component 12 which fits telescopically into a lower component 13 which can be removably fitted into a socket 14 (shown in broken outline) in the ground. To the upper end of the lower column part 13 is fitted a collar 15 which extends beyond the upper end of the column part 13 and has an axially split portion which can be clamped to the upper column portion 12 by a screw clamp operated by a hand wheel 16. Adjustment of the height of the column 11 can thus be readily achieved, and the column can be collapsed to a relatively short length for storage.

Mounted on the upper end of the upper column part 12 is a cap 17 having lugs 18 for receiving pivot pins 19. Typically there may be three or four pairs of lugs 18 at 120° or 90° from one another. Between adjacent pairs of lugs 18 fits an upper end of a stay 20 the lower end of which is pivoted at 21 to an intermediate point of a main support arm 22. Again, depending on the design of the drier there may be three or four main support arms 22.

The radially inner ends of the main support arms are pivotally mounted to respective pairs of lugs 23 by pivot pins 24, the lugs 23 projecting from a slidable sleeve 25 on the upper part 12 of the column 11. The sleeve 25 has a lower part 26 with an axial slot and can be clamped, like the collar 15, by operation of a hand wheel 27 which tightens or slackens the split lower portion 26.

With the hand wheel 27 turned to slacken the split portion 26 the sleeve 25 can be raised to an upper extended position (which may be defined by an abutment (not shown) on the upper part 12 of the column 11) to move the arms 22 to their working position in which they are closest to a horizontal orientation (but inclined upwardly away from the column 11). The sleeve 25 may also be lowered (again by releasing the hand wheel 27) to a lower most or collapsed position in which the arms 22 lie parallel to the column 11.

Each arm 22 is provided with a plurality of line guides 28. In this embodiment three line guides on each arm 22 are illustrated although it will be appreciated that the number of line guides per arm may vary depending on the size and proportions of the drier 11.

An individual line guide 28 is illustrated by way of example in Figure 2. In this example the arm 22 is shown as a box-section having an upper face 29 which is formed with two circular holes 30, 31 at an appropriate spacing. The line guide 28 comprises a main base or body portion 33 having tapered end portions 34, 35 at opposite ends thereof. Upwardly from the base portion 35 project two cleat arms generally indicated 36, 37. Each cleat arm 36, 37 comprises an upwardly projecting limb 38, 39, a laterally projecting limb 40, 41 lying generally parallel to the base 33. Each lateral portion 40, 41 has a downwardly extending nose projection 42, 43 of triangular or tapered cross section with an inclined outer face 44, 45 and an inner face 46, 47 substantially at right angles to the general plane of the lateral limb 40, 41.

The inclined surfaces 44, 45 of the lateral projections 42, 43 form a tapering entrance with the inclined surfaces 34, 35 of the ends of the base 33 whilst the limbs 40, 41 form, with the upstanding portions 38, 39 and the cooperating parts of the base 33 an opening

for receiving a line to be guided by the line guide 28. The line-receiving openings are identified by the reference numerals 48, 49. A line may be introduced into one or other of the line-receiving openings 48, 49 laterally by applying it to the inclined entrance defined by the surfaces 44, 34 or 45, 35 and the flexibility of the respective limbs 40, 41, together with the compressibility of the line allows it to enter the opening 48 or 49 respectively. Once in the opening the line returns to its normal dimensions and the arms 40 or 41 relax to their unstressed position closing the entrance to a dimension such that the line cannot now be displaced laterally therefrom.

A rotary drier or airer such as that illustrated in Figure 1, provided with three line guides 28 on each arm 22 may have several concentric lines or a single line threaded in a spiral arrangement with opposite ends of the line tied to the terminal line guide 28 in the manner of a cleat by passing the line entirely around the body two or three times and either tying a knot or overlapping the line such that it is clamped by another turn.

Should it be necessary to tension any section of line between two adjacent arms 22 this can be achieved readily by introducing a turn around a line guide 28 intermediate the ends of the line without it being necessary to release either end so that successive tightening operations on individual slack lengths can be achieved readily.

