

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 March 2008 (20.03.2008)

PCT

(10) International Publication Number  
**WO 2008/031204 A1**

(51) International Patent Classification:  
*G02C 5/22* (2006.01) *G02C 5/00* (2006.01)

(21) International Application Number:  
PCT/CA2007/001594

(22) International Filing Date:  
12 September 2007 (12.09.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
11/531,180 12 September 2006 (12.09.2006) US

(71) Applicant (for all designated States except US): **CHIC OPTIC, INC.** [CA/CA]; P.O. Box 1799, Terminal A, Montreal, Quebec H3C 3A5 (CA).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **IFERGAN, Nonu** [CA/CA]; 343 Carlyle Street, Mont-royal, Quebec H3R 1T3 (CA).

(74) Agents: **SLANEY, Brett** et al.; Blake, Cassels & Graydon LLP, Box 25, Commerce Court West, 199 Bay Street, Suite 2800, Toronto, Ontario M5L 1A9 (CA).

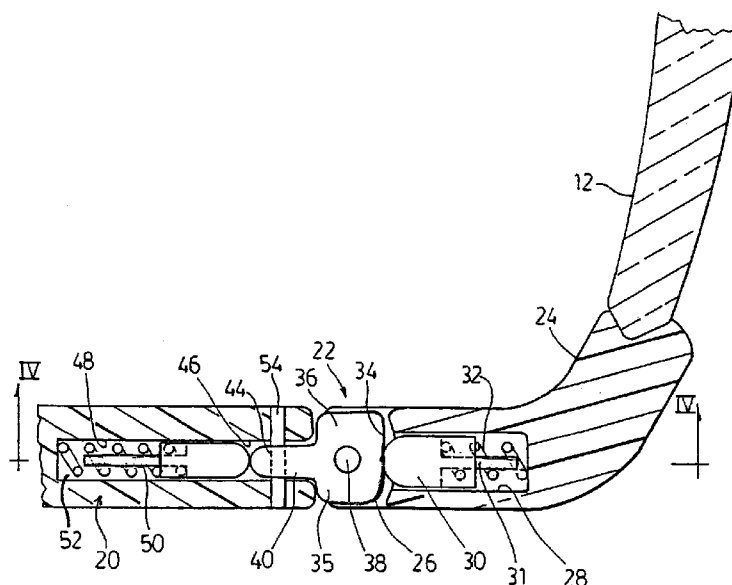
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(54) Title: MECHANICAL UNIVERSAL HINGE



(57) Abstract: A hinge assembly is provided for connecting the temple of an eyeglass to a lens support assembly. The hinge assembly comprises a cam member with a pair of oppositely directed cam surfaces disposed in orthogonal planes. The assembly also comprises a pair of pivots extending normal to respective ones of the planes and defining orthogonal pivot axes for relative movement between the cam member and the main frame and the temple respectively. The hinge has a pair of followers, each associated with a respective one of the cam surfaces; and a pair of biasing members acting on the followers to maintain the followers in contact with the cam surfaces. An eyeglass comprising the hinge assembly is also provided. The hinge assembly allows a compound movement between the main frame and the temple that can accommodate the abnormal loading that might be placed on the eyeglasses.

WO 2008/031204 A1

## MECHANICAL UNIVERSAL HINGE

### FIELD OF THE INVENTION

[0001] The present invention relates to eyeglasses and to hinges for an eyeglass.

### BACKGROUND OF THE INVENTION

[0002] Eyeglasses typically comprise a frame having a pair of apertures to support lenses and a pair of temples that extend rearwardly from the front portion of the spectacle frame for engagement with the users' ears. The temples are normally connected to the front portion of the spectacle frame by a hinge to allow the temples to be folded behind the lenses in the frame for storage when not in use.

[0003] In conventional eyeglasses, the hinge permits folding in one direction but inhibits movement of the temples beyond a position in which they are generally perpendicular to the plane of the lenses carried by the spectacle frame. In that position, the hinge is relatively vulnerable to abnormal loads that inevitably occur in normal use. Such loads may occur for example, from accidental contact with the eyeglasses, from improper storage when not in use or may be exerted by the side of a user's face where the overall width of the wearer's face is broader than the width of the spectacle frame. Inevitably, the hinge arrangement can be one of the more vulnerable components of the eyeglasses and accordingly, damage frequently occurs.

[0004] U.S. Patent No. 4,494,834 to Tabacchi discloses a resilient hinge in which a hinge block is mounted for sliding movement relative to the temple. A spring opposes such movement to hold the hinge block in the temple. If the temple is pulled outwardly, the outer edge of the temple abuts the outer edge of the frame and provides a fulcrum about which the temple rotates. The spring permits the movement and avoids bending of the temple.

[0005] Similarly, U.S. Patent No. 4,689,851 to Beyer shows a hinge arrangement that has a sliding support within the temple to permit lateral outward motion.

[0006] U.S. Patent No. 7,073,904, U.S. Publication No. 2005/0163560 and U.S. Patent No. 6,168,341 to Chene et al. show a number of variants in the placement of the type of hinge shown in the above two U.S. patents.

1 [0007] It is therefore an object of the present invention to provide a hinge arrangement  
2 for a pair of eyeglasses in which the above disadvantages are obviated or mitigated.

### 3 SUMMARY OF THE INVENTION

4 [0008] In one aspect, an eyeglass comprising a lens support assembly is provided. The  
5 eyeglass comprises a pair of temples extending from the lens support to support the eyeglass  
6 on a user, and a hinge assembly to connect respective ones of the temples to the lens support  
7 assembly frame, each of the hinge assemblies comprising a pair of mutually perpendicular  
8 pivot axes to permit movement between the temples and the lens support assembly about the  
9 substantially perpendicular axes, and a biasing element operable about at least one of the  
10 axes to maintain the temple in a stable position relative to the lens support assembly.

