

# Exhibit C

## Part 1

(TimeBase's U.S. Patent No. 7,293,228 B1,  
"System for Electronic Publishing")

to

TimeBase's Response to Defendants'  
Motion for Summary Judgment



US007293228B1

(12) **United States Patent**  
**Lessing et al.**

(10) **Patent No.:** **US 7,293,228 B1**  
(45) **Date of Patent:** **Nov. 6, 2007**

(54) **MALTWEB MULTI-AXIS VIEWING  
INTERFACE AND HIGHER LEVEL SCOPING**

4,627,019 A 12/1986 Ng  
4,714,992 A 12/1987 Gladney et al.  
4,853,843 A 8/1989 Ecklund

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**Geoffrey John Nolan**, Lane Cove (AU)

(Continued)

**FOREIGN PATENT DOCUMENTS**

WO WO97/15890 5/1997

(Continued)

**OTHER PUBLICATIONS**

Azaria, Adrienne. "SGML: A Lifesaver in a Sea of Electronic Documents." Network World 11/50 (Dec. 12, 1994) 67.

(Continued)

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 817 days.

(21) Appl. No.: **09/689,927**

(22) Filed: **Oct. 12, 2000**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/108,999, filed on Jul. 1, 1998, now Pat. No. 6,233,592, which is a continuation of application No. PCT/AU1998/000050, filed on Jan. 30, 1998.

**Foreign Application Priority Data**

Jan. 31, 1997 (AU) ..... P04892

(51) **Int. Cl.**  
**G06F 17/21** (2006.01)  
**G06F 17/24** (2006.01)

(52) **U.S. Cl.** ..... **715/511**; 715/514; 715/513;  
715/515; 715/520; 715/531; 715/539

(58) **Field of Classification Search** ..... 715/500,  
715/511, 513, 514, 515, 517, 520, 531, 539,  
715/902, 910, 908

See application file for complete search history.

(56) **References Cited**

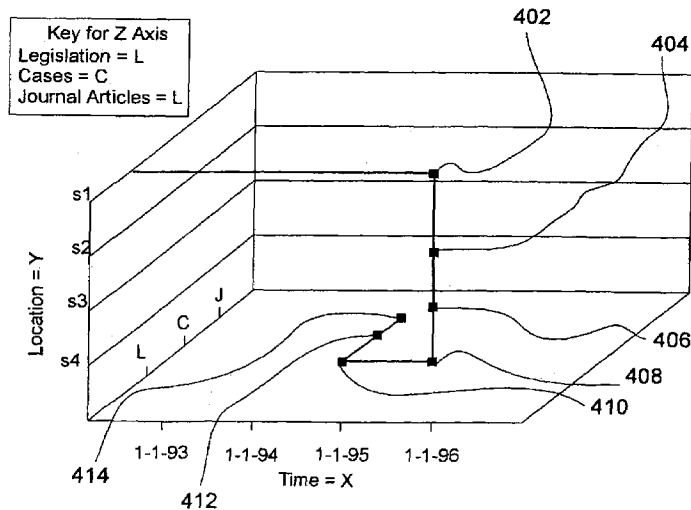
**U.S. PATENT DOCUMENTS**

4,558,413 A 12/1985 Schmidt et al.

(57) **ABSTRACT**

A method, apparatus and computer program product for navigating in a multi-dimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language are disclosed. A selected predefined portion is displayed in a first display region. A point on a primary axis of the multi-dimensional space corresponding to the displayed pre-defined portion is also displayed. Also, a method, apparatus and computer program product for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language are also disclosed. Predefined portions are stored in terminal nodes. Higher level nodes are provided for organizing the terminal nodes into an hierarchical structure embodied in said electronic publication. Each higher level node contains the identity of a parent node, a position indicator for the higher level node and an associated identifier.

**48 Claims, 23 Drawing Sheets**



U.S. PATENT DOCUMENTS

4,875,159	A	10/1989	Cary et al.	
5,287,496	A	2/1994	Chen et al.	
5,302,660	A	4/1994	Klinksiek et al.	
5,355,472	A	10/1994	Lewis	
5,732,257	A	3/1998	Atkinson et al.	
5,740,425	A	4/1998	Povilus	
5,835,087	A	11/1998	Herz et al.	
5,892,513	A *	4/1999	Fay .....	345/854
5,935,210	A *	8/1999	Stark .....	709/224
5,963,208	A *	10/1999	Dolan et al. ....	345/760
6,026,388	A	2/2000	Liddy et al.	
6,144,962	A *	11/2000	Weinberg et al. ....	707/10
6,185,576	B1 *	2/2001	McIntosh .....	707/200
6,189,019	B1 *	2/2001	Blumer et al. ....	715/513
6,233,592	B1	5/2001	Schnelle et al.	
6,421,656	B1	7/2002	Cheng et al.	
6,502,101	B1	12/2002	Verprauskus et al.	
6,529,905	B1	3/2003	Bray et al.	
6,542,911	B2	4/2003	Chakraborty et al.	
6,581,062	B1	6/2003	Draper et al.	
6,584,459	B1	6/2003	Chang et al.	
6,584,480	B1 *	6/2003	Ferrel et al. ....	715/513
6,606,653	B1	8/2003	Ackermann, Jr. et al.	
6,636,845	B2	10/2003	Chau et al.	
6,643,633	B2	11/2003	Chau et al.	
6,708,186	B1	3/2004	Claborn et al.	
6,721,727	B2	4/2004	Chau et al.	
6,772,139	B1	8/2004	Smith, III	
6,823,495	B1	11/2004	Vedula et al.	
6,826,726	B2	11/2004	Hsing et al.	
6,853,997	B2	2/2005	Wotring et al.	
6,944,817	B1	9/2005	Danneels	
6,947,945	B1	9/2005	Carey et al. ....	707/102
2001/0047372	A1	11/2001	Gorelik et al.	
2002/0010711	A1	1/2002	Nakanishi et al.	
2002/0023091	A1	2/2002	Silberberg et al.	
2002/0116371	A1	8/2002	Dodds et al.	
2002/0120630	A1	8/2002	Christianson et al.	
2002/0129052	A1	9/2002	Glazer et al.	
2002/0133484	A1 *	9/2002	Chau et al. ....	707/3
2002/0156811	A1	10/2002	Krupa	
2002/0169788	A1	11/2002	Lee et al.	
2002/0194357	A1	12/2002	Harris et al.	
2003/0041305	A1	2/2003	Schnelle et al.	
2003/0070144	A1	4/2003	Schnelle et al.	
2003/0140308	A1	7/2003	Murthy et al.	
2003/0167456	A1	9/2003	Sabharwal	
2003/0177443	A1	9/2003	Schnelle et al.	
2004/0139327	A1	7/2004	Brown et al.	
2004/0183831	A1	9/2004	Ritchy et al. ....	345/762
2004/0220927	A1	11/2004	Murthy et al.	
2005/0278475	A1	12/2005	Karatal et al. ....	711/100
2006/0181531	A1	8/2006	Goldschmidt .....	345/440

FOREIGN PATENT DOCUMENTS

WO WO98/34179 8/1998

OTHER PUBLICATIONS

Legal database Program entitled STATUS utilizing Folio Bound VIEWS, pub. 1994.  
 Morrison Michael et al. XML Unleashed, Sam's Publishing Indianapolis, IN, Dec. 1999, pp. 398-415, 482-489, 506-507 and 518-519.  
 "DB2 Universal database XML extender: Web-enabling you Data with XML", IBM product information sheet 200, 2 pages.  
 Baru, Chaitanya, "Xviews: VML Views of Relational Schemas" San Diego Supercomputer Center Technical Report, SDSC TR-100-3, Oct. 1999, 18 pages.  
 Sturm, Jake Developing XML Solutions, Microsoft Press, Redmond, WA 2000, pp. 287-289, 347-348 and 359-366.

Harold, Elliotte Rusty, XML: Extensible Markup Language, IDG Boks Worldwide, Inc., Foster City 1198, pp. 32-39, 57-59, 66-70 and 96-99.  
 DeRose, W3C: XML Linking Language XLink, Dec. 20, 2000, W3C, Version 1.0, pp. 1-27.  
 Arnold-Moore, Timothy and Sacks-Davis, Ron; Databases of Legislation: the Problems of Consolidations, Collaborative Information Technology Research Institute, May 15, 1994.  
 Freeman, Simon and Callum, Euan; A Brief History of Time Travel; Legal Information Management 4 (2004) pp. 28-30.  
<http://www.xml.com/pub/a/2001/06/20/databases.html>.  
[http://www.sweetandmaxwell.co.uk/westlaw/pdfs/user\\_guide.pdf](http://www.sweetandmaxwell.co.uk/westlaw/pdfs/user_guide.pdf).  
<http://www.sweetandmaxwell.co.uk/about/history.html>.  
<http://www.complinet.com/home/about>.  
<http://www.sweetandmaxwell.co.uk/westlaw/about.htm>.  
<http://www.butterworths.com/about/index.htm>  
[http://www.complinet.com/home/share/pdf/news\\_rules/uk/companylaw\\_NR\\_insert.pdf](http://www.complinet.com/home/share/pdf/news_rules/uk/companylaw_NR_insert.pdf).  
[http://www.complinet.com/home/news\\_rules/](http://www.complinet.com/home/news_rules/)  
<http://www.pendragon.co.uk/perspective>.  
<http://www.pendragon.co.uk/perspective/perspective2.htm>.  
<http://www.pendragon.co.uk/perspective/perspective3.htm>.  
 Lim et al., "An Automated Approach for Retrieving Hierarchical Data from HTML Tables", CIKM '99, Nov. 1999, Kansas City, MO, USA, pp. 466-474.  
 Eisenberg et al., "SQL/XML is Making Good Progress", SIGMOD Record, vol. 31, No. 2, Jun. 2002, pp. 101-108.  
 Promenschenkel, "STEPS: toward a new era in electronic publishing", OCLC Newsletter, Jul./Aug. 1995, No. 216, found at website: <http://digitalarchive.oclc.org/da/ViewObjectMain.jsp?jsessionid=84ae0c5fi82409328f8d87a14475bd40eaceff43afd?fileid=0000001695:000000042504&regi>.  
 Search Report of Corresponding European Appl. No. 98 901 249.7 - 1527.  
 Kim et al., "OOHS: An Object-Oriented Hypermedia System", COMPSAC, Seoul, KR, Aug. 21, 1996 - Aug. 23, 1996, pp. 496-501, IEEE, XP 000684382, IEEE Comp. Soc. Los Alamitos, CA US ISBN: 0-8 186-7579-9.  
 Arnold-Moore et al., "The ELF data model and SGQL query language for structured document databases", Sixth Australasian Database Conf., ADC'95, Adelaide, AU, [Online] vol. 17, No. 2, Jan. 30, 1995 - Jan 31, 1995 pp. 17-26, XP002204886, Australian Computer Science Communications ISSN: 0157-3055 Retrieved from the Internet: URL:<http://www.mds.rmit.edu.au/~tja/papers/index.html>.  
 P. Francois, "Generalized SGML repositories: Requirements and modeling", Computer Standards and Interfaces, vol. 18, No. 1, 1996, pp. 11-24, XP004006104, Elsevier Sequoia, Lausanne, CH ISSN: 0920-5489.  
 Dayen, Igor, "Storing XML is Relational Databases", XML.com, [www.xml.com/lpt/a/803](http://www.xml.com/lpt/a/803), Jun. 20, 2001, pp. 1-13.  
 WR Communication pursuant to Article 115(c) EPC, Nov. 30, 2006.  
 Communication pursuant to Article 115(c) and responsive to "WR Communication pursuant to Article 115(c) EPC, Nov. 30, 2006" EPC, Jan. 26, 2007.  
 Arnold-Moore et al. "Models for Structured Document Database Systems", Royal Melbourne Institute of Technology, 1998.  
 Arnold-Moore, "Automatic Generation of Amendment Legislation", ACM 1997.  
 Arnold-Moore et al. "Connected to the Law: Tasmanian Legislation Using EnAct", InQuirion Pty Ltd., 2002.  
 Sacks-Davis et al. "Database Systems for Structured Documents", International Symposium on Advanced Database Technologies and Their Integration, Japan, 2002.  
 Sacks-Davis et al., "A Standards-Based Approach to Combining Information retrieval and Database Functionality", International Journal of Information Technology, 1(1):1-15, 1995.  
 Arnold Moore, "Automatically, Processing Amendments to Legislation", ACM 1995.  
 Jan. 18, 2007 letter enclosing website entitled "The Information Society Creative Awards 1996", available at: <http://met.open.ac.uk/isca/>, 1996.

Active TEXT Datasheet, available at: <http://web.archive.org/web/19970630042435/www.ais.co.uk/atds.html>.1997.

Jan. 19, 2007 letter in response to Jan. 18, 2007 letter enclosing website entitled "The Information Society Creative Awards 1996", available at: <http://met.open.ac.uk/isca/>, 1996.

Office Action of Corresponding European Application No. 98 901 249.7 - 1527, Jan. 25, 2007.

Maioli C. et al., "Versioning Issues in a Collaborative Distributed Hypertext System" Technical Report Universita Di Bologna, Apr. 1993.

Request for Ex Parte Reexamination of U.S. Appl. No. 6,233,592 filed on Jan. 25, 2007.

Order Granting Reexamination Request from U.S. Appl. No. 6,233,592, Apr. 3, 2007.

TimeBase Pty Ltd. v. The Thompson Corp., U.S. District Court for the Northern District of Illinois, Complaint filed Jan. 24, 2007.

Third Party Observations Under Article 115EPC filed Apr. 21, 2007 in EP 98901249.7.

*XSoft, A Division of Xerox* updated Jul. 12, 1996 - <http://xml.coverpages.org/duCharme-sgmlbms.html>.

*XSoft Premieres Astoria: A Simpler Way to Manage 'Mega-Documents'* dated Mar. 12, 1996 - <http://www.highbeam.com/doc/1G1-18079234.html>.

*XSoft Astoria* - <http://www.architag.com/tag/Article.asp?v=10&i=4&p=8&s=1>.

