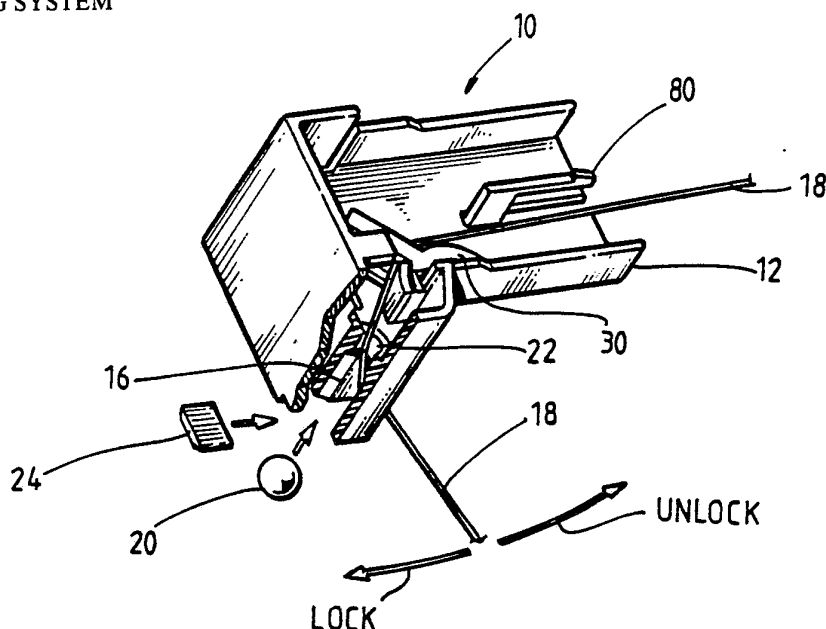


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 : E06B 9/38		A1	(11) International Publication Number: WO 89/ 07187 (43) International Publication Date: 10 August 1989 (10.08.89)
(21) International Application Number: PCT/US89/00121 (22) International Filing Date: 12 January 1989 (12.01.89) (31) Priority Application Number: 152,261 (32) Priority Date: 4 February 1988 (04.02.88) (33) Priority Country: US (71) Applicant: COOPER INDUSTRIES, INC. [US/US]; 1001 Fannin, Suite 4000, P.O. Box 4446, Houston, TX 77210 (US). (72) Inventor: WAGER, John, E. ; 601 South Clay Street, Sturgis, MI 49091 (US). (74) Agent: THIELE, Alan, R.; Cooper Industries, Inc., P.O. Box 4446, Houston, TX 77210 (US).			(81) Designated States: DE (European patent), GB (Euro- pean patent), IT (European patent). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: CORD LOCKING SYSTEM



(57) Abstract

A cord locking system (10) for use with a window shade or the like includes a substantially tubular member (16) in which a ball member (20) is positioned. The ball member (20) is prevented from falling out of the bottom of the tubular member (16) by a stop element (24). Disposed at the top of the tubular member (16) is a socket (22). Any upward movement of the ball member (20) with the control cords (18) into the socket (22) causes the control cords (18) to be caught between the ball (20) and the socket (22) thus preventing further movement. The control cords (18) are guided by an arcuate surface (30) disposed on an end cap portion (12) having a biased pronged latching element (80) for attaching the cord locking system onto the window shade in operative association therewith.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	ML	Mali
AU	Australia	GA	Gabon	MR	Mauritania
BB	Barbados	GB	United Kingdom	MW	Malawi
BE	Belgium	HU	Hungary	NL	Netherlands
BG	Bulgaria	IT	Italy	NO	Norway
BJ	Benin	JP	Japan	RO	Romania
BR	Brazil	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	LI	Liechtenstein	SN	Senegal
CH	Switzerland	LK	Sri Lanka	SU	Soviet Union
CM	Cameroon	LU	Luxembourg	TD	Chad
DE	Germany, Federal Republic of	MC	Monaco	TG	Togo
DK	Denmark	MG	Madagascar	US	United States of America
FI	Finland				

-1-

CORD LOCKING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to window shade or window blind systems; more particularly the present invention relates to a locking method for the cords used in window shade or window blind systems.

