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A simplified fully automatic umbrella.

A fully automatic umbrella comprising a shank consisting of an inner and an outer tubes (11,12), the inner tube (11) having a middle ring (13) at upper section and an extension (14) while the outer tube (12) having a lower ring (15) at upper end; an umbrella opening spring (2) received within the extension; a cylinder (3) mounted around the extension (14) and provided with an upper ring (31) at lower end; an umbrella closing spring (4) mounted around the inner tube; a locking mechanism consisting of an upper and alower pawls (5,6); a canopy structure (7) connected to the upper, middle and lower rings; a wire (8) interconnected between the upper pawl and the lower ring; and a handle (9) provided with an actuating member (91) for controlling the operation of opening and closing the umbrella.

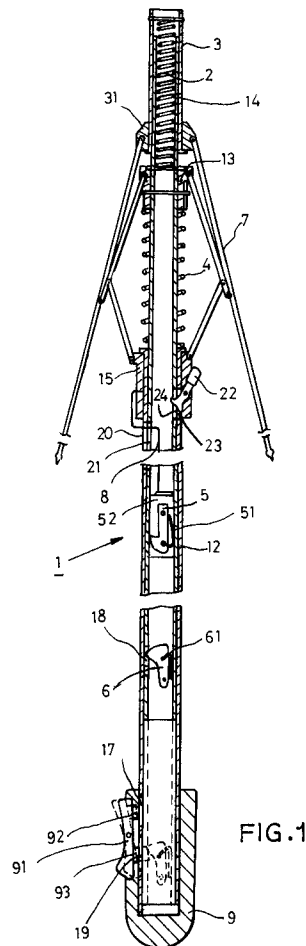


FIG.1

Field of the Invention

This application relates to a fully automatic umbrella, more particularly to an umbrella having significantly simplified construction.

Recently, a number of patent applications have been assigned to the present inventor, which include EP Application Nos. 91112480.8, 91115521.6 and 92109778.8. Upon implementation, the present inventor found that various disadvantages including too much of the parts to be favorably manufactured and assembled should be overcome.

Summary of the Invention

It is, therefore, an object of the present invention to overcome the aforementioned disadvantages in the prior art and to provide a novel fully automatic umbrella having significantly simplified construction.

This object is achieved by a fully automatic umbrella according to the present invention which comprises a shank consisting of an inner and an outer tubes capable of relative sliding movement with respect to each other, in which said inner tube having a middle ring at upper section and an extension outreached over said middle ring while said outer tube having a lower ring at upper ends, both tubes being provided with respective upper and lower aligned apertures; an umbrella opening spring telescopically received within said extension of said inner tube; a cylinder mounted around said extension for relative sliding movement therewith and provided with an upper ring at lower end; an umbrella closing spring telescopically mounted around said inner tube in the limit between said middle ring and the top end of said outer tube; a locking mechanism consisting of an upper and a lower pawls to be respectively locked into said upper and lower aligned apertures for restricting said umbrella opening and closing springs at a locked state, respectively; a canopy structure connected with said upper, middle and lower rings correspondingly; a wire interconnected between said upper pawl and said lower ring for pushing and pulling said upper pawl in movement; and a handle provided with an actuating member for controlling the operation of opening and closing the umbrella, respectively.

Brief Description of the Drawings

The foregoing and other objects, features and advantages of the invention will be apparent from the following particular description of preferred embodiments of the invention as illustrated in the accompanying drawings, in which:

Fig.1 is a partly sectional elevation illustrating the automatic umbrella of the invention in the closing state;

Fig.2 is a partly sectional elevation illustrating the umbrella in the preparative state before opening; and

Fig.3 is a partly sectional elevation illustrating the umbrella in the opening state.

Detailed Description of Preferred Embodiments

Now, reference is made to Fig.1 which shows that the present invention mainly comprises a shank 1, an umbrella opening spring 2, a cylinder 3, an umbrella closing spring 4, an upper pawl 5, a lower pawl 6, a canopy structure 7, a wire 8 and a handle 9.