11 [0009] In another aspect, a hinge assembly is provided for connecting a temple to the  
12 end piece of the spectacle frame. The hinge assembly comprises a cam member with a pair  
13 of oppositely directed cam surfaces disposed in orthogonal planes; a pair of pivots extending  
14 normal to respective ones of the planes and defining orthogonal pivot axes for relative  
15 movement between the cam member and the end piece of the spectacle frame and the temple  
16 respectively; a pair of followers, each associated with a respective one of the cam surfaces;  
17 and a pair of biasing members acting on the followers to maintain the followers in contact  
18 with the cam surfaces.

### 19 BRIEF DESCRIPTION OF THE DRAWINGS

20 [0010] Embodiments of the invention will now be described by way of example only  
21 with reference made to the appended drawings wherein:

22 [0011] Figure 1 is a perspective view of a pair of eyeglasses.

23 [0012] Figure 2 is a view on the line II-II of Figure 1.

24 [0013] Figure 3A-B is an exploded view of the arrangement shown in Figure 2.

25 [0014] Figure 4 is a view on the line IV-IV of Figure 2.

26 [0015] Figure 5A-B is a pair of views showing alternate configurations of the hinge  
27 arrangement shown in Figures 2-4.

[0016] Figure 6 is a sectional view similar to Figure 4 of an alternative arrangement of a hinge.

[0017] Figure 7 is a perspective view of a portion of a further embodiment of a hinge for eyeglasses.

[0018] Figure 8 is a section on the line VIII-VIII of Figure 7.

[0019] Figure 9 is a view on the line IX-IX of Figure 7.

[0020] Among those benefits and improvements that have been disclosed, other objects and advantages of this invention will become apparent from the following description taken in conjunction with the accompanying figures. The figures constitute a part of this specification and include illustrative embodiments of the present invention and illustrate various objects and features thereof.

## DETAILED DESCRIPTION OF THE INVENTION

[0021] Detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely illustrative of the invention that may be embodied in various forms. In addition, each of the examples given in connection with the various embodiments of the invention are intended to be illustrative, and not restrictive. Further, the figures are not necessarily to scale, some features may be exaggerated to show details of particular components. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present invention.

[0022] Referring now to the drawings, and initially to FIGS. 1 to 4, a pair of eyeglasses incorporating a hinge in accordance with one embodiment of the present invention may comprise a laterally extending lens support assembly 11 and a pair of temples 20. In the embodiment of Figures 1 to 4 the lens support assembly is defined by a frame 11. The spectacle frame comprises apertures to receive lenses 14, defined by the lens rim 12. The eyeglass frame includes a bridge 16 and a pair of end pieces 24 that extend from the sides 18 of the eye rim 12. A pair of temples 20 generally extend rearwardly to the user's temple region or ears and are connected to the frame 11 containing the lens rim 12 at the end pieces 24 by a hinge assembly 22 shown in greater detail in Figures 2 through 4.

1 [0023] The hinge assembly 22 is located in the end piece 24 generally formed as an  
2 extension of the sides 18. The end piece 24 is connected, attached or formed as a single  
3 piece at one end to the eye rim 12 and has a slot 26 formed at the opposite end. A bore 28 is  
4 formed in the end piece 24 that extends inwardly from the slot 26. The bore 28 houses a  
5 follower 30 which is biased out of the bore 28 by a spring 32. The follower includes a  
6 cylindrical tail 31 that passes within the spring 32 so as to locate the spring 32 relative to the  
7 follower. The follower 30 bears against a cam surface 34 that is formed on the periphery of  
8 a flange 35 of a cam member 36. The cam member 36 is received in the slot 26 and  
9 pivotally secured to the end piece 24 by a pin 38 that defines a first pivot axis.

10 [0024] The cam member 36 has a rearwardly extending tongue 40 that is delimited by a  
11 second cam surface 42. The tongue 40 is generally perpendicular to the flange 35 and has a  
12 bore 44 disposed at an axis perpendicular to the pin 38. The tongue 40 is received in a slot  
13 46 formed at one end of the temple 20. A bore 48 extends from the slot 46 and houses a  
14 follower 50 that is free to slide within the bore 48. The follower 50 has a rearwardly  
15 projecting cylindrical tail 51 that is located within a spring 52. Spring 52 biases the follower  
16 50 out of the bore 48 and into engagement with the cam surface 42. The cam member 36 is  
17 connected to the temple 20 by a pin 54 that extends through the bore 44 and into aligned  
18 bores 56 intersecting the slot 46 to define a second pivot axis. The first and second axes are  
19 substantially perpendicular to one another to permit movement between the main frame and  
20 temple in mutually perpendicular planes and thereby provide universal movement.

21 [0025] Each of the cam surfaces 34, 42 is profiled to provide a stable disposition of the  
22 temple 20 relative to the main frame 12 when generally perpendicular to one another. In a  
23 preferred embodiment, the cam surface has a central portion that is at a minimum radius  
24 from the respective axis. The cam surface progressively increases in radius to either side of  
25 the central portion to provide a progressively increasing resistance to movement.

26 [0026] The temple 20 may be folded, as shown in Figure 5a, to a stored position by  
27 rotation of the temple 20 about the axis provided by the pin 38. As the temple 20 is moved  
28 inwardly, the cam member 36 rotates about the pin 38 and overcomes any bias imposed by  
29 the follower 30 on the cam surface 34. In some circumstances, the cam surface 34 may be  
30 part circular over the movement required to store the temples 20 so as to provide a uniform  
31 resistance to movement caused by friction of the follower 30 across the cam surface 34.

1 Alternatively, the cam surface 34 may be profiled to provide resistance to movement from  
2 the stable position over a certain range of movement and then a bias to the stored position  
3 once that range of movement has been exceeded.