Window shade or window blind systems typically have cords which run along the headrail and then hang freely along the sides of the window shade or window blind. These cords are used to control the shade or blind raising and lowering mechanism.

In most commonly used raising and lowering systems, the user pulls the cords to one side to free the cords for travel. Once the cords have been moved, the user then re-positions the cords so that a hinged plate member can pinch the cords against a flat surface.

The hinged plate method of impeding cord travel to lock a shade or blind in position has several inherent problems. Typical of such problems is the situation which occurs in a multi-cord system wherein one or more cords may become positioned so that it lies on top of other cords. In this situation, the cords can not be reliably locked. When this condition occurs the weight of the shade or blind may cause one side of the bottom rail of the shade or blind system to fall down while the other side remains in position. The user must

-2-

then unlock the cords again to remedy the problem before adjusting the position of the bottom rail.

Another problem with the hinged plate and flat surface system is the wear on the cords themselves caused by the continued mechanical engagement of the edge of the hinged plate with the cords. This continual contact causes the cord to wear and eventually break. As the cords wear, small cord fragments may become lodged in the pinch or hinge mechanism. These bits of cord can disable the entire pinch mechanism or cause the hinge to wear at an accelerated rate.

There is therefore a need in the art to provide a system which includes a substantially fail-safe locking system for cords used with a window shade system or the like. Such systems should be simple to manufacture, inexpensive and only minimally wear the control cords.

SUMMARY OF THE INVENTION

A fail-safe cord locking system for use with a window shade or the like and which reduces wear on the cord is provided by the present invention. The cord locking system is contained in a end cap which fits into the end of a headrail of a window shade system or the like. Within the end cap is a tubular space which surrounds the control cords for the window shade or blind.

Positioned within the tubular space is a ball member. The tubular space includes a stop at its base so that the ball member will not fall out. At the top of the tubular space is a socket whose configuration is slightly smaller than the size of the ball member.

-3-

As the cords pass through the tubular space, they carry the ball member upwardly through the tubular space into the socket.

When the ball member reaches the top of its travel in the tubular space, the control cords are trapped between the ball member and the socket. This trapping of the cords between the ball member and the socket stops further travel of the cords and consequently locks the window shade or blind system in the desired position.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the cord locking system of the present invention may be had by reference to the drawings wherein:

Figure 1 is a perspective view in partial section of a schematic of the cord locking system of the present invention;

Figure 2 is a top plan view of the schematic system shown in Figure 1;

Figure 3 is front elevational view of the schematic system shown in Figure 1 with the front portion removed;

Figure 4 is an exploded perspective view of a first embodiment of the cord locking system of the present invention;

Figure 5 is a sectional view taken at line 5-5 of Figure 4;

Figure 6 is a perspective view of the main part of the system shown in Figure 4;

Figure 7 is a bottom plan view of the system shown in Figure 4;

Figure 8 is an exploded perspective view of a second embodiment of the cord locking system of the present invention;

-4-

Figure 9 is a view taken at line 9-9 of Figure 8;

Figure 10 is a perspective view of the assembled system shown in Figure 8; and

05 Figure 11 is a bottom plan view of the system shown in Figure 11.

DESCRIPTION OF THE EMBODIMENTS

As may be seen in the schematic views of a simple cord locking system 10 shown in Figures 1, 2 and 3 all components are sized to be contained in an end piece 12 typically used with a headrail (reference number 190 in Figure 4) of a window shade system or the like. Attachment to a headrail may be by a biased pronged finger 80 or similar system. End piece 12 contains a tubular space 16 through which control cords 18 for positioning a shade or a blind pass. Located within tubular space 16 is a locking ball 20. As
10 cords 18 are moved through tubular space 16 particularly in an upward fashion, their travel causes locking ball 20 to move in a similar fashion. As locking ball 20 rises within the tubular space 16, it enters socket 22. Socket 22 prevents the upward travel of locking ball 20 and causes cords 18 to be pressed against the interior
15 surface of socket 22. The further travel of cords 18 is thus prevented and the travel of the shade is thereby stopped. Preventing ball 20 from dropping out of tubular space 16 is ball retainer 24 which is formed at the base of tubular space 16.
20

It has been found that socket 22 may be a conical shape or
25 may include a series of stepped ridges 26 as shown in Figure 3.