\* cited by examiner

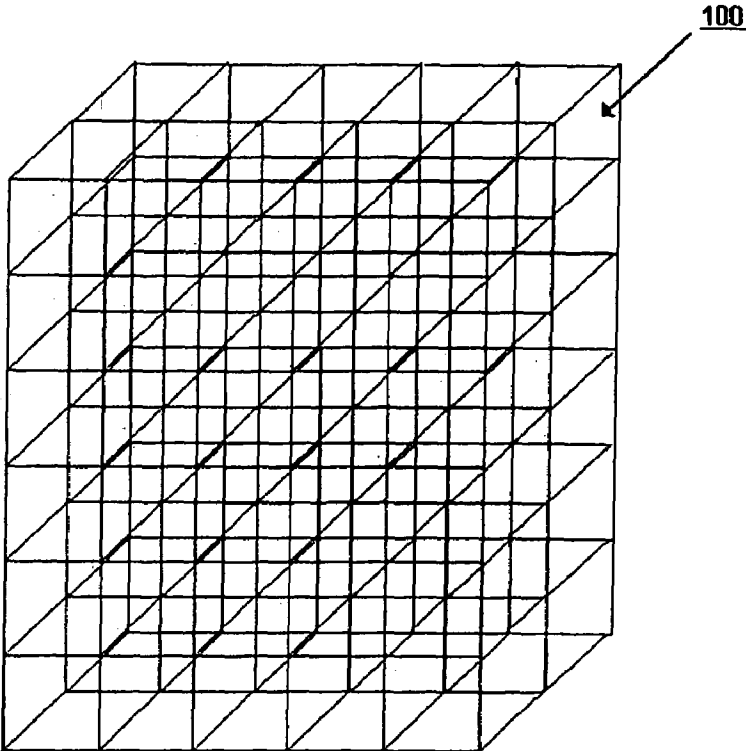


Fig. 1

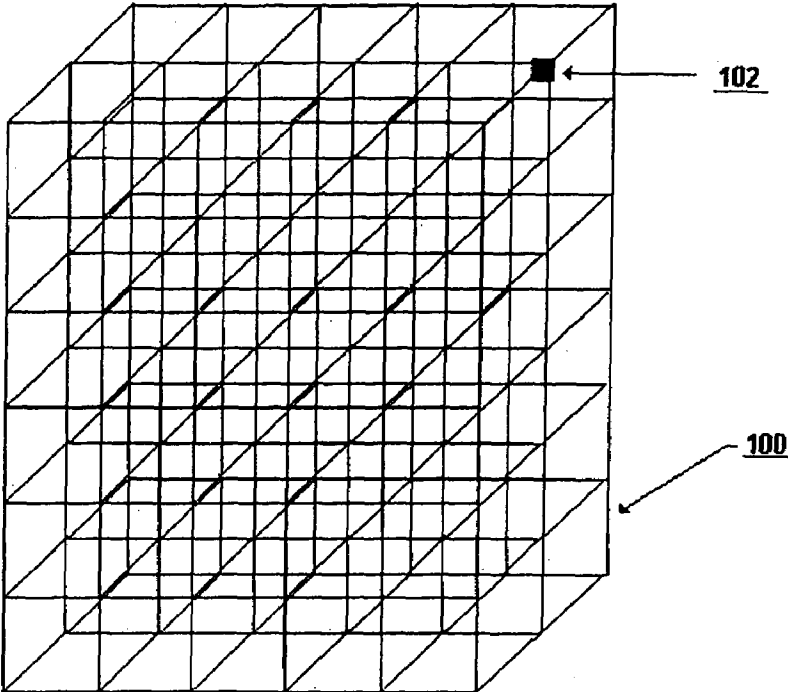


Fig. 2

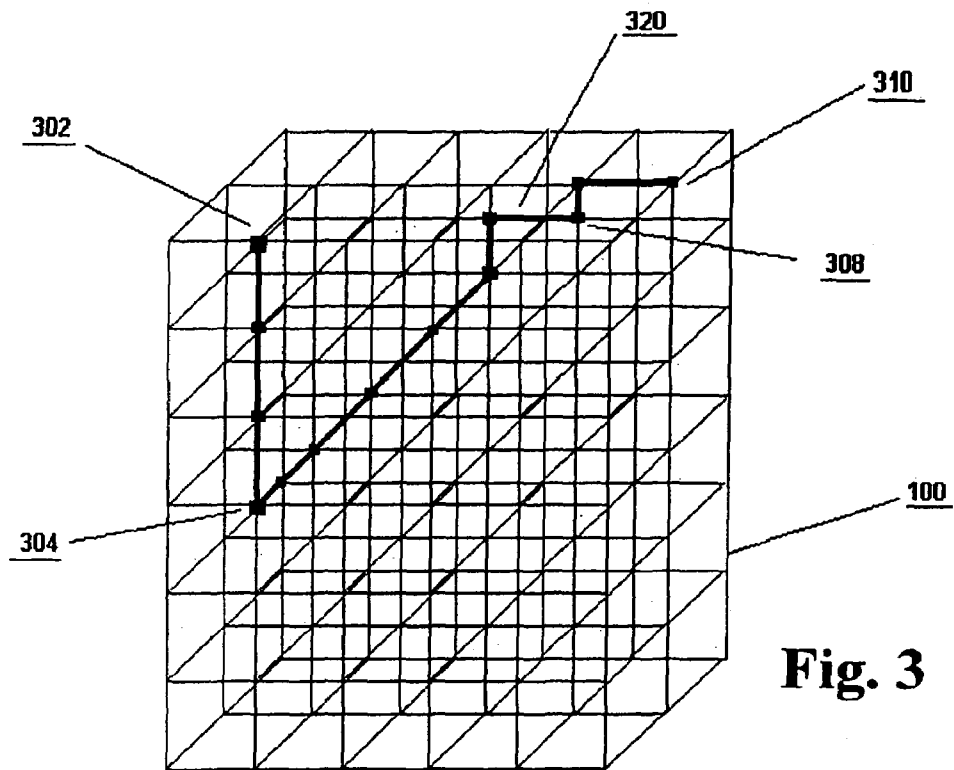


Fig. 3

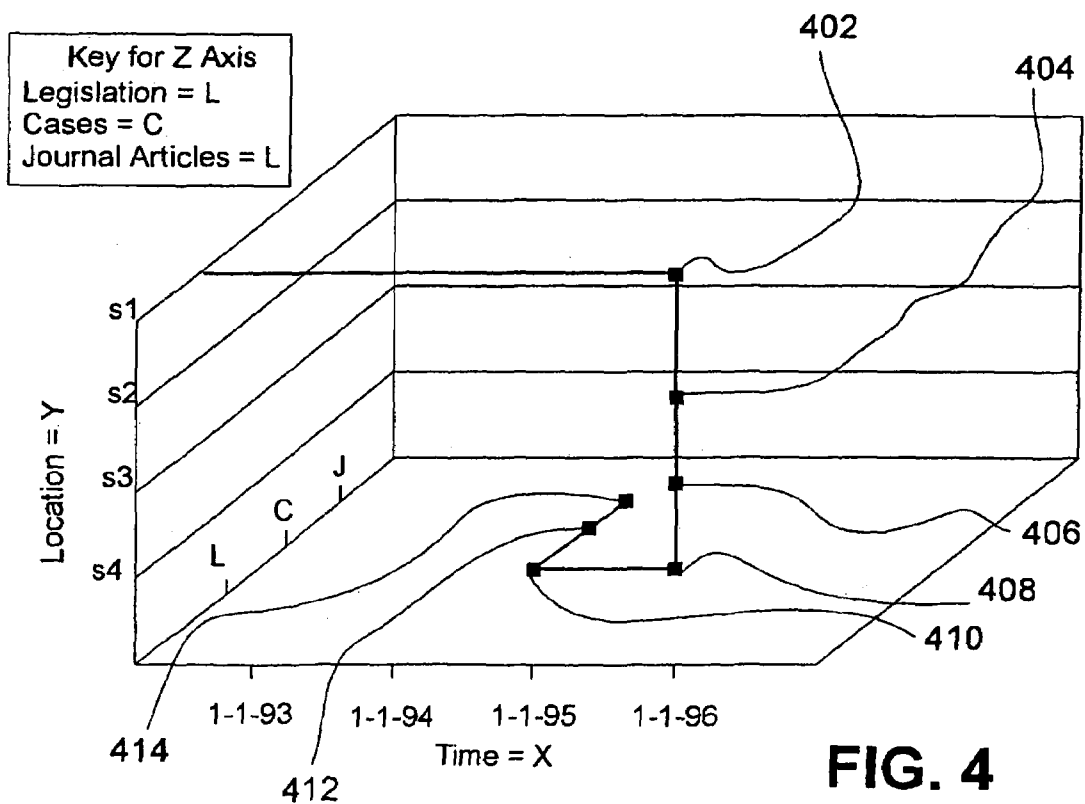


FIG. 4

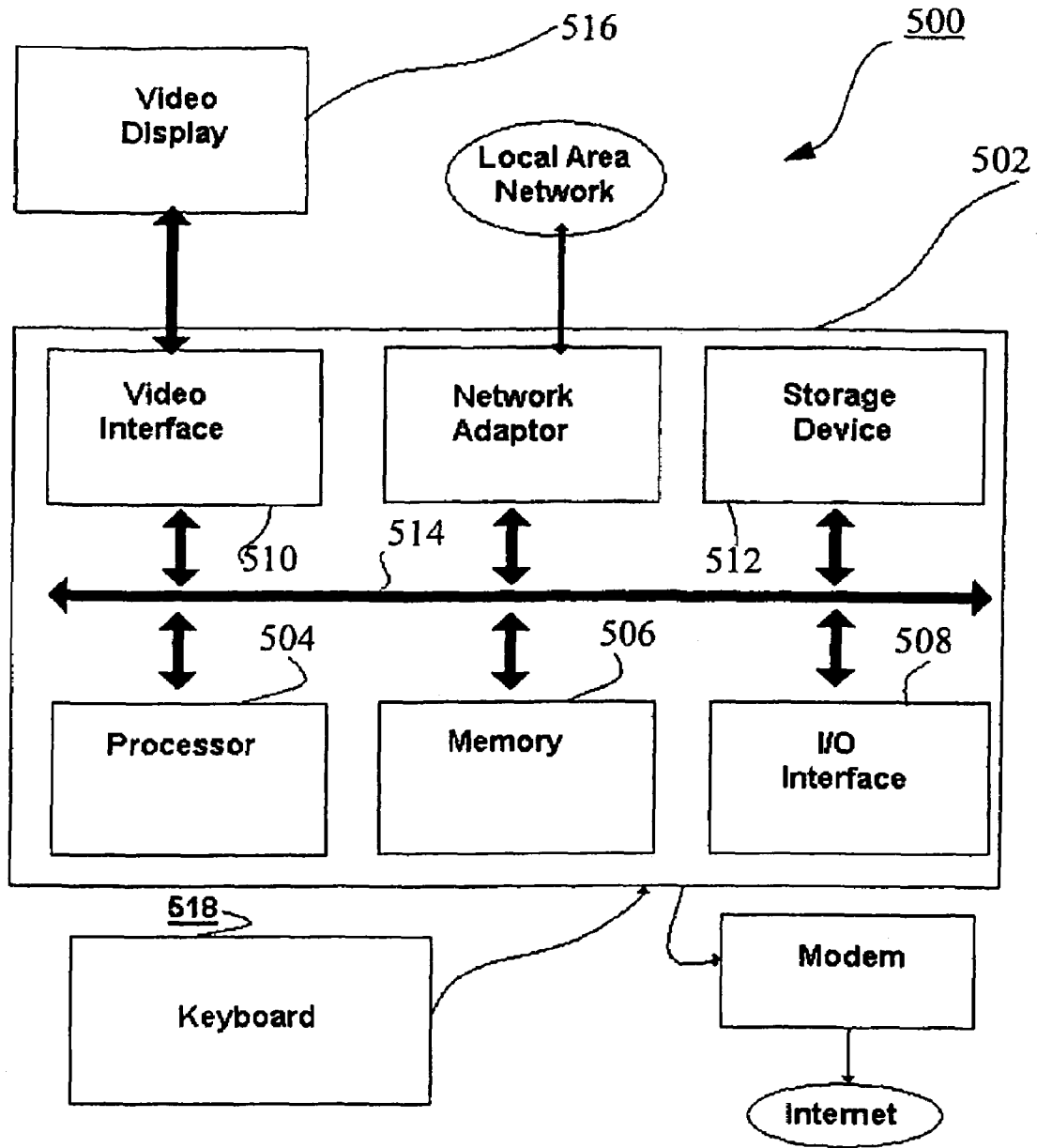


Fig. 5

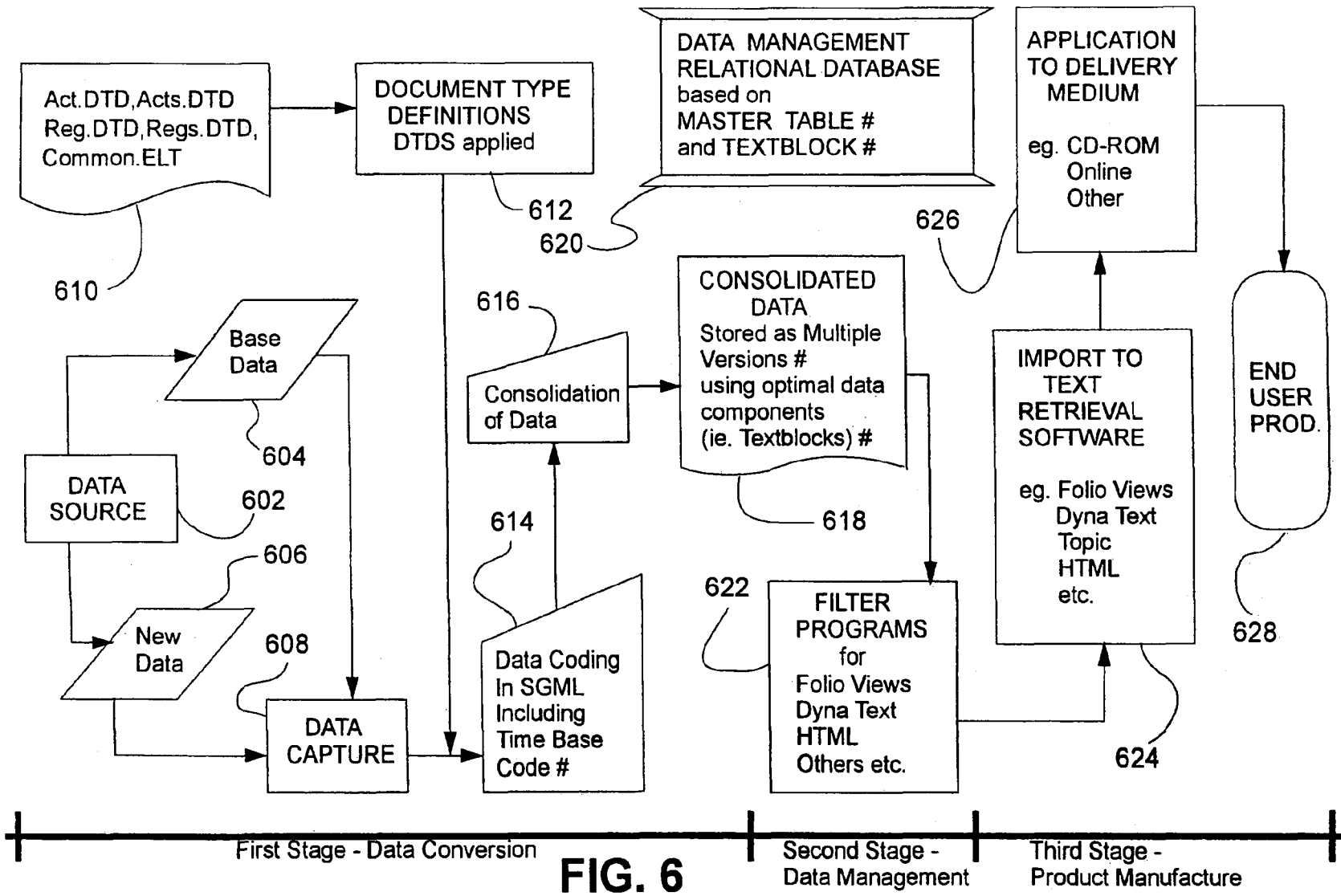


FIG. 6



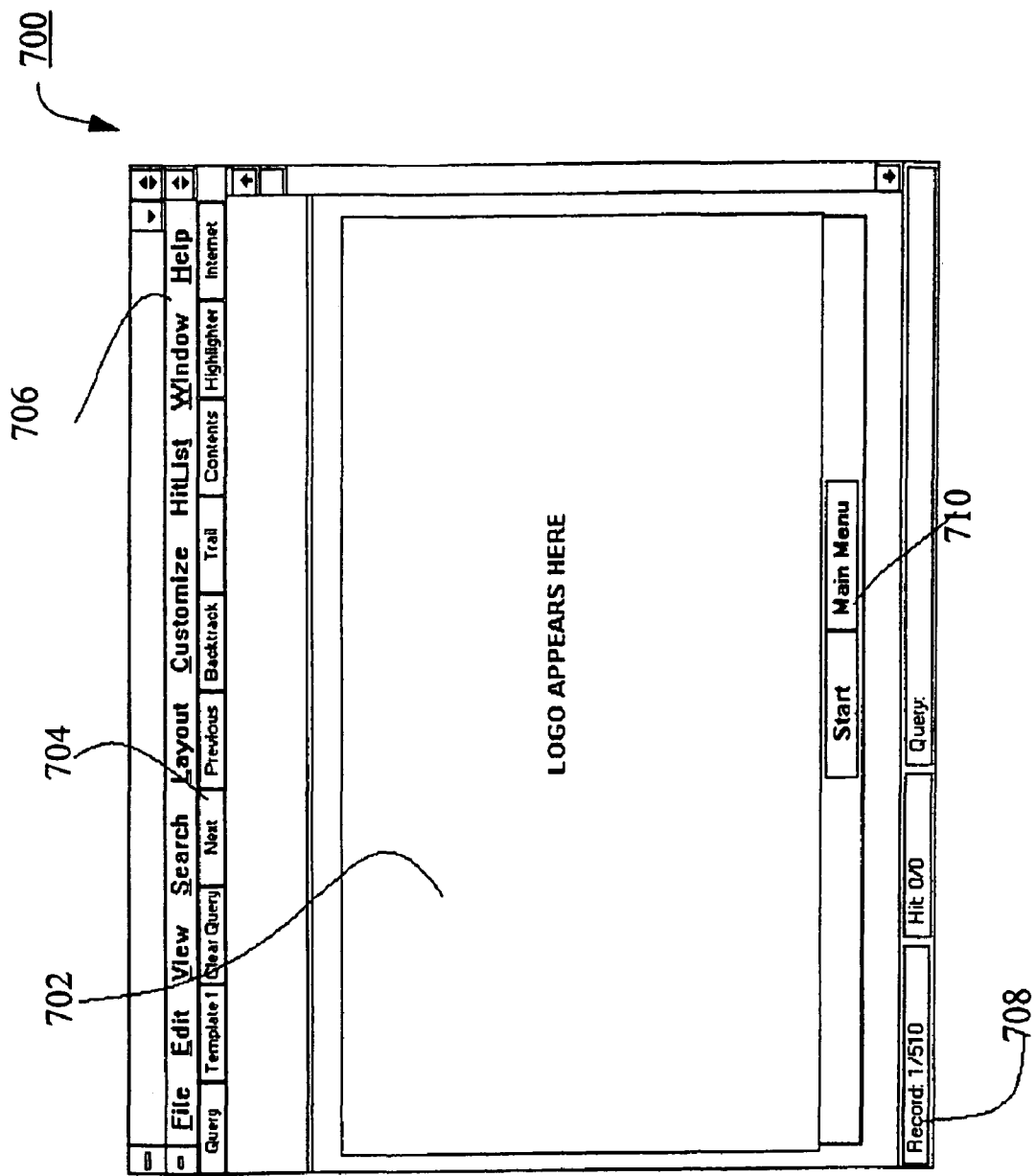


Fig. 7

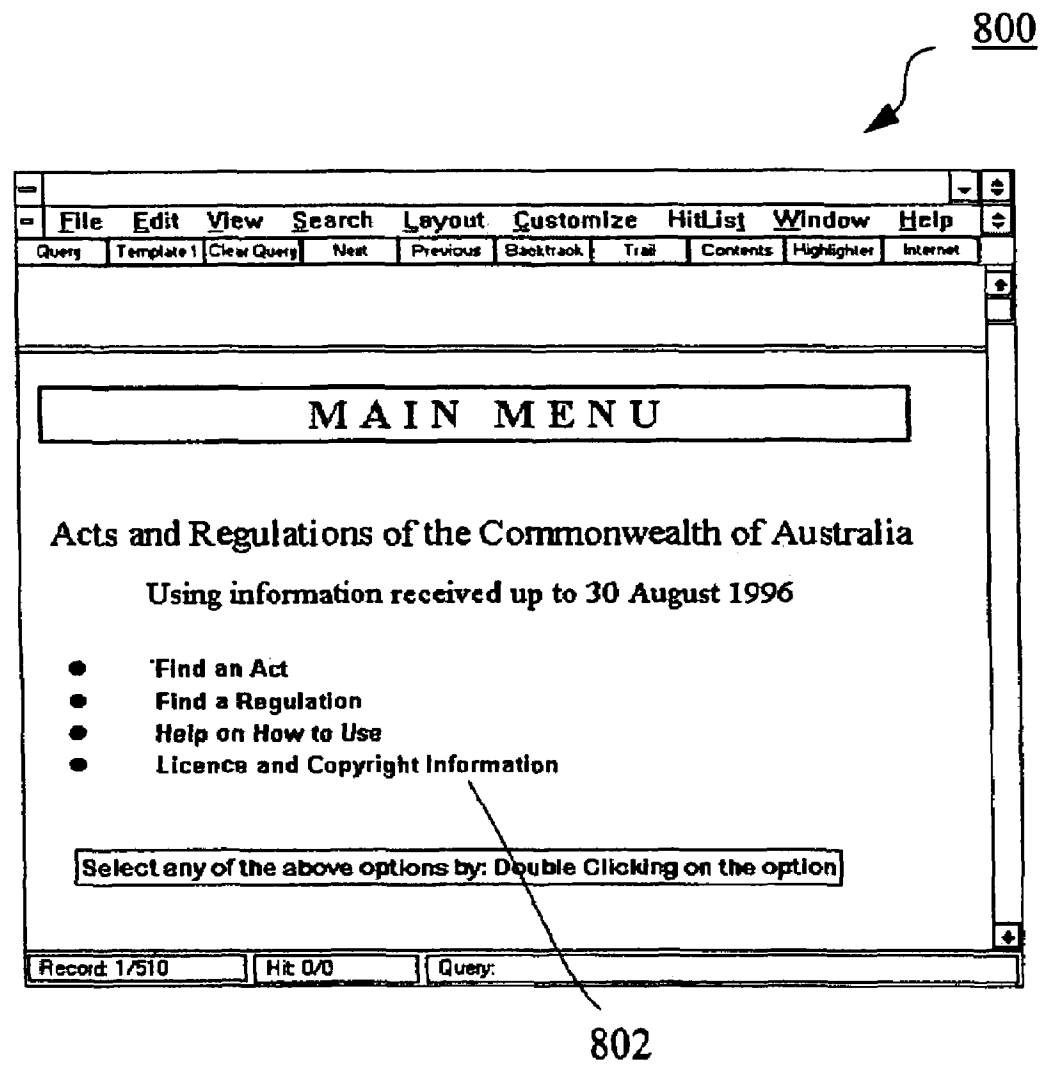


Fig. 8

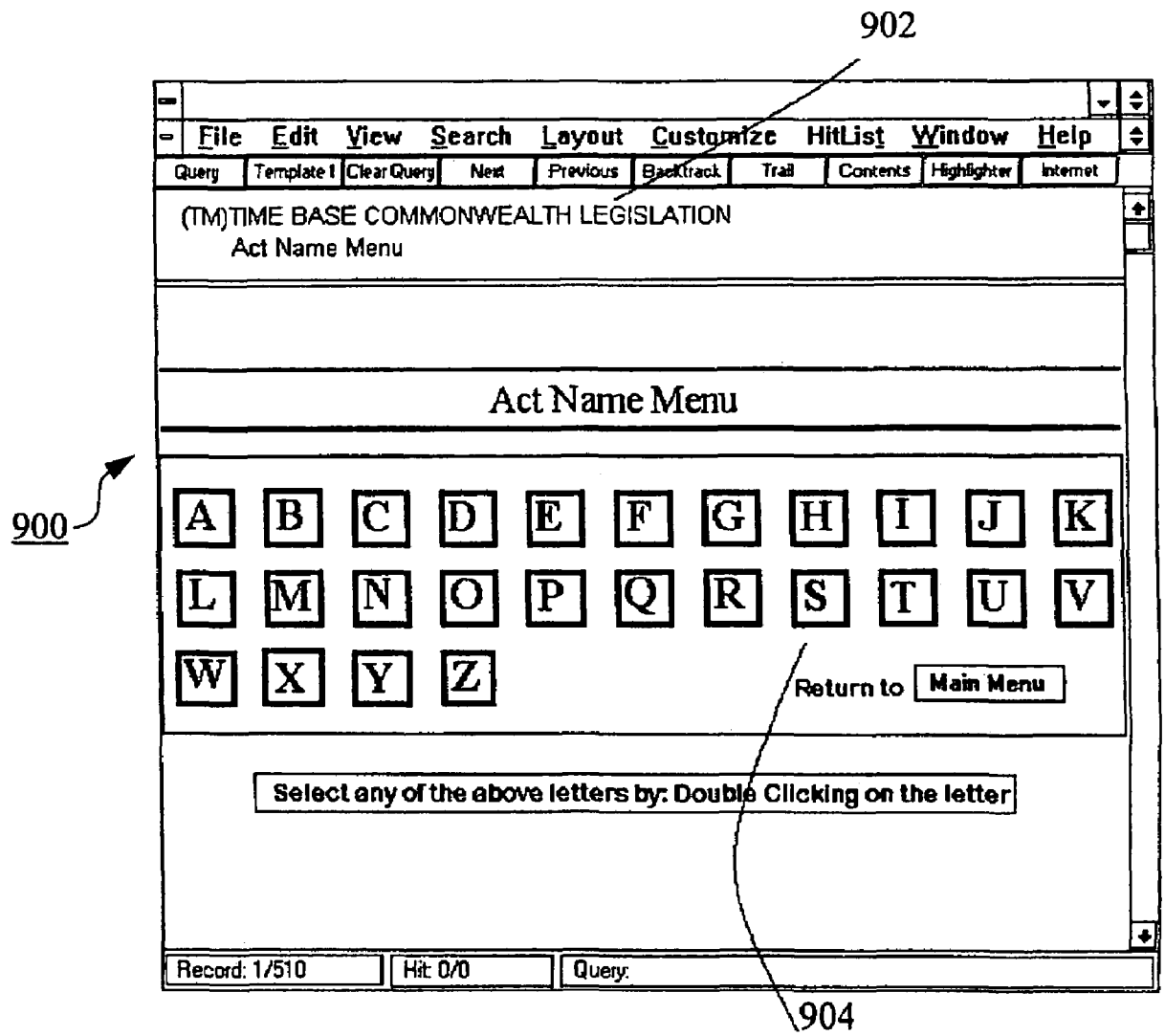


Fig. 9

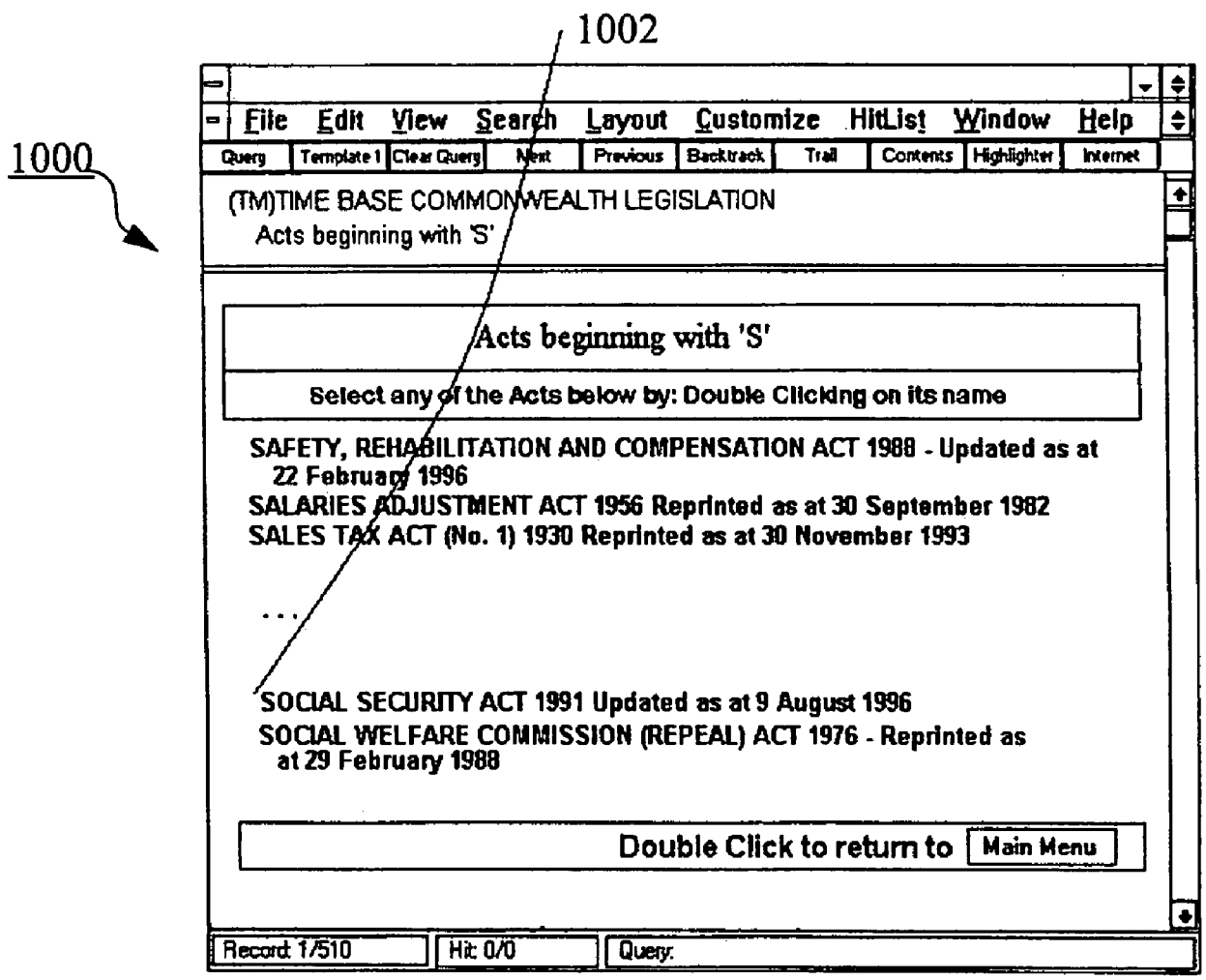


Fig. 10

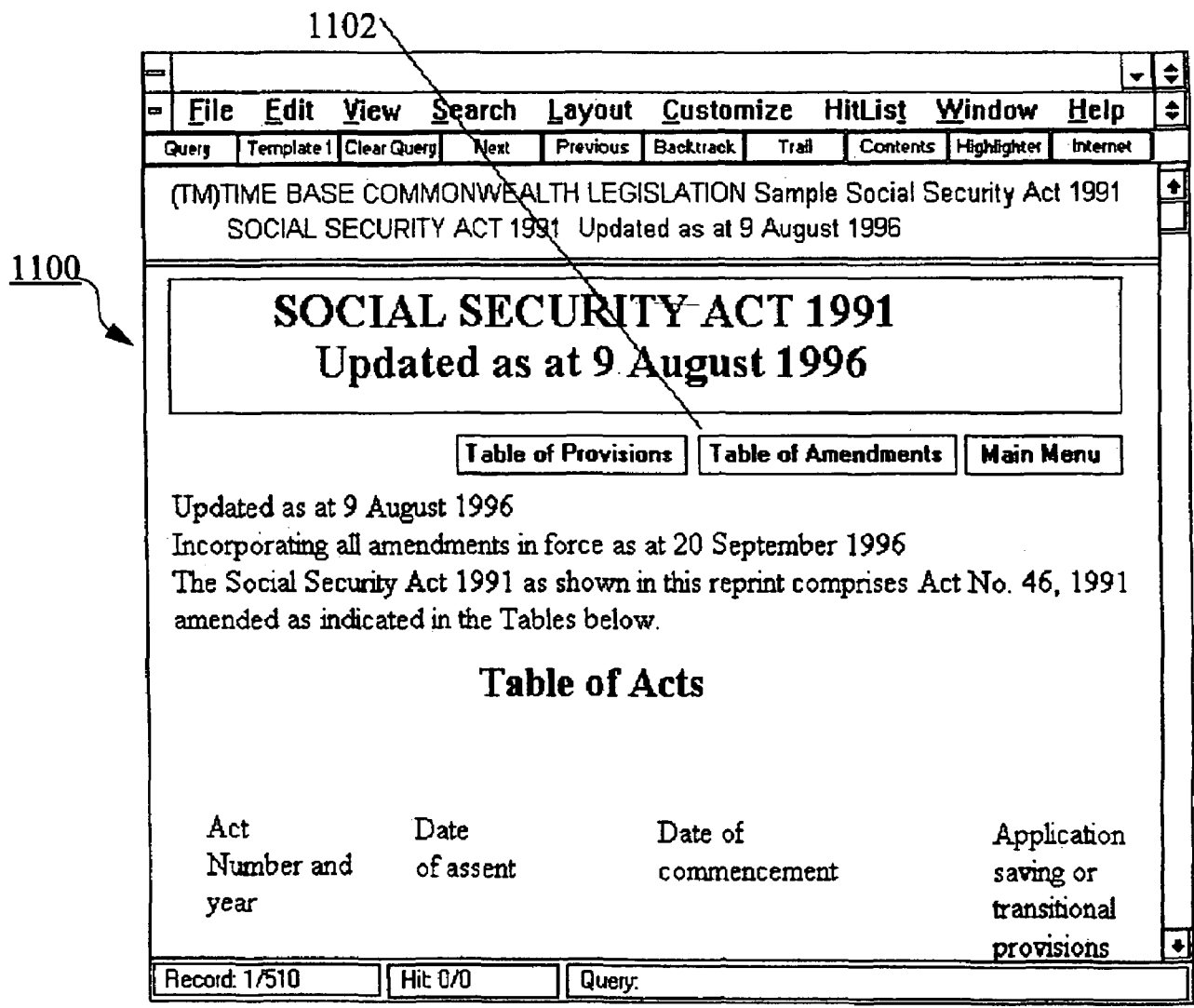


Fig. 11

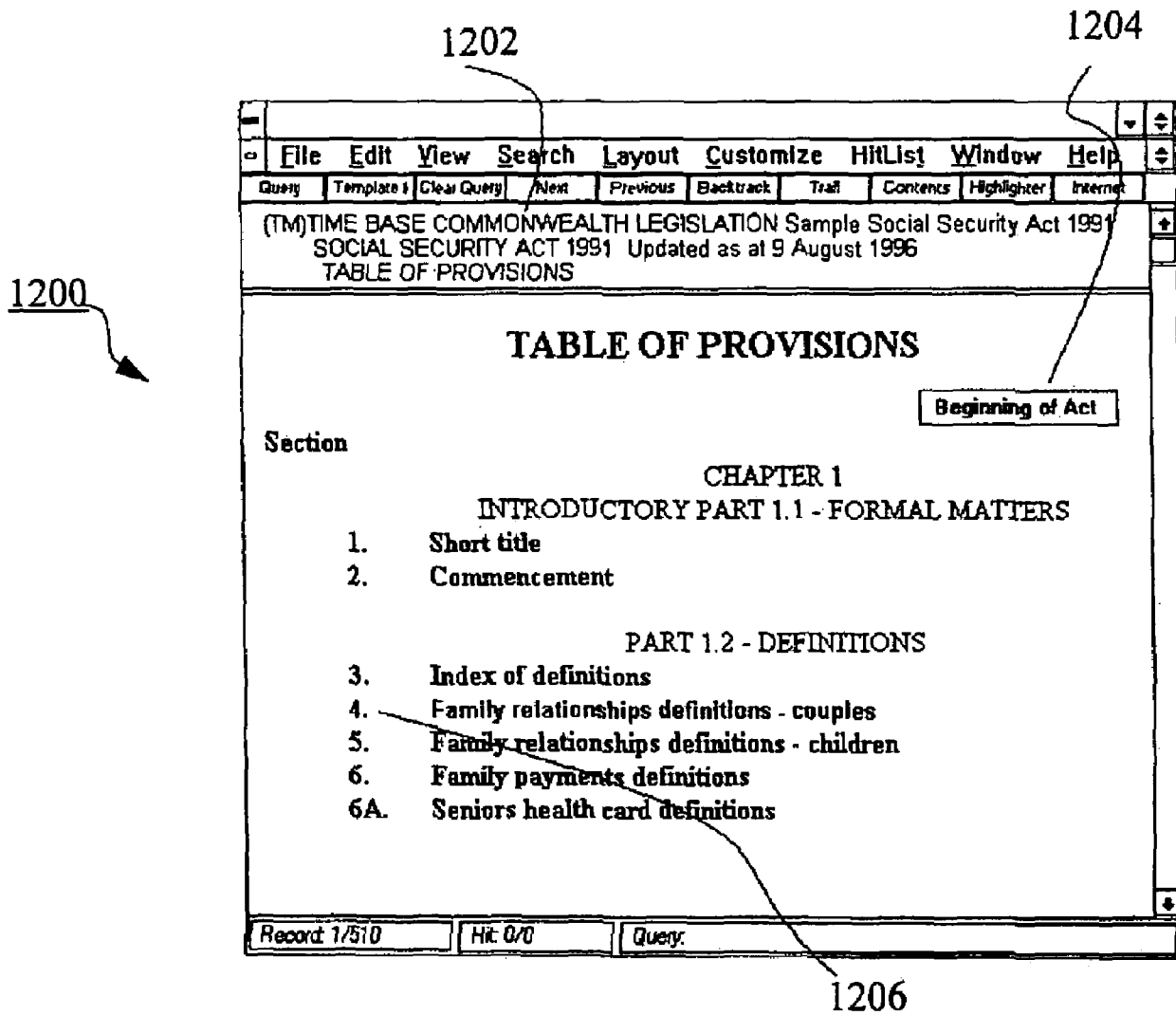


Fig. 12

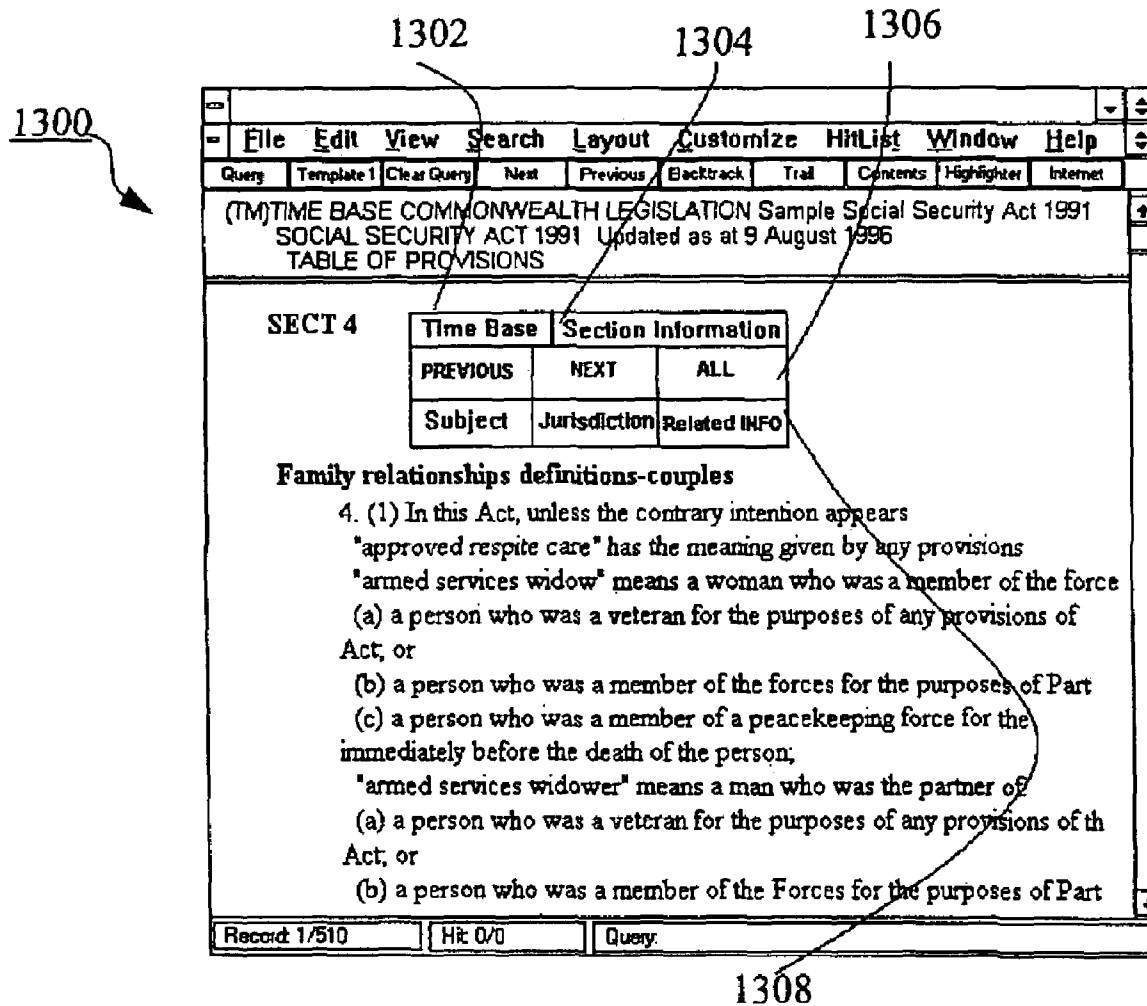


Fig. 13

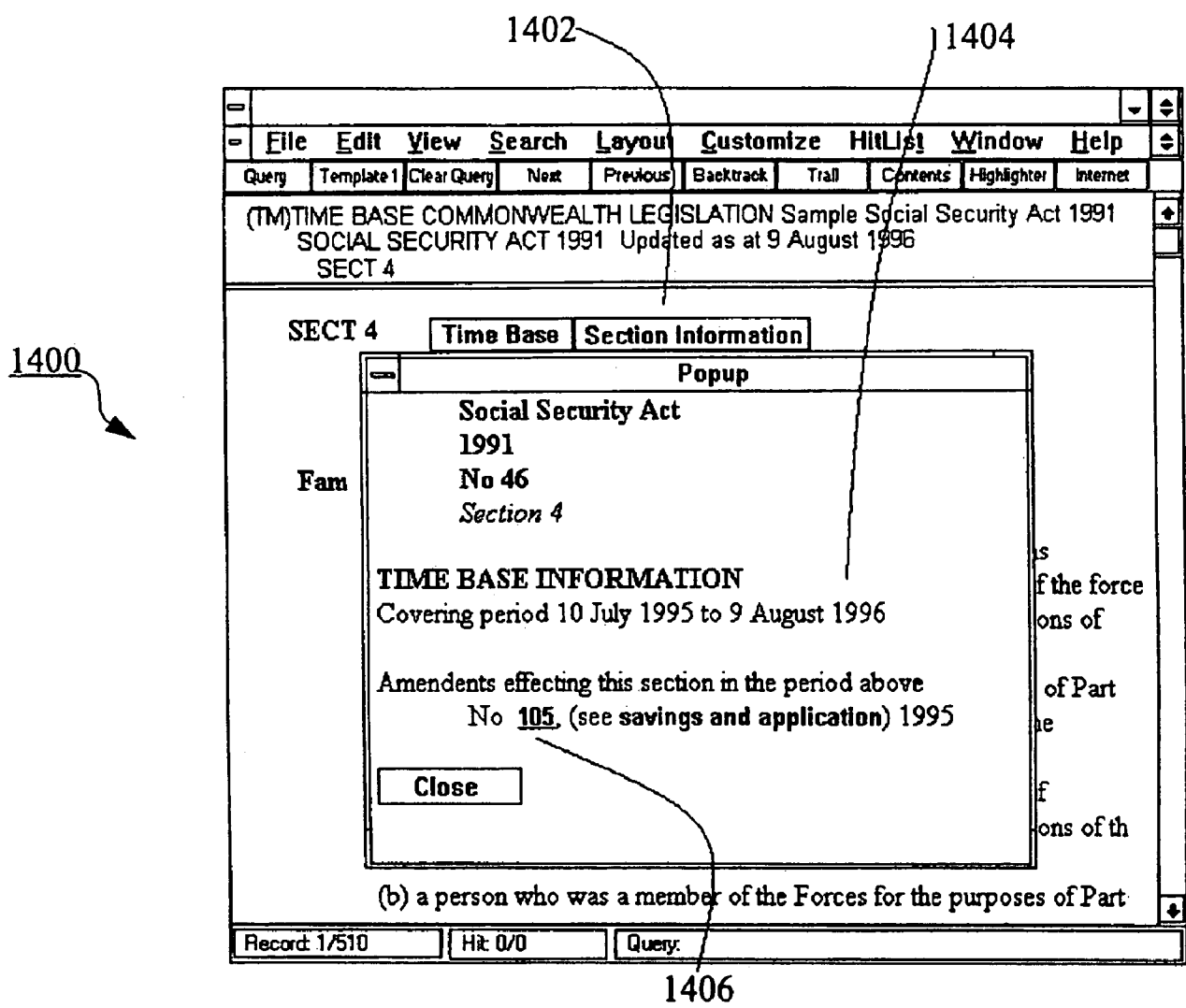


Fig. 14



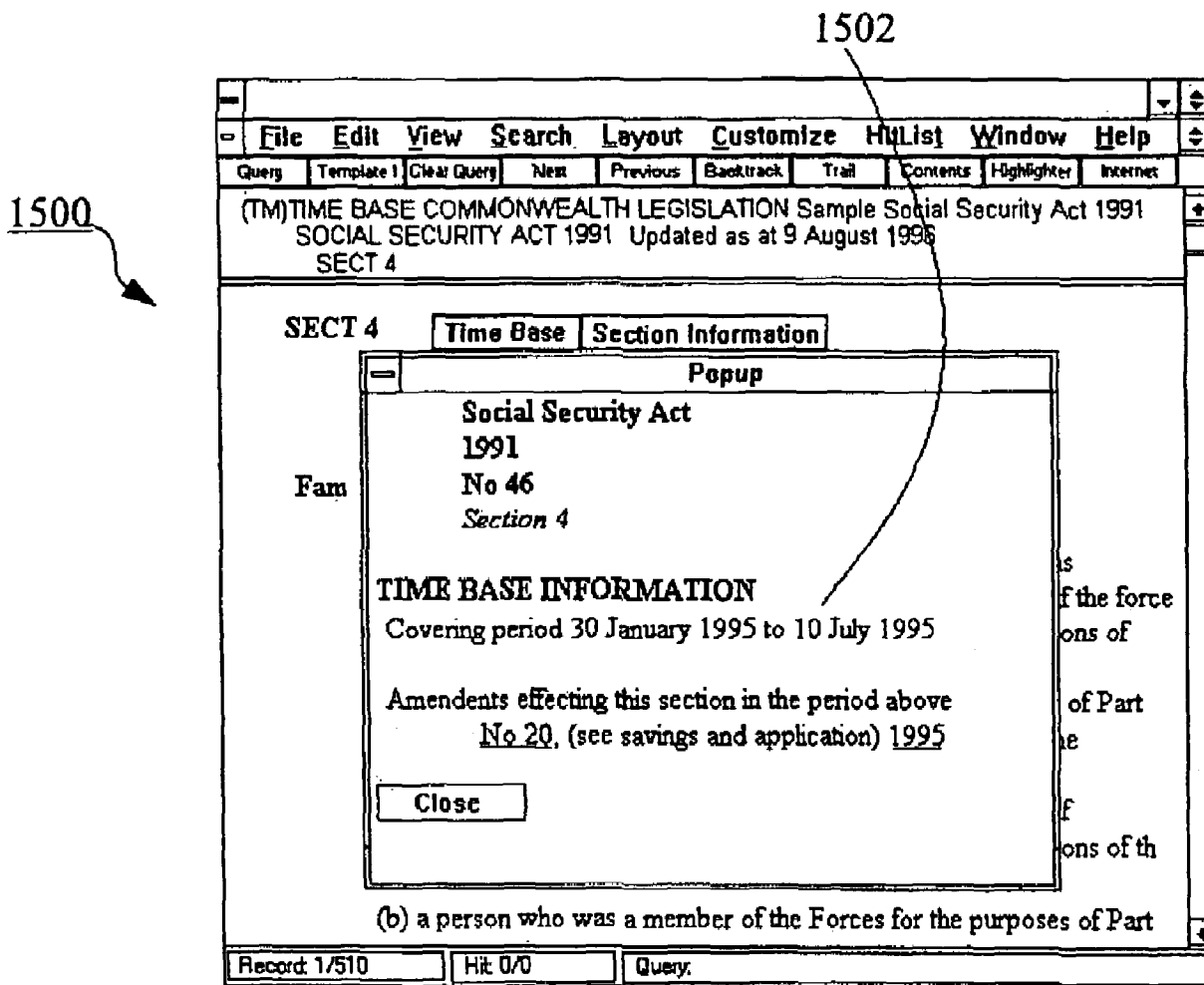


Fig. 15

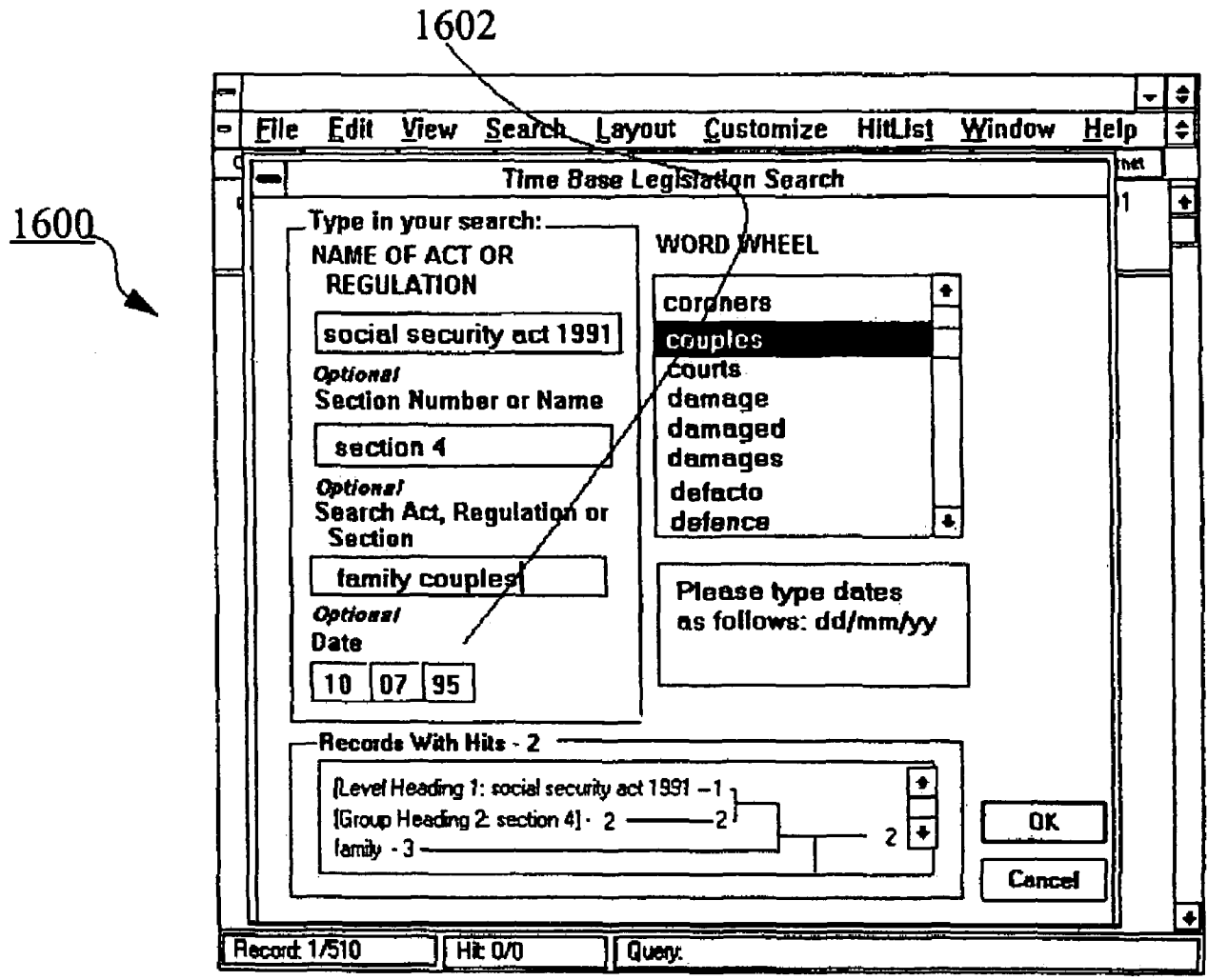


Fig. 16

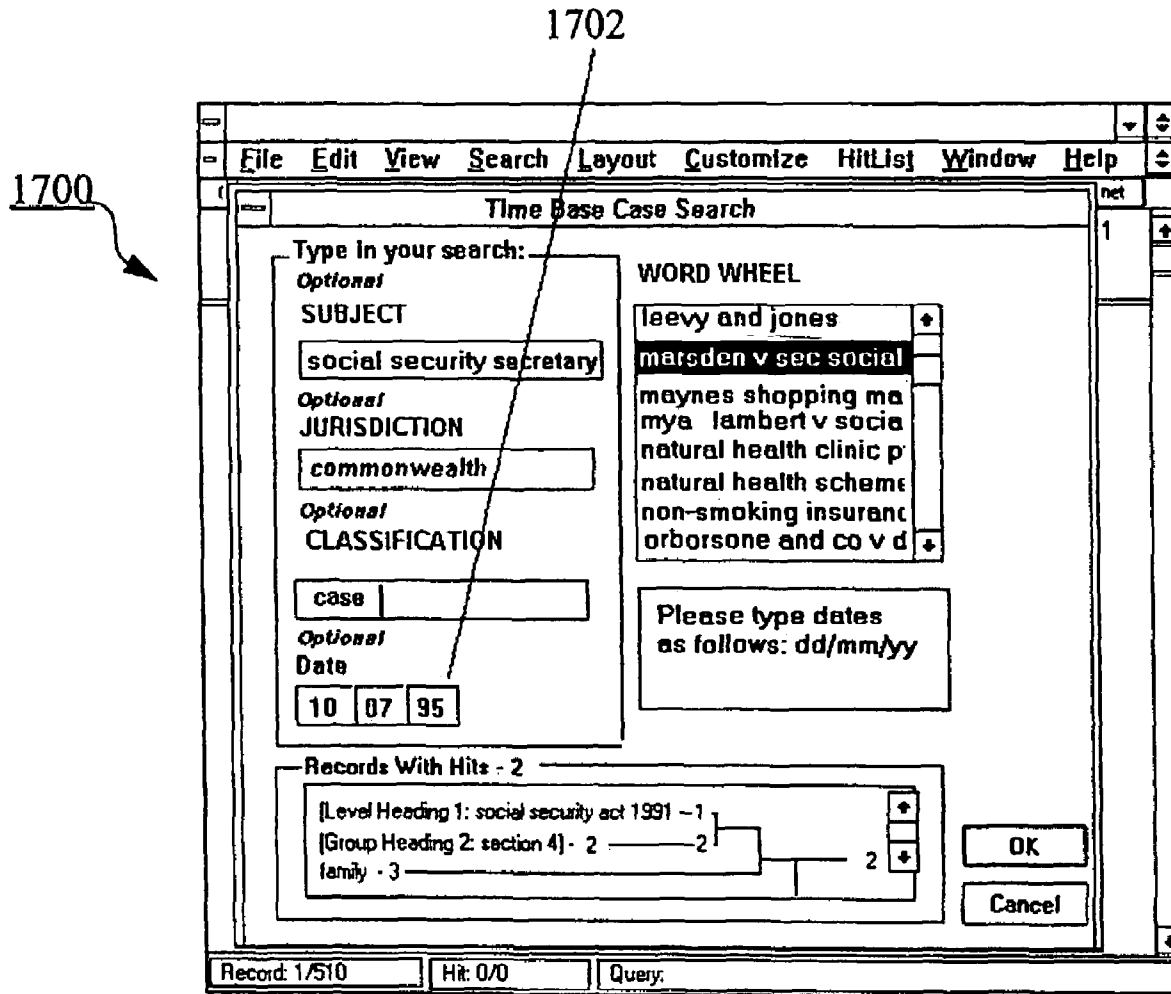


Fig. 17