The line guides 28 are easily and quickly fitted to the arms 22 as follows: the base 33 has two downwardly projecting legs 50, 51 from the free ends of which project respective inclined fingers 52, 53 which terminate a short distance from the respective end portion of the base 33 by a distance slightly less than the thickness of the material from which the arm 22 is made. The two elbow portions (that is at the junction between the fingers 52, 53 and the legs 50, 51) are introduced into the openings 30, 31 and pressed in until the lower surface of the base portion 33 contacts the face 29 of the arm 22. A sharp tap or blow is then applied to the body of the line guide 28 to cause it to compress slightly, the face 29 of the arm 22 to flex slightly and allow the tips 52a. 53a of the fingers, 52, 53 to clear the holes 30, 31 and spring out to their normal relaxed position. In this condition the fingers 52, 53 hold the line guide 28 against removal.

Because of its symmetry the line guide 28 can be fitted with either leg 48, 49 in either hole 30, 31 thereby simplifying assembly.

Claims

1. A line guide for an arm (22) or other support of a drier or airer of the type having one or a plurality of flexible line sections spanning adjacent fixed arms or other supports, characterised in that it comprises a body (33) having an opening (48, 49) therein for receiving a line to be guided, and a fixing leg (50, 51) which can be passed through an opening (30, 31) in the said arm (22) of the drier or airer, the fixing leg (50, 51) having means (52, 53) by which the said body (33) may be retained in the said opening (48, 49) in the said arm (22) or other support after having been introduced thereinto.

2. A line guide according to Claim 1 characterised in that the said fixing leg (50, 51) has a resilient finger (52, 53) for retaining the leg in position on the arm (22).

3. A line guide according to Claim 2, characterised in that the said resilient finger (52, 53) lies at an acute angle to the leg (50, 51) such as to be resiliently flexed towards the leg upon insertion of the leg into an opening (48, 49) in the support arm, the length of the finger (52, 53) and its position on the leg (50, 51) being such that it is carried entirely through the opening (48, 49) in the arm (22) when the leg is fully inserted.

4. A line guide according to any of Claims 1 to 3, characterised in that the resilient finger (52, 53) is mounted on the leg (50, 51) in a position such that it is carried entirely through the opening (48, 49) in the support arm (22) only upon slight compression of the line guide body (33) such that it retains the line guide securely in position on the arm or other support with substantially no play.

5. A line guide according to any preceding Claim, characterised in that the said body (33) has line retainer means (40, 41) thereon.

6. A line guide according to Claim 5, characterised in that the said line retainer means (40, 41) comprise at least one cleat arm.

7. A line guide according to Claim 6, characterised in that the said body (33) comprises a stem portion (32) from which project oppositely directed cleat arms (40, 41).

8. A line guide according to Claim 6 or Claim 7, characterised in that the or each said cleat (40, 41) arm has a tapered free end portion (42, 43) and a transverse projection (46, 47) defining, with the said body (33), a tapering entrance (44, 45) to a line housing recess (48, 49) into which a line can be introduced laterally of its length.

9. A line guide according to any preceding Claim, characterised in that the said line guide body (33) has two fixing legs (50, 51) for introduction into

respective openings (30, 31) in a support arm (22) of a drier or airer.

10. A line guide according to Claim 9, characterised in that the said two fixing legs (50, 51) lie in the same plane as the said two cleat arms (40, 41).

11. A rotary drier or airer (10) having an upright column (11), a plurality of radially projecting support arms (22) carried by the said column (11), at least one of the said arms (22) having one or a plurality of line guides (28) according to any preceding Claim fitted thereto for receiving a section of line to be supported by the said arm (22).