The shank 1 consists of an inner tube 11 and an outer tube 12 capable of relative sliding movement with respect to each other. Said inner tube 11 is provided with a fixed middle ring 13 at upper section. an extension 14 is outreached over said middle ring 13. Said outer tube 12 is provided with a movable lower ring 15 which is slidable in relation to said outer tube 12. Both inner and outer tubes 11, 12 are provided with upper apertures 16, 17 and lower apertures 18, 19, respectively. In the preparative state as shown in Fig.2, namely, when said inner tube 11 is flushed with said outer tube 12 at both lower ends, said upper apertures 16 and 17 as well as said lower apertures 18 and 19 are aligned to each other respectively.

The umbrella opening spring 2 is telescopically received within said extension 14 of said inner tube 11. Said extension 14 is housed within a cylinder 3. Said cylinder 3 is slidable in relation to said extension 14 in cooperation with the telescopic action of said opening spring 2. The cylinder 3 is provided with a fixed upper ring 31 at lower end.

The umbrella closing spring 4 is telescopically mounted in the limit between said middle ring 13 and the top end of said outer tube 12. Said outer tube 12 is slidable in relation to said inner tube 11 in cooperation with the telescopic action of said closing spring 4.

Said upper and lower pawls 5,6 constitute a locking mechanism. Said lowerpawl 6 is resiliently secured at lower end of said inner tube 11 by means of a hair spring 61, while said upper pawl 5 is resiliently secured in a housing 52 similarly by means of a hair spring 51 in which said housing 52 is, in turns, slidably movable within said inner tube 11. Of course, said housing 52 is provided with a slit for allowing the hook portion of said upper pawl 5 protruding out therethrough.

The wire 8 is interconnected between said upper pawl 5 and said lower ring 15. the outer tube 12 has a longitudinal slot 20 below said lower ring

15 while the inner tube 11 has also a longitudinal slot 21 at corresponding intermediate section. The wire 8 is deflected at upper end to pass through out of the aligned slots 20,21 and then bent returned to engage into said lower ring 15. This wire 8 is so rigid that capable of pushing and pulling said upper pawl 5.

The canopy structure 7 is just the same as conventional one so that further description is not necessary and herewith omitted. Anyway, each constituting rib is at one end pivotably connected to said upper, middle and lower rings 31,13 and 15 correspondingly.

The handle 9 is mounted at lower end of the shank 1. In the handle 9 an actuating member 91 is provided with two protrusions, namely, the umbrella opening and closing actuating portions 92 and 93, respectively, directing to said upper and lower apertures 17,19 of said outer tube 12.

Moreover, said lower ring 15 is optionally provided with a locking means 22 to be locked into the correspondingly aligned lock holes 23 and 24 in said inner and outer tubes 11 and 12, respectively, so as to support said lower ring 15 more stable and thereby to prevent said canopy structure from slipping off by accident.

Before opening of the umbrella, a preparative action should be taken by the user, for example, holding the handle 9 with one hand and putting the end of the cylinder 3 against any surface of the ground, a wall or another hand of himself. When a slight force is applied by said one hand, then said outer tube 12 will be slidably moved in relation to said inner tube 11 to cause said umbrella closing spring 4 compressed. Since in the closing state of the umbrella, the umbrella opening spring 2 is kept under the compressed state, so that in the action of preparative operation only the umbrella closing spring 4 is going to be compressed which is easily accomplished by a slight force. The handle 9 brought by said outer tube 12 is moved upwards in relation to said inner tube 11 to push the locking means 22 of said lower ring 15 out of the corresponding lock holes 23,23, until the upper and lower apertures 17 and 19 thereof are aligned with the upper and lower apertures 18 and 20, respectively. At this point, the upper pawl 5 is pushed downwards by the wire 8 to lock into the aligned apertures 16 and 17 to restrict said umbrella opening spring 2 at compressed and locked state while the lower pawl 6 brought by said inner tube 11 is simultaneously moved downwards in relation to said outer tube 12 until locked into the aligned apertures 18 and 19 to restrict said umbrella closing spring 4 at compressed and locked state, as illustrated in Fig. 2.

Under this preparative state, the umbrella can be opened any time. When the thumb, for exam-

ple, of the hand that holds the handle 9 presses upper side of the actuating mechanism 91, said upper pawl 5 is thus pressed down by the umbrella opening actuating portion 92 out of the aligned apertures 16 and 17, then the locked state of said umbrella opening spring 2 is released. Thereby, said umbrella opening spring 2 is expanded by its own accumulated energy when compressed, then the cylinder 2 is moved upwards in relation to the extension 14 of said inner tube 11 so as to open the canopy structure 7. At the same time the lower ring 15 is moved upwards to the top end of the outer tube 12, the locking member 22 is locked into the aligned lock holes 23,24 and the upper pawl 5 is pulled upwards by the wire 8. Now, the lower pawl 6 is kept under locked state, as illustrated in Fig.3.