-5-

When it is desired to release ball 20, cords 18 are pulled to one side as shown in Figure 3. This causes ball 20 to drop down in tubular space 16 by the force of gravity. Ball 20 is prevented from falling out of tubular space 16 by ball retainer 24.

05 When it is desired to reposition the shade or blind, cords 18 are brought to a substantially vertical position. As cords 18 travel upwardly into end cap 12 they pick up ball 20 and carry it into socket member 22.

10 It is not fully understood why the upward travel of cords 18 readily picks up locking ball 20; however, it has been found that both smooth spherical and irregular locking balls 20 work in a satisfactory manner. It is also been discovered that the locking ball 20 works well irrespective of the material from which it is formed. So far locking balls 20 of plastic, metal and wood have been
15 tried and all seem to provide the desired operation. Similarly the locking action of the cord locking system 10 of the present invention seems to work well irrespective of the material from which end cap 12 is formed.

20 Additionally, it has been noticed that cords 18 tend to space themselves in a substantially even array around ball 20. This alignment prevents the bunching of cords 18 and allows for the positive locking of ball 20 in socket 20. The reason for this substantially even array of control cords 18 is not fully understood.

25 Proper operation of the cord locking system of the present invention is enhanced if the cords are properly guided through the

-6-

end piece into the tubular space. In the schematic embodiments shown in Figures 1, 2 and 3, this guiding is accomplished by arcuate surface 30 which conducts the cords into tubular space 16.

In Figures 4, 5, 6 and 7, another method of guiding the cords from the headrail into the cord locking system is shown. Herein the cords pass under arcuate surface 130 and end piece 112. Once passing arcuate surface 130, the cords then pass over roller 132 which turns on axle 134. Once passing roller 132, the cords then travel through tubular space 116 in which ball 120 is located. As previously explained with regard to Figures 1, 2 and 3, ball 120 will cause the cords to lock into position by resting in socket 126.

Yet another method of guiding cords from the headrail into the tubular space is shown by reference to Figures 8, 9, 10 and 11. Therein it may be seen that two rollers are used. Specifically, roller 236, which turns on axle 238, makes initial contact with the cords and roller 232, which turns on roller 234, makes secondary contact with the cords before they enter tubular space 216. As previously explained, ball 220 locks the cords once it interacts with socket 222. The entire assembly is formed into an end piece 212 which is shaped to fit within a headrail.

There is now provided by the cord locking system 10 of the present invention an easy-to-manufacture, inexpensive system which is substantially fail-safe and which minimizes cord wear.

The foregoing description discloses the scope of the invention in terms of the preferred embodiment. Those of ordinary

-7-

skill in the art may determine that other embodiments of the invention are possible without departing from the scope of the appended claims.

-8-

I Claim:

1. A system for locking the control cords used with a window shade or the like comprising:

05 a housing, said housing including a substantially vertical tubular space constructed and arranged to surround the control cords used with window shades or the like;

a ball member positioned within said tubular space;

means for preventing said ball member from falling out of said tubular space;

10 means for limiting the upward travel of said ball member;

whereby the control cords from a window shade or the like are locked into position by being trapped between said ball member and said means for limiting the upward travel of said ball member.

2. The system as defined in Claim 1 wherein said housing is an end cap for a headrail used with a window shade or the like.

3. The system as defined in Claim 1 wherein said means for limiting the upward travel of said ball member is a socket.

4. The system as defined in Claim 3 wherein said socket has a conical shape.

5. The system as defined in Claim 3 wherein said socket has a stepped surface.

6. The system as defined in Claim 2 wherein said means for limiting the upward travel of said ball member is a socket.

7. The system as defined in Claim 1 wherein the cords are guided into said tubular space by an arcuate surface.

-9-

8. The system as defined in Claim 1 wherein the cords are guided into said tubular space by a roller member.

9. The system as defined in Claim 1 wherein the cords are guided into said tubular space by an arcuate surface and at least one roller member.