4 **[0027]** The arrangement of the pin 38 and cam member 36 also permits the temple 20 to  
5 be moved outwardly beyond the normal position to accommodate abnormal lateral loads.  
6 Such a load placed on the temple 20 causes rotation of the cam member 36 in the opposite  
7 direction about the pin 38 and causes displacement of the follower 30 against the bias of the  
8 spring 32. The temples 20 are able to move to accommodate the abnormal loading but upon  
9 removal of that loading, the bias of the spring 32 will return the cam member to its stable  
10 position. During such movement, the tail 31 is located within the spring 32 allowing it to  
11 compress and expand. The tail 31 assists in locating the spring 32 in the chamber 28 and  
12 also assists during assembly to hold the spring in situ.

13 **[0028]** The provision of the pin 54 also enables the temples to be displaced vertically in  
14 either direction relative to the plane of the lenses 14, as shown in Figure 5b. The cam  
15 surface 42 is profiled to provide a stable position with the temples 20 extending generally  
16 perpendicular to the plane of the lenses 14. However, the pin 54 permits pivotal movement  
17 of the temple relative to the cam member 34 and thus movement in a vertical plane.  
18 Movement about the pin 54 causes displacement to the follower 50 against the bias of the  
19 spring 52 to provide a restorative force when the loading on the temple is removed. The tail  
20 51 again locates the spring 52, both during operation and assembly.

21 **[0029]** It will be appreciated therefore that the disposition of the pins 38 and 54 along  
22 mutually perpendicular axes allows a compound movement between the main portions of the  
23 eyeglass frame and temples 20 that can accommodate the abnormal loading that might be  
24 placed on the eyeglasses 10. However, the provision of the cam surfaces 34, 42 enables the  
25 stable configuration of the eyeglasses 10 to be maintained under normal conditions and  
26 facilitates folding of the temples 20 to the stored position. It will be appreciated that the  
27 relative disposition of the axes may be reversed from that shown, i.e. the first axis is  
28 disposed horizontally and the second vertically, if preferred.

29 **[0030]** An alternative arrangement is shown in Figure 6 in which like components will  
30 be identified by like reference numbers with a suffix "a" added for clarity. In the

1 arrangement shown in Figure 6, the hinge assembly 22a is accommodated within a pair of  
2 exterior housings 60, 62. The bore 28a is formed within a body 63 that is dimensioned to fit  
3 within a cavity 64 formed within the housing 60. Similarly, the bore 48a is formed within a  
4 body 66 that is dimensioned to fit within a cavity 68 formed in the housing 62. The cam  
5 member 36a is pivotally connected to each of the bodies 24a, 66 to form a unitary  
6 construction. The housings 60, 62 are each provided with a socket 70, 72 respectively to  
7 which the arm 24a and temple 20a may be attached by adhesive or pins or other suitable  
8 means. In this way, the hinge 22a provides a unitary structure to which temples 20a and  
9 frames 12a may be secured to provide the flexibility of the hinge 22a.

10 **[0031]** A further embodiment of the hinge is shown in Figures 7 through 9 with like  
11 components being identified with like reference numerals and a suffix b added for clarity. In  
12 the arrangement shown in Figure 7, the hinge assembly 22b has a bushing 60 formed at one  
13 end of the arm 24b with a central bore 62 to receive pin 38b. The pin 38 b extends between  
14 opposite arms 64 of a yolk 66 that is formed as part of the cam member 36b. The pin 38b is  
15 threaded into one of the arms 64 and recessed in a socket in the other arm 64 to provide a  
16 flush surface and allow relative pivotal movement between the cam member 36b and the  
17 arm 24b. A biasing mechanism similar to that shown in Figure 2 is incorporated in the yoke  
18 66 to bear against the bushing 60 and bias the temples to a predetermined position.  
19 Alternatively, a spring may be incorporated between the bushing 60 and yoke 66 about the  
20 pin 38b to provide the bias.

21 **[0032]** The cam member 36b has a rearwardly extending tongue 40b that is received in a  
22 slot 46b formed at one end of the temple 20b. A pin 54b extends between the temple 20b  
23 and the cam member 36b to pivotally connect them. The pin 54b is perpendicular to the pin  
24 38b to permit relative pivotal movement about mutually perpendicular axis.

25 **[0033]** The cam member 36b has a cam surface 42b which bears against a follower 50b  
26 biased into engagement with the cam surface 42b by a spring 52b. The cam surface 42b is  
27 profiled to bias the temple 20b to a normal horizontal position but may yield against the bias  
28 of the spring 52b to accommodate displacement in a vertical plane about the pin 54b.  
29 Similarly, the temple may rotate in a horizontal plane by relative pivotal movement about  
30 the pin 38b with the biasing device returning the temples to the predetermined position.

1 [0034] In the arrangement of Figures 7 through 9, the construction of the hinge assembly  
2 22b is simplified to facilitate production.

3 [0035] Although the invention has been described with reference to certain specific  
4 embodiments, various modifications thereof will be apparent to those skilled in the art  
5 without departing from the spirit and scope of the invention as outlined in the claims  
6 appended hereto.

7 [0036] For example it is well known in the art that eyeglasses (e.g., spectacle frames,  
8 sunglasses and other types of eyewear) are available in a diverse array of types, shapes,  
9 sizes, and materials. Generally, eyeglasses come into three basic types—full, semi or half-  
10 rimless, and rimless. In a “full” eyeglass frame, the lens support assembly is comprised of a  
11 lens rim that completely encircles the lens. In a semi-rimless eyeglass frame there is no rim  
12 encircling both the bottom and top of the lens. Rimless eyeglass frames normally have no  
13 rim around the lens. For the most part, rimless eyeglasses come in three pieces (two end  
14 pieces and the nose bridge), although other variations also exist. In this configuration, the  
15 lenses form part of the of the lens support assembly. Generally, in a rimless configuration,  
16 each lens is routinely drilled so that the components fit snugly into the lens. While the  
17 invention is described using one specific example of spectacle frames (e.g., rimmed), it can  
18 also be adapted and used for semi-rimless, rimless frames. For the purpose of ease and  
19 convenience, the embodiments were illustrated and described using a "full" eyeglass frame  
20 but each figure could be illustrated with any of the varying types of construction detailed  
21 above or others known in the art.