When the opened umbrella is going to be closed, the user only needs to press the lower side of the actuating mechanism 91, said lower pawl 6 is thus pressed down by the umbrella closing actuating portion 93 out of the lower aperture 19 of the outer tube 12, then the locked state of said umbrella closing spring 4 is released. Thereby, said umbrella closing spring 4 is expanded by its own accumulated energy when compressed, then the outer tube 12 is moved downwards in relation to the inner tube 11 so as to close the canopy structure 7. At the same time, the umbrella opening spring 2 is compressed and the lower pawl 6 is brought by the inner tube 11 moved upwards a certain distance, returned to the state as illustrated in Fig.1.

As mentioned above, the arrangement and construction of the automatic umbrella according to the present invention are significantly simplified, yet the structure is still sufficient strong and stable. Furthermore, the operation is easy and positive, and the production cost is greatly reduced.

Although the invention has been described in detail with reference to its presently preferred embodiment, it will be understood by any person skilled in the art that various modifications, changes and variations can be made without departing from the spirit and scope of the invention.

Claims

1. A fully automatic umbrella comprising, in combination:

a shank consisting of an inner and an outer tubes capable of relative sliding movement with respect to each other, in which said inner tube having a middle ring at upper section and an extension outreached over said middle ring while said outer tube having a lower ring at upper end, both said inner and outer tubes being provided with respective up-

per and lower aligned apertures;

an umbrella opening spring telescopically received within said extension of said inner tube;

a cylinder mounted around said extension 5
for relative sliding movement therewith and provided with an upper ring at lower end;

an umbrella closing spring telescopically mounted around said inner tube in the limit between said middle ring and the top end of 10
said outer tube;

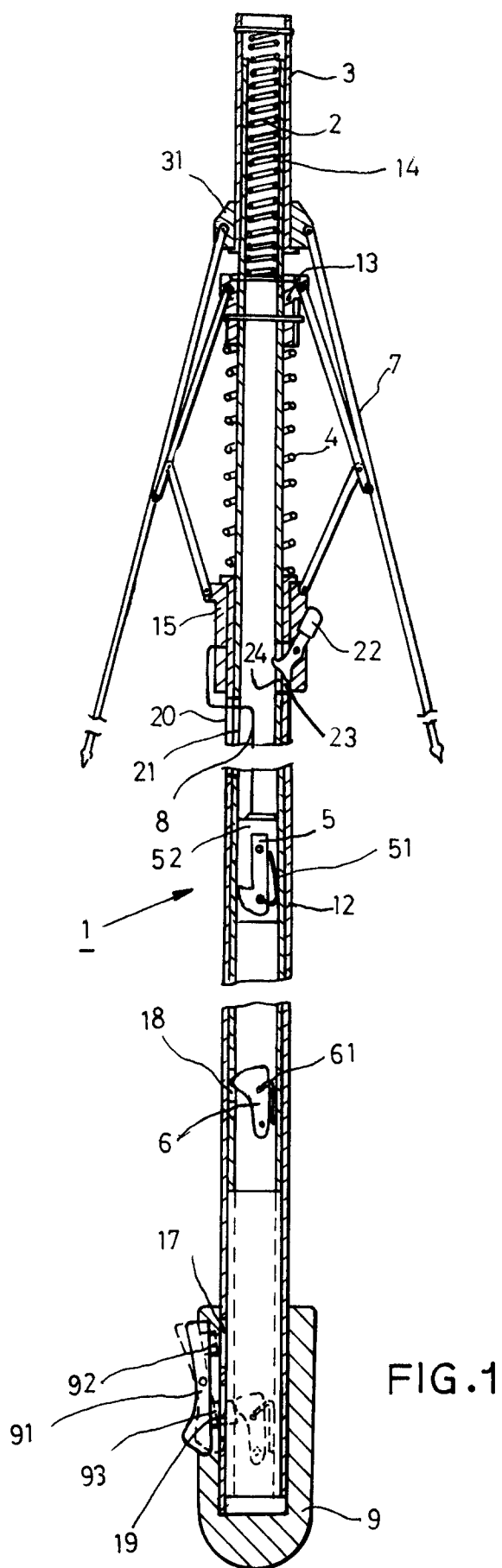
a locking mechanism consisting of an upper pawl to be locked into said upper aligned apertures for restricting said umbrella opening spring at a locking state, and a lower pawl to 15
be locked into said lower aligned apertures for restricting said umbrella closing spring at a lock state;