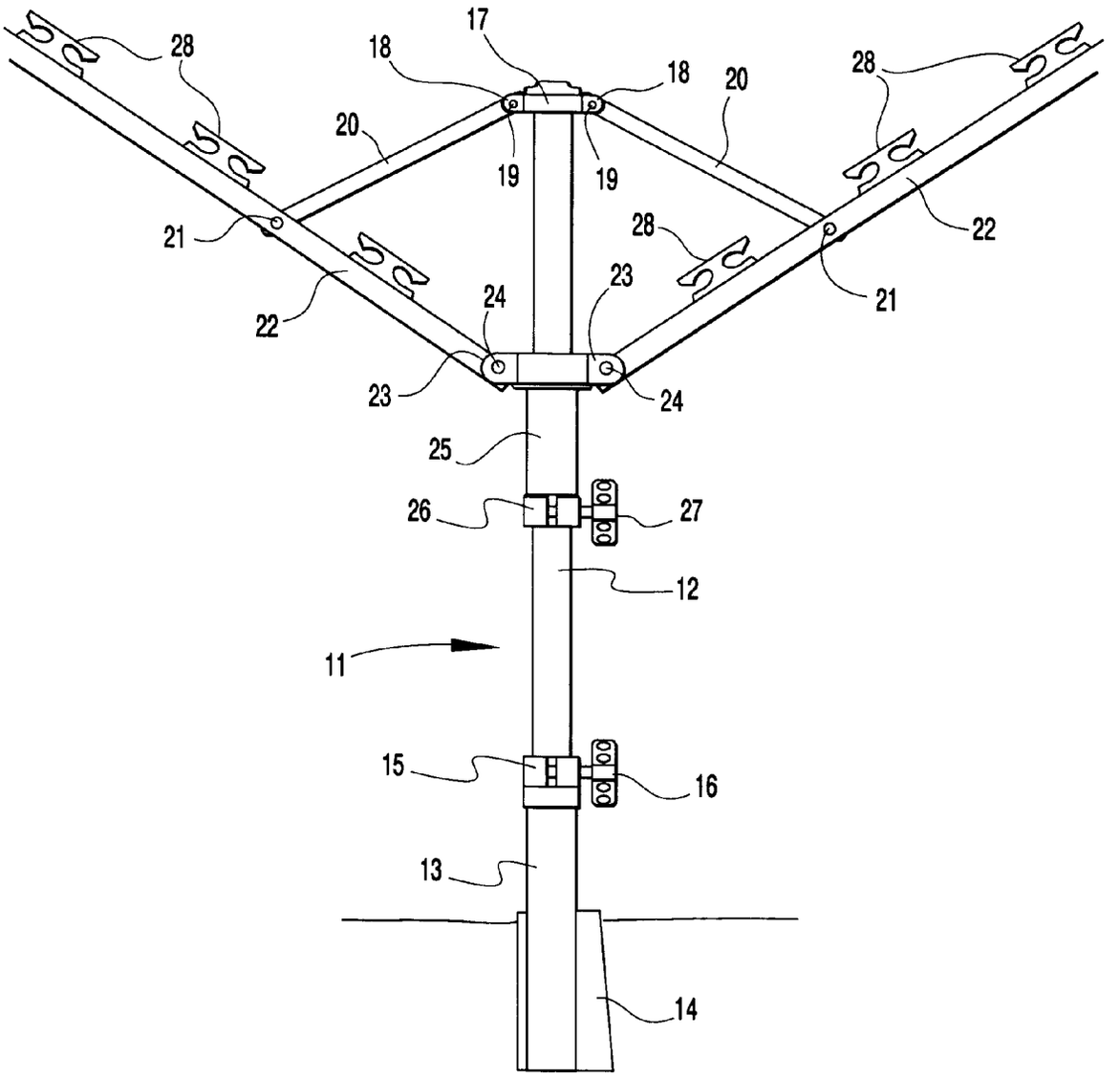
17
18
18
28
28
20
20
19
19
21
22
28
21
22
24
23
23
24
25
26
27
12
11
15
16
13
14