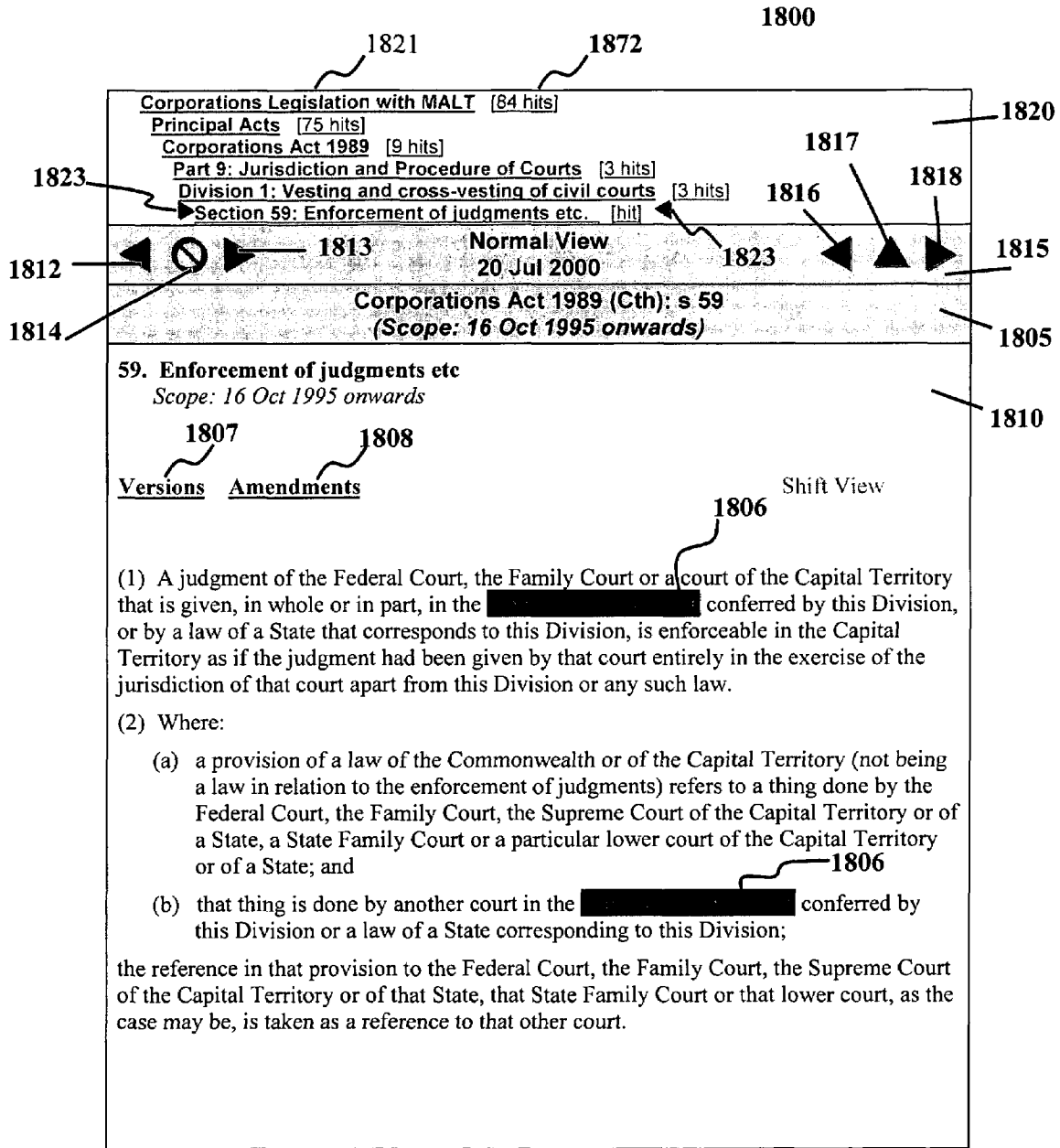


Fig. 18

1900

<p>16 Oct 1995 to 31 Dec 2001 : s 59                  ▶ 01 Jan 1994 to 15 Oct 1995 : s 59 ◀</p>	<p>1920</p>
<p>◀ ⊗ ▶ Versions of s 59                  (base date 20 Jul 2000)</p>	<p>1915</p>
<p>Corporations Act 1989 (Cth): s 59                  (Scope: until 15 Oct 1995)</p>	<p>1905</p>
<p>59. Enforcement of judgments etc                  Scope: until 15 Oct 1995</p> <p>Versions <u>Amendments</u> <u>Shift view</u></p> <p>(1) A judgment of the Federal Court, the Family Court or the Supreme Court of the Capital Territory that is given, in whole or in part, in the exercise of jurisdiction conferred by this Division, or by a law of a State that corresponds to this Division, is enforceable in the Capital Territory as if the judgment had been given by that Court entirely in the exercise of the jurisdiction of that Court apart from this Division or any such law.