10. A shade system for a window comprising:

a headrail;

means for limiting the passage of light through the window connected to said headrail;

05 a plurality of control cords for adjusting the length of said means for limiting the passage of light;

a pair of end pieces constructed and arranged to fit on either end of said headrail, at least one of said end pieces including:

10 a housing, said housing including a substantially vertical tubular space constructed and arranged to surround said control cord system used with said means for limiting the passage of light through the window;

a ball member positioned within said tubular space;

15 means for preventing said ball member from falling from said tubular space;

means for limiting the upward travel of said ball member;

20 whereby said control cords may be locked into position by being trapped between said ball member and said means for limiting the upward travel of said ball member.

-10-

11. The shade system as defined in Claim 10 wherein said means for limiting the upward travel of said ball member is a socket.

12. The shade system as defined in Claim 11 wherein said socket has a conical shape.

13. The shade system as defined in Claim 11 wherein said socket has a stepped surface.

14. The device as defined in Claim 10 wherein said cords are guided into said tubular space by an arcuate surface.

15. The device as defined in Claim 10 wherein the cords are guided into said tubular space by a roller member.

16. The device as defined in Claim 10 wherein the cords are guided into said tubular space by an arcuate surface and at least one roller member.

17. A method for preventing the movement of control cords used in a window covering system comprising the steps of:

passing the control cords through a substantially vertical tubular space;

05 positioning a ball in said tubular space;

preventing said ball from falling from the bottom of said substantially vertical tubular space;

10 limiting the upward travel of said ball so that the control cords are trapped within said tubular space as said ball approaches its upward limit.