22 [0037] Also, while the above descriptions and figures have been described in a specific  
23 manner, it can be appreciated that the orientation of individual components can be reversed  
24 to achieve the same result.

25 [0038] The entire disclosures of all references recited above are incorporated herein by  
26 reference.



**Claims:**

1. An eyeglass comprising a lens support assembly; a pair of temples extending from said lens support to support the eyeglass on a user, and a hinge assembly to connect respective ones of said temples to said lens support assembly frame, each of said hinge assemblies comprising a pair of mutually perpendicular pivot axes to permit movement between said temples and said lens support assembly about said substantially perpendicular axes, and a biasing element operable about at least one of said axes to maintain said temple in a stable position relative to said lens support assembly.
2. An eyeglass according to claim 1 wherein said biasing element acts to return said temple to a predetermined position.
3. An eyeglass according to claim 2 wherein said predetermined position is centrally located within a range of movement provided by said one axis.
4. An eyeglass according to claim 1, wherein said hinge assembly includes a cam member movable with one of said temple and said lens support assembly frame and said biasing element is associated with the other of said temple and said lens support assembly and acts against a cam surface on said cam member.
5. An eyeglass according to claim 4, wherein said cam surface shaped to return said temple to a predetermined position relative to said lens support assembly.
6. An eyeglass according to claim 5 wherein a central portion of said cam surface has a minimum radius from said pivot axis and progressively increases in radius to either side of said central portion.
7. An eyeglass according to claim 6 wherein said biasing element includes a follower engaging said cam surface and a spring biasing said follower against said cam surface.

8. An eyeglass according to claim 7 wherein said follower is slidably supported within said other of said temple and said main frame.
9. An eyeglass according to claim 8 wherein said biasing element is a spring supported on an extension of said follower.
10. An eyeglass according to claim 9 wherein said spring and said follower are located within an elongate bore within said other of said temple and said lens support assembly and retained in said bore by a pin defining one of said pivot axes.
11. A hinge assembly for connecting a temple to a lens support assembly, said hinge assembly comprising a cam member with a pair of oppositely directed cam surfaces disposed in orthogonal planes; a pair of pivots extending normal to respective ones of said planes and defining orthogonal pivot axes for relative movement between said cam member and said main frame and said temple respectively; a pair of followers, each associated with a respective one of said cam surfaces; and a pair of biasing members acting on said followers to maintain said followers in contact with said cam surfaces.
12. A hinge assembly according to claim 11 wherein said cam surfaces have a progressively increasing radius to either side of a central portion to provide a stable position for said cam surface.
13. A hinge assembly according to claim 12 wherein each of said followers are slidable in a radial direction relative to respective ones of said axes.
14. A hinge assembly according to claim 13 wherein each of said biasing members is a spring acting to bias said follower toward the respective axis.
15. A hinge assembly according to claim 14 wherein said spring is mounted on an extension of said follower.

16. A hinge assembly according to claim 15 wherein each of said followers is slidably mounted in a respective housing and retained by a respective one of said pivots.

17. A hinge assembly according to claim 16 wherein said housings are integrally formed with said temple and said lens support assembly.

18. A hinge assembly according to claim 16 wherein each of said housings includes a docket to receive said temple and said lens support assembly.