</p> <p>(2) Where:</p> <p>(a) a provision of a law of the Commonwealth or of the Capital Territory (not being a law in relation to the enforcement of judgments) refers to a thing done by the Federal Court, the Family Court, the Supreme Court of the Capital Territory or of a State or a State Family Court; and</p> <p>(b) that thing is done by another court in the exercise of jurisdiction conferred by this Division or a law of a State corresponding to this Division;</p> <p>the reference in that provision to the Federal Court, the Family Court, the Supreme Court of the Capital Territory or of that State, that State Family Court, as the case may be, is taken as a reference to that other court.</p>	<p>1910</p>

Fig. 19

2000

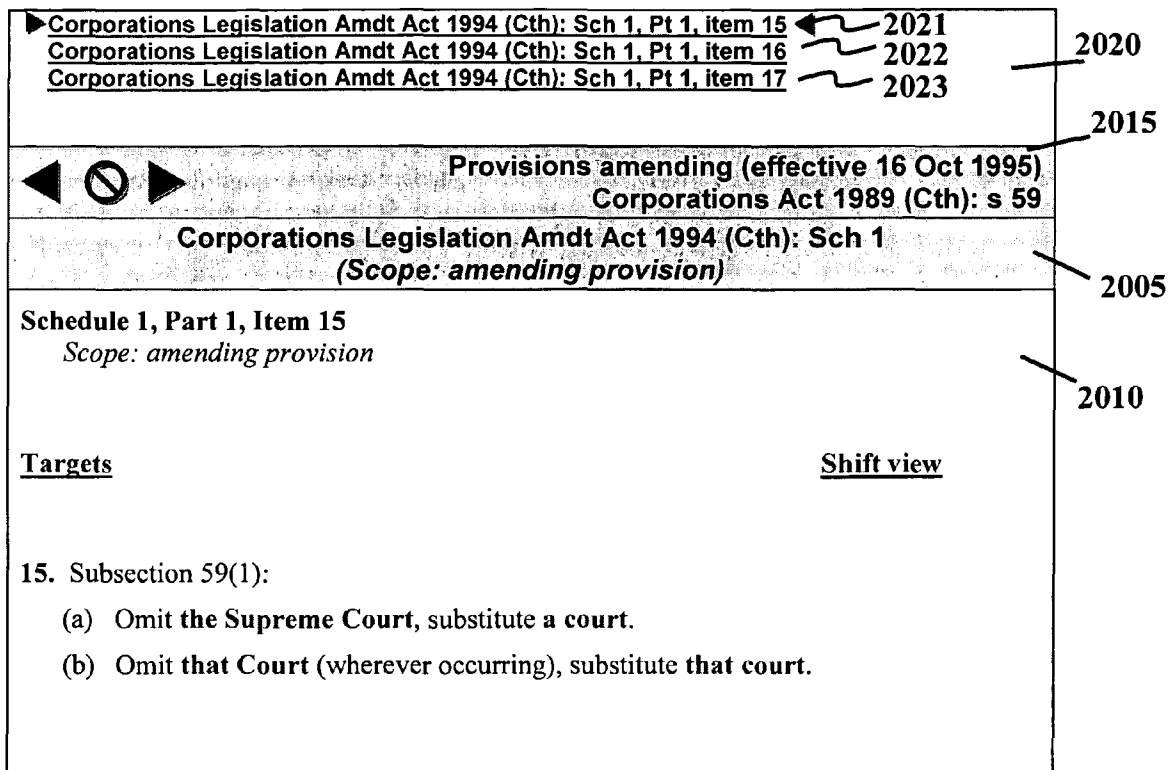
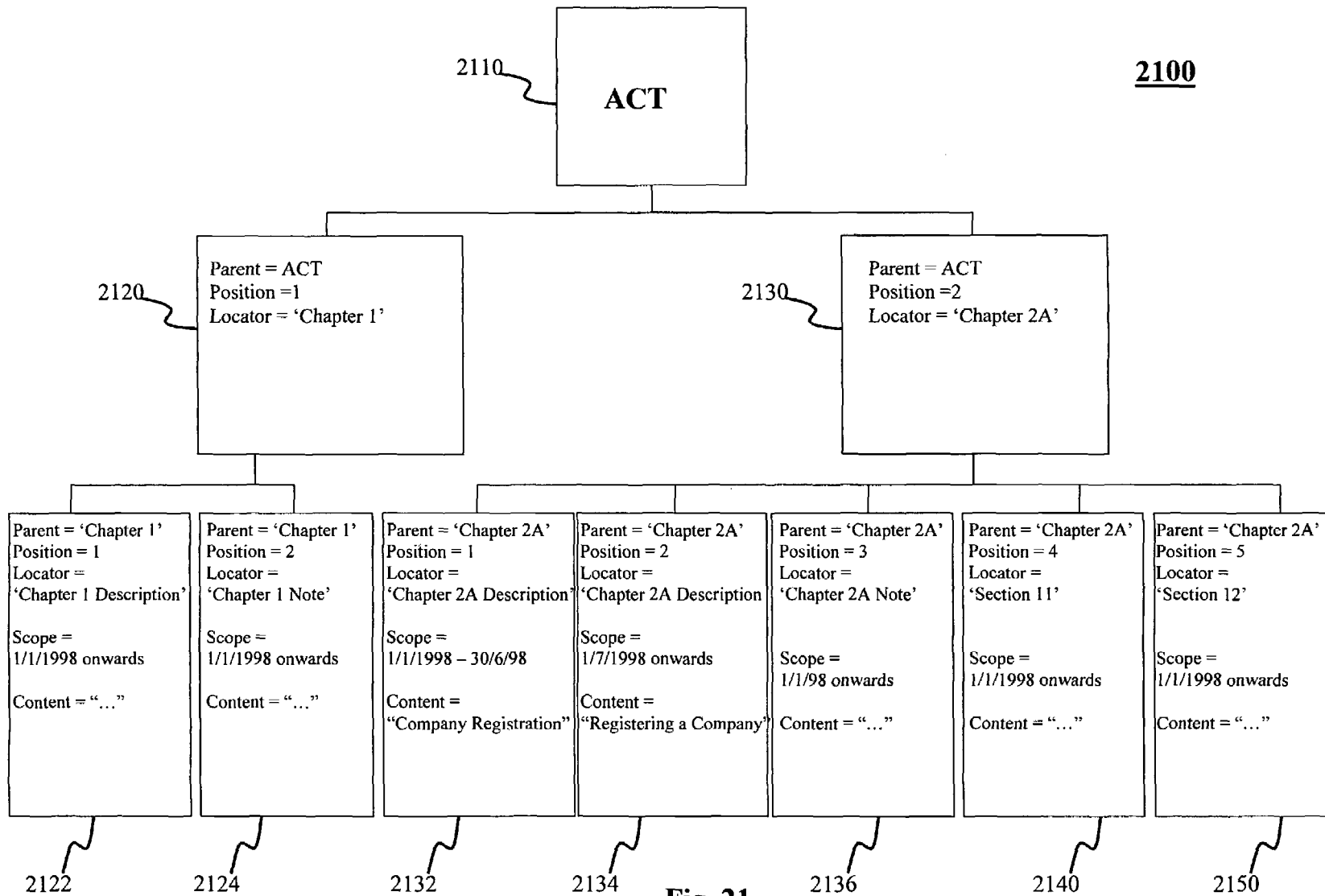


Fig. 20



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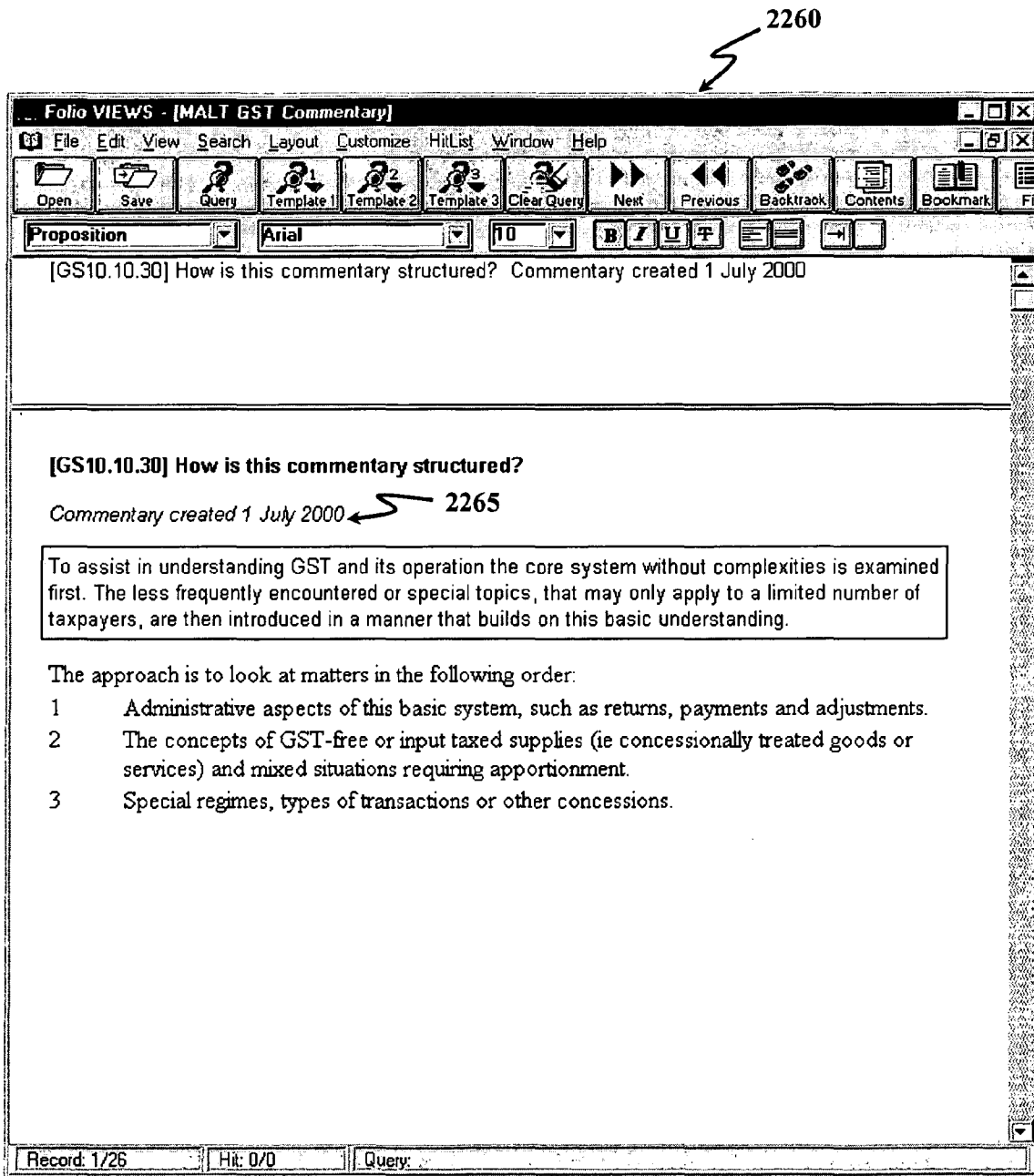