1/3

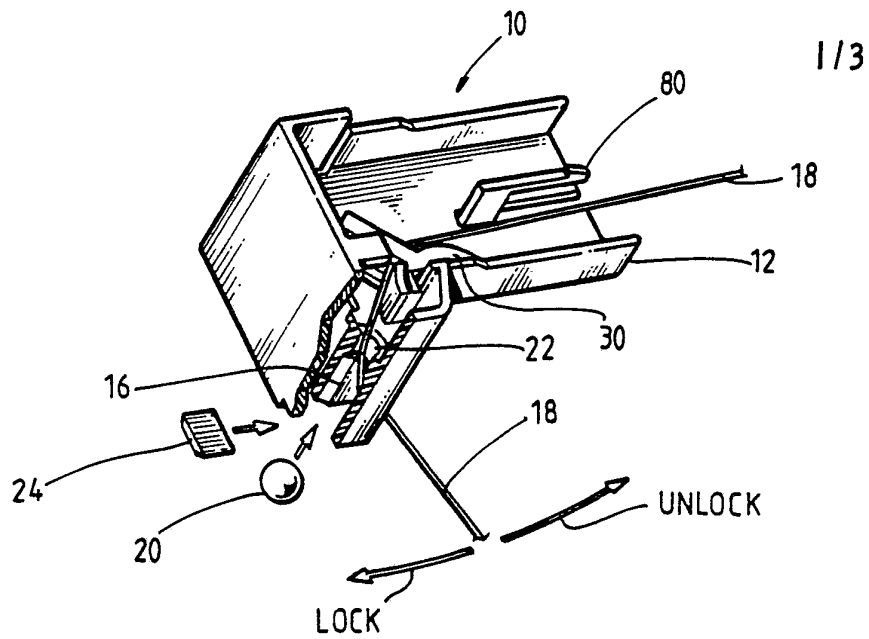


Fig. 1

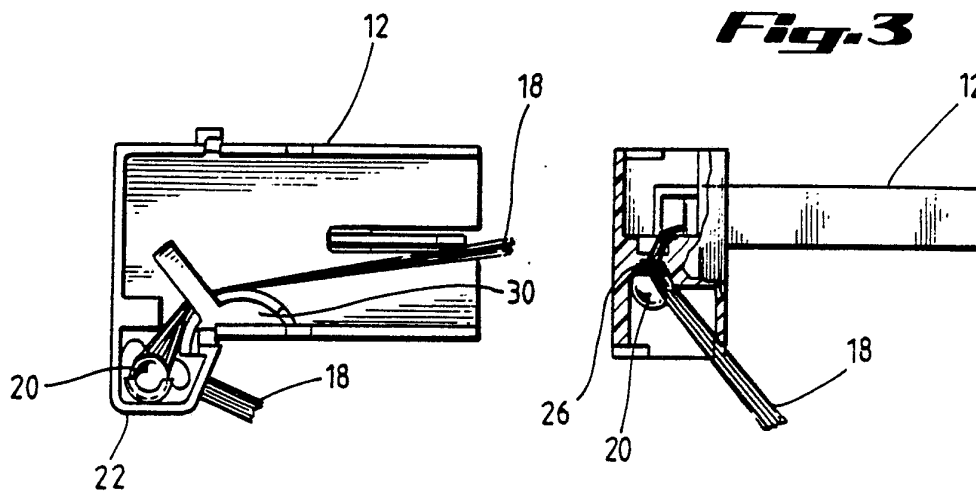
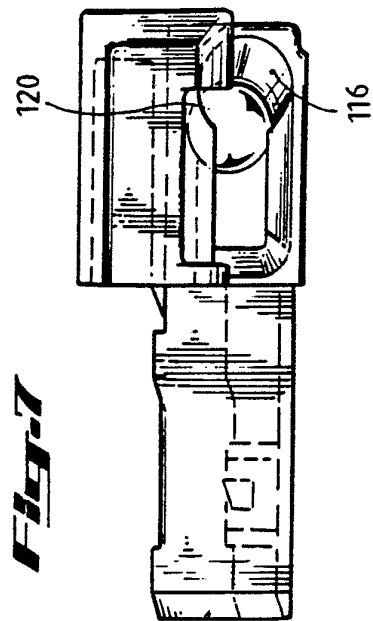
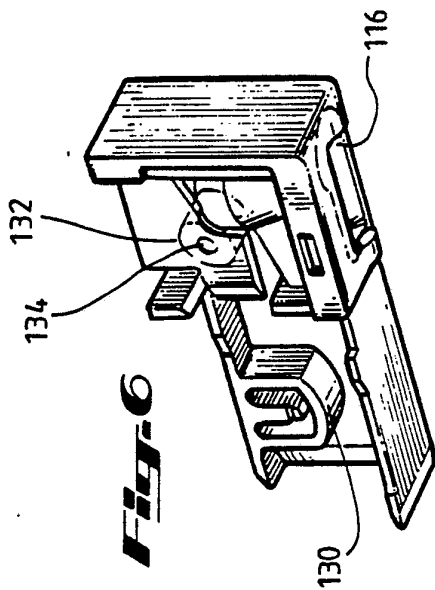
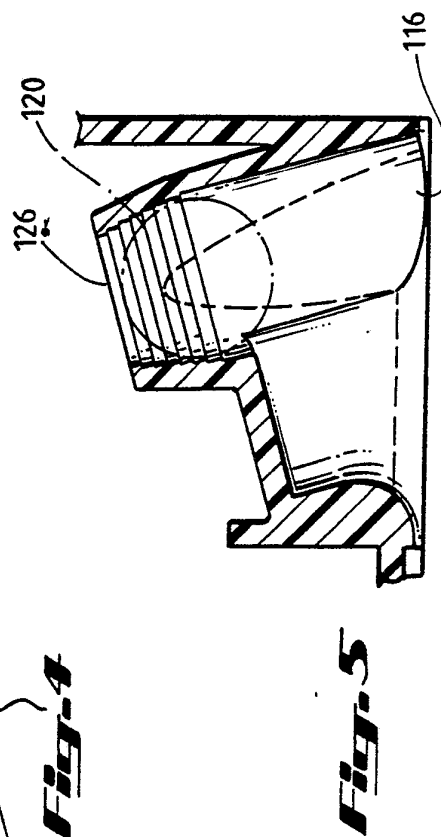
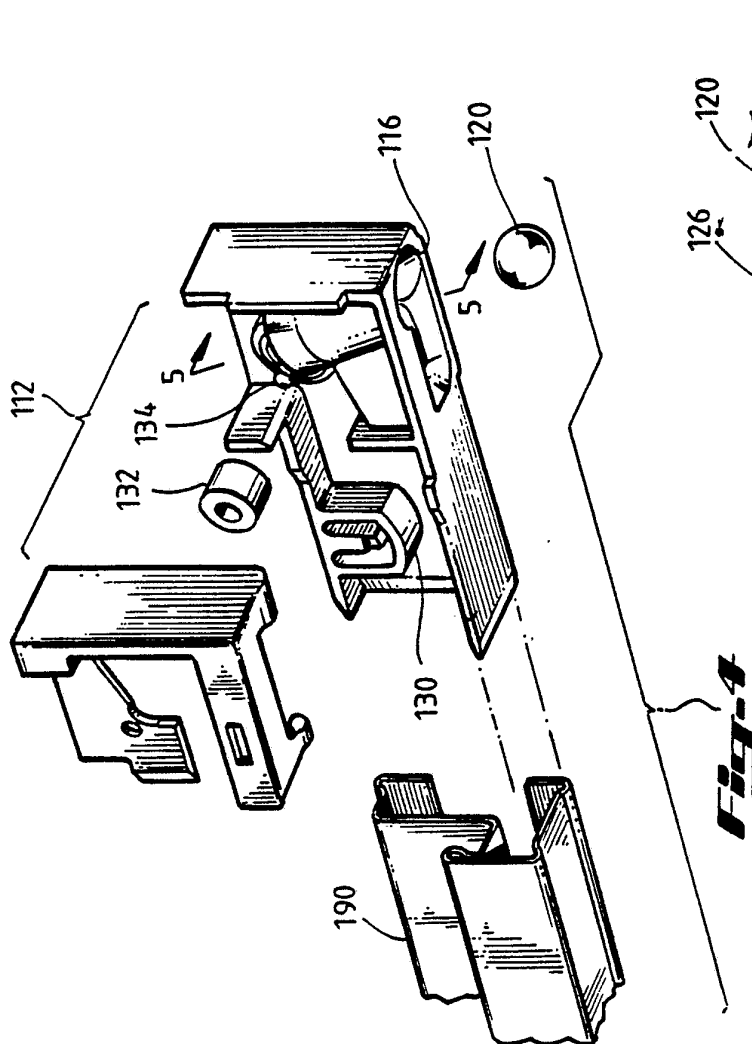