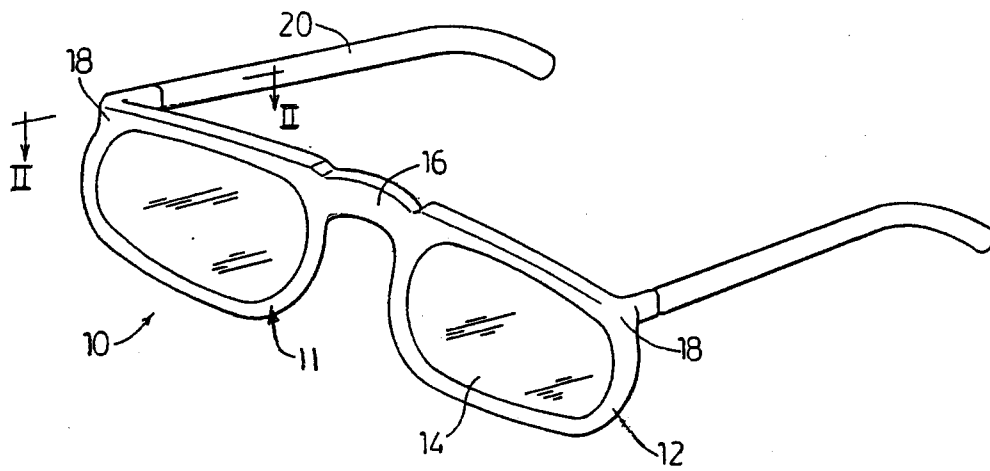


FIG.1

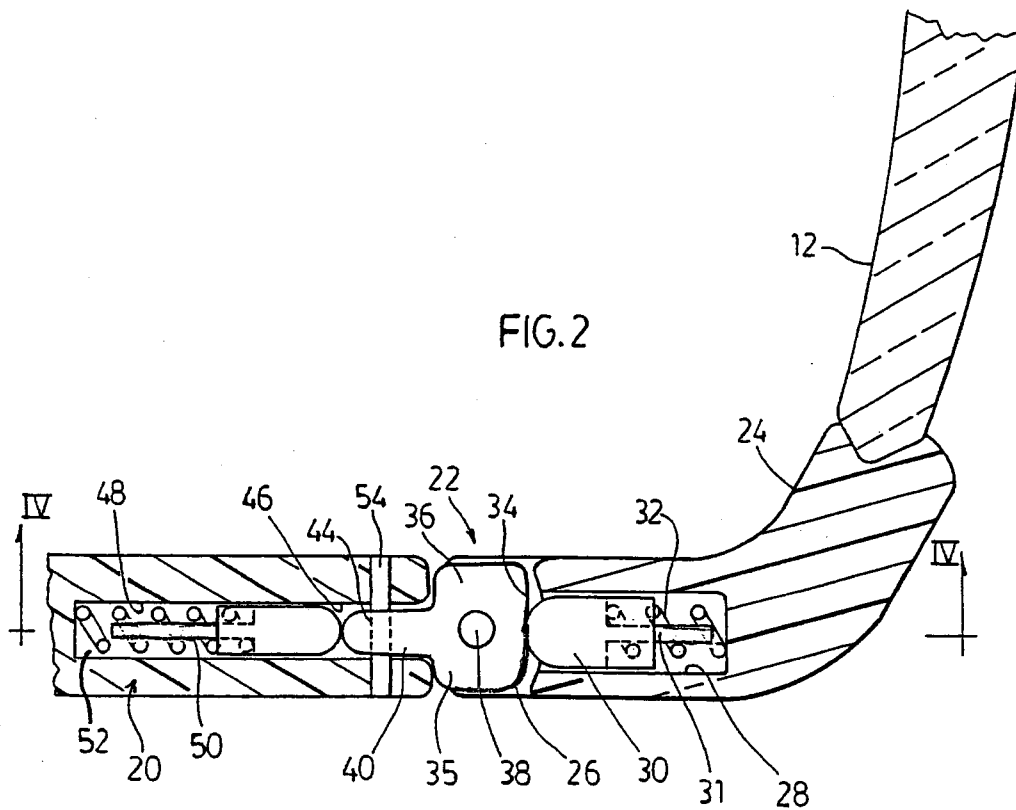
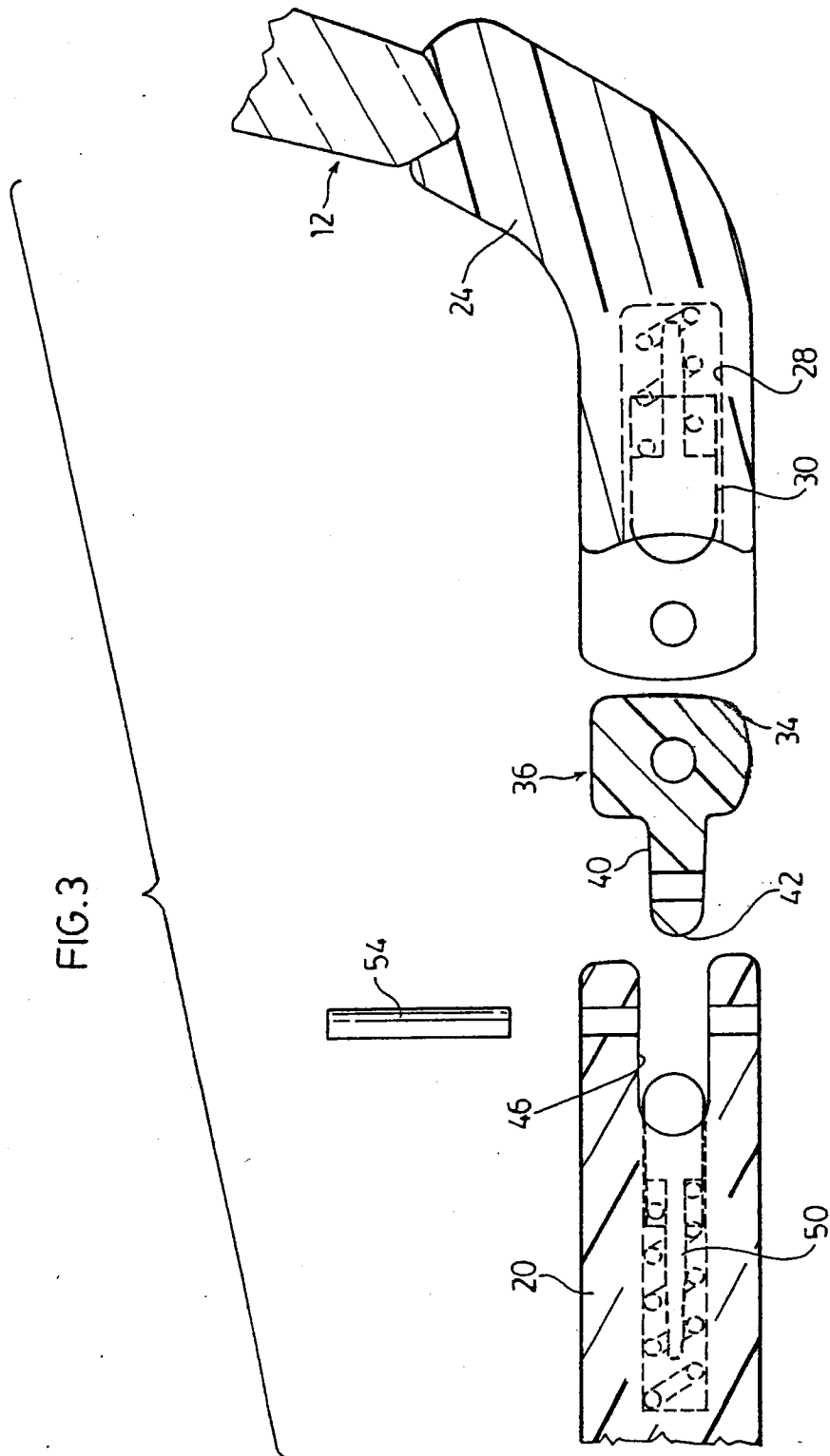