Fig. 22A



2270

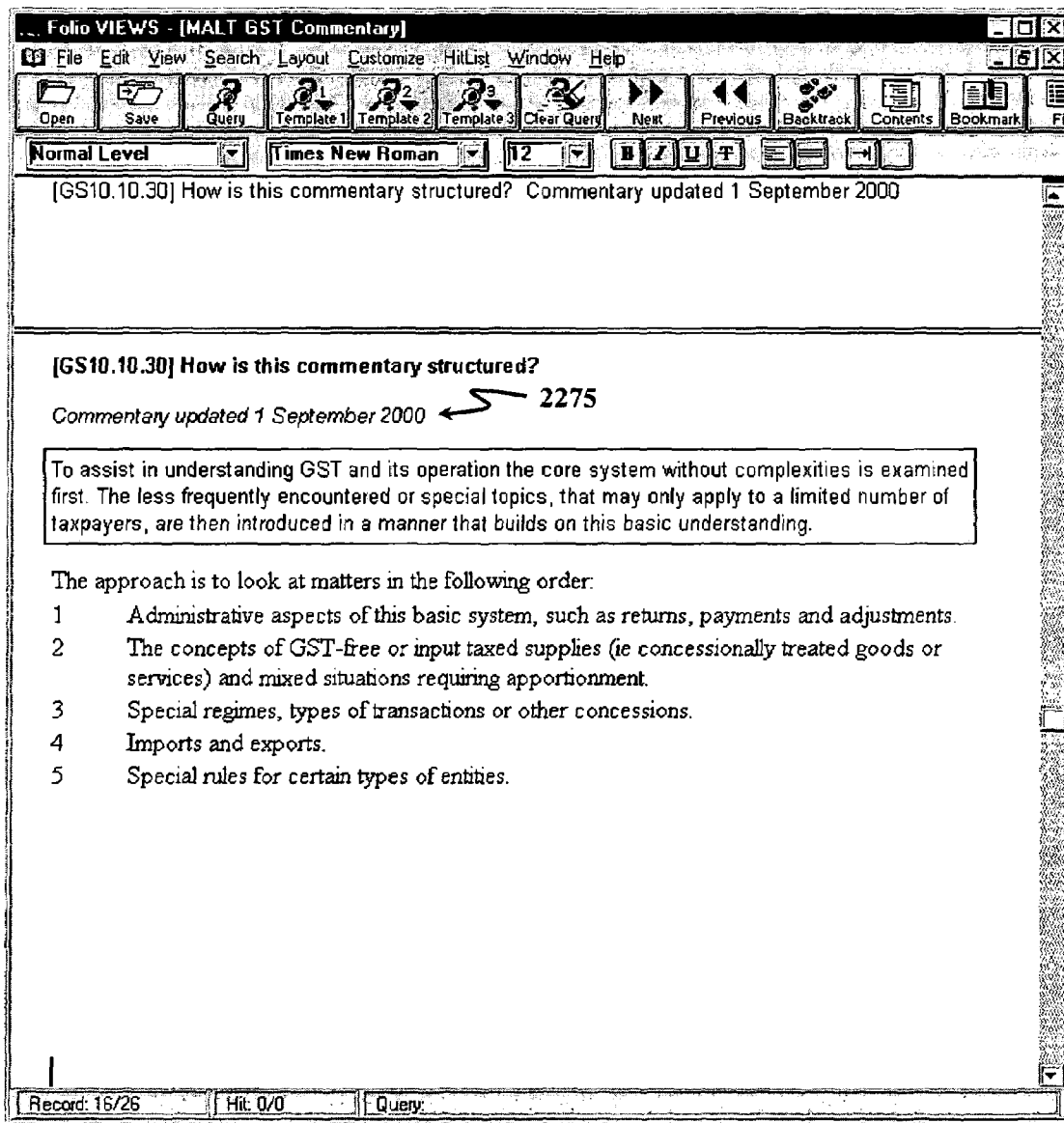


Fig. 22B

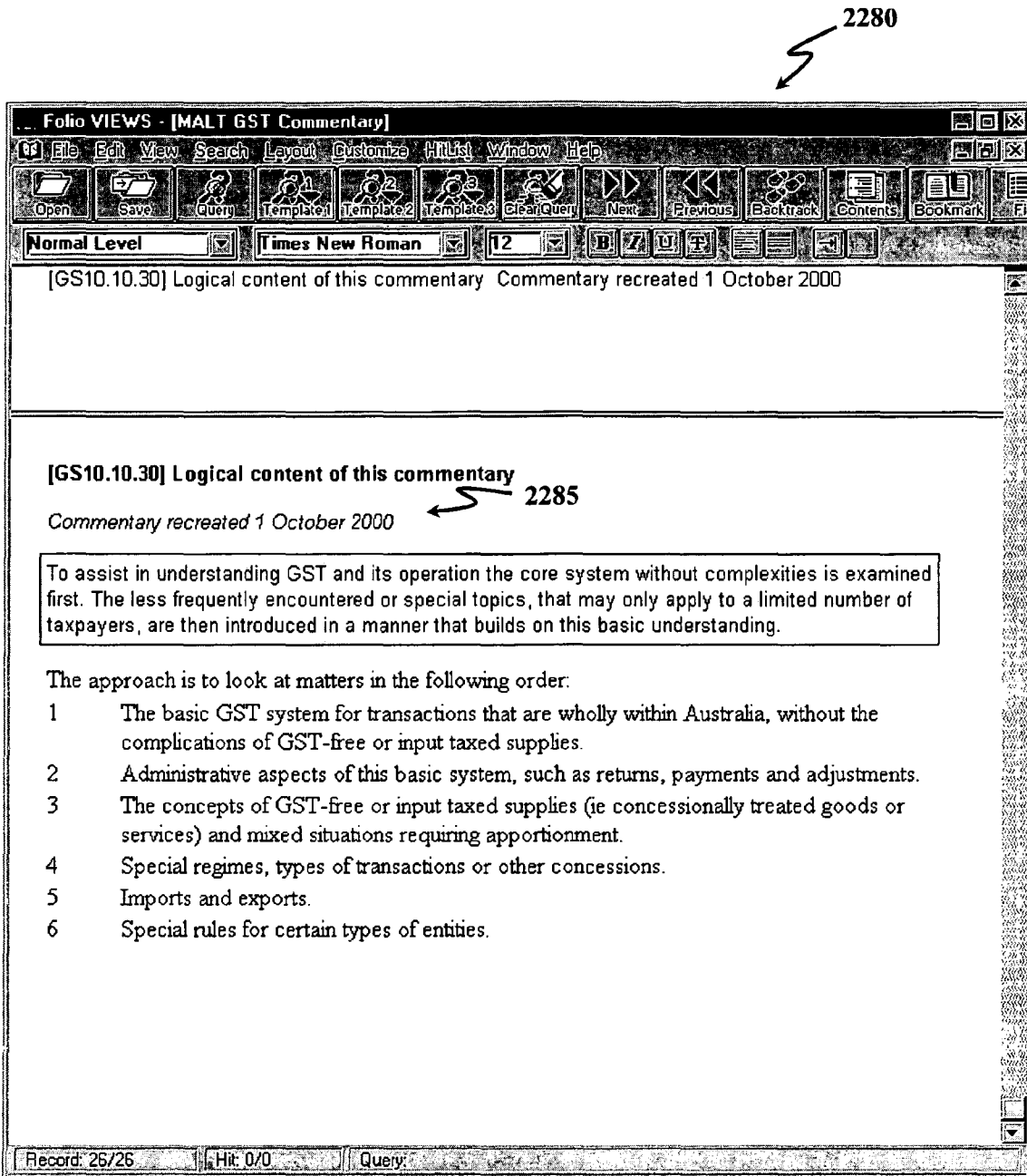


Fig. 22C

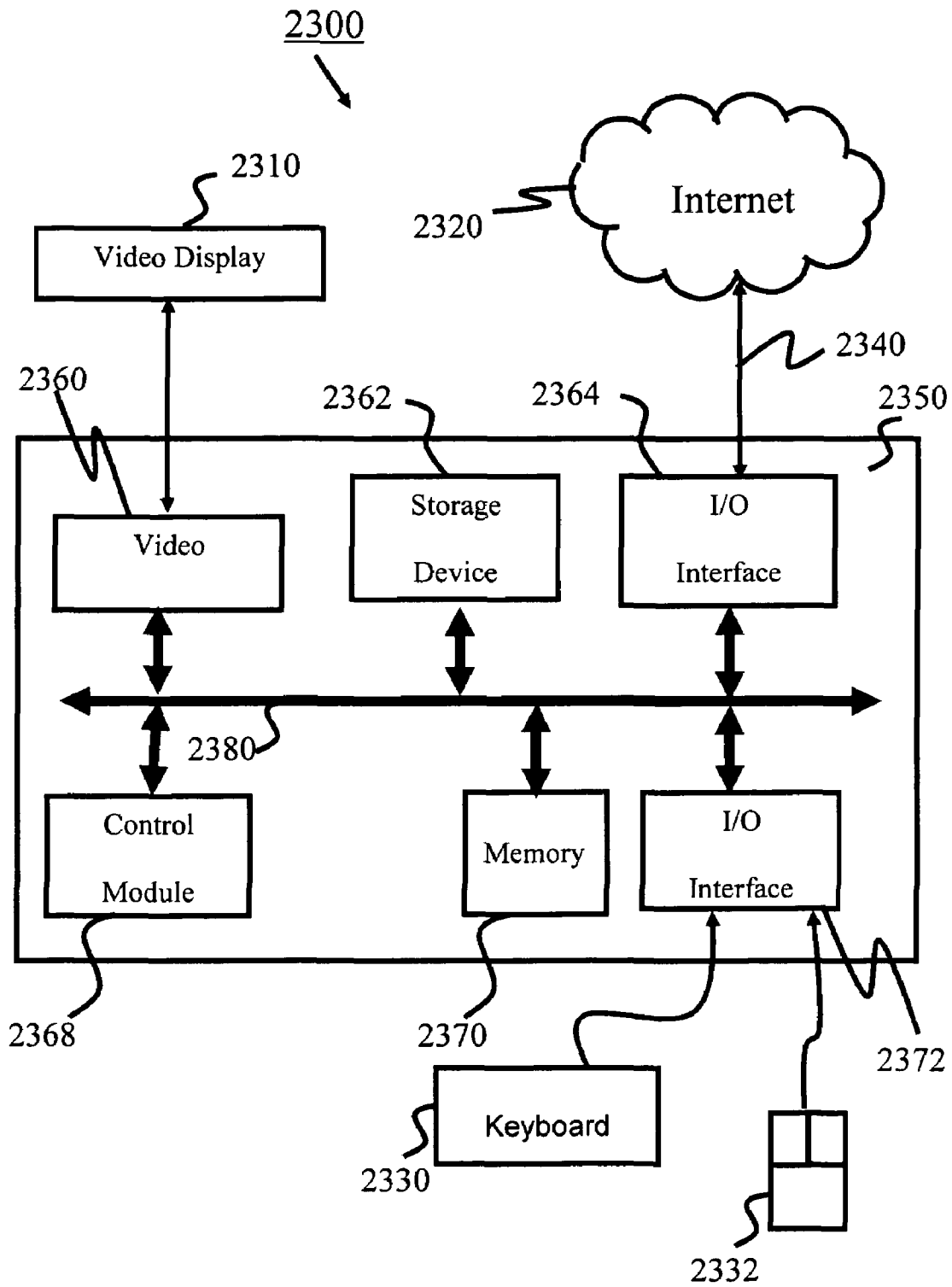


FIG. 23

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## MALTWEB MULTI-AXIS VIEWING INTERFACE AND HIGHER LEVEL SCOPING

### CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. application Ser. No. 09/108,999, filed on Jul. 1, 1998, now U.S. Pat. No. 6,233,592, which is a continuation of International Application No. PCT/AU1998/000050, filed Jan. 30, 1998, which designated the United States and was published in English, and which claimed priority to Australian Application No. P04892, filed on Jan. 31, 1997. These applications are incorporated by reference herein.

### FIELD OF THE INVENTION

The present invention relates to an electronic publishing system, and in particular to an electronic publishing system for the delivery of information which is not limited as to storage space and is not governed by predetermined pathways.

The present invention relates generally to an electronic publishing system and, in particular, to aids for navigating in an electronic publishing system and a method of organising data in an electronic publishing system.

### BACKGROUND

Conventionally, information is published in document form as a printed publication, or in electronic form but again using the document or book metaphor. In the past, the concept of a "multidimensional space" in electronic publishing has been intuitively understood (that is, instinctively desired). However, a comprehensive display, discussion or treatment has been rejected by publishers and information providers as too difficult to develop and manage. Instead, publishers and information providers have managed large amounts of data:

(1) by limiting the size or coverage of the information space; and

(2) by setting or predetermining the path through that information space.

The effect of this is clearest when the dimension of time is considered. The conventional approach to information storage and publishing is centred on the notion that information is either "current information" (ie, present day) or "historical information" (ie, the day before the present day and all days prior to that). Thus, information is traditionally retained (stored) and/or published (sold) as either current or historical information.

The effect of this has been to leave the end user with a collection of non-integrated repositories and many additional tasks to do before the information is useful to them. For example, the end user is required to:

(1) make most of their own connections between related pieces of information;

(2) do their own analysis of the type and subject of information they require or are seeking; and

(3) find information appropriate to the point in, or period of, time with which they are concerned.

To illustrate the disadvantages of conventional publishing systems, an example of using such conventional techniques and publishing systems to research information is provided. If a person were interested in information regarding the powers of the Secretary under Australian legislation with respect to couples in a family relationship, when and how

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the Secretary is restricted, and what did the relevant legislation provide prior to that, the person would refer to relevant legal information, which is the Social Security legislation of the Commonwealth of Australia. The relevant provisions are set forth in Appendix A under the heading "Example Research". This would be determined by the end user's own knowledge of the broad subject and/or reference to secondary material.

The relevant legislative provision is Section 4, which in conventional electronic legal publishing systems might be found by looking for words or phrases such as "family", "family relationships", and "family relationships" AND "social security", where AND is a logical operator.

Once the above is established, it can be seen from the information found that Section 4 of the Social Security Act, as at Sep. 8, 1996, has been amended ten times (see Appendix A: A1. AMENDMENTS TO SECTION AT Sep. 08, 1996).

There is however nothing in the current Commonwealth Government Reprint, in either the electronic or print versions (see heading EXAMPLE RESEARCH of Appendix A), that allows the end user to see the text of those amendments or what part(s) of Section 4 were changed by them.

Thus, unless the end user is prepared to refer to many statute books, reading each piece of text against another, the end user is not able to see easily or reliably what section 4 looked like before it was amended by any one of a number of prior amending Acts. However, if the end user has a library complete enough to provide access to the prior amending Acts, the person would eventually determine that Act No 105 of 1995 is the relevant amending Act.

Further, it should be noted that, while the Commonwealth Government Reprint indicates that the Social Security Act was amended by Act No 105 of 1995, it does not indicate what section or schedule in Act No 105 of 1995 actually amended Section 4. This again requires the end user to have access to the amending Acts themselves and renders the information provided by the Reprint as to commencement (see Appendix A: B. COMMENCEMENT INFORMATION FOR ACT NO 105 OF 1995 CONTAINED IN REPRINT) of little utility without a copy of the amending Act No 105 of 1995 from which it can be established that Section 14 of Act No 105 amended Section 4 of the Social Security Act with respect to powers of the Commissioner (see Appendix A: D. AMENDING ACT 1995 NO 105 AMENDING SECTION 14).

Eventually, the required information can be found but several pieces of information need to be searched by the end user. This is an arduous, time consuming, tedious and complex task that must be manually repeated for each research topic and if the same search is to be carried out again.

Conventional publishing systems, including electronic publishing systems that typically are speeded-up, paper-based publishing systems, are based on a book-metaphor. The smallest piece of information used by such conventional publishing systems is either (I) an Act or Regulation (in the case of reprints, a whole Act or Regulation is printed again), or (II) a word. Typically, conventional publishing systems choose a word as the smallest piece when legislation is amended. To track such amendments, a lawyer or their assistant may actually use scissors to cut and paste pieces of legislation or the publisher cuts and pastes each word electronically. If a whole Act or Regulation is tracked as in (I) above, it is necessary to store each new version of an Act or Regulation in its entirety.

This has a number of consequences, including:

a) only a few versions of each Act or Regulation are stored;

b) the end user rarely searches more than one reprint at a time;

c) it is very difficult to know which particular section or schedule has changed, to track how that particular section or schedule has changed, to find the relevant section of the Amending Act or Regulation that effected the section or schedule as shown in the reprint;

d) if multiple changes have occurred on a particular section or schedule between reprints, the latest version of the section or schedule can only be seen in the reprint;

e) issues like commencement of the latest version of a particular section or schedule and so-called "Application, Saving or Transitional Provisions" are difficult to recreate; and

f) it is difficult to come to a full understanding of the legislation by means of the reprints.

If every single word is tracked, as in (II) above, a level of complexity results that is difficult to administer and maintain without a large number of errors. For example, some legislative sections and schedules are amended several times annually.

Table 1 provides an example where Section 6 of the Income Tax Assessment Act has been amended 70 times:

TABLE 1

S. 6	am. No. 88, 1936; No. 30, 1939; No. 50, 1942; No. 3, 1944; No. 6, 1946; No. 44, 1948; No. 48, 1950; No. 1, 1953; No. 65, 1957; No. 55, 1958; No. 85, 1959; Nos. 18 and 108, 1960; No. 17, 1961; No. 69, 1963; No. 110, 1964; No. 103, 1965; No. 85, 1967; Nos. 4, 60 and 87, 1968; No. 93, 1969; No. 54, 1971; Nos. 51 and 164, 1973; No. 216, 1973 (as am. by No. 20, 1974); No. 126, 1974; Nos. 80 and 117, 1975; Nos. 50, 143 and 205, 1976; Nos. 87 and 172, 1978; No. 27, 1979; No. 24, 1980; Nos. 108 and 154, 1981; No. 103, 1983; Nos. 47 and 123, 1984; No. 168, 1985; Nos. 41, 48, 52 and 154, 1986; No. 138, 1987; Nos. 73, 97, 105 and 107, 1989; Nos. 20, 35 and 135, 1990; Nos. 4, 5, 100 and 216, 1991; Nos. 80, 98 and 224, 1992; Nos. 17, 18, 57 and 82, 1993; Nos. 138 and 181, 1994; Nos. 5 and 169, 1995
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It is both difficult and impractical to store the complete amendment history of every word and phrase within section 6. Trying to track all changes on such a detailed level leads to unmanageable complexity.

Largely, the split between historical and present information has come about because of the publishing and information industry's own development, and not because such is the desired or best way to manage information. Thus, a need clearly exists for an electronic publishing system that can overcome one or more of the disadvantages of conventional techniques and systems.

International Publication No. WO 98/34179 (PCT/AU98/00050), corresponding to U.S. patent application Ser. No. 09/108,999, is incorporated herein by cross reference and discloses an electronic publishing system that provides a sparse multidimensional matrix of data using a set of flat file records. In particular, the computer-implemented system publishes an electronic publication using text-based data. Predefined portions of the text-based data are stored and used for the publication. At least one of the predefined portions is modified, and the modified version is stored as well. The predefined portion is typically a block of text, greater in size than a single word, but less than an entire document. Thus, for example, in the case of legislation, the predefined portion may be a section of the Act. Each predefined portion and the modified portion(s) are marked

up with one or more links using a markup language, preferably SGML or XML. The system also has attributes, each being a point on an axis of a multidimensional space for organising the predefined portions and the modified portion(s) of the text-based data. This system is simply referred to as the Multi Access Layer Technology or "MALT" system hereinafter.

Existing methods of navigating electronic publications have been derived from traditional methods used to navigate printed publications. Typical of these methods is the use of a bookmark, which is merely an indicator which identifies a page or section of interest. Bookmarks are typically limited in the information provided to users. Bookmarks follow a single axis, perhaps indicating the current page, chapter and title of the publication. However, bookmarks do not necessarily provide the user with adequate context pertaining to how the user arrived at the current page. If a user knows the exact publication desired and then navigates through the same publication, a bookmark is probably adequate for the user's needs. In the event that the user has conducted a number of searches and trawled through various versions of different documents to arrive at the current page of a publication, it is impossible for a bookmark to capture all the relevant information and provide the user with an adequate reading context. The book metaphor fails to address the abilities and complexities of electronic publications.

Existing methods of navigating compact disc based publications and Internet sites are typically ill-suited to displaying the complex data provided by MALT. Known web solutions, for example, typically handle two axes, sequential and hierarchical, using either embedded links such as Previous, Next and Contents, or expandable content frames, as provided in Windows Explorer. Further axes may be handled by incorporating embedded links in the body of the text. Such embedded links are point to point, and provide limited navigational value to the user.

Object databases are capable of providing the required functionality, but search queries employed by these databases are too complicated for untrained users, both in terms of the complexity and amount of information required.

Thus, a need clearly exists for a detailed context to be provided to users of electronic publishing, overcoming one or more disadvantages of existing systems.

## SUMMARY

In accordance with a first aspect of the invention, there is provided a system for publishing electronic information, comprising:

a plurality of predefined portions of data with each predefined portion being encoded with at least one linking means, and, for each predefined portion, the each predefined portion is stored and, where such predefined portion has been modified, each such modified predefined portion is stored; and

a plurality of attributes, each attribute being a point on an axis of a multidimensional space for organising the data.

In accordance with a second aspect of the invention, there is provided a recording medium for publishing electronic information, comprising:

a plurality of predefined portions of data with each predefined portion being encoded with at least one linking means, and, for each predefined portion, the each predefined portion is stored and, where such predefined portion has been modified, each such modified predefined portion is stored; and

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a plurality of attributes, each attribute being a point on an axis of a multidimensional space for organising the data.

In accordance with a third aspect of the invention, there is provided a method for publishing electronic information, comprising:

providing a plurality of predefined portions of data with each predefined portion being encoded with at least one linking means, and, for each predefined portion, the each predefined portion is stored and, where such predefined portion has been modified, each such modified predefined portion is stored; and

providing a plurality of attributes, each attribute being a point on an axis of a multidimensional space for organising the data.

According to a first aspect of the invention, there is provided a method of navigating in a multidimensional space having three or more dimensions. The method includes the steps of:

displaying in a first display region a selected predefined portion of an electronic publication formed from predefined portions of text-based data encoded using a markup language, each predefined portion having at least one attribute being a coordinate of an axis of the multidimensional space, wherein logical connections among the predefined portions, and any logical connections between the predefined portions and predefined portions of any further electronic publication data in the multidimensional space, correspond to one or more axes of the multidimensional space;

displaying a point on a primary axis of the multidimensional space dependent upon an attribute of the displayed predefined portion;

displaying a second point on a second, viewing axis orthogonal to the first axis, the second point being derived from the first point dependent upon a logical connection between the displayed predefined portion and a predefined portion associated with the second point; and

displaying information regarding the second point of the second axis in a second display region, the first and second points being displayed in two display regions.

According to a second aspect of the invention, there is provided a method of navigating in a multidimensional space having three or more dimensions, the multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language. The method includes the steps of:

providing a view comprising at least two anchor sets;

displaying at least one base point and at least a first axis depending from the base point;

displaying at least one of a further point and an axis derived from the base point;

navigating a multidimensional space formed by the points and axes;

returning to the base point when required; and  
adjusting the view so a current view point becomes a new base point.

According to a third aspect of the invention, there is provided an apparatus for navigating in a multidimensional space having three or more dimensions. The apparatus includes:

a device for displaying in a first display region a selected predefined portion of an electronic publication formed from predefined portions of text-based data encoded using a markup language, each predefined portion having at least one attribute being a coordinate of an axis of the multidimensional space, wherein logical connections among the predefined portions, and any logical connections between the predefined-  
portions and predefined portions of any fur-

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ther electronic publication data in the multidimensional space, correspond to one or more axes of the multidimensional space;

a device for displaying a point on a selected axis of the multidimensional space dependent upon an attribute of the displayed predefined portion;

a device for displaying a second point on a second, viewing axis orthogonal to the selected axis, the second point being derived from the first axis at the first point dependent upon a logical connection between the displayed predefined portion and a predefined portion associated with the second point; and

a device for displaying information regarding the second point of the second axis in a second display region, the first and second points being displayed in two display regions.

According to a fourth aspect of the invention, there is provided an apparatus for navigating in a multidimensional space having three or more dimensions, the multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language. The apparatus includes:

a device for providing a view comprising at least two anchor sets;

a device for displaying at least one base point and at least a first axis depending from said base point;

a device for displaying at least one of a further point and an axis derived from the base point;

a device for navigating a multidimensional space formed by the points and axes;

a device for returning to the base point when required; and  
a device for adjusting the view so a current view point becomes a new base point.

According to a fifth aspect of the invention, there is provided a computer program product having a computer readable medium having a computer program recorded therein for navigating in a multidimensional space having three or more dimensions. The computer program product includes:

a computer program code module for displaying in a first display region a selected predefined portion of an electronic publication formed from predefined portions of text-based data encoded using a markup language, each predefined portion having at least one attribute being a coordinate of an axis of the multidimensional space, wherein logical connections among the predefined portions, and any logical connections between the predefined portions and predefined portions of any further electronic publication data in the multidimensional space, correspond to one or more axes of the multidimensional space;

a computer program code module for displaying a point on a primary axis of the multidimensional space dependent upon an attribute of the displayed predefined portion;

a computer program module for displaying a second point on a second, viewing axis orthogonal to the first axis, the second point being derived from the first point dependent upon a logical connection between the displayed predefined portion and a predefined portion associated with the second point; and

a computer program code module for displaying information regarding the second point of the second axis in a second display region, the first and second points being displayed in two display regions.

According to a sixth aspect of the invention, there is provided a computer program product having a computer readable medium having a computer program recorded therein for navigating in a multidimensional space having three or more dimensions, the multidimensional space con-

taining an electronic publication formed from predefined portions of text-based data encoded using a markup language. The computer program product includes:

a computer program code module for providing a view comprising at least two anchor sets;

a computer program code module for displaying at least one base point and at least a first axis depending from said base point;

a computer program code module for displaying other points, axes or both derived from said base point;

a computer program code module for navigating a multidimensional space formed by said points and axes;

a computer program code module for returning to said base point when required; and

a computer program code module for adjusting the view so a current view point becomes a new base point.

According to a seventh aspect of the invention, there is provided a method of publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language. The method includes the steps of:

storing predefined portions in terminal nodes; and

providing one or more higher level nodes for organising the terminal nodes to correspond with a hierarchical structure embodied in the electronic publication, wherein each higher level node consists of the identity of a parent node, a position indicator for the higher level node, and an identifier;

wherein one of the higher level nodes has a null parent identity, and the position indicator indicates a position of the higher level node relative to a sibling node.

According to an eighth aspect of the invention, there is provided an apparatus for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language. The apparatus includes:

a device for storing predefined portions in terminal nodes; and

a device for providing one or more higher level nodes for organising the terminal nodes to correspond with a hierarchical structure embodied in the electronic publication, wherein each higher level node consists of the identity of a parent node, a position indicator for the higher level node, and an identifier;

wherein one of the higher level nodes has a null parent identity, and the position indicator indicates a position of the higher level node relative to a sibling node.

According to a ninth aspect of the invention, there is provided a computer program product having a computer readable medium having a computer program recorded therein for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language. The computer program product includes:

a computer program code module for storing predefined portions in terminal nodes; and

a computer program code module for providing one or more higher level nodes for organising the terminal nodes to correspond with a hierarchical structure embodied in the electronic publication, wherein each higher level node consists of the identity of a parent node, a position indicator for said higher level node, and an identifier;

wherein one of the higher level nodes has a null parent identity, and the position indicator indicates a position of the higher level node relative to a sibling node.

According to a tenth aspect of the invention, there is provided a method of publishing an electronic publication

formed from predefined portions of text-based data encoded using a markup language. The method includes the steps of:

storing predefined portions in terminal nodes; and

providing one or more higher level nodes for organising the terminal nodes to correspond with a hierarchical structure embodied in the electronic publication, wherein each higher level node consists of the identity of a parent node, a position indicator for the higher level node, and an identifier, the predefined portion includes text associated with a commentary, and a scope including a start date, an end date and an update date, the update date being later than the start date and earlier than the end date;

further wherein one of the higher level nodes has a null parent identity, and the position indicator indicates a position of the higher level node relative to a sibling node.

Other aspects of the invention are also disclosed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

A small number of embodiments of the invention are described with reference to the drawings, in which:

FIG. 1 illustrates a grid of a multidimensional space according to the first embodiment;

FIG. 2 illustrates the effect of the various axes;

FIG. 3 illustrates the mapping of various axis intersection points, or nodes, that is used to organize, present, and find information (present and past) according to the first embodiment;

FIG. 4 illustrates the application of legal information to mapped nodes according to the first embodiment;

FIG. 5 is a block diagram illustrating a general purpose computer that can be used to implement the electronic publishing system according to the first embodiment;

FIG. 6 is a flow diagram illustrating the method of electronic publishing according to the first embodiment; and

FIGS. 7 to 17 are screen shots illustrating operation of the first embodiment as a software application executing on a general purpose computer.

One or more embodiments of the present invention are described hereinafter with reference to the drawings, in which:

FIG. 18 is a screen shot of a Normal axis view of a MALT publication (with a search mode enabled) in accordance with an embodiment of the present invention;

FIG. 19 is a screen shot of a Versions axis view of a MALT publication in accordance with an embodiment of the present invention;

FIG. 20 is a screen shot of a Source axis view of a MALT publication in accordance with an embodiment of the present invention;

FIG. 21 is a block diagram representation of higher level scoping in accordance with an embodiment of the present invention;

FIGS. 22A, 22B and 22C are screen shots illustrating a commentary in accordance with a further embodiment of the invention; and

FIG. 23 is a computer program product block diagram.

#### DETAILED DESCRIPTION

The present invention is directed towards a system of electronic publishing that can overcome the disadvantages of conventional information publishing, both in print and electronic form. The present invention reduces, if not eliminates, end user problems with conventional information publishing including:

- (1) the connectivity between related pieces of information;
- (2) analysis of the type and subject of information; and
- (3) finding information appropriate to the point in time with which they are concerned.

#### Overview of Embodiments

The embodiments of the invention provide an entirely new way of delivering, storing and publishing information. The embodiments allow publishers to add an arbitrary number of logical connections to a set of data, and even permit the publisher to display the precise evolution of that data set over time. This can be done without getting bogged down in the complexity of the logical connections and without limit as to storage space.

Frequently, people desire to have more "information" available. However, with the advent of the Internet and new technology, many people suffer from information overload. The embodiments of the invention provide an easy and effective way to navigate large complex volumes of information.

Conventionally, information may only contain very rudimentary (i.e., haphazard hyperlinks) or non-existent logical connections. Thus, conventional techniques of investigating how a set of data has evolved and changed over time can only be done for small data sets and are very expensive.

However, with the embodiments of the invention, it is possible to list all logical connections within a data set no matter how complex those connections may be. The embodiments of the invention and the principles of those embodiments described hereinafter can be applied to many different types of information such as medical, scientific, pharmaceutical, etc. For ease of description, however, the embodiments are set forth in relation to legal information.

Conventionally, legislation is often purchased in two ways: (1) The individual Numbered Acts and Regulations that give each piece of legislation as it is passed; and (2) Consolidated legislation that provides the latest consolidated version.

In the embodiments of the invention, legislation is stored using every version of each Act or Regulation. The end user can search every version of any section, schedule, or provision. For example, the required version of a section is immediately available as is the opportunity to view every preceding and subsequent version of the same section. Also, links are available to any relevant amending legislation commencing that change, as well as the one that repealed it. Relevant Application, Saving or Transitional Provisions can also be easily accessed.