FIG 1

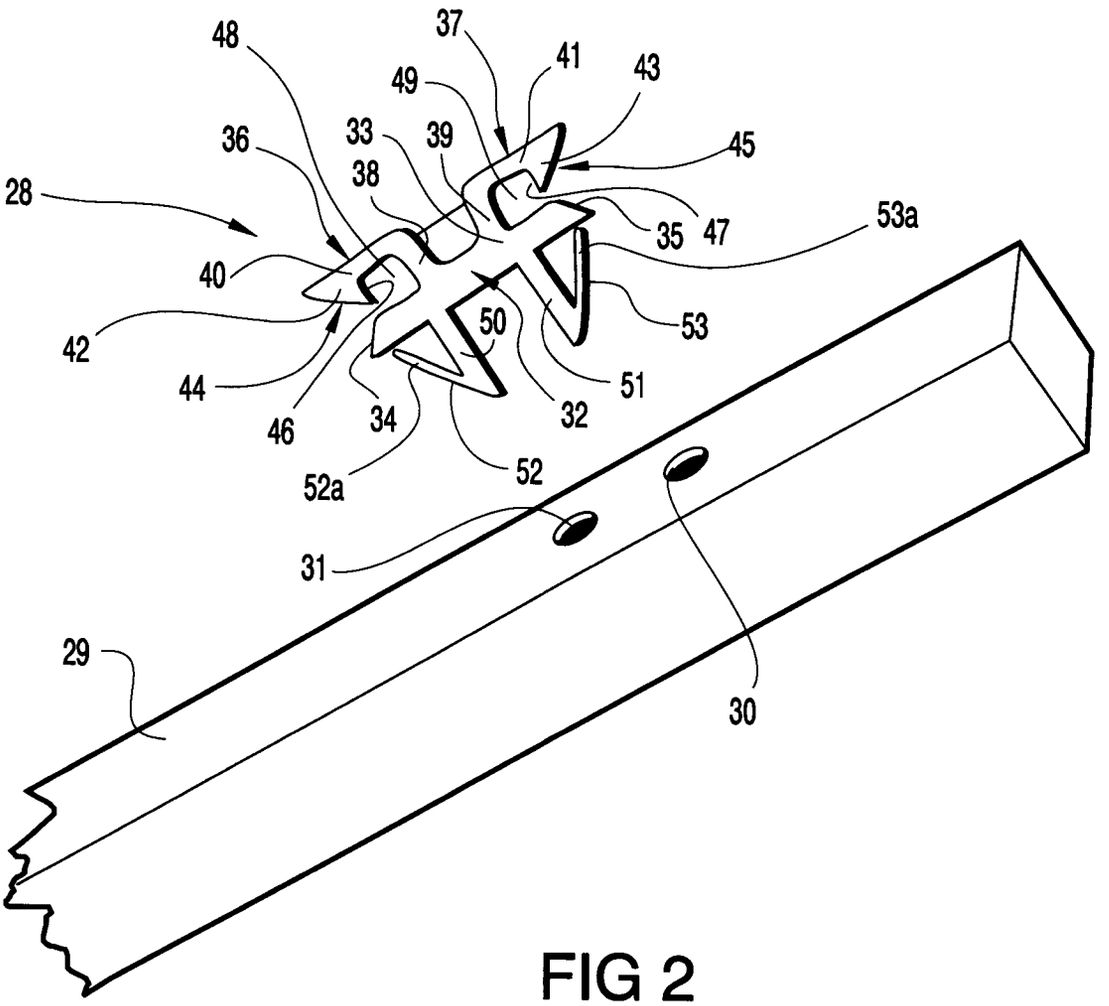
48
37
41
43
49
36
33
39
45
38
28
35
47
53a
40
53
50
42
51
44
32
46
34
52a
52
31
29
30

FIG 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 0224

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)
X	GB-A-2 263 633 (HILLS INDUSTRIES LIMITED)	1,5-7,9, 11	D06F57/04
A	* page 6, line 31 - page 7, line 5; figures 1,3 *	2-4,8	
X	GB-A-2 009 307 (LEIFHEIT INTERNATIONAL GUNTER LEIFHEIT GMBH)	1,5,6,8, 11	
A	* page 2, line 55 - page 3, line 17; figures *	2-4	
X	DE-B-12 97 407 (SIEGAS METALLWARENFABRIK WILHELM LOH KG.) * claims; figures *	1,5,11	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	5 April 1995	Courrier, 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)