FIG.2



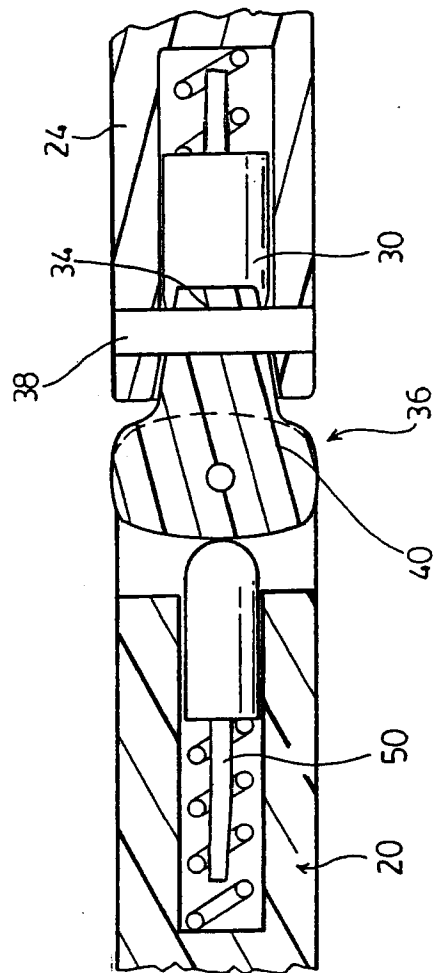
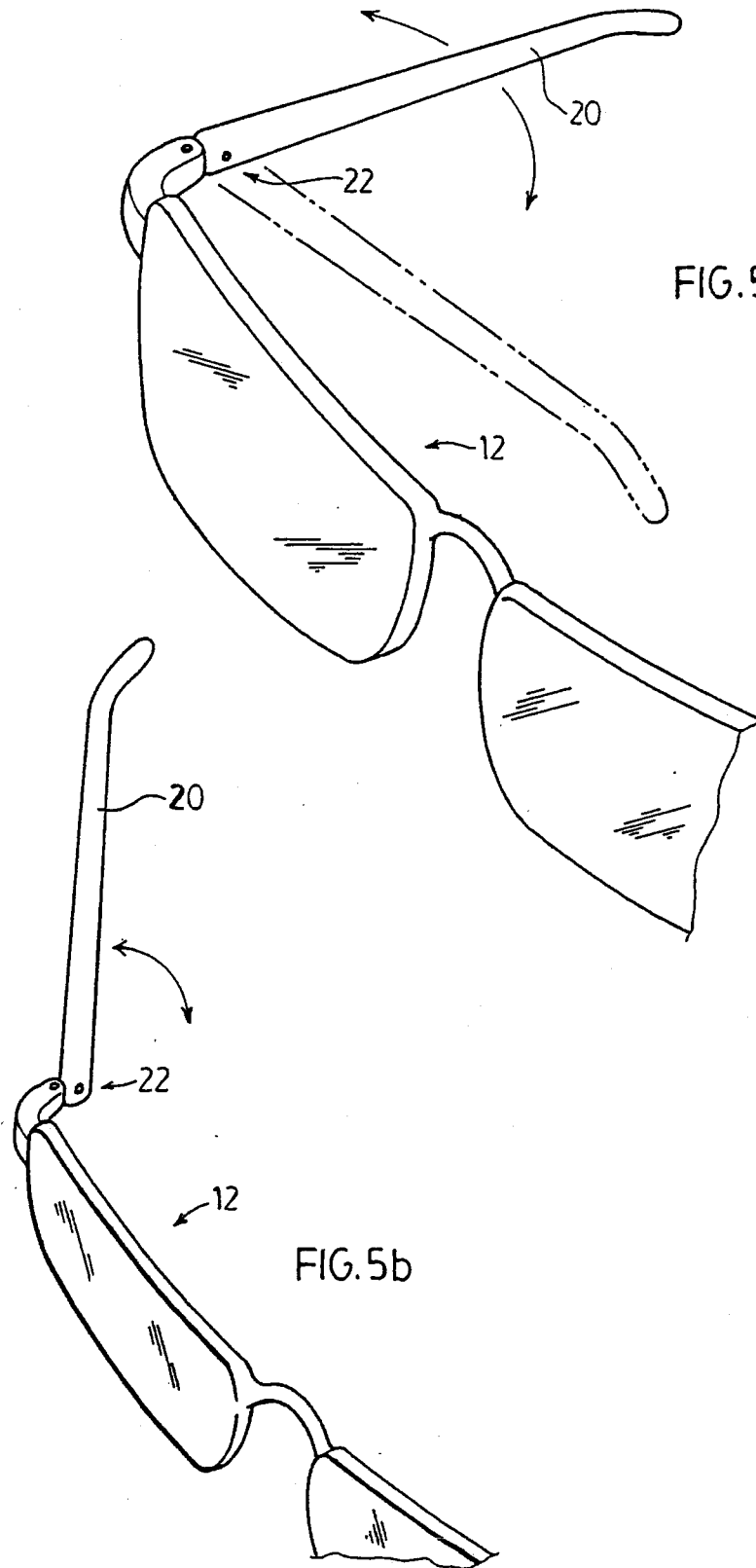


FIG. 4



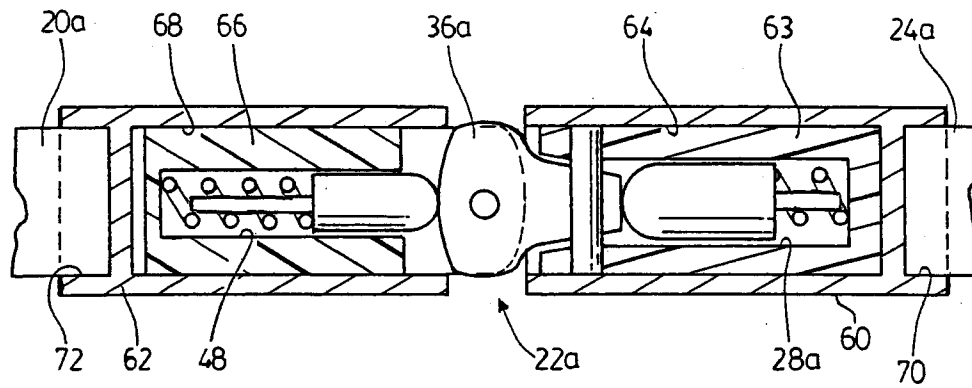


FIG. 6

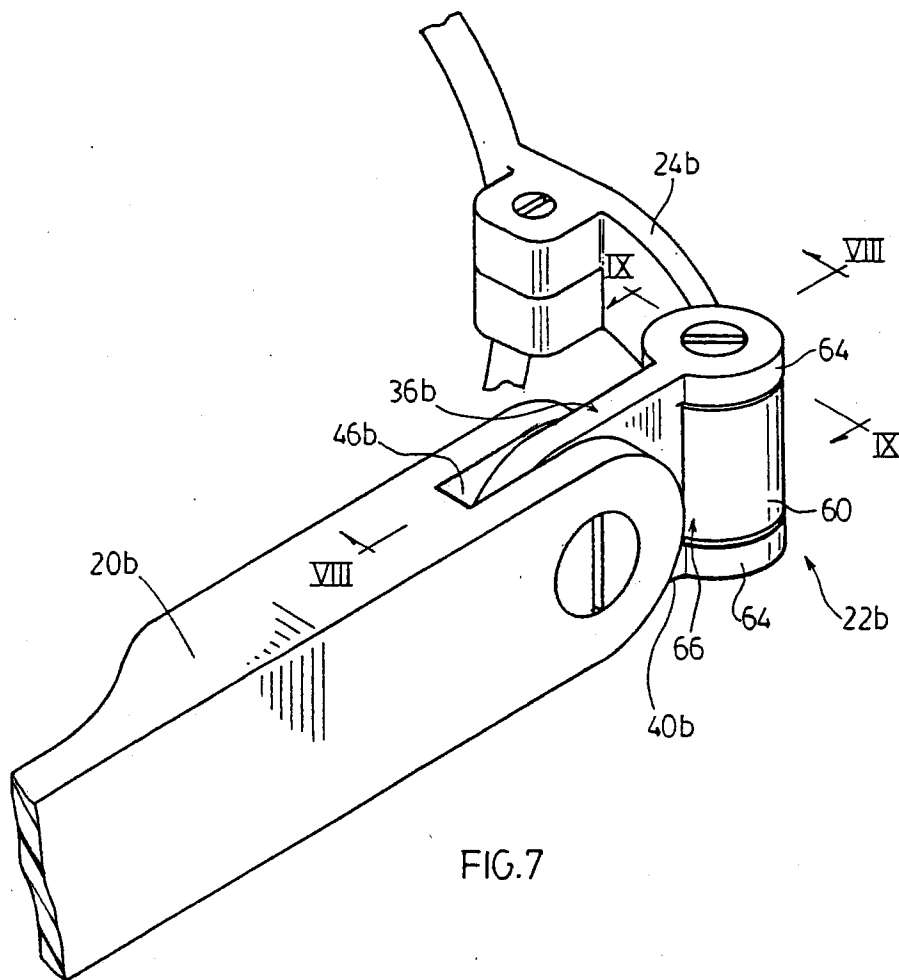
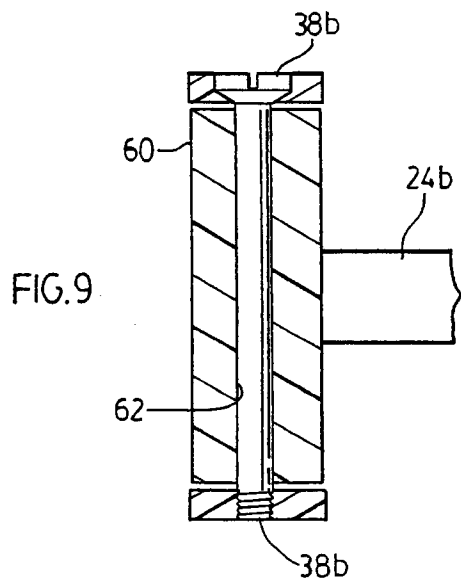
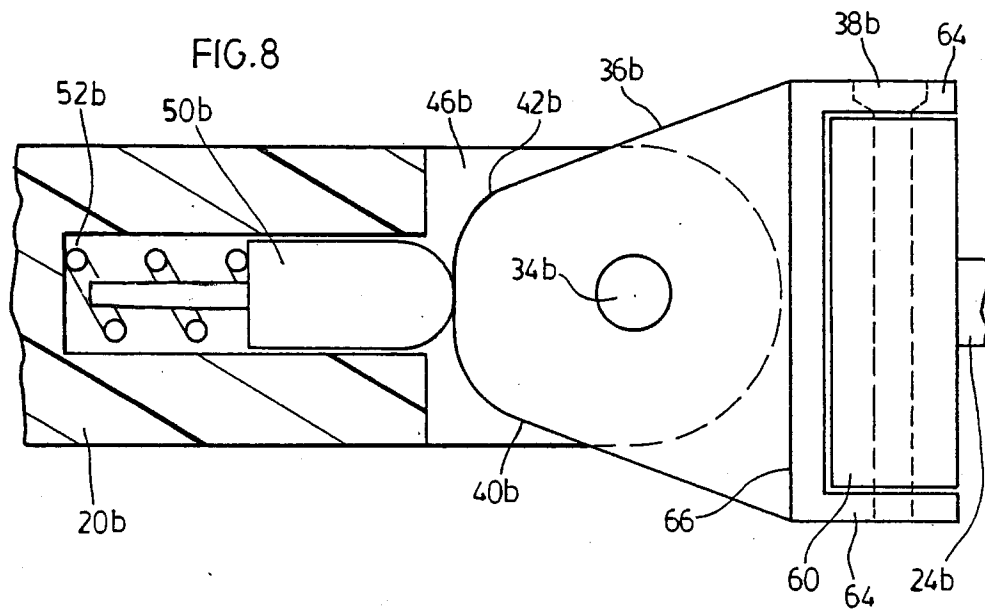


FIG. 7





# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2007/001594

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: **G02C 5/22** (2006.01) , **G02C 5/00** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: **G02C 5/22** (2006.01) , **G02C 5/00** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Canadian Patent Database, Delphion

keywords: cam, spring or biasing or elastic or resilient

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	CA 2 347 052 (Spindelbalker) 20 April 2000 (20-04-2000) * see abstract, Figure 3 and corresponding description *	1 2 to 10 11 to 18
X Y A	CA 2 190 875 (Stepan) 23 May 1997 (23-05-1997) * see abstract, Figures 8 and 9 and corresponding description *	1 2 to 10 11 to 18
Y A	WO 03/087917 A1 (Quehin) 23 October 2003 (23-10-2003) * see abstract, Figure 7 and corresponding description *	2 to 10 11 to 18
X A	WO 2005/121870 A2 (Curci et al. ) 22 December 2005 (22-12-2005) * see abstract, Figure 5 and corresponding description *	1 2 to 18
X A	CA 2 181 020 (Pernicka et al.) 12 January 1998 (12-01-1998) * see abstract, Figure 2a and corresponding description *	1 2 to 18
X A	US 6 464 354 B1 (Chen et al.) 15 October 2002 (15-10-2002) * see abstract, Figure 2 and corresponding description *	1 2 to 18

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

20 November 2007 (10-11-2007)

Date of mailing of the international search report

14 January 2008 (14-01-2008)

Name and mailing address of the ISA/CA  
Canadian Intellectual Property Office  
Place du Portage I, C114 - 1st Floor, Box PCT  
50 Victoria Street  
Gatineau, Quebec K1A 0C9  
Facsimile No.: 001-819-953-2476

Authorized officer

Wendy Stewart 819- 934-2674

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2007/001594

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2002/0085171 A1 (Wang-Lee) 4 July 2002 (04-07-2002) * see abstract, Figure 4 and corresponding description *	1 2 to 18
A	US 2005/0163560 a1 (Chene et al. ) 28 July 2005 (28-07-2005) * see whole document *	1 to 18
A	US 6 513 926 B1 (Kizu) 4 February 2003 (04-02-2003) * see whole document *	1 to 18

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/CA2007/001594**

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
CA2347052	20-04-2000	AT169598 A	15-10-1999
		AT252243T T	15-11-2003
		AT406529B B	26-06-2000
		AU760834B B2	22-05-2003
		AU5720399 A	01-05-2000
		DE59907395D D1	20-11-2003
		EP1131667 A1	12-09-2001
		ES2209493T T3	16-06-2004
		JP2002527792T T	27-08-2002
		PT1131667T T	31-03-2004
		US6464353 B1	15-10-2002
		WO0022476 A1	20-04-2000
CA2190875	23-05-1997	US5796461 A	18-08-1998
WO03087917	23-10-2003	AU2003244721 A1	27-10-2003
		DE60301275D D1	15-09-2005
		DE60301275T T2	08-06-2006
		EP1495356 A1	12-01-2005
		FR2838530 A1	17-10-2003
		US6916093 B2	12-07-2005
WO2005121870	22-12-2005	AU2005250917 A1	15-12-2005
		AU2005250918 A1	15-12-2005
		CA2561324 A1	15-12-2005
		CA2561382 A1	22-12-2005
		CA2561384 A1	22-12-2005
		CA2561772 A1	15-12-2005
		CA2561832 A1	22-12-2005
		CA2561837 A1	22-12-2005
		EP1751606 A2	14-02-2007
		EP1751607 A2	14-02-2007
		EP1751608 A2	14-02-2007
		EP1751609 A2	14-02-2007
		EP1751610 A2	14-02-2007
		EP1751611 A1	14-02-2007
		MXPA06012998 A	12-02-2007
		MXPA06012999 A	12-02-2007
		US7175270 B2	13-02-2007
		US7210777 B2	01-05-2007
		US7237892 B2	03-07-2007
		US7246901 B2	24-07-2007
		US2005270475 A1	08-12-2005
		US2005270478 A1	08-12-2005
		US2006279694 A1	14-12-2006
		WO2005119342 A2	15-12-2005
		WO2005119343 A2	15-12-2005
		WO2005121868 A2	22-12-2005
		WO2005121869 A2	22-12-2005
		WO2005121872 A1	22-12-2005
CA2181020	12-01-1998	AU3331597 A	09-02-1998
		EP1010033 A1	21-06-2000
		US5760867 A	02-06-1998
		WO9802770 A1	22-01-1998
US6464354	15-10-2002	NONE	
US2002085171	04-07-2002	NONE	

**INTERNATIONAL SEARCH REPORT**International application No.  
**PCT/CA2007/001594**

US2005163560	28-07-2005	AU2004207202 A1	12-08-2004
		BR0406838 A	13-12-2005
		CA2481015 A1	12-08-2004
		CN1697934 A	16-11-2005
		DE202004020563U U1	15-09-2005
		EP1588063 A1	26-10-2005
		FR2850143 A1	23-07-2004
		JP2006509173T T	16-03-2006
		KR20050044757 A	12-05-2005
		MXPA05007769 A	28-02-2006
		NO20053165 A	21-10-2005
		PL374328 A1	17-10-2005
		RU2005127033 A	20-01-2006
		WO2004067977 A1	12-08-2004

US6513926	04-02-2003	NONE
-----------	------------	------