In this manner, it is possible to come to a full understanding of the legislation just by looking at the data provided through the embodiments of the invention. In contrast, using conventional techniques, it would have been impossible or very hard, expensive and time consuming to do so.

Using conventional means, a person wishing to view a particular section of a particular Act (e.g., the Income Tax Assessment Act) as of a particular date (e.g., 30th Jun. 1996), a significant amount of work would be required to do so. The end user would need to track all Amendments since the last reprint of the legislation, which may take a long time and involve referring to many volumes. This may even possibly involve using scissors and paste to actually cut and replace words. Even to figure out which Acts amended a particular section and to trace those commencement dates can be difficult, time consuming and trying. However, a piece of research that may have taken an experienced

researcher days or even weeks can be accomplished in minutes using the embodiments of the invention.

The ability to move through information in time is outlined above. The embodiments of the invention also give additional flexibility and SCOPE to the end user. Further dimensions and interconnections may include: type, jurisdiction, subject, depth.

Some examples are:

1. Doing research on the subject evidence at depth confession for types Acts and Case for time period 12 months.
2. Doing research on type cases within jurisdictions NSW and Queensland subject murder and depth statutes dealing with subject.

The ability to associate the relevance and interconnection contained within the information is highly advantageous to the end user.

A key aspect of the embodiments of the invention in successfully providing a multi-dimensional repository of information has been in deciding the "optimum storage unit". In the past publishers have chosen to either store new versions of the entire Act (too big) or new versions of each and every change, in a method similar to red lining (too complex). The first aspect of the invention was to analysis the data and choose to store every version of every section or provision level of legislation.

Structured Generalised Markup Language (SGML) is a recognised way to mark up data. SGML allows logical structure to be added to a document (unlike HTML and word processors which only allow the addition of visual content). SGML alone is not enough to deal with text-based data that contains a highly complex logical structure. The complexity increases exponentially until the complexity cannot be managed any more. Large legal publishers have stored their data in SGML, but those legal publishers that are successful in dealing with their SGML-based data have purposely kept their markup as simple as possible. When such publishers have tried to encode a complex structure on text-based data their costs of creating the data set and maintaining the data set simply went through the roof, and it became impossible to maintain the integrity of the data set.

In contrast, the embodiments of the invention allow SGML data to be encoded with a much more complex structure whilst remaining manageable. Alternatively, Extensible Markup Language (XML) may be used. For example, with SGML it is possible to encode all 71 versions of Section 6 of the Australian Federal Income Tax Assessment Act in a single file (that Act has about 6,000 sections) but this would be utterly unmanageable when applied to the 6,000 other sections of the Income Tax Assessment Act. It becomes even more unmanageable if anybody would try to use the above method on all the sections within all other Acts and Regulations of the Commonwealth. A significant problem with using SGML, even well executed SGML, is that it is possible to quickly get bogged down in unmanageable levels of complexity. The embodiments of the invention have overcome these problems.

Another key aspect of the invention is the use of database technologies in the management of the SGML encoded techniques. Database technology provides a large number of ready tools to deal with complex structured data. The embodiments combine these technologies (SGML, XML and database technologies) in an advantageous manner.

In the past, traditional publishers have been limited by the size and speed of available storage systems. Only a limited amount can be reproduced in paper and until recently hard



disk costs prohibited the storing of multiple gigabytes of data, for both publishers and clients alike.

The embodiments of the invention have the ability to look at situations from a new and up-to-date view point and therefore come up with innovative conclusions that can be radically different to processes employed in the past.

Thus, the embodiments of the invention provide a new computer publishing system that changes the availability of electronic information from being merely "speeded up paper" to being electronic information taking advantage of new electronic media by providing users with enhanced functionality of data retrieval and manipulation. The information included in the electronic format is of a publishable standard, meets cost constraints and is able to be accessed under any combination of dimensions from the multi-dimensional space (Acts, cases, time, jurisdiction, subject). The publishing system facilitates continual updates to the data contained in the databases, without any adverse effects on the operating capabilities that make the publishing system unique. Due to the extra functionality, the publishing system is also designed in such a way that it can still be made available in as many different electronic media as possible, and all search functions are able to operate in a time-efficient manner.

The embodiments of the invention organize, process and present information in a way that is significantly different than conventional structures, processes and presentation. They provide an information storage and publishing system, and in particular, an information storage and publishing system that stores and manages large and comprehensive amounts of information (eg, legal information).

Publication data, being preferably legal information, is encoded using Standard Generalized Markup Language (SGML) or Extensible Markup Language (XML) which adds codes to the publication data and provides functionality to the data. The publication data is processed as a plurality of predefined portions, which in the case of legislation is preferably at the section, schedule level, or provision level. A hierarchy of divisions of the legislation may be implemented. For each of the predefined portions, the system stores a copy of the predefined portion and a modified predefined portion in the first database whenever it is changed. A second (relational) database is preferably provided that comprises plural attributes for managing the information of the first database, with each attribute being a point on an axis of a multidimensional space for organising the data for publication. Alternatively, a single repository of information may be practised as described with reference to the second embodiment.

The system enables the first database to be searched for one of the predefined portions of the publication data using attributes of the second database by following one or more pathways through the multidimensional space. The plurality of attributes are connected to by the plurality of links. Once the desired predefined portion is located, the predefined portions can be retrieved using the attributes to define a point in the multidimensional space.

Preferably, the system implements, inter alia, time-based legislation in which sections of legislation that have been amended are not discarded and replaced with the current provision only as of the publication date. Instead, each version of an amended section is retained in the first database. Thus, the systems according to the embodiments of the invention are particularly advantageous in that legal information is published so that a user can obtain such sections or provisions at a particular time point.

The embodiments advantageously divide information into "suitably" small pieces (or blocks) of text, each of which is a predefined portion of data, and add to each piece of text, either expressly or implicitly, a number of attributes (characteristics or descriptors). The suitability as to size of text pieces is determined by an analysis of the information and its naturally occurring structure based on knowledge of how the information is used and consumed by the end user.

This makes it possible to locate each piece or block of text at a particular point in a "multidimensional space" using as coordinates the attributes added to the piece or block of text. Multidimensional space refers to an area not having boundaries and that is capable of, or involves, more than three dimensions.

FIG. 1 illustrates a multi-dimensional space **100** as used in embodiments of the invention. The multidimensional space is represented by a layered grid. The diagram represents axes or pathways as vertical and horizontal lines; in reality (in the case of more than two dimensions), they are at all angles and inclines.

Referring to FIG. 2, the ability to locate (assign) or map each node **102** (or key intersection point of the various axes or pathways) is a significant functional aspect of the embodiments of the invention. This mapping is explained further hereinafter. With such coordinates **102** known (located or mapped), it is possible to move easily between points in the multidimensional space **100**.

The effect of mapping nodes as shown in FIG. 3 is that a course **320** through the information represented in the three-dimensional space **100** can be easily plotted. The user begins the course **320** at node **302** and progresses vertically downward to the fourth node **304**. Further, the plotted course **320** is flexible to the extent of the relationships a user chooses to follow or seek out.

#### First Embodiment

A first embodiment of the invention provides information management in the multidimensional space and allows movement along different axes or "pathways":

- location of the information (its address);
- type of information (its genesis);
- jurisdiction (its class);
- subject (its content description);
- depth (extent of content); and
- time (the point in time at which the information is viewed).

In the first embodiment, coding of information or data for publication is based on SGML or XML and one or more specifically developed Document Type Definitions (DTD), which preferably is specifically designed for legal information. Alternatively, in the case of XML, a Style Sheet Mechanism (SSM) may be used. This coding can then be related back to information retained in a specifically developed database that enables the code information to be managed and updated. For a detailed description of this aspect of the invention, reference is made to Appendix C. The DTDs according to the first embodiment are set forth in detail in Appendix B. A DTD is used to define the structure of publication data, preferably being legislation, down to a comprehensive level. This is done by using information coded in conjunction with any one of a number of off-the-shelf, free-text retrieval software packages (eg, Folio Views or Dynatext) to deliver the information to the end user.

A DTD describes the markup for the SGML publication data, or "repository", which may contain legislation, case law, journal articles and other types of material that are

stored in computer files. The files contain publication data in text form and the markup, which is extra information about the text included with the text. An example of a markup is '<BD+>' which indicates that "the data from this point on is bold". A further example is

'<SECTION ID="CWACT-19950104-SEC-1" LBL="1">'. This markup indicates that: the data from this point on is part of a section of legislation; the section has an identifier of CWACT-19950104-SEC-1; and the section has a label of "1".

There are a number of different ways to add markup to data. The first embodiment adds markup to data using SGML. Alternatively, XML may be used. Still further, in the case of XML being used, an SSM may be used. Even within SGML, there are many ways to add markup to text. Each particular way of adding markup within SGML is described by using a DTD. In the first embodiment, the data for publication is marked up using a number of different DTDs. In particular, the DTDs are used to mark up the logical structure of the legislation, case law or journal articles. Significant amounts of information about the data for publication is stored in the markup. For example, the markup '<SECTION ID="CWACT-19950104-SEC-1" LBL="1">' provides the following information: the data is a piece of Commonwealth of Australia legislation (indicated by 'CW' at the beginning of the string); the section is part of an Act ('ACT' after 'CW') and not a regulation; the act is Act No. 104 of 1995 ('19950104' in the middle of the string), the data is a Section ('SEC') within the Act; and it is Section 1 ('1' at the end).

The preparation of such DTDs necessitates that the author has a sound knowledge of the data that will be marked up using the DTD. It is especially important that the underlying structure of the data to be marked up using the DTD be understood. The process of becoming acquainted with the structure of the data to be marked up is referred to hereinafter as "content analysis".

In particular, the section-level or schedule-level portion of legislation is used in the first embodiment. That is, the section-level portion is preferably the predefined portion of the publication data, which is the smallest piece of information to be tracked. This is unlike conventional publishing systems. For example, with reference to Table 1, the first embodiment stores every version of Section 6. In this manner, complexity (tracking every word) is reduced by increasing storage. However, unlike example (I) of conventional publishing systems, the first embodiment does not lose any pertinent information:

- a) every version of each Act or Regulation is stored;
- b) the end user can search every version of any section or schedule at the same time;
- c) it is easy to know which particular section or schedule has changed, to track how that particular section or schedule has changed, and to find the relevant section of the Amending Act or Regulation that affected the section or schedule;
- d) if multiple changes have occurred on a particular section or schedule, every version of the section or schedule can be seen;
- e) issues like commencement of the latest version of a particular section or schedule and so-called "Application, Saving or Transitional Provisions" can easily be recreated;
- f) it is possible to come to a full understanding of the legislation just by looking at the data provided through the first embodiment.

A further advantage of tracking every version of each section or schedule is that it is possible to store some of the information, not in the markup, but in a database, as noted hereinbefore. This simplifier the updating process.

While SGML is a powerful way of storing information, it is not a retrieval medium. Therefore, the stored information needs to be converted into a format that the end user of the information can access. The first embodiment uses an electronic format for retrieval. For this electronic retrieval, a software application called 'high-end text retrieval software' is used. Examples of high-end, text-retrieval software applications include Folio Views and Dynatext. In the first embodiment, Folio Views is used.

Folio Views has its own proprietary markup language, which is not part of the SGML family. A complete guide to the Folio Views markup language is provided in the text Folio Views Infobase Production Kit Utilities Manual, Version 3.1, Provo, Utah: Folio Corporation (1 Jun. 1994). Storing the data for publication in SGML allows other retrieval software applications besides Folio Views to be used.

In the first embodiment, a process is implemented to convert the SGML marked-up data into the format used by the retrieval software application. The example given for Folio Views hereinafter is but one example of the process involved. The conversion program basically maps the SGML markup to Folio Views markup. For example, for the SGML markup '<SECTION ID="CWACT-19950104-SEC-1" LBL="1">', the conversion process marks all ID's substantively unchanged as Jump Destinations (JD's): '<JD:="CWACT-19950104-SEC-1">'.

A Keying Guide for Australian Legislation Documents with instructions for the conversion process to Folio Views added is provided in Appendix D.

Movement through legal information can be as follows (the flexibility and scope is largely up to the end user):

- (1) doing research on the subject of fences and boundaries at the depth fences that are hedges looking for types Acts and Regulations in jurisdictions NSW and Victoria for the time period last 20 years;
- (2) doing research on the subject evidence at depth confession for types Acts and cases for time period last 12 months; or
- (3) doing research on type cases with jurisdictions NSW and Queensland, subject murder and depth statutes dealing with subject.

The application of legal information to mapped nodes is shown in FIG. 4. However, this is only one of numerous possible applications. Information from medical, technical and scientific areas are all open to the application of this invention. This diagram substitutes the technical terminology of FIG. 3 with legal terms to show the way information appears according to the first embodiment. Further, FIG. 4 provides an example of how legal information is navigated by an end user. The user may be seeking information on the following matters:

- (1) Does NSW legislation on fences presently cover hedge rows between the boundary of a private property and a public road?
- (2) If not, have such hedge rows ever come under NSW legislation?
- (3) Are there any cases under current law or previous law?
- (4) How have the cases been interpreted?

Some general assumptions are made about legal information for the purposes of this example. Broadly, legal information has two main primary sources: statute law (including subordinate legislation), and case law. There is also second-

ary information such as commentary which can be added to aid interpretation. Each of these sources is interconnected and relevant to the other in terms of both past and present information. This may also apply to future information in terms of bills or other forms of uncommenced legislation. It is the association of this relevance and interconnection that is advantageous to the end user.

In FIG. 4, the X-, Y-, and Z-axes indicate time (Time), the legislative provision (location), and type (eg, legislation=L, cases=C, and journal articles=J). To simplify the diagram, only three axes are illustrated, however, other axes may be included dependent upon the number of dimensions of the space. In the first embodiment, the multidimensional space also includes another three axes: jurisdiction=U, subject-V, and depth=W. Thus, the space according to the first embodiment has six dimensions. In the six-dimensional case, it is possible to move along each axis and at the points of intersection change direction, as well as find and/or follow new or additional information.

The end user begins at legislation (L) along the Z-axis, where the Fences 10 and Boundaries Act is located and then selects Section 1 of legislation (indicated by L allowing the Z-axis) at node 402, as of 1 Jan. 1996. The user then follows a path in the legislation through nodes 404, 406 and 408 for Sections 2, 3 and 4, respectively, as of that same date (ie, the Y-axis), to find a definition of the term "fences". Node 408 contains Section 4 at 1 Jan. 1996 which contains the current definition of "fences". This would provide information in response to above query (1).

The user then selects Section 4 of the legislation as of 1 Jan. 1995, which in this case is an earlier version of the section prior to amendment, by moving to node 410 (along the X-axis). This provides information about the prior law for above query (2). The user can then move to other information on Section 4 as of 1 Jan. 1995 by going to nodes 412 and 414 for case and journal article information, respectively, along the Z-axis. For example, a case on the earlier Section 4 might be identified at node 412 and articles on interpretation of Section 4 at node 414. The foregoing is only one possible route through the multidimensional space of information. Other more complicated and interrelated pathways involving axes U, V and W are possible. For example, the user can move to axis U (jurisdiction) and compare the definition in Section 4 of New South Wales with that in another jurisdiction (eg, Victoria).

FIG. 6 is a flow diagram illustrating the method of electronic publishing according to the first embodiment. A data source 602, preferably for legal information, is provided. In steps 604 and 606, base data and new data are input from the data source 602, respectively, and in step 608 the data is captured. The DTDs 610 are input to step 612. The DTDs 610 include Act.DTD, Acts.DTD, Reg.DTD, Regs.DTD, and Common.ELT, which are shown in detail in Appendix B. In step 612, the DTDs 610 are applied to the captured data from step 608. In step 614, the data is coded in SGML, including the Time Base Code. In step 616, the data is consolidated. As indicated in FIG. 6, steps/items 602 to 616 comprise the (first) data conversion stage.

A data management database 620 is provided to step 618. The database is based on a master table and a textblock table (see Appendix C for further detail). The output of step 616 is also provided to step 618. In step 618, the data is consolidated; the data is stored as multiple versions, if applicable, and uses the predefined portions of data (ie, textblocks). In step 622, a filter program(s) is applied to the consolidated data to convert the data from SGML to the relevant format for the retrieval software application, includ-

ing Folio Views, DynaText, Topic, HTML, and the like. Steps/item 618 to 622 comprise the (second) data management stage.

The filtered data output by step 622 can then be provided to step 624. In step 624, the filter consolidated data is imported to the text retrieval software. In step 626, the data is provided to the delivery medium, which may include CD-ROM, DVD, tape, electronic online services, and other media. The output of this is the end user product 628. Steps/item 624 to 628 comprise the (third) product manufacture stage.

The first embodiment is preferably practiced using a conventional general-purpose computer, such as the one shown in FIG. 5, wherein processes for providing and managing the information are carried out using software executing on the computer. In particular, the legislation database, the database and the DTD(s) may be stored after a filtering process on a CD-ROM used by the computer system, and the computer system is operated using Folio View. The computer system 500 includes a computer 502, a video display 516, and input devices 518. A number of output devices, including line printers, laser printers, plotters, and other reproduction devices, can be connected to the computer 502. Further, the computer system 500 can be connected to one or more other computers using an appropriate communication channel such as a modem communications path, a computer network, or the like.

The computer 502 consists of a central processing unit 504 (simply, processor hereinafter), an input/output interface 508, a video interface 510, a memory 506 which can include random access memory (RAM) and read-only memory (ROM), and one or more storage devices generally represented by a block 512 in FIG. 5. The storage device(s) 512 can consist of one or more of the following: a floppy disc, a hard disc drive, a magneto-optical disc drive, CD-ROM or any other of a number of non-volatile storage devices well known to those skilled in the art. Each of the components 504 to 512 is typically connected to one or more of the other devices via a bus 514 that in turn can consist of data, address, and control buses.

The video interface 510 is connected to the video display 516 and provides video signals from the computer 502 for display on the video display 516. User input to operate the computer 502 can be provided by one or more input devices. For example, an operator can use the keyboard 518 and/or a pointing device such as the mouse to provide input to time computer 502. Exemplary computers on which the embodiment can be practiced include Macintosh personal computers, Sun SparcStations, and IBM-PC/ATs and compatibles.

In an alternate embodiment of the invention, the computer system 500 can be connected in a networked environment by means of an appropriate communications channel. For example, a local area network could be accessed by means of an appropriate network adaptor (not shown) connected to the computer, or the Internet or an Intranet could be accessed by means of a modem connected to the I/O interface or an ISDN card connected to the computer 502 by the bus 514. In such a networked configuration, the electronic publishing system can be implemented partially on the user's computer 500 and a remote computer (not shown) coupled over the network. The legislation database, the database and the DTD(s) can be implemented on the remote computer and the computer system 500 can be operated using Folio View.

The operation of the first embodiment is described with reference to the screen shots shown in FIGS. 7 to 17. All screen shots are derived from the first embodiment which uses Folio Views as the retrieval software. Broadly, FIGS. 7

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to **15** are screen shots illustrating navigation or movement around the information. FIGS. **16** and **17** are screen shots that show search capacities.

FIG. **7** shows the opening screen **700**, which the end user sees when the program is started. The interface is a standard windows interface featuring drop menus that provide access to all functions. The functions include basic searching and customised search templates such as the ones shown in FIGS. **16** and **17** that allow users to exploit time-based and multidimensional searching.

The title screen **702** is presented when the process is commenced and is the first screen. A customisable toolbar **704** is provided for searching functions. Also, drop menus **706** are provided above the toolbar **704**. In the lower portion of the screen **700** contains a status bar **708** showing information relevant to searching. The Start and Main menu buttons **710** in FIG. **7** are both navigational tools. The Start button takes a new user to information providing help on how to use the invention. The Main Menu button takes the end user to the menu shown in the second screen shot of FIG. **8**.

FIG. **8** shows a main selection menu **800**. At this menu **800**, the user can see the currency of the total information. The user is also able to make broad choices as to the type of information that the person might like to see. All items preceded by bullet points in the menu are jump links **802** which lead the user to further menus for the items selected. The jump links **802** also provide a uniform or consistent form of movement. Thus, if searching the Social Security Act, selecting the first jump link "Find an Act" takes the user to the next screen which would be the "Act Name Menu".

FIG. **9** shows the "Act Name Menu" screen **900**. In this menu **900**, all letter buttons are links **904** to Acts beginning with the letter selected. That is, the jump links **904** allow access to sub-menus for Acts with the corresponding selected letter. If "S" is clicked, this leads to the "Acts beginning with S" menu (see FIG. **10**) where an entry linked to the most current version of the Social Security Act 1991 appears. A similar menu may be provided for Regulations. Further, locational information **902** is provided in the upper portion of the screen **900**.

FIG. **10** illustrates acts beginning with "S", as selected in the screen **900** of FIG. **9**. By selecting jump link **1002**, the Social Security Act can be accessed. Likewise, other acts in this screen **1000** may be accessed using the respective jump link (e.g. Safety, Rehabilitation and Compensation Act).

Assuming the appropriate jump link **1002** is selected in FIG. **10**, FIG. **11** shows how the beginning of the Social Security Act appears in screen **1100**, and the buttons that link the user to the provisions of the Act. This is the start of the most current version of the Social Security Act preferably. From this screen, provisions of the Act can be accessed. By accessing the Table of Provisions box, the Table of Provisions menu can be accessed. FIG. **12** shows the Table of Provisions screen **1200**, and illustrates how a specific provision, say Section 4, can be accessed again using links **1206**. Different sections of the Act (e.g. ss 3, 4 and 6A) may be accessed as well using corresponding jump links. Again, location information **1202** is provided in the upper portion of the screen. A return button **1204** is also provided that provides access back to the beginning of the Act.

FIG. **13** shows screen **1300** containing the Time Base Toolbar **1302**, which preferably provides eight buttons for accessing time based information. This Toolbar **1302** is not a feature of Folio Views, but is a designed addition added to Folio Views by the first embodiment. It is made possible by the way in which the publication data is coded. The Section

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Information button **1304** takes the user to an overview of information. The Previous, Next and All buttons **1306** allows the user to have access to the previous, next and all versions of the relevant section. The Subject, Jurisdiction and Related Info buttons **1308** allow the user to view and access sections dealing with a similar subject, or similar sections in other jurisdictions, or related information such as cases and articles on or about the section. This Toolbar **1302** allows a user to cycle through previous and subsequent versions of sections and as shown in screens in FIGS. **14** and **15** to refer to the text of sections amending the section. As well, the user can also call to the screen all versions of the section as one view (or display) using the "ALL" button.

FIG. **14** illustrates a screen **1400** which appears when the user selects the Section information button **1402** (button **1304** in FIG. **13**). The resulting popup screen illustrates the time period or date range **1404** covered by this version of section 4. It also indicates the Year and Number jump link **1406** to text of the amending act which created this version of section 4.

FIG. **15** illustrates a screen **1500** which appears when the user selects the previous button **1502** (not shown—it is located behind the popup screen), which corresponds to previous button **1306** of FIG. **13**. This shows an earlier version of section 4 that the user can access by using the previous button **1502**. The pop-up screen indicates that this version covers a different time span than that shown in FIG. **14**.

The screen shots in FIGS. **7** to **15** display a step-through or navigation-based way of locating information. There is also the more direct approach of searching for terms using text retrieval. The screen shots in FIGS. **16** and **17** illustrate such searching provided by the first embodiment. Screen **1600** shown in FIG. **16** provides a customised search template **1602** that includes a time base option allowing a user to search for versions of a section, for example. Screen **1700** shown in FIG. **17** illustrates a customised search template **1702** for case law which includes a time base option connecting cases to legislation at a particular date, for example. Again, the ability to relate such to time and then to mix and match types of information from different sources (jurisdictions) is a feature provided by the coding technique used for the data and not the Folio Views software used to deliver the data to the end user.