a canopy structure connected via respective one end of constituting ribs with said upper, middle and lower rings correspondingly; 20

a wire interconnected between said upper pawl and said lower ring for pushing and pulling said upper pawl in movement; and

a handle provided with an actuating member for controlling the operation of opening and closing the umbrella, respectively. 25

2. A fully automatic umbrella according to claim 1, wherein said lower pawl is resiliently secured to said inner tube at lower end by means of a hair spring. 30
3. A fully automatic umbrella according to claim 1, wherein said upper pawl is resiliently secured in a housing by means of a hair spring, and said housing is slidable within said inner tube. 35
4. A fully automatic umbrella according to claim 1, wherein said lower ring is provided with a locking means to be releasably locked into a pair of aligned lock holes disposed correspondingly in said inner and outer tubes. 40
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5. A fully automatic umbrella according to claim 1, wherein said outer tube is provided with a longitudinal slot below said lower ring while said inner tube is also provided with a longitudinal slot at corresponding section. 50
6. A fully automatic umbrella according to claim 5, wherein said wire is deflected at upper end for passing through out of said aligned longitudinal slots in said inner and outer tubes, respectively, and then bent returned to engage into said lower ring. 55



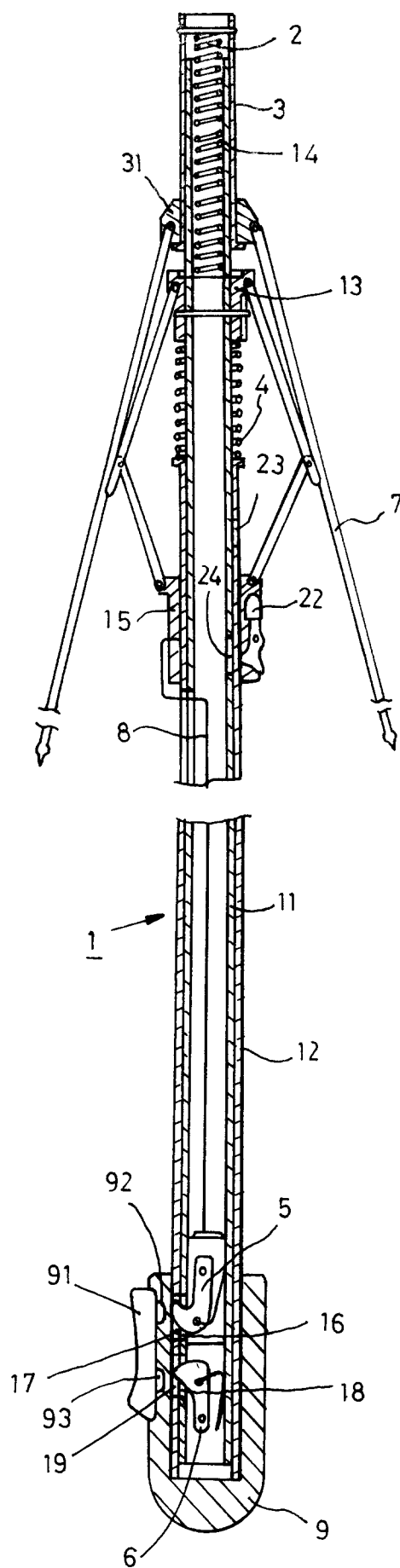


FIG. 2

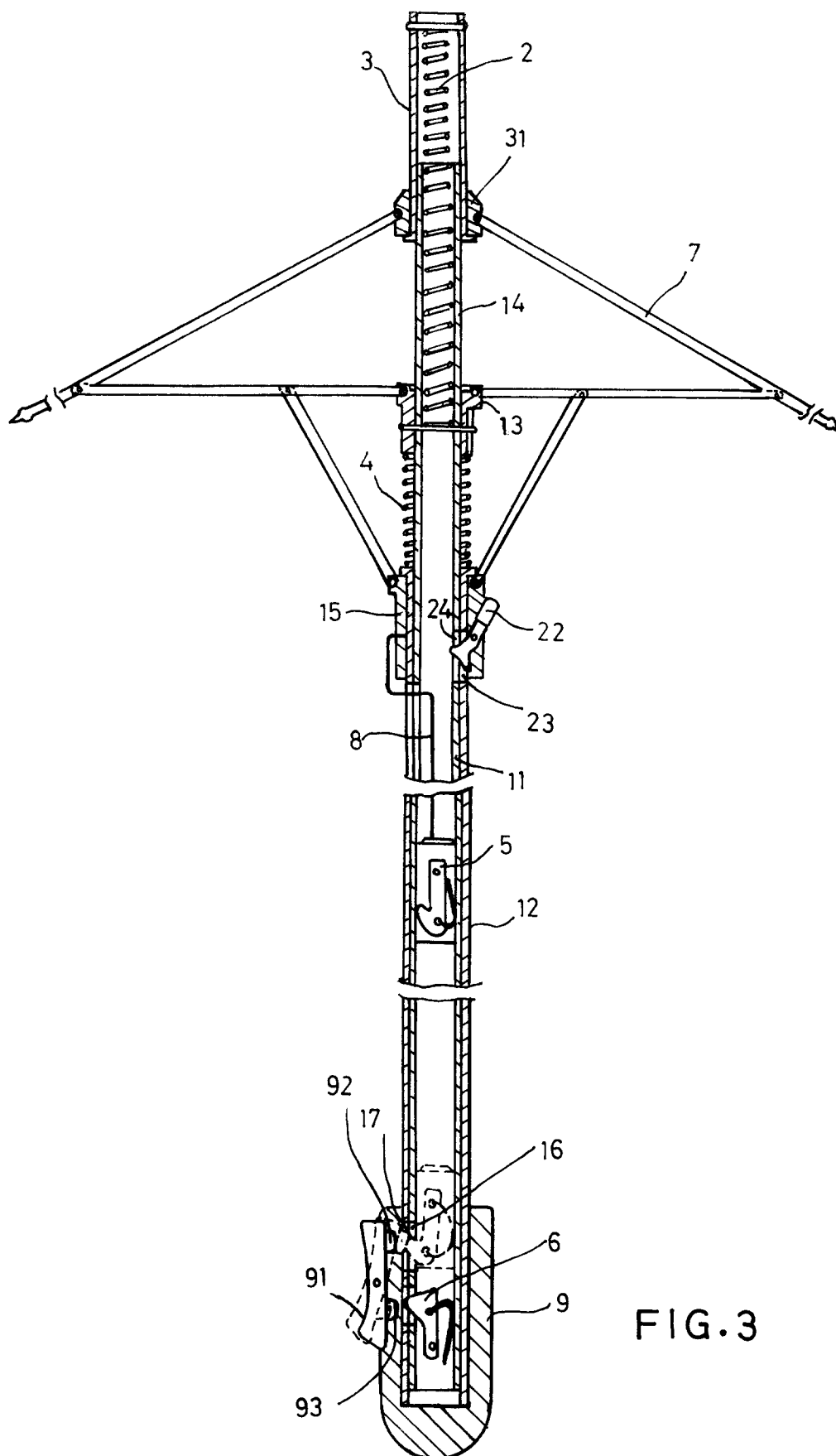


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 12 0933

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.5)
E	DE-U-9 213 055 (CHU) * the whole document *	1,2,4	A45B25/14

A	US-A-5 088 512 (CHOU ET AL.) * column 2, line 30 - column 5, line 19; figures 1-4 *	1,4	
D	& EP-A-0 525 227		

A	US-A-5 144 969 (CHOU ET AL.) * the whole document *	1-3	
D	& EP-A-0 531 572		

A	EP-A-0 151 847 (DAY) * page 7, line 6 - page 9, line 18; figures 1-4 *	1,2,4	

A	EP-A-0 291 589 (DAY) * the whole document *	1,2,4	

A	DE-A-3 812 613 (TSENG) * column 2, line 13 - column 5, line 53; figures 1-4 *	1,3,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	FR-A-2 094 251 (TISSMETAL LIONEL-DUPONT) * the whole document *	1	A45B

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 JULY 1993	Examiner WILLIAMS M.J.
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	