Fig. 2

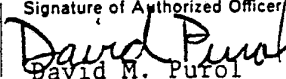
Fig. 3

2/3



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US89/00121

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC 4 E06B 9/38 U.S. Cl. 160/178.2		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
U.S. Cl.	160/178.2, 178.1 24/115L	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category [*]	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	US,A, 2,091,033 (Dodge) 24 August 1937 see the entire document	
A	US,A, 2,161,703 (Ellis et al) 06 June 1939 see the entire document	
Y	US,A, 3,931,846 (Zilver) 13 January 1976 see the entire document	1-17
Y	US,A, 3,952,789 (Marotto) 27 April 1976 see the entire document	9, 16
A	US,A, 4,463,791 (McClure) 07 August 1984 see the entire document	
A	US,A, 4,488,588 (McClure) 18 December 1984 see the entire document	
A	US,A, 4,646,808 (Anderson) 03 March 1987 see the entire document	
Y	US,A, 4,651,795 (Valle et al) 24 March 1987 see the entire document	5, 13
A	US,A, 4,660,612 (Anderson) 28 April 1987 see the entire document	
Y	US,A, 4,719,956 (Valle) 19 January 1988 see the entire document	1-17
[*] Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
28 March 1989	02 JUN 1989	
International Searching Authority	Signature of Authorized Officer	
ISA/US	 David M. Purol	