#### Second Embodiment

The second embodiment stores all the information in a single repository which is marked up in SGML or XML. The information is divided in that repository into suitable pieces or blocks of text (as described in the first embodiment) and any relevant markup marks up a whole suitable piece or block of text by (a) choosing suitable pieces or blocks of text, and (b) demanding that relevant markup belongs to a whole suitable piece or block of text, the following becomes possible. A relational database consisting of records consisting of fields can be created with one and only one record per suitable piece or block of text where the actual text of each suitable piece or block of text is the content of one filed of the above record and where each item of the markup is assigned its own field in the above record.

For example, a version of Section 6 of the Income Tax Assessment Act (ITAA) **1936** may be stored as a record in the above relational database. The first field of that record contains the actual text of that version of Section 6. The next field identifies it as Section 6 of the ITAA, the next field gives the date this version came into being, the next field

contains the section of the amending act that created this particular version, the next field contains the day this version became superseded, another field contains the subject(s) this version addresses, another field contains the case(s) that have addressed this version of section 6 and so on. Storing the data in this way allows multidimensional database techniques to be applied to the data.

An XML DTD for implementing the second embodiment is set forth in Appendix E. It will be apparent to one skilled in the art that the second embodiment may be readily implemented in view of the foregoing description of the first embodiment, which is not repeated here for the purpose of brevity, and in view of the accompanying DTD set out in Appendix E.

The foregoing only describes a small number of embodiments of the invention, and modifications and changes apparent to those skilled in the art can be made thereto without departing from the scope and spirit of the invention. For example, the embodiments of the invention have been described with reference to SGML. The embodiments may alternatively be practiced with the extensible markup language (XML) as well. Also, the embodiments may alternatively be practiced with a Style Sheet Mechanism (SSM) instead of, or in addition to, one or more DTDs.

A method, apparatus and computer program product for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language are disclosed. In the following description, numerous specific details are set forth. However, it will be apparent to those skilled in the art in view of this disclosure that changes may be made without departing from the scope and spirit of the invention. In other instances, well known features have not been described in detail so as not to obscure the invention. Whilst the invention may be preferably practised on flat files, it will be apparent to a person skilled in the art that the invention may also be practised on databases. A database may be constructed from sets of flat file records. A relational database is a collection of related tables, each table being a set of flat files having the same structure. The method includes the step of: displaying a selected one of the predefined portions in a first display region. The display region preferably takes the form of an area of real estate on a computer screen (henceforth referred to as the "content frame"). The method also includes the step of displaying a view into a primary axis of the multidimensional space in which the displayed preferred portion is clearly marked. This second area of the computer screen shall be referred to as the "reference frame". Each frame has an associated "anchor", which is a title bar clearly indicating the nature of the view currently displayed in the frame. The reference anchor also contains tools for navigating the displayed axis. The method also includes the step of displaying a point on a primary axis of the multidimensional space for the displayed predefined portion.

The method may be enhanced by displaying a second point on a second axis which relates to the first axis at the first point. The second axis represents time-based versions of the selected one of the predefined portions. Alternatively, the second axis represents amending legislation that was applied to the selected one of the predefined portions. In another example, the second axis represents case law that applied the selected one of the predefined portions. In further example, the second axis represents annotations to the selected one of the redefined portions. In a yet further example, the second axis represents entries of a subject index that are covered in the selected one of the predefined portions.

The embodiment of the present invention allows for a primary axis (the combined hierarchical/sequential or normal axis). A "base node" may be selected by navigating the primary axis. The method then allows for one of a number of potential axes (associated with the base node) to be selected and subsequently navigated. The selection is accomplished by means of activating "links" in the displayed base node. The reference frame is redrawn to give a view of the members of the selected axis and one member of that axis is displayed. At any point it is possible to return to the primary axis and select a new base node. Alternatively, the currently displayed base node may be chosen as a new base node from which subsequent axes are derived. In this manner, any number of axes may be displayed and navigated without increasing the complexity of the screen view (i.e. only two frames are ever required). It is this quality which allows a complex dataset to be navigated by a non-specialist end user.

By way of example, a user may select a first node, corresponding to a provision, in the multidimensional space. The first node's locator is displayed in a first anchor to provide the user with a first point of reference. If the user is interested in different versions of the provision, the user may then move to second node on an orthogonal axis, being the Versions axis. The first anchor is updated and displays the locator of the second node. A second anchor displays the locator of the first node. The second anchor also displays the relationship between the first node and the second node. The user is provided with information which indicates the original provision that was being studied, the provision currently being studied and the current provision's relationship to the original provision. Thus, the first and second anchors and the information provided therein enable the user to navigate the multidimensional space.

Where reference is made in any one or more of the accompanying drawings to steps and/or features, which have the same reference numerals, those steps and/or features have for the purposes of this description the same function(s) or operation(s), unless the contrary intention appears.

The principles of the preferred method described herein have general applicability to electronic publishing. However, for ease of explanation, the steps of the preferred method are described with reference to navigating in a MALT publication. However, it is not intended that the present invention be limited to the described method. It will be appreciated by those skilled in the art that a publication could include a document or a database. The invention may apply to any hierarchical XML data where any of the nodes may change independently of other nodes in the hierarchy. Typical examples might include manuals and newspapers. For example, the invention may have application to the production and display of aircraft manuals. In this case, each node would be a set of maintenance instructions for a part or assembly. The axes might be part number; category (electrical, structural, etc.); location (Boeing 737, wing, wingtip assembly, eddy baffle, securing flange AX-703); airline (United, QANTAS); language (English, French). Since each commercial aircraft is in effect a one-off construct, the basic information needs to be reconfigured for each plane, each airline, etc.

Before proceeding with a description of the embodiments, a brief review of terminology is discussed hereinafter. A dataset refers to the complete set of data that is to be navigated. A dataset has a complete set of discrete objects called nodes. The dataset may be viewed as a sparse multidimensional matrix, as is produced using the MALT pub-

lishing method. In the example of this specification, the dataset preferably refers to a body of legislation designed for point in time searching.

A node preferably corresponds to a particular legislative provision at a particular date. A base node is a particular node from which one or more viewing axes may be derived.

A viewing axis is an ordered set of nodes derived from a single base node. The base node itself may or may not constitute part of the axis. For example, given a particular provision in time, three possible viewing axes are: the set of all provisions in force on the same date as the base node; the set of versions of the base provision in time; and the set of amending provisions most recently applied to the base provision. Further viewing axes may be practised, and may include case law that applied the provision, annotations to the provision and entries of a subject index that are covered in the provision.

A provision, for the purposes of this system, is a unit of legislation having a heading and/or content, but not including text belonging to any sub-provision that is a predefined portion of text. A provision may be an Act, a schedule, a chapter, a section or other legislative unit. A provision has a scope in time, such that when a provision is amended, a new provision is created. A provision corresponds to a set of nodes, each node corresponding to a range of dates in the scope of the provision.

Scope refers to a period of time during which a provision is in force. Thus, a given scope is usually expressed as start and end dates. A provision's scope is determined by the dates on which the provision commenced, was amended and/or was repealed.

A locator is an identifier that is used to locate a particular node. For example, a locator may be a date, or a position such as the name of an Act and a section number.

#### Multi-axis Viewing Interface

Using the publication of legislation as an example, a provision is defined as being an amendable unit of legislation. At any given moment, the body of active legislation can be divided into provisions. Provisions also have a scope in time, so that when a provision is amended, the current provision goes out of scope and a new provision is created. The nodes of the dataset in this example are provisions with an associated date. Two locators are required to specify a particular node uniquely: a position (such as act and section number) and a date.

There are a number of viewing axes associated with each node. As indicated in the explanation of terminology above, a viewing axis is defined as an ordered set of nodes that can be derived from the current node. When XML data is converted to a series of flat files, viewing axes are derived from the current node as a result of an intersection between two flat files. Two flat files intersect if common entries are contained in the fields of the respective flat files. For example, a legislation flat file may contain a field "identifiers of cases that apply this provision". The legislation flat file shares a common entry with a case law flat file. Alternatively, the legislation flat file may contain a field "subjects covered in the provision". In this example, the legislation flat file shares a common entry with a subject index flat file. Alternatively, an amending legislation flat file may have a field "Identifiers of provisions amended by this provision" and share a common entry with the legislation flat file.

In a preferred example, seven such viewing axes are:

Sequential ( . . . ; s 26; s 27; s 27A; . . . ),

Hierarchical ( . . . ; Corporations Act 1989; Part 2; Division 2.1; s 27),

Temporal (the set of versions of the current provision in time),

Source (the set of provisions which amend the current provision),

Case law (cases that apply the current provision),

Annotations (annotations to the current provision), and

Subject (Entries of a subject index that are covered in the current provision).

The above axes are orthogonal in the sense that none can be directly derived from another. Thus, the temporal axis cannot be derived from the sequential axis. Moreover, members of the temporal axis are not simply those provisions sharing the same locator as the current provision. As a result of renumbering, members of the same temporal axis may possibly have widely differing locations. While the example uses two locators and four viewing axes, the MALTweb interface is capable of handling as many locators and axes as required.

Having utilised MALT to construct a set of data encapsulating the above relationships, the problem is how to access this data in a meaningful way. To provide an untrained user with full multi-axis access to MALT type data whilst maintaining a consistent look and feel throughout, a view consisting of a two frame screen is provided.

FIG. 18 is a screenshot 1800 depicting a section of legislation in accordance with an embodiment of the invention. A content frame 1810 displays the content of the current node. In essence, this frame 1810 constitutes a known portion of display "real estate". In the example of FIG. 18, the node corresponds to Section 59 of the Commonwealth Corporations Act 1989 and the node has a scope of 16 Oct. 1995 onwards. The scope indicates the time during which the provision is in force. The content anchor 1805 of the content frame 1810 displays the locators for the current content provision in a user friendly form, such as:

Corporations Act 1989 (Cth): s 59

Scope: 16 Oct. 1995 onwards

Situated above the content anchor 1805 is a reference frame 1820, which contains a set of links 1821 corresponding to the members of a viewing axis associated with the current base node. Reference markers 1823 indicate which of the links 1821 is currently selected. In the Normal view, the content node shown in the content frame is always the same as the base node for the reference frame. In the Version view, the content node and base node are initially the same, but deviate when a different version is selected. In the Source view, the base node is being amended and the content node is one of the amending provisions.

The reference frame 1820 has a corresponding reference anchor 1815, which describes the current viewing axis and provides buttons 1816, 1818 for navigating the sequential axis and button 1817 for accessing higher levels of the hierarchy. These levels can also be accessed via the links 1821 in the reference frame. In the example, the reference anchor 1815 indicates that the user is being shown a normal view of s59, as in force on 20 Jul. 2000. This view also shows the search mode, in which the text "exercise of jurisdiction" has been located. The buttons 1812, 1813 allow access to the next or previous occurrence of this text, whilst button 1814 cancels the search. The "hits" links 1822 in the reference frame allow rapid access to occurrences of the search text in other parts of the document. In this respect, the search mode acts very much like a separate viewing axis.

The highlighting **1806** indicates the selected text. Finally, the links **1807**, **1808** allow access to the other viewing axes (in this case, Versions and Amendments).

Where appropriate, the reference anchor **1815** may indicate the base node of the viewing axis. The base node is the node from which the viewing axis is derived. For example, the reference anchor **2015** of FIG. **20**, which shows a Source axis view of the same provision depicted in FIG. **18**, displays the following information:

Provisions amending (effective 16 Oct. 1995)

Corporations Act 1989 (Cth): s 59

This indicates that the Source axis being viewed by the user is derived from the base provision: Corporations Act, s59 [16 Oct. 1995 onwards]. The content anchor **2005** details the amending provision, which in this example is Corporations Legislation Amdt Act 1994 (Cth):Sch 1.

The relationship of the base node and the content node depends on the view. In the Normal axis view, consisting of the sequential and hierarchical axes, the base node and the content node are always the same. In the Versions axis view, the base node and the content node may or may not be the same.

A view is, therefore, defined as the display of a particular content node in relation to a specified axis. Each view may be uniquely identified from the following: the current content node, the current viewing axis, and the base node of the viewing axis. To further help the user in distinguishing the different viewing axes, the reference frame links may optionally vary in colour, content and indenting style among the views.

FIG. **19** shows a Version axis view **1900** of the provision depicted in FIG. **18**. The content anchor **1905** indicates that the provision being displayed is, in fact, an earlier version of the provision displayed in FIG. **18**. Thus, the information shown in the content frame **1910** has a different scope from the information shown in content frame **1810** of FIG. **18**. Closer examination of the information of the content frame **1910** and the information of content frame **1910** indicates that amendments have in fact been made between the two versions of the provision.

The reference frame **1920** of FIG. **19** indicates that there are two versions of the provision, a first version with a scope of 1 Jan. 1994 to 15 Oct. 1995 and a second version with a scope of 16 Oct. 1995 to 31 Dec. 2001. Each version of the provision is a distinct node on the Version axis. The reference anchor **1915** indicates that the user is navigating along the Versions axis view of section **59**.

FIG. **20** shows a Source axis view **2000** of the provision under consideration. The reference anchor **2015** of FIG. **20** indicates to the user that the material being displayed relates to provisions amending the Corporations Act **1989** (CTH); s 59. The reference frame **2020** indicates that there are three relevant nodes **2021**, **2022**, **2023** on the source axis. Each node corresponds to a provision which amends the current provision. The amending provisions are not necessarily sequential and may be non-consecutive and/or in different schedules and/or in different Acts. The content anchor **2005** indicates that the current information being shown is Schedule 1, Part 1, Item 15 of the Corporations Legislation Amendment Act 1994, corresponding to the first node **2021** shown in the reference frame **2020**. The content of the amending act is displayed in the content frame **2010**.

Thus, the multi-access viewing interface provides a user with content and reference components. Anchors uniquely

identify the content node by position and date, and the viewing axis by base node and axis type. Furthermore, the reference frame is capable of displaying multiple viewing axes for a given base node, as illustrated in FIGS. **18–20**.

#### Higher Level Scoping

The MALT concept encapsulates the ability to store the contents of a sparse multidimensional matrix in a set of flat file records. As previously defined, the scope of a provision is a time period during which the given provision is in force. A problem arises relating to scoping a record which encompasses a number of lower level records.

Consider as an example legislation marked up for point in time searching. The body of the legislation consists of provisions (or nodes), where each provision is an amendable unit of legislation. For the purposes of this example, each provision possesses the following four properties:

A single parent, or container provision in which the current provision resides. [The children of a provision are those provisions which have the current provision as the parent.]

A position within a provision's parent, and (optionally) an associated locator (eg. the fourth child provision of an Act may have the locator "Chapter 2A").

A scope in time (i.e. start and end dates).

The content of the provision.

The provisions are divided into three classes:

A single root node, which has no parent, but from which all other nodes ultimately descend;

A set of terminal nodes, which have no children; and

A set of higher level nodes which are neither the root node nor terminal.

The legislation can then be said to form a tree descending from the root node and containing the terminal nodes at the ends of the root node's branches.

The scope of a terminal node is the period of time between the terminal node's start date and end date, inclusive. The root node is deemed to be always in scope. The scope of a node which is neither a terminal node nor a root node is problematic.

For example, a chapter may encompass many sections, but the chapter's actual content, viewed in isolation as a record, is simply the chapter's title, including locator if present, and any notes or other attachments that apply to the chapter as a whole. All other content is contained indirectly via the chapter's descendant provisions, such as parts, sections and the like.

Difficulty arises in determining the scope of the chapter node. In one sense, the scope of the chapter node is the sum of the scopes of the chapter node's descendants. A question then arises if, for example, the chapter's title is altered. The same applies to the case in which the abovementioned notes or other attachments are altered.

One solution is to create a duplicate chapter with the altered title. While effective, this method has some major drawbacks. Firstly, it involves a great deal of unnecessary duplication of material. Since each child provision can have only one parent; new copies of every sub-level have to be made. The scope of both the original and duplicate sublevels then have to be split at the date of the chapter's title change. This in turn requires each sub-level to behave as though amended, even though the amendment only applies to the title of an ancestor level.

A better solution is to create a new terminal sub-level of the chapter which contains just the title and associated text. This sub-level can then be scoped independently of the main

level, and other sub-levels are unaffected. The sub-levels retain the same parent as the chapter level itself was not affected by the amendment.

However, this still leaves open the question of what to do with the scope of the chapter level. Clearly a chapter, like any other provision, can be created or repealed. Thus, an amendment such as "repeal Chapter 2A" should end the scope of the chapter level as well as all of the chapter's descendants.

The editors, however, may wish to leave a stub entry to mark the place of the former chapter thus:

```
Chapter 2A
Repealed
```

The scope of the stub clearly lies outside the scope of the chapter. There are three possible solutions:

- allow the [repealed] entry (which stands in place of a normal title) to live inside the chapter, even though the entry is out of the chapter's scope;
- extend the scope of the chapter to encompass the scope of the stub; or
- create a new chapter level containing just the stub.

The first option creates significant inefficiencies in the design, since the scope of a sub-level cannot be assumed to lie within the scope of the sub-level's parent. The other two options give rise to potential conflicts between the stub and possible replacement chapters.

Having delegated the title and other general notes to their own sublevels, all content has effectively been removed from the chapter. However, a chapter level is still required, as removing higher levels makes all terminal nodes direct children of the root. This in turn severely impacts on the usefulness of the data when mapped to a hierarchical form, such as XML.

In addition, a higher level does contain one property, namely one or more locators ("Chapter 2A" in the example). While this property can theoretically be delegated to yet another sub-level, the practical implications are significant. In particular, the locator reflects the ordering of the chapter amongst its siblings. If, for example, an amendment renumbers chapter 2A to chapter 4, this gives rise to the issue of whether the chapter comes before or after chapter 3 in either a flat file or in XML. For this reason, the locator is the sole property preserved by a higher level node throughout the higher level node's scope. If the position is changed, then a new level (and sub-levels) is created.

This still leaves the problem of the scope of a higher level. For example, if Chapter 2A is repealed and a new, unrelated chapter 2A immediately takes the place of the repealed Chapter 2A, a problem is potentially presented as to two overlapping scopes for the same provision. The scope of the original node has to be terminated, otherwise there are two Chapter 2As in scope contemporaneously. The co-existence of two Chapter 2As poses a detrimental impact on the ability to navigate and search the legislation under consideration. In the situation in which the original Chapter 2A has a repeal stub, the original Chapter 2A's scope may overlap the new Chapter 2A, since the stub may continue indefinitely in time. Among many possibilities, a repeal stub may be provided while Chapter 2A does not exist.

Other problems include: repeal or substitution of a higher level node; renumbering/relocation of a higher level node; renaming (without renumbering/relocation) of a higher level node; elevation or demotion of a higher level node within the

hierarchy, e.g. changing a part to a chapter or a division to a subdivision; and insertion/removal of an intermediate level heading node, requiring that nodes which follow and are/were, according to their type, inferior to that heading node become/cease to be children of that node.

In order to resolve these problems, the following design rule is applied: Higher level nodes may have neither scope nor content. In other words, a non-terminal node must be a container only. A non-terminal node's only properties are a parent indicator, a position within the parent, and (optionally) a locator. Any content notionally belonging to such a node, such as a chapter title, is assigned to a new (terminal) child node. A (terminal) child node may contain a label, which is preferably a title, but can be or include other data related to the parent node. The new child node preserves the scope of the title, so (for example) a single chapter may possess a number of (temporally disjoint) title nodes.

Higher level scoping has a number of surprising but useful consequences. In particular, a higher level provision is, in itself, not subject to amendment. Thus, an instruction such as "Repeal Chapter 2A" actually terminates the scope of all of Chapter 2A's constituent terminal nodes. The chapter node, having no scope of its own, is unaffected.

Additionally, the previously described problem pertaining to the overlapping scope of the 2A repeal stub disappears. Embodiments of the invention utilise the following approaches. When Chapter 2A is repealed, the associated scope of all terminal nodes within Chapter 2A is terminated. In a first embodiment, a new Chapter 2A is enacted immediately after the original chapter is terminated. The new Chapter 2A has an associated scope commencing on the day after which the original Chapter 2A was repealed. In a second embodiment, a repeal stub is introduced. A repeal stub in the preferred embodiment is a title with an attribute marking this title as being of the type "repeal stub". The repeal stub has an associated scope with a start date corresponding to the date after which Chapter 2A was repealed. The repeal stub has the Chapter 2A node as a parent. If a new Chapter 2A is later enacted, the scope of the repeal stub is terminated and the scope of the terminal nodes of the new Chapter 2A will begin on the day after the end date of the repeal stub's scope.

Thus, a request "for Chapter 2A on date X" returns a description of Chapter 2A that was valid on that date. In the event that the request is for a date on which the chapter is repealed, the fact that the chapter is not in force, having been repealed on or before that date, will be returned.

A portion of Document Type Definition (DTD) code which is used to enable higher level scoping appears in Tables 2 to 8 below:

TABLE 2

```

<!--
#####
ENTITY:      hlev-id
PURPOSE:     Concatenation of the elements that make the
Identification of a higher level element. Only to be used for levels in
which the <desc> can be MALTed - for levels in which the whole level
should be MALTed (ie, section, reg, schedule) and for their sub-levels,
use %lev-id;
#####
-->
<ENTITY % hlev-id
"*(target*, label?, (desc, %amendments;)*)"
>

```



TABLE 3

<pre> &lt;!ELEMENT act   (%hlev-id;   (%hnote;   %raw;)*,   (longtitle, %amendments;)+,   preamble*,   (chapter*   part*   section*),   (schedule*   include+)*,   hist* ) &gt; &lt;!ATTLIST act   juris     (cth\insw\vic\qlds\sa\watas\act\nt\imp)     #REQUIRED   year     CDATA     #REQUIRED   number     CDATA     #REQUIRED   &gt; </pre>	<p>5</p> <p>10</p> <p>15</p> <p>20</p>
--	--

TABLE 5-continued

<pre> (((%secreg;)*, division*)   (article+   item+   clause+)   (guide+)   (unconverted+))) &gt; &lt;!ATTLST part   id     CDATA     #IMPLIED   next-id     CDATA     #IMPLIED   &gt; </pre>	<p>20</p>
---	-----------

TABLE 4

<pre> &lt;!ELEMENT regulations   (%hlev-id;   (%hnote;   %raw;)*,   (chapter*   part*   reg*),   (schedule*   include+)*   ) &gt; &lt;!ATTLIST regulations   juris     (cth\insw\vic\qlds\sa\watas\act\nt\imp)     #REQUIRED   year     CDATA     #REQUIRED   number     CDATA     #REQUIRED   &gt; &lt;!ELEMENT chapter   (%hlev-id;   (%hnote;)*,   (((%secreg;)*, part*)   article+))   &gt; &lt;!ATTLIST chapter   id     CDATA     #IMPLIED   next-id     CDATA     #IMPLIED   &gt; </pre>	<p>25</p> <p>30</p> <p>35</p> <p>40</p> <p>45</p> <p>50</p>
---	---

TABLE 6

<pre> &lt;!ELEMENT division   (%hlev-id;   (p   %hnote;)*,   (((%secreg;)*, subdivn*)     (clause*, item*)))   &gt; &lt;!ATTLIST division   id     CDATA     #IMPLIED   next-id     CDATA     #IMPLIED   &gt; </pre>	<p>40</p>
--	-----------

TABLE 7

<pre> &lt;!ELEMENT subdivn   (%hlev-id;   (%hnote;)*,   (((%secreg;)+   clause+))   &gt; &lt;!ATTLIST subdivn   id     CDATA     #IMPLIED   next-id     CDATA     #IMPLIED   &gt; </pre>	<p>45</p> <p>50</p>
--	---------------------

TABLE 5

<pre> &lt;!ELEMENT part   (%hlev-id;   hist*, </pre>	
--	--

TABLE 8

```

<!--
#####
ELEMENT: desc
PURPOSE: Defines the "description" of a level.
ATTRIBUTES:
    %date-atts; - defines the start and end dates for this version of the
                description.
#####

```

TABLE 8-continued

---

```

-->
<! ELEMENT desc
  (#PCDATA | %refs; | %effect; | quote)*
>
<! ATTLIST desc
  %date-atts;
>

```

---

The DTD has been altered such that scoping is transferred from the higher level nodes to terminal nodes.

Consider an example consisting of an Act with two chapters, the second chapter containing two sections, as shown by the system **2100** of FIG. **21**. A root node **2110** represents the Act. The root node **2110** has no parent, and all other nodes descend from the root node **2110**. The first chapter of the Act is represented by a higher level node **2120**. As a higher level node, node **2120** has neither scope nor content. Node **2120** has the following properties: a parent, being the Act node **2110**; a position within the parent node **2110**, being 1; and an optional locator, being "Chapter 1". Node **2120** has two descendant nodes **2122**, **2124**. Node **2122** has the following properties: a parent, being the node **2120** identified by its locator "Chapter 1"; a position within the parent node **2120**, being 1; an optional locator, being "Chapter 1 Description"; scope, being 1 Jan. 1998 onwards; and content relating to the title or textual description of the first chapter of the Act under consideration. Node **2124** has the following properties: a parent, being the node **2120** identified by its locator "Chapter 1"; a position within the parent node **2120**, being 2; an optional locator, being "Chapter 1 Note"; scope, being 1 Jan. 1998 onwards; and content providing general notes or comments pertaining to the first chapter of the Act under consideration.

A second higher level node **2130** represents the second chapter of the Act. Node **2130** has two sections. Node **2130** has the following properties: parent, being the Act node **2110**; a position within the parent node **2110**, being 2; and an optional locator, being "Chapter 2A". Node **2130** has five child nodes: **2132**, **2134**, **2136**, **2140** and **2150**, each of which is a terminal node in this example. Node **2132** has the properties: parent, being Chapter 2A; a position within the parent, being 1; an optional locator, being "Chapter 2A description"; scope, being 1 Jan. 1998–30 Jun. 1998; and content, being "Company Registration". Node **2134** has the properties: parent, being Chapter 2A; a position within the parent, being 2; an optional locator, being "Chapter 2A description"; scope, being 1 Jul. 1998 onwards; and content, being "Registering a Company". Node **2136** has the properties: parent, being Chapter 2A; a position within the parent, being 3; an optional locator, being "Chapter 2A note"; scope; and content. Node **2140** has the properties: parent, being Chapter 2A; a position within the parent, being 4; an optional locator, being "Section 11"; scope; and content. Node **2150** has the properties: parent, being Chapter 2A; a position within the parent, being 5; an optional locator, being "Section 12"; scope; and content.

The different scopes of nodes **2132** and **2134** allow nodes **2132**, **2134** to co-exist, without overlapping. Nodes **2132**, **2134** may share the same locator, but the combination of locator and scope uniquely identifies the nodes. Nodes **2132**, **2134** reflect the amendment of the title of Chapter 2A from "Company Registration" to "Registering a Company". The

scopes of nodes **2132**, **2134** indicate that the amendment came into effect on 1 Jul. 1998.

In accordance with a further embodiment, higher level scoping is extended to facilitate commentaries, subject indices and similar material. When considering legislation, any amendment results in the production of a modified portion. However, when considering commentaries, two types of amendment to the commentary are possible. In the first scenario, corresponding to the legislation example, the scope of the current predefined portion of commentary is terminated and a new predefined portion is provided. The new predefined portion has a scope commencing on the day after the expiration of the current predefined portion. In the second possible scenario, the current predefined portion of the commentary is amended without a second predefined portion being created.

The scope of commentary portions is extended to include three dates: a start date, an update date and an end date. Referring to FIG. **22A**, a screen shot **2260** shows a commentary. The commentary was created on 1 Jul. 2000, as seen from the amendment bar **2265**. The commentary has the following scope properties: start date of 1 Jul. 2000, no update date and no end date. FIG. **22B** shows a screen shot **2270** of the commentary of FIG. **22A** at a later date. The amendment bar **2275** indicates that the commentary was last updated on 1 Sep. 2000. Thus, the scope of the commentary now has a start date of 1 Jul. 2000, an update date of 1 Sep. 2000 and no end date. FIG. **22C** shows a further screen shot **2280** of the commentary of FIGS. **22A** and **22B** at a yet later date. The amendment bar **2284** indicates that at least one further amendment has been applied to the commentary since the update of 1 Sep. 2000 indicated at **2275** in FIG. **22B**. The amendment bar **2285** of FIG. **22C** shows that the last update date of the commentary is 1 Oct. 2000. Therefore, the scope properties of the commentary now read: First portion: start date of 1 Jul. 2000, end date of 30 Sep. 2000; Second portion: start date of 1 Oct. 2000, and no end date.

In a further embodiment, XML data may be divided into predefined portions and stored as a collection of flat files. In an example, the flat files take the form of a relational database. There is a one to one correspondence between the XML data and the relational database. The hierarchy of the XML data is expressed via the implementation of higher level scoping. A single record is provided with an identifier and other terminal nodes are provided in which to store the remainder of the information.

The process for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language can be implemented using a computer program product in conjunction with a computer system **2300** as shown in FIG. **23**. In particular, the process for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded

using a markup language can be implemented as software, or computer readable program code, executing on the computer system **2300**.

Similarly, the process for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language may also be implemented using a computer program product in conjunction with the computer system **2300** shown in FIG. **23**.

The computer system **2300** includes a computer **2350**, a video display **2310** and input devices **2330**, **2332**. In addition, the computer system **2300** can have any of a number of other output devices including line printers, laser printers, plotters, and other reproduction devices connected to the computer **2350**. The computer system **2300** can be connected to one or more other computers via a communication input/output (I/O) interface **2364** using an appropriate communication channel **2340** such as a modem communications path, an electronic network, or the like. The network may include a local area network (LAN), a wide area network (WAN), an Intranet, and/or the Internet **2320**.

The computer **2350** includes the control module **2368**, a memory **2370** that may include random access memory (RAM) and read-only memory (ROM), input/output (I/O) interfaces **2364**, **2372**, a video interface **2360**, and one or more storage devices generally represented by the storage device **2362**. The control module **2368** is implemented using a central processing unit (CPU) that executes or runs a computer readable program code that performs a particular function or related set of functions.

The video interface **2360** is connected to the video display **2310** and provides video signals from the computer **2350** for display on the video display **2310**. User input to operate the computer **2350** can be provided by one or more of the input devices **2330**, **2332** via the I/O interface **2372**. For example, a user of the computer **2350** can use a keyboard as I/O interface **2330** and/or a pointing device such as a mouse as I/O interface **2332**. The keyboard and the mouse provide input to the computer **2350**. The storage device **2362** can consist of one or more of the following: a floppy disk, a hard disk drive, a magneto-optical disk drive, CD-ROM, magnetic tape or any other of a number of non-volatile storage devices well known to those skilled in the art. Each of the elements in the computer system **2350** is typically connected to other devices via a bus **2380** that in turn can consist of data, address, and control buses.

The method steps for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language are effected by instructions in the software that are carried out by the computer system **2300**. Again, the software may be implemented as one or more modules for implementing the method steps.

In particular, the software may be stored in a computer readable medium, including the storage device **2362** or that is downloaded from a remote location via the interface **2364** and communications channel **2340** from the Internet **2320** or another network location or site. The computer system **2300** includes the computer readable medium having such software or program code recorded such that instructions of the software or the program code can be carried out. The use of the computer system **2300** preferably effects advantageous apparatuses for navigating a multidimensional space containing an electronic publication formed from predefined portions of text based data encoded using a markup language and for publishing an electronic publication formed from

predefined portions of text based data encoded using a markup language in accordance with the embodiments of the invention.

The computer system **2300** is provided for illustrative purposes and other configurations can be employed without departing from the scope and spirit of the invention. The foregoing is merely an example of the types of computers or computer systems with which the embodiments of the invention may be practised. Typically, the processes of the embodiments are resident as software or a computer readable program code recorded on a hard disk drive as the computer readable medium, and read and controlled using the control module **2368**. Intermediate storage of the program code and any data including entities, tickets, and the like may be accomplished using the memory **2370**, possibly in concert with the storage device **2362**.

In some instances, the program may be supplied to the user encoded on a CD-ROM or a floppy disk (both generally depicted by the storage device **2362**), or alternatively could be read by the user from the network via a modem device connected to the computer **2350**. Still further, the computer system **2300** can load the software from other computer readable media. This may include magnetic tape, a ROM or integrated circuit, a magneto-optical disk, a radio or infrared transmission channel between the computer and another device, a computer readable card such as a PC card, and the Internet **2320** and Intranets including email transmissions and information recorded on Internet sites and the like. The foregoing are merely examples of relevant computer readable media. Other computer readable media may be practised without departing from the scope and spirit of the invention.

The process for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language can be realised in a centralised fashion in one computer system **2300**, or in a distributed fashion where different elements are spread across several interconnected computer systems.

The process for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language may also be implemented using a computer program product in conjunction with the computer system **2300** of FIG. **23** in a manner similar to that which has just been described.

Computer program modules or computer program in the present context mean any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after either or both of the following: a) conversion to another language, code or notation or b) reproduction in a different material form.

In the foregoing manner, a method, an apparatus, and a computer program product for navigating in a multidimensional space containing an electronic publication formed from predefined portions of text-based data encoded using a markup language are disclosed. Further, a method, an apparatus, and a computer program product for publishing an electronic publication formed from predefined portions of text-based data encoded using a markup language are disclosed. While only a small number of embodiments are described, it will be apparent to those skilled in the art in view of this disclosure that numerous changes and/or modifications can be made without departing from the scope and spirit of the invention.

**APPENDIX A****Example Research**

SOCIAL SECURITY ACT 1991 No 46

Updated as at 9 August 1996

**A 1. Amendments to Section at 9/8/96**

S.4 am. Nos. 74, 116 and 194, 1991; No. 81, 1992;  
 No. 36, 1993; Nos. 55, 63 and 184, 1994; Nos.  
 104 and 105, 1995

**A 2. Amendments to Section at 10/7/95**

S.4 am. Nos. 74, 116 and 194, 1991; No. 81,  
 1992; No, 36, 1993; Nos. 55, 63 and 184,  
 1994

**B. Commencement Information for Act No 105 of 1995 contained in Reprint**

Social Security(Non-Budget Measures) Legislation Amendment Act 1995

Number	Year	Date of Assent	Commencement
105	1995	29 Sept 1995	Subdiv. A of Div. 2 of Part 2 (s. 4): 1 July 1993 Ss. 8 and 9: 1 July 1995 S. 10: 1 Apr 1993 Div. 5 of Part 2 (ss. 12 and 13): 20 Sept 1994 (ze) Ss. 17(c), (d) and 18: 1 Jan 1996 Div. 15 of Part 2 (s. 37): 29 Nov 1993 Div. 18 of Part 2 (ss. 41-48): 20 Mar 1995 S. 49 (a): 12 Mar 1992 S. 49 (b): 1 July 1992 S. 49(c): 28 Jan 1993 S. 49(d): 1 Mar 1993 S. 49(e): 24 Dec 1993 S. 49(f): 1 Jan 1994 Remainder: Royal Assent

**C 1. Text of Section at 9/8/96****bold text indicates amendments made by NO 105 of 1995.****SECT 4**

Family relationships definitions-couples

4. (1) (1) In this Act, unless the contrary intention appears:

"approved respite care" has the meaning given by subsection (9);

"armed services widow" means a woman who was the partner of:

(a) a person who was a veteran for the purposes of any provisions of the Veterans'  
 Entitlements Act; or

(b) a person who was a member of the forces for the purposes of Part IV of that Act; or

(c) a person who was a member of a peacekeeping force for the purposes of Part IV of that Act; immediately before the death of the person;

"armed services widower" means a man who was the partner of:

(a) a person who was a veteran for the purposes of any provisions of the Veterans' Entitlements Act; or

(b) a person who was a member of the Forces for the purposes of Part IV of that Act; or

(c) a person who was a member of a peacekeeping force for the purposes of Part IV of that Act; immediately before the death of the person;

"illness separated couple" has the meaning given by subsection (7);

"member of a couple" has the meaning given by subsections (2), (3), **(3A) [reference to new section added]** and (6);

"partner", in relation to a person who is a member of a couple, means the other member of the couple;

"partnered" has the meaning given by subsection (11);

"partnered (partner getting benefit)" has the meaning given by subsection (11);

"partnered (partner getting neither pension nor benefit)" has the meaning given by subsection (11);

"partnered (partner getting pension)" has the meaning given by subsection (11);

"partnered (partner getting pension or benefit)" has the meaning given by subsection (11);

"partnered (partner in gaol)" has the meaning given by subsection (11);

"respite care couple" has the meaning given by subsection (8).

#### Member of a couple-general

4 (2) Subject to subsection (3), a person is a member of a couple for the purposes of this Act if:

(a) the person is legally married to another person and is not, in the Secretary's opinion (formed as mentioned in subsection (3)), living separately and apart from the other person on a permanent or indefinite **[Words added]** basis; or

(b) all of the following conditions are met:

(i) the person **has a relationship [Words is living replaced]** with a person of the opposite sex (in this paragraph called the "partner");

(ii) the person is not legally married to the partner;

(iii) the relationship between the person and the partner is, in the Secretary's opinion (formed as mentioned in subsections (3) and **(3A)[Words added]**), a marriage-like relationship;

(iv) both the person and the partner are over the age of consent applicable in the State or Territory in which they live;

(v) the person and the partner are not within a prohibited relationship for the purposes of section 23B of the Marriage Act 1961.

Note: a prohibited relationship for the purposes of section 23B of the Marriage Act 1961 is a relationship between a person and:

- .. an ancestor of the person; or
- .. a descendant of the person; or
- .. a brother or sister of the person (whether of the whole blood or the part-blood).

**Member of a couple-criteria for forming opinion about relationship**

4 (3) In forming an opinion about the relationship between 2 people for the purposes of paragraph (2) (a) or subparagraph (2) (b) (iii), the Secretary is to have regard to all the circumstances of the relationship including, in particular, the following matters:

- (a) the financial aspects of the relationship, including:
  - (i) any joint ownership of real estate or other major assets and any joint liabilities; and
  - (ii) any significant pooling of financial resources especially in relation to major financial commitments; and
  - (iii) any legal obligations owed by one person in respect of the other person; and
  - (iv) the basis of any sharing of day-to-day household expenses;
- (b) the nature of the household, including:
  - (i) any joint responsibility for providing care or support of children; and
  - (ii) the living arrangements of the people; and
  - (iii) the basis on which responsibility for housework is distributed;
- (c) the social aspects of the relationship, including:
  - (i) whether the people hold themselves out as married to each other; and
  - (ii) the assessment of friends and regular associates of the people about the nature of their relationship; and
  - (iii) the basis on which the people make plans for, or engage in, joint social activities;
- (d) any sexual relationship between the people;
- (e) the nature of the people's commitment to each other, including:
  - (i) the length of the relationship; and
  - (ii) the nature of any companionship and emotional support that the people provide to each other; and
  - (iii) whether the people consider that the relationship is likely to continue indefinitely; and
  - (iv) whether the people see their relationship as a marriage-like relationship.

**4 (3A) The Secretary must not form the opinion that the relationship between a person and his or her partner is a marriage-like relationship if the person is living separately and apart from the partner on a permanent or indefinite basis. [Subsection added]**

**C 2. Text of Section at 10/7/95 prior**

**SECT 4**

Family relationships definitions - couples

**4. SECT 4**

Family relationships definitions-couples

4. (1) In this Act, unless the contrary intention appears:

- "approved respite care" has the meaning given by subsection (9);
- "armed services widow" means a woman who was the partner of:
- (a) a person who was a veteran for the purposes of any provisions of the Veterans' Entitlements Act; or
  - (b) a person who was a member of the forces for the purposes of Part IV of that Act; or
  - (c) a person who was a member of a peacekeeping force for the purposes of Part IV of that Act; immediately before the death of the person;
- "armed services widower" means a man who was the partner of:
- (a) a person who was a veteran for the purposes of any provisions of the Veterans' Entitlements Act; or
  - (b) a person who was a member of the Forces for the purposes of Part IV of that Act; or
  - (c) a person who was a member of a Peacekeeping Force for the purposes of Part IV of that Act; immediately before the death of the person;
- "illness separated couple" has the meaning given by subsection (7);
- "member of a couple" has the meaning given by subsections (2), (3), and (6);
- "partner", in relation to a person who is a member of a couple, means the other member of the couple; "partnered" has the meaning given by subsection (11);
- "partnered (partner getting benefit)" has the meaning given by subsection (11);
- "partnered (partner getting neither pension nor benefit)" has the meaning given by subsection (11);
- "partnered (partner getting pension)" has the meaning given by subsection (11);
- "partnered (partner getting pension or benefit)" has the meaning given by subsection (11);
- "partnered (partner in gaol)" has the meaning given by subsection (11);
- "respite care couple" has the meaning given by subsection (8).

#### Member of a couple-general

4 (2) Subject to subsection (3), a person is a member of a couple for the purposes of this Act if:

- (a) the person is legally married to another person and is not, in the Secretary's opinion (formed as mentioned in subsection (3)), living separately and apart from the other person on a permanent basis; or
- (b) all of the following conditions are met:
  - (i) the person with a person of the opposite sex (in this paragraph called the "partner");
  - (ii) the person is not legally married to the partner;
  - (iii) the relationship between the person and the partner is, in the Secretary's opinion (formed as mentioned in subsections (3)), a marriage-like relationship;
  - (iv) both the person and the partner are over the age of consent applicable in the State or Territory in which they live;
  - (v) the person and the partner are not within a prohibited relationship for the purposes of section 23B of the Marriage Act 1961.

Note: a prohibited relationship for the purposes of section 23B of the Marriage Act 1961 is a relationship between a person and:

- . an ancestor of the person; or
- . a descendant of the person; or
- . a brother or sister of the person (whether of the whole blood or the part-blood).

Member of a couple-criteria for forming opinion about relationship

4 (3) In forming an opinion about the relationship between 2 people for the purposes of paragraph (2) (a) or subparagraph (2) (b) (iii), the Secretary is to have regard to all the circumstances of the relationship including, in particular, the following matters:

- (a) the financial aspects of the relationship, including:
  - (i) any joint ownership of real estate or other major assets and any joint liabilities; and
  - (ii) any significant pooling of financial resources especially in relation to major financial commitments; and
  - (iii) any legal obligations owed by one person in respect of the other person; and
  - (iv) the basis of any sharing of day-to-day household expenses;
- (b) the nature of the household, including:
  - (i) any joint responsibility for providing care or support of children; and
  - (ii) the living arrangements of the people; and
  - (iii) the basis on which responsibility for housework is distributed;
- (c) the social aspects of the relationship, including:
  - (i) whether the people hold themselves out as married to each other; and
  - (ii) the assessment of friends and regular associates of the people about the nature of their relationship; and
  - (iii) the basis on which the people make plans for, or engage in, joint social activities;
- (d) any sexual relationship between the people;
- (e) the nature of the people's commitment to each other, including:
  - (i) the length of the relationship; and
  - (ii) the nature of any companionship and emotional support that the people provide to each other; and
  - (iii) whether the people consider that the relationship is likely to continue indefinitely; and
  - (iv) whether the people see their relationship as a marriage-like relationship.

**D. Amending Act 1995 No 105 amending Section 14**

SOCIAL SECURITY (NON-BUDGET MEASURES) LEGISLATION AMENDMENT ACT 1995 No. 105

of 1995- SECT 14

Family relationships definitions-couples



## SECT

14. Section 4 of the Principal Act is amended:

- (a) by inserting in the definition of "member of a couple" in subsection (1), "(3A)" after "(3)";
- (b) by inserting in paragraph (2)(a) "or indefinite" after "permanent";
- (c) by omitting from subparagraph (2)(b)(i) "is living" and substituting "has a relationship";
- (d) by omitting from subparagraph (2)(b)(iii) "subsection (3)" and substituting "subsections (3) and (3A)";
- (e) by inserting after subsection (3):

"(3A) The Secretary must not form the opinion that the relationship between a person and his or her partner is a marriage-like relationship if the person is living separately and apart from the partner on a permanent or indefinite basis."

**APPENDIX B**

CODING - Document Type definitions (dtds)

**ACT.DTD**

```

<!-- *****
Document Type Definition for a set of acts
Typical invocation:
<!DOCTYPE acts PUBLIC "-//SGMLSE//DTD 1.0 Acts//EN">
Copyright Aunty Abha's Electronic Publishing Pty. Ltd. 1996, 1997
*****-->

<ENTITY % CONSOL "IGNORE">
<!-- ***** Include common element and entity definitions *****-->
<ENTITY % common
PUBLIC "-//SGMLSE//ELEMENTS 2.0 Common Elements//EN">
%common;
<!-- *****End common element and entity definitions *****-->
<ELEMENT acts -- (title, header?, act+)
>
<ENTITY % act PUBLIC "-//SGMLSE//DTD 1.0 Act//EN">
%act;

```

**ACTS.DTD**

```

<!-- *****
Document Type Definition for a set of acts
Typical invocation:
<!DOCTYPE acts PUBLIC "-//SGMLSE//DTD.1.0 Acts//EN">
Copyright Aunty Abha's Electronic Publishing Pty. Ltd. 1996, 1997
*****-->

<ENTITY % CONSOL "IGNORE">
<!-- ***** Include common element and entity definitions *****-->
<ENTITY % common
PUBLIC "-//SGMLSE//ELEMENTS 2.0 Common Elements//EN">
%common;
<!-- ***** End common element and entity definitions *****-->
<ELEMENT acts -- (title, header?, act+)
>
<ENTITY % act PUBLIC "-//SGMLSE//DTD 1.0 Act//EN">
%act;

```

**REG.DTD**

```

<!-- *****
Document Type Definition for a set of regulations

```

Typical invocation:

```
<!DOCTYPE regact PUBLIC "-//SGMLSE//DTD 1.0 Regulation Act//EN">
```

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#### REVISION History

\*\*\*\*\*

190197 TH Since RULE, REG and SECTION are all equivalent, removed REG from this DTD

Added long-title

\*\*\*\*\* -->

```
<!ELEMENT reg -- (title, notes?, provisions?, (preamble|long-title)?,
```

```
((order+| (section|schedule)+ |chapter+|part+),schedule*))>
```

```
<!ATTLIST reg Id ID #REQUIRED
```

```
date CDATA #IMPLIED -- used in numacts --
```

```
%status;
```

```
%subject;
```

>

#### REGS.DTD

```
<!-- *****
```

Document Type Definition for a set of regulations

Typical invocation:

```
<!DOCTYPE regs PUBLIC "-//SGMLSE//DTD 1.0 Regulations//EN">
```

Copyright Aunty Abha's Electronic Publishing Pty. Ltd. 1996, 1997

#### REVISION History

\*\*\*\*\*

\*\*\*\*\* -->

```
<!ENTITY % CONSOL "IGNORE">
```

```
<!ELEMENT regs -- (title, header?, reg+)>
```

```
<!-- ***** Include common element and entity definitions *****-->
```

```
<!ENTITY % common
```

```
PUBLIC "-//SGMLSE//ELEMENTS 2.0 Common Elements//EN">
```

```
%common;
```

```
<!-- ***** End common element and entity definitions *****-->
```

```
<!ENTITY % reg PUBLIC "-//SGMLSE//DTD 1.0 Regulation//EN">
```

```
%reg;
```

#### COMMON. ELT

```
<!-- *****
```

Common element, attribute and entity definitions.

Typical invocation: