EXHIBIT 5

Internationale Anmeldung veröffentlicht durch die

Weltorganisation für geistiges Eigentum unter der Nummer:

WO 01/06375 (art. 158 des EPÜ).

International application published by the World

Intellectual Property Organisation under number:

WO 01/06375 (art. 158 of the EPC).

Demande internationale publiée par l'Organisation

Mondiale de la Propriété sous le numéro:

WO 01/06375 (art. 158 de la CBE).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: METHOD AND DEVICE FOR FINDING, COLLECTING AND ACTING UPON UNITS OF INFORMATION
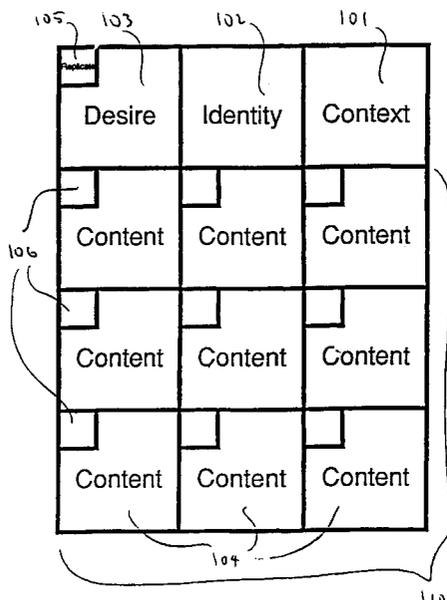
(57) Abstract: An information interface and method for finding, collecting and acting upon information which has been arranged in hierarchical form. In its best mode of implementation, the interface has a display area (110) with four components: a content area (104) for showing units of information at a particular level in a hierarchy, a context area (101) for showing the information node which is parent to the displayed level of units, an identity area (102) for showing the sequence of such parents in the user's navigation history through the information relative to the currently displayed level, and a desire area (103) for the user to collect and act upon desired units of information. The method of the invention provides two functions: one for clarification, for navigating the hierarchy of information, moving forward and backward through the nodes and branches; and a second for memorization, for collecting desired units of information and then acting upon them. The invention further provides overlay modes, using the clarification and memorization functions, for identifying properties usable for limiting content displayed during clarification, and for providing alternative choices for acting upon memorized units of information.

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METHOD AND DEVICE FOR

FINDING, COLLECTING AND

ACTING UPON UNITS OF

INFORMATION

5   **DESCRIPTION**

        This application claims the priority date of
July 14, 1999 based on US Application No. 09/353,546
entitled *Method and Device for Finding, Collecting
and Acting Upon Units of Information.*

10   **BACKGROUND OF THE INVENTION**

                        Field of the Invention

        The present invention generally relates to
information appliances, and more particularly to user
interfaces for finding, collecting and acting upon
15   hierarchically structured information.

                        Background Description

        Since the advent of the personal computer there
have been many efforts to improve the user interface,
to make it easier for human beings to find the

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information they need and do with it what they want
in an efficient manner.

Initial command line approaches were replaced by
graphical user interfaces (GUI's), as demonstrated at
5   Xerox's Palo Alto Research Center (PARC) with the
Xerox 8010 "Star" Information System in the 1970's
and implemented by the Apple Macintosh and by
Microsoft Windows operating system in the 1980's and
by the Mosaic graphical web browser for the Internet
10 in the 1990's. These efforts have included graphical
tools such as tool bars, pull down menus, pointers,
icons, windows and desktops. These efforts are
mostly task-oriented interfaces for desktop
environments.

15   Other efforts have been directed toward
information visualization techniques for handling
large volumes of hierarchically arranged data. For
example, researchers at PARC have considered a three
dimensional technique in "Cone Trees: Animated 3D
20 Visualizations of Hierarchical Information" in
Reaching Through Technology, CHI '91 Conference
Proceedings, New Orleans, Louisiana, April 27 - May
2, 1991 (Association of Computing Machinery Special
Interest Group in Computer-Human Interaction, 1991
25 ACM 0-89791-383-3/91/0004/0189), pp. 189-194. This
approach includes methods for focusing on smaller
parts of a complex structure.

The foregoing prior art techniques illustrate
methods of expanding human capacity to "see" large
30 amounts of information, and to peruse this

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information looking for patterns and particular
pieces of information. But they do not integrate
within their methodologies techniques for
accomplishing practical results beyond information
5   visualization and retrieval.

Furthermore, while much progress has been made,
the interfaces remain much too complicated for most
users, and as a result the potential for mass access
to the power of the computer has not been realized.
10   There remains a need for a simple interface that is
intuitive for users who are not familiar with
computers, and yet powerfully enables these users to
find, collect and act upon vast quantities of
information made available by computer.

15   **SUMMARY OF THE INVENTION**

It is therefore an object of the present
invention to provide a more efficient means for
interacting with information.

It is a further object of the invention to
20   enable a user of information to quickly find and
display information, and then to perform actions on
the information.

It is also an object of the invention to
seamlessly integrate computer functions and a user
25   interface.

Another object of the invention is to provide an
interface to information which is implicit and

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transparent, enabling the user to focus on the actual data.

It is also an object of the invention to overcome the distractions of the mechanics of manipulating the interface and limit the disruptions between human thought and computer functions.

Yet another object of the invention is to create an implicit means for navigating through information, orienting with respect to information, creating new information, and acting upon information.

A further object of the invention to allow the human user to easily make associations between information units, group information units, and act upon information units.

It is also an object of the invention to decrease the need for conventional graphical user interface devices such as tool bars, menus and icons.

It is a further object of the invention to present information to the user in a manner that complements the user's natural thought processes about the information.

Another object of the invention is to extend to humans the power of the computer to retrieve, store and process vast amounts of information.

A further object of the invention is to provide means for handling information which are compatible with existing database means for organizing and storing information.

It is also an object of the invention to integrate information navigation and retrieval

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techniques with the accomplishment of practical
results beyond information retrieval and
visualization.

The invention provides an intuitive and simple
5   method for packaging and dispensing a body of
information which has been structured into a
hierarchy of component units of information, the
hierarchy being multi-hierarchical and having layers,
where a unit in one layer can be related to a
10   subordinate layer and a layer can be related to a
superior unit in another layer. An information
appliance is disclosed which is divided into a
CONTENT area for viewing and interacting directly
with the content of information units, which in the
15   best mode implementation is further divided into a
three-by-three array of content sub-areas, and a base
or monitor area consisting of a CONTEXT area for
identifying the immediate context of the information
displayed in the content area, an IDENTITY area for
20   identifying and storing the history of prior
information contexts, and a DESIRE area for
collecting and acting upon selected units of
information, in accordance with the desires of the
user.

25   The foregoing elements of an information
appliance are used to implement two processes which
characterize the simplicity and ease of use of the
invention. One process is clarification: navigating
a body of information to locate desired units of
30   information which have been organized hierarchically.

Representations of units of information -- preferably graphical images and/or text -- at one level under one node in the hierarchy are displayed in the content area. The user can clarify a unit of

5   information by selecting it, in which case the representation of the selected unit will be placed in the context area and units of information giving more detail about the selected unit, at the hierarchical level immediately below, will then be displayed in

10   the content area. The former content of the context area is added to the identity area, which keeps a history of the user's navigation. By selecting this identity area the user can go backward (with reference to the function of CLARIFICATION) up the

15   hierarchy from a subordinate layer to a superior unit in another layer.

      With each of the content sub-areas there is provided an association enabling operation of the second process: MEMORIZATION. In a typical

20   implementation, this association is provided by graphically designating a small part of each of the content sub-areas (e.g. the upper left corner). By selecting this small part of the representation of the unit of information displayed in the content

25   area, the selected unit is copied to the desire area where multiple units of information can be collected and then acted upon. The actions can include forming the collected units as a new subordinate layer for a unit of information within the information hierarchy,

30   or forming a new unit of information within the

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information hierarchy, or routing the collected
information to an external information base, such as
by placing an order for selected items at a local
market or ordering a custom sandwich from a local

5   deli. For example, many typical consumer objectives
can be accomplished by using overlays in accordance
with the invention, overlays which themselves conform
to the underlying processes of clarification and
memorization.

10   The described methodology operates in a normal
mode for reviewing a body of information, and is able
to move seamlessly into an overlay mode for applying
additional bodies of information which provide
greater particularity with respect to the context of

15   information units and with respect to the user's
desire to act upon this information.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, aspects and
advantages will be better understood from the

20   following detailed description of a preferred
embodiment of the invention with reference to the
drawings, in which:
Figure 1 is a schematic layout of an information
appliance implementing the functionality of the

25   invention.
Figures 2 and 3 are schematic layouts showing
areas of the information appliance (shown in Figure

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1) used for implementing the clarification and memorization processes of the invention.

Figure 4 is a schematic representation of a body of information organized in a hierarchy.

Figure 5A through 5J is a series of representations of displays on the information appliance (shown in Figure 1), demonstrating a sequence of clarifying and memorizing functions illustrating operation of the invention.

Figure 6A through 6D is a series of representations of displays on the information appliance, demonstrating overlays for the desire area.

Figure 7A through 7F is a series of representations of displays on the information appliance, demonstrating overlays for the context area.

Figure 8A through 8L is a series of schematics showing alternative configurations for the areas of the information appliance.

Figure 9A through 9Y is a series of representations of displays on the information appliance, demonstrating operation of the invention as it might be implemented to emulate a yellow pages directory.

Figure 10A is a representation of a "seed atom" concept for thinking and intelligence; Figure 10B is a schematic for an information appliance using a circular motif.

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Figure 11A through 11E is a series of charts showing the functions of the invention.

Figure 12A through 12H is a series of representations showing operation of the invention on

5   a television portal.

Figure 12J through 12K is a series of representations showing operation of the invention on an Internet portal.

Figure 12L through 12P is a series of

10   representations showing operation of the invention on a hand held organizer.

Figure 12Q through 12T is a series of representations showing operation of the invention on a digital voice recorder.

15   **DETAILED DESCRIPTION OF A PREFERRED**
                EMBODIMENT OF THE INVENTION

Conceptualizations of the human thought process are many and varied. The present invention is derived from a conceptualization of thinking and

20   intelligence that locates a "seed atom" at the interface between an experiencer and the contents of experience, as shown in Figure 10A. Under the seed atom concept, the function of intelligence is achieved from interaction of two simple movements,

25   represented in Figure 10A by the letters "C" and "M". "C", as shown by the arrow 121, represents outward movement where the experiencer 111 seeks to find the closest mirror content of desire in the contents of

experience 112. This movement is from one to many, from whole to parts, from context to contents. "M" represents inward movement, as shown by the arrow 122, where the experiencer seeks to collect the

5   closest mirror content of desire from the contents of experience 112. This movement is from many to one, from parts to whole, from contents to context. The function of "intelligence" may be represented as a creative combination 113 of these two simple

10   movements. The same seed atom model may be used to describe the creative tension between existence (as 111) and potential (as 112) to create forms of intelligence (113).

        While the foregoing description is philosophical

15   in nature, its simplicity is mirrored in the present invention and, as will be shown, the present invention is quite practical. The "contents of experience" is represented by a body of one or more units of information, as is commonly understood in

20   the art of information science. For the purposes of the present invention it will be sufficient to assume that these units of information have been structured in traditional hierarchical relationships. As will be seen, it is important to provide for a

25   multiplicity of hierarchical relationships between and among these units of information. In order to traverse these "contents of experience" it is necessary and sufficient to navigate up and down the branches of a structured hierarchy. This

30   navigational functionality roughly corresponds to the

outward moving "C" force represented in the "seed atom" concept, and is called CLARIFICATION.

The CLARIFICATION process is a first group of functions as described hereafter which provides the

5   ability to find individual units of information responsive to the objectives of the seeker, by traversing up and down a hierarchically structured body of information and by filtering that body of information through application of overlays of

10   properties associated with a unit of information. These properties may themselves be arranged in a hierarchical structure, which may itself be traversed, to quickly and easily lead the user to a more intelligent (i.e. more appropriately informed)

15   choice of detail in the course of searching for what the user desires. This process of CLARIFICATION roughly corresponds to the "seed atom" notion of seeking to find the closest mirror content of desire.

A second functional group, the process called

20   MEMORIZATION, roughly corresponding to the inward moving "M" force of the "seed atom" concept and provides the ability to act upon the information sought, that is, to elicit the action denoted by the information unit, either immediately or after

25   collecting separate units of information having denotations which elicit action, and then acting immediately or, if provided by the structure within which the units of information are organized, by activating an overlay which uses hierarchical

30   structures of information and the mechanisms of the

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invention to quickly and easily lead the user to a
more intelligent action upon the information. This
process of MEMORIZATION roughly corresponds to the
"seed atom" notion of seeking to collect the closest

5   mirror content of desire.

It is important to note that, for the practical
purposes of the invention, the action that could be
taken or the "action denoted" by an information unit
must be built into the hierarchical information

10   structures which serve to describe and represent the
units of information. Typically, this structuring
will be done by those who compile particular bodies
of information for the specific purpose of getting
potential customers to act commercially on the

15   information. As will be explained, the invention may
be applied recursively as a tool to develop this
structuring. While significant value added is
provided by such structuring, the simple mechanisms
of the present invention also and primarily provide

20   an improved facility to connect people to the
information units representing the world of
experience at heightened levels of speed and
convenience. The invention provides the user with a
mastery over information in existing structures that

25   is a significant improvement over the prior art.
Indeed, the invention enables existing information
structures to be tied together in ways which
dramatically expand the intelligent access of
ordinary citizens to the commercial marketplace - in

30   food, entertainment, shopping, communications,

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transportation, and more - as well as to the
marketplace of ideas. Thus the building block of the
"seed atom" is a common underlying thread, working
through the present invention, for transforming our

5   management of goods, services, people, and
information and realizing a higher degree of dominion
for all mankind.

The invention provides an interface between the
user and machine-understandable information. This

10   information or content resides in facilities such as
directory engines, search engines and databases. The
invention provides a mechanism to extend and enhance
practical access to the massive amounts of
information content residing in these facilities,

15   using functions which facilitate the ability of the
human to constructively experience the information.
The invention provides a protocol for mapping the
CLARIFICATION and MEMORIZATION processes of the
invention to corresponding elements in a variety of

20   presentation schemes (as described below with
particular attention to Figures 8A through 8L), and
for modifying the presentation responsive to human
selection of each mapped function (as described below
with particular attention to Figures 11A through

25   11E). The invention promotes a human-assisted
conceptual classification of content and projects
this intelligence across the content.

Many methods are available for classifying
content, especially content on the World Wide Web

30   (WEB) or Internet. The WEB continues to be a major

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repository of content. The invention is compatible

with facilities, foundations or methods that describe

or manage WEB content. One method, specifically, XML

(eXtensible Mark-up Language) could be used as a

5   possible encoding syntax for the content of

hierarchies. Another method, complementary to XML,

is RDF. RDF provides the necessary foundation and

infrastructure to support the description and

management of WEB content. A definition of RDF is

10 appropriate and will now be given.

Resource Description Framework (RDF) is defined

in *Resource Description Framework (RDF) Model and*

Syntax Specification, W3C Recommendation 22 February

1999 (http://www.w3.org/TR/REC-rdf-syntax). RDF is a

15 foundation for processing metadata or "data about

data"; it provides interoperability between

applications that exchange machine-understandable

information on the Web. RDF emphasizes facilities to

enable automated processing of Web resources. RDF can

20 be used in a variety of application areas; for

example: in resource discovery to provide better

search engine capabilities, in cataloging for

describing the content and content relationships

available at a particular Web site, page, or digital

25 library, by intelligent software agents to facilitate

knowledge sharing and exchange, in content rating, in

describing collections of pages that represent a

single logical "document", for describing

intellectual property rights of Web pages, and for

30 expressing the privacy preferences of a user as well

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as the privacy policies of a Web site. RDF with
digital signatures will be key to building the "Web
of Trust" for electronic commerce, collaboration, and
other applications.

5   Referring now to the drawings, and more
particularly to Figure 1, there is shown a schematic
grid layout of a user interface in accordance with
the best mode of implementing the invention. The
CONTENT portion 110 of the grid is composed of a

10   three-by-three array of squares 104. Arrays of other
dimensions may be used in implementing the invention.
Square arrays (i.e. n x n arrays, where "n" is a
positive integer) are advantageous for a user
information interface because of the symmetry of

15   spatial relationships. Rectangular arrays (i.e. m x
n arrays, where "m" and "n" are positive integers and
"m" is not equal to "n") are also usable for the
CONTENT area. A three-by-three array is believed
optimal because of the simplicity of its symmetry,

20   and because a three-by-three array is very familiar
to the vast majority of users who have used three-by-
three arrays in such varied forms as a telephone
keypad or numeric keypad (the numbers 1 - 9). Note
that if there is only one item at a displayed content

25   level, that single item would fill the entire area.
It should also be noted, of course, that the
invention may be implemented around a content display
which is circular. A circular presentation motif is
suggested by the seed atom described in connection

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with Figure 10A. An exemplar presentation from a
circular implementation is shown in Figure 10B.

Returning to Figure 1, areas for the DESIRE 103,
IDENTITY 102 and CONTEXT 101 portions of the grid are
5   arrayed across the top of the grid in a base or
control area. Note that the base area may be
configured in a variety of ways consistent with
practice of the invention. Examples of several of
these ways is shown in Figures 8A through 8F. In
10   Figures 8A and 8B, respectively, the DESIRE 103,
IDENTITY 102 and CONTEXT 101 areas are arranged to
the right and to the left, respectively, of the
CONTENT area. This enables the display to be
presented in a conventional computer monitor user
15   interface 4:3 aspect ratio. In Figures 8C and 8D,
the IDENTITY 102 area is represented by an arrow,
which would be selected to navigate up the
information hierarchy but would not show a navigation
history as in the preferred embodiment. In Figure 8D
20   the DESIRE area has been removed as well, which
leaves a memorization functionality suitable for some
information hierarchies which don't require
intermediary collection areas for multiple units of
information to be acted upon. Similarly, in Figure
25   8E, the CONTEXT area has also been removed, leaving
only an arrow 102 for navigating back up the
information hierarchy.

A further variation is shown in Figure 8F, which
shows the same three-by-three array of sub-content
30   areas 850, but where the two processes of

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clarification and memorization are represented by
buttons 810 and 820, respectively, and the IDENTITY
area is represented by an icon button 830 (e.g. an
arrow, as similarly shown in Figure 8C). In this

5   variation, operation of the invention may be
described by a selection sequence. There is no
separate area for memorization designated within a
content sub-area 850. Selection of a content sub-
area is therefore ambiguous with respect to the

10   functions available. This ambiguity is resolved by
mapping these functions unambiguously to convenient
elements of a presentation protocol. In this
example, this is accomplished by considering the
sequence of user selections as an element of the

15   presentation protocol, and in particular the
interpretation of the very next selection. If the
next selection is clarify button 810, then the
information item represented by the immediately prior
selected content sub-area becomes the context and the

20   hierarchy level immediately below that information
item is used to fill the content area. On the other
hand, if the next selection is memorize button 820,
then the information item represented by the
immediately prior selected content sub-area is

25   memorized for such action, if any, as may be called
for in accordance with the organization and structure
of the hierarchy or hierarchies of which the selected
information item is a part.

     The utility of the foregoing selection sequence

30   implementation of the invention's functionality may

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be understood with reference to Figure 8G, which

shows a conventional telephone keypad 860. It is

readily apparent how the numbers 1 - 9 may be mapped

to the three-by-three grid content area which is also

5   shown in Figures 8A - 8F. The ubiquity of the

telephone key pad, and the general familiarity of

potential users of the invention with the telephone

keypad, is one reason why the three-by-three grid

implementation of the CONTENT area is a preferred

10   embodiment of the invention.

It is also readily apparent how the other keys

("*" 862, "0" 863, and "#" 861) can be mapped to

enable the functions of the invention. The "#" key

861 can serve as the CLARIFY button, the "*" key 862

15   can serve as the MEMORIZE button, and the "0" key 863

can serve to represent the IDENTITY area. It is

important to note that the mapping necessary to

implement the invention can be accomplished in a

variety of ways, as may be seen by contrasting Figure

20   8H with Figure HG. While Figure 8H shows the same

keypad as in Figure 8G, the mapping of the available

twelve keys on the pad is modeled after the

arrangement shown in Figure 8C, with the top row of

keys being mapped, respectively, as a CLARIFY button

25   864, a MEMORIZE button 865 and an IDENTITY area 866.

The remaining nine keys in the lower three-fourths of

the pad then map to the CONTENT sub-areas. This

mapping flexibility extends the basic function of the

grid to any common keypad enabled device, a worldwide

30   universal layout. This is especially useful when

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visual displays are not available. Typically, the keypad would be augmented by an Audio User Interface (AUI) with or without a visual display. The layouts shown in Figures 8G and 8H are merely examples, and

5   many other designs are compatible with the invention and within its spirit. Also, alphanumeric data can be entered using the alphanumeric nomenclature on existing phone keypads using a time sequencing consistent with an audio user interface. Note that

10   overlays can be activated by holding down appropriate keys (e.g. CLARIFY button 862 to invoke a context overlay, and MEMORIZE button 861 to invoke a desire overlay) for a set period of time.

A similar mapping to three additional keys can

15   be accomplished to implement the invention using the numeric keypad portion of a computer keyboard as shown in Figure 8J. There, the keys 1 - 9 serve for the content area, with mapping of the Insert key 868 to serve as a CLARIFY button, the Enter key 867 to

20   serve as a MEMORIZE button, and the Delete key 869 to serve as the IDENTITY area. Alternatively -- since there are more than three keys in addition to the numeric pad which are available for mapping -- other key mappings to could prove convenient. Consequently,

25   in the manner already described in connection with Figure 8F, a telephone keypad or a numeric keypad on the computer can be used with a selection sequence mode of operation to implement the invention.

By connecting a telephone keypad to a visual

30   display such as a television (or using the connection

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between a computer's numeric keypad and a display on a computer monitor), it may be understood how the invention may be implemented in a manner which is accessible to, and usable by, a vast audience. A

5   three-by-three array of information items in the CONTENT area, may be displayed on a television and a connected telephone keypad may be used in the manner described above to achieve the functionality of the invention.

10   Figure 8K shows how the aforementioned mapping techniques may be used to accommodate a cell phone to operation of the invention, complete with a visual display area 870. Note that the additional buttons 871-873 immediately below the visual display area 870

15   provide additional flexibility for mapping the functions of the invention, as will be appreciated by one skilled in the art. A particular mapping configuration is a design choice which may be made following appropriate user and market studies.

20   It should also be understood that the selection sequence mode of operation can similarly be used with the telephone keypad to implement additional functionality of the invention. For example, after a content sub-area (850 in Figure 8F or keys 1 - 9 in

25   Figure 8G) has been selected and then clarified by next in sequence selecting "#" key 861 in (or clarify button 810 in Figure 8F), a further selection of the "#" key 861 can be interpreted as selection of the CONTEXT area, so as to implement an overlay with

30   respect to the clarified item of information, if such

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an overlay has been designed into the information
base. Similarly, after a content sub-area (850 in
Figure 8F or keys 1 - 9 in Figure 8G) has been
selected and then memorized by next in sequence

5   selecting "*" key 862 in (or memorize button 820 in
Figure 8F), a further selection of the "*" key 862
can be interpreted as selection of the DESIRE area,
so as to implement an action overlay with respect to
the memorized item of information (or with respect to

10   any items of information accumulated in the DESIRE
area), if such an overlay has been designed into the
information base. Note that in the selection
sequence mode, if an option is not available (e.g. a
MEMORIZE selection sequence is applied where the

15   selected content sub-area is not available for
memorization, or a context overlay option sequence is
applied where no overlay is available) it would be
convenient to provide a sound (e.g. a "beep") or
other feedback to confirm to the user that the option

20   selected is not available.

       However, in the preferred embodiment, there is
contained in the upper left hand corner of each
square in the content portion of the grid a
memorization area 106 whose use will be explained

25   below in reference to Figures 2 and 5. A similar
corner area 105 is shown in the desire portion of the
grid shown in Figure 1.

       Note that while the arrays and corner areas
shown are a best mode of implementing the invention,

30   other workable configurations will be readily evident

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to those skilled in the art. What is important for
practice of the invention is that there be a
distinction apparent to the human user enabling two
different processes (CLARIFICATION and MEMORIZATION,

5   as described below) associated with each content sub-
area. The distinctions may be based on space, as
shown of a corner area in the figures, or based on
time, or a combination. For example, the necessary
binary distinction could be based upon different

10 patterns of illumination, with selection while one
pattern is operable triggers CLARIFICATION and
selection while the other pattern is operable
triggers MEMORIZATION. Another example would be as
shown in connection with Figure 8F, where the

15 necessary binary distinction is based on a timing
sequence, i.e. a content sub-area is first selected,
and then either a clarify or memorize button is the
very next selection. Note that an advantage of the
preferred embodiment with respect to the memorization

20 option is that if the memorization option is not
available there will be no visual marking which can
be associated by selection; by contrast, in the
sequence mode of operating the invention, the key
sequence is always available, even if a visually

25 distinct cue is given (e.g. a particular pattern of
illuminating the applicable content sub-area on the
display) to indicate that the option is not
available. Thus a confirming "beep" or other
distinct error indicator for application in such

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circumstances would be a convenient addition to the implementation.

The different mappings of particular user distinguishable user interface structures which can
5   implement the invention's functionality may be summarized with reference to Figure 8L, to which we now turn. The topology shown in Figure 8L distinctly identifies the presentation user control elements of the invention, namely, a CONTENT area 881, CONTENT
10 sub-areas 882, a CONTEXT area 883, an IDENTITY area 884, a DESIRE area 885, areas 886 and 887 associated with CLARIFICATION and MEMORIZATION, respectively, of individual units of information, and area 888 for REPLICATION of desire.

15   It will be appreciated that at a visual presentation level these structures are topologically comparable to the best mode of implementation shown in Figure 1, and that Figure 8L represents an abstraction from the matrix structure of Figure 1 so
20 as to focus upon those structural elements which characterize the invention, thereby highlighting differences which are immaterial to practice of the invention. Furthermore - recognizing the restrictions upon description placed by the
25 limitations of paper media - Figure 8L may also be used to represent the full range of visual, auditory, tactile, olfactory, temporal and spatial stimuli and combinations thereof which may be distinguishable by the human user and therefore usable in a practical
30 user interface to implement the invention. While

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visual examples are particularly well suited to the
paper media of this specification, some examples of
auditory and temporal combinations have also been
given so that differences in implementation which are

5   immaterial to practice of the invention may be
illustrated. In accordance with the invention, a
body of information is presented to, and experienced
by, a human user. The presentation may be visual,
where a layer of information in a hierarchy is set

10   out in the CONTENT sub-areas of a grid as shown in
Figure 1. But for humans whose visual senses are
impaired the same information may be presented
aurally using a combination of auditory and temporal
stimuli understandable and distinguishable by a human

15   user. For example, CONTENT sub-areas 882 could be
labeled aurally with a number or other identifier and
presented aurally; and the user interface could
provide for supplemental auditory or tactile user
controls to repeat aural presentations of labeled

20   CONTENT sub-areas 882, so as to simulate the ability
of the visual user to review the entire information
content of the display. Similarly, for those whose
visual and auditory senses are impaired the same
information may be presented using tactile stimuli,

25   for example through use of a Braille device
configured so that separate tactile Braille areas
corresponding to CONTENT sub-areas 882 would be
distinguishable by the user, or by using a temporal
and tactile combination so that different CONTENT

30   sub-areas 882 would be temporally distinguished by a

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human user on a single tactile Braille area. It is
an important object of the invention that the
invention's functionality be provided to human users
using whatever stimuli may be distinguishable by
5   them.

In the best mode of implementation, the
presentation and user control elements of the
invention are integrated, that is, the same elements
used to display information also serve as user
10   controls. For example, the CONTENT sub-areas are
used to display a layer in a hierarchy of
information, and these very display areas are
selectable by the user to activate particular
functions of the invention (as will be described in
15   greater detail hereafter and in connection with
Figures 11A - 11E), e.g. areas 886 for CLARIFICATION
and areas 887 for MEMORIZATION. Similarly, CONTEXT
area 883 is in the best mode used for the display of
the unit of information which is the immediate parent
20   of the layer of information displayed in the CONTENT
area, and is also selectable by the user for a
particular function of the invention, e.g. to
activate a context overlay. IDENTITY area 884 is in
the best mode used for the display of the navigation
25   history of the CLARIFICATION process, and is also
user selectable to activate a navigation function
(i.e. clarify up) of the invention. DESIRE area 885
is in the best mode used for the display of items of
information collected by the memorize function, and
30   also contains the user selectable REPLICATE area 888

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to act upon the information collected in the DESIRE

area. While it is a design choice how to map the

REPLICATE function (and it is possible to use the

entire DESIRE area for the function), in the

5   preferred three-by-three grid embodiment of the

invention the REPLICATE function is mapped to an

upper left corner square in the DESIRE area which

parallels use of the upper left corner squares of the

CONTENT sub-areas for the memorize function.

10   However, the overlapping of presentation

structures and user control structures as described

for the best mode of implementation is not necessary

to implement the invention. For example, as

described above with respect to the use of a

15   telephone keypad, the presentation structures (e.g.

implemented on a television screen) may be entirely

separate from the user control structures (e.g.

implemented on a telephone keypad). Furthermore, in

at least one mode of implementation (as shown in

20   Figure 8F) units of information may be presented

minimally in the CONTENT sub-areas, with the user

control structures being implemented by a protocol

which uses a combination of tactile selection and

timing sequences. For implementation of the

25   invention, there must be a presentation structure

(minimally, for a layer of an information hierarchy

and, optimally, for a parent unit of information, for

a navigation history of parent units of information,

and for collecting memorized units of information),

30   and there must be a user control structure mapped to

the functionality of the invention, namely the
CLARIFICATION process (minimally, navigating downward
and upward through an information hierarchy and,
optimally, applying a context overlay for filtering
5   the information in the hierarchy) and the
MEMORIZATION process (minimally, memorizing selected
units of information which mirror the content of the
user's desire and then acting upon them and,
optimally, applying a desire overlay for choosing
10 alternate actions).

    The grid is the best mode for implementing the
two processes of the invention, CLARIFICATION and
MEMORIZATION. The preferred implementation is shown
in Figures 2 and 3, which operate on a hierarchically
15 arranged body of information shown schematically in
Figure 4. The schematic in Figure 4 shows a hierarchy
having five levels (401 to 405), with each unit in
each level being expanded to a three-by-three array
at the next lower level of the hierarchy (e.g. third
20 level unit 403 is expanded to a three-by-three array
430 at level four, and fourth level unit 404 is
expanded to a three-by-three array 440 at level 5).
In a best mode implementation, each unit is
represented by a thumbnail image appropriately
25 reflecting the information content associated with
that unit.

    The clarification process is accomplished using
the content, context and identity portions of the
grid (combined in area 302 in Figure 3). The
30 memorization process uses the memorization areas (201

in Figure 2 and 106 in Figure 1B) within each of the

squares 202 in the content portion and, optionally,

the desire portion of the grid (area 301 in Figure 3

and area 103 in Figure 1B). These divisions of

5   functional areas are shown schematically in Figures 2

and 3.

As will be evident to those skilled in the art,

the foregoing four areas (CONTENT, CONTEXT, IDENTITY,

DESIRE) and two processes (CLARIFICATION and

10 MEMORIZATION) could be presented in a user interface

in a variety of other configurations without

departing from the spirit and substance of the

invention. Similarly, a body of information could be

structured hierarchically in levels in a variety of

15 ways, in accordance with principles which are well

established in the art. For example, different

branches of a hierarchy need not have the same number

of levels, there may be a variety in the number of

units at a particular level, and any particular unit

20 of information may be represented in multiple

contexts within a hierarchy. All these variations in

form and structure may be conformed to practice of

the invention.

For purposes of illustration, however, we will

25 continue to use the grid structure shown in Figures 1

through 3 and the schematic representation of an

information hierarchy shown in Figure 4.

Turning now to Figure 5 we will illustrate

operation of the grid in accordance with the

30 invention. In this example, information content will

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be represented abstractly by a conventional numerical
notation, where successive levels in a hierarchy are
separated by periods and the respective units at a
particular level each are represented by a distinct

5   number. For example, the numerical notation
"1.5.3.8" refers to a unit of information designated
by "8" at a fourth level, coming out of a node
designated "3" at a third level, coming out of a node
designated "5" at a second level, and so forth. This

10   notation will help explain the invention, although in
practice a thumbnail and/or text image, as shown
hereafter in connection with Figure 9, would better
serve the user in navigating through the body of
information and acting on that information in

15   accordance with the user's purposes. Note that the
layout of Figures 5A through 5J follows the exemplar
pattern shown in Figure 1B, with the areas of CONTEXT
101, IDENTITY 102 and DESIRE 103 being arrayed from
right to left in a row across the top of the 3x3

20   array of CONTENT areas 104. For convenience,
therefore, reference will be made to item numbers
from Figure 1B in discussion of Figure 5 (and also,
subsequently, in discussion of Figures 6, 7 and 9)
and it will be understood that reference is being

25   made to the corresponding area of Figure 5 (and
similarly for Figures 6, 7 and 9) even though the
reference number from Figure 1B is not redrawn on the
later figure.

In Figure 5A the content portion of the grid 501

30   is taken up with unit of information "1.1". In order

to clarify this unit of information, the user selects
it in a manner which is well known in the art, e.g.
by touching it if the grid is implemented on a touch
screen or by locating a pointing device icon in the
5   selection area and pressing a button on the pointing
device, such as a mouse. Selection could also be
accomplished with other means, including use of voice
commands or a telephone keypad configured with a
"dumb" display. The results of that selection are
10   shown in Figure 5B. The representation of the
selected unit of information now appears in the
context portion 502 of the grid, and the units of
information under that unit at the next level in the
hierarchy (represented by "1.1.1" through "1.1.9")
15   are displayed in squares of the three-by-three array
in the content portion of the grid.

        Next, the user seeks to clarify the content of
the unit of information 503 represented as "1.1.3" in
Figure 5B by selecting that unit. The result of that
20   selection is shown in Figure 5C. The representation
of the selected unit now appears in the context area
504, with the prior contents of the context area
(unit of information "1.1") now appearing in the
identity portion 505 of the grid. Note that in
25   Figures 5A, 5B, 5C and 5D none of the units of
information there shown contain a corner area marked
for memorization. The significance of this omission
will become evident in connection with the discussion
below of Figure 5E.

The clarification process is repeated until the user's desires are satisfied, insofar as the body of information has been organized to so satisfy the user. The user selects unit "1.1.3.7" 506 in Figure

5   5C, and the results of that selection are shown in Figure 5D. As before, the representation of the selected unit now appears in the CONTEXT portion of the grid, with the prior contents of the CONTEXT portion (the unit represented by "1.1.3" 504 in

10   Figure 5C) being moved to the IDENTITY portion of the grid. Note that now there are two units of information represented in the IDENTITY portion of the grid, unit "1.1" (as shown in the CONTEXT area as item 502 in Figure 5B) and unit "1.1.3" (as shown in

15   the CONTEXT area as item 504 in Figure 5D). This provides a means for the user to navigate back out of the path taken down the information hierarchy. For example, by selecting anywhere in the IDENTITY area in Figure 5D the user returns to the preceding

20   display shown in Figure 5C. Note that the IDENTITY area acts as a last-in-first-out (LIFO) buffer: unit "1.1.3" was the last unit placed in the IDENTITY area (as shown in the progression from Figure 5C to Figure 5D) and would be the first unit removed upon

25   activating the IDENTITY area (thereby reversing the navigation and going from Figure 5D back to Figure 5C). If the IDENTITY area were selected again, then unit "1.1" 505 (as shown in Figure 5C) would be removed and the display would return to that shown in

30   Figure 5B.

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Seeking further clarification, continuing from
Figure 5C, the user selects unit "1.1.3.7.4" 508 in
Figure 5D. In the same manner as demonstrated above,
the selected unit represented as "1.1.3.7.4" now

5   appears as item 509 in the CONTEXT area, with the
former contents of that CONTEXT area (unit "1.1.3.7"
507 as shown in Figure 5D) now being moved to the
IDENTITY portion of the grid in Figure 5E. Note that
now there are three units of information represented

10   in the IDENTITY portion of the grid, unit "1.1" 512,
unit "1.1.3" 511 and unit "1.1.3.7" 510. As before,
the contents of the IDENTITY portion of the grid
provide a means for the user to navigate back to
higher levels in the information hierarchy. Note

15   also that the size of the representations of the
units of information shown in the identity portion of
the grid has been reduced (compare "1.1" in the
IDENTITY portion of the grid in Figure 5C with "1.1"
in the IDENTITY portion of the grid in Figure 5D) in

20   order to accommodate the number of units shown. Note
further that the number of units shown corresponds to
the number of levels in the hierarchy that have been
traversed by the user in navigating the body of
information. The general concept of retaining and

25   displaying a hierarchical history of navigation is
old in the art. However, the implementation
described here -- where the items in the history
display are spatially configured in a two dimensional
array rather than linearly in an outline form, and

30   where the history display is integrated with the

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clarification and memorization processes described
herein -- is believed to be novel and useful.

Note that in Figure 5E there is shown, in each
square in the three-by-three array within the content
5   portion of the grid, a corner marked for the
memorization function (e.g. 514). This marking
indicates, in accordance with the design of the body
of information, that the indicated units of
information may be selected by the user in accordance
10   with the memorization function of the invention.
Each body of information can have its own unique
rules for whether and how its various units of
information can be acted upon by the MEMORIZATION
function: a) no MEMORIZATION option at all, in which
15   case there will be no MEMORIZATION indicator 106 when
that unit of information is shown in a CONTENT area;
b) collection in the DESIRE area with other
information units until action on the collected units
is elicited in accordance with the structure of the
20   body of information, either automatically or by user
selection of the DESIRE area; or c) selecting the
MEMORIZATION indicator will directly elicit the
action represented by the information unit in the
corresponding CONTENT area.

25   Continuing with the example, the user memorizes
items "1.1.3.7.4.5" 515 as shown in Figure 5F and
then "1.1.3.7.4.8" 516 as shown in Figure 5G by
selecting the respective memorization corners in the
squares where these items of information are
30   represented. In Figure 5F the representation of unit

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of information "1.1.3.7.4.5" now appears in two
places on the grid: it remains in the content portion
of the grid at 515, but it also appears in reduced
form 517 in the desire portion of the grid.

5   Similarly, in Figure 5G unit of information
"1.1.3.7.4.8" remains in the content portion of the
grid at 516, and also appears in reduced form 518 in
the desire portion of the grid. Note that the
memorization corner has disappeared for

10   "1.1.3.7.4.5", indicating that the item 515 can no
longer be memorized, whereas the memorization corner
of "1.1.3.7.4.8" remains, indicating that the item
516 can be memorized more than once. These
differences are a function of the structure of the

15   information hierarchy. The invention is adaptable to
any of these differences.

        Continuing now with Figure 5G, the user seeks
further clarification of item "1.1.3.7.4.2" 519 and
selects it. The results of this selection are shown

20   in Figure 5H. In the same manner as demonstrated
above, the selected unit represented as "1.1.3.7.4.2"
now appears in the context area 520, with the former
contents of that context area (unit "1.1.3.7.4") now
being moved to the identity portion of the grid. Now

25   the user selects the item represented as
"1.1.3.7.4.2.6" 521 for further clarification, and
the results of this selection are shown in Figure 5J.
Note that one sub-area of the content display is
blank, indicating that the number of choices at the

30   current display level is less than the nine which can

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be shown in a three-by-three array. Unit of
information "1.1.3.7.4.2.6" now appears in the
context area 522, with the former contents of that
context area (unit "1.1.3.7.4.2") now being moved to
5   the identity portion of the grid. Note that now
there are five units of information represented in
the identity portion of the grid, unit "1.1", unit
"1.1.3", unit "1.1.3.7", unit "1.1.3.7.4", and the
newly added unit "1.1.3.7.4.2" 523. As before, the
10   contents of the identity portion of the grid provide
a means for the user to navigate back to higher
levels in the information hierarchy. For example, in
the preferred embodiment, if the user selects
anywhere in the IDENTITY area two changes will be
15   made in the display: first, newly added unit
"1.1.3.7.4.2" 523 will be removed from the IDENTITY
area and will become the contents of the CONTEXT area
522, replacing unit "1.1.3.7.4.2.6"; second, the
units of information under unit "1.1.3.7.4.2" (i.e.
20   the various units "1.1.3.7.4.2.x" where "x" is an
integer between 1 and 9) are displayed in the CONTENT
area. It will be observed that these changes return
the display to that shown in Figure 5H. Similarly, a
further selection in the IDENTITY area will return
25   the display to that shown in Figure 5G.

Note that the size of the representations of the
units of information shown in the identity portion of
the grid has been reduced again (compare the change
in size of unit "1.1" in the IDENTITY areas of Figure
30   5C, Figure 5D and Figure 5J) in order to accommodate

the number of units shown. Note also that it would

be feasible, where a limited number of information

units are displayed in the IDENTITY area, to enable

the user to select individual units in the IDENTITY

5   area. In such an implementation, for example, the

user could return from the display shown in Figure 5J

directly to the display shown in Figure 5H by

selecting unit "1.1.3.7.4" 525 in the IDENTITY area,

instead of selecting twice in the IDENTITY area using

10   the LIFO queue methodology. However, even in such an

implementation, at some threshold level there may be

too many information units displayed in the IDENTITY

area to be readily distinguished and selectable by

the user, and therefore beyond that level it is

15   appropriate to revert to the LIFO queue methodology.

Turning now to Figure 6 we will illustrate the

operation of the DESIRE overlay feature. As with

Figure 5J, two units of information have been

collected in the DESIRE area, "1.1.3.7.4.5" and

20   "1.1.3.7.4.8." If the human user desires to act upon

these collected units he selects REPLICATE in the

DESIRE area and will be shown alternative choices for

action, which are now shown in the content area of

Figure 6A. These choice alternatives may reflect a

25   hierarchy of information as demonstrated above,

resulting in successive selection of "9.1.5" 610,

which is moved to CONTEXT in Figure 6B, and "9.1.5.2"

620, which is moved to CONTEXT in Figure 6C. Then,

in Figure 6D, item "9.1.5.2.8" is memorized by

30   selecting the MEMORIZATION indicator 630, and the

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memorized item then replaces the former contents of
the DESIRE area. If the darkened corner REPLICATE
640 of the DESIRE area is then selected, the action
is complete and the display will return to the
5   content area displayed in Figure 5J. Note that in
Figures 6A through 6D any areas containing being used
for the desire overlay are outlined in gray. Such
highlighting provides a convenient reminder to the
user that an overlay is in operation.
10   Turning now to Figure 7, there is shown a
similar overlay pattern for the CONTEXT area.
However, the context sensitive overlays for CONTEXT
are typically (but not always) properties. These
choices may similarly be navigated through as shown
15   in Figures 7A through 7F with selections being made,
and then returning to the prior display (similar to
Figure 5J) when the replicate button is selected.
Beginning with the display shown in 5J, selection of
the CONTEXT area results in the display shown in
20   Figure 7A, where the CONTENT area has been replaced
with units "8.1" through "8.9". Note that units
"8.1" through "8.7" have MEMORIZATION indicators and
may be memorized. The MEMORIZATION indicator 701 is
selected and unit "8.4" then replaces the contents of
25   the DESIRE area, as shown in Figure 7B. Then unit
"8.2" 702 is selected and moved to the CONTEXT area
as shown in Figure 7C. Similarly unit "8.2.7" 703 is
selected and moved to the CONTEXT area as shown in
Figure 7D. Note the movement of the information
30   units from CONTEXT area to IDENTITY area, as

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described earlier, and the opening up of further
levels of the information hierarchy each time a unit
in the CONTENT area is selected. Note also, however,
that if there were no further levels in the

5   hierarchy, in a preferred embodiment the selected
item after being moved to the CONTEXT area would be
shown in enlarged form in the CONTENT area. However,
in other embodiments, as shown in connection with the
discussion of Figure 7D, nothing would happen when

10   the unit was selected, signaling to the user that the
item, in accordance with the structure of the
information hierarchy, could not be further
CLARIFIED. This is shown by the selection of item
"8.2.7.8" 704 in Figure 7D, which results in no

15   change in the display. Then item "8.2.7.9" is
MEMORIZED by selecting the memorization indicator
705, with the result shown by the addition of item
"8.2.7.9" to the DESIRE area in Figure 7E. Note that
in Figures 7A through 7E any areas containing being

20   used for the context overlay are outlined in gray.
Such highlighting provides a convenient reminder to
the user that an overlay is in operation. At this
point the REPLICATE button 720 is selected in the
desire area, completing the CONTEXT overlay first

25   shown in Figure 7A, resulting in a return (displayed
in Figure 7F) to a version of the Figure 5J display
modified by the properties represented by the
MEMORIZED items "8.4" and "8.2.7.9". Note in Figure
7F that only those choices of the Figure 5J display

30   remain which satisfy the properties selected through

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this overlay process. In particular, items
"1.1.3.7.4.2.6.6", "1.1.3.7.4.2.6.7" and
"1.1.3.7.4.2.6.8" from Figure 5J did not satisfy the
selected properties and no longer appear, as shown in
5   Figure 7F.

The foregoing characteristics of the invention
will now be demonstrated by an example, with
reference to Figure 9, which shows a complete
sequence of display screens in accordance with the
10   invention, where the information content is organized
as it might be in a telephone yellow pages, and where
the invention is used to place an order for food at a
restaurant over the Internet. In each of the figures
in the sequence, Figures 9A through 9Y, there is
15   shown a grid layout in conformity with Figure 1B,
with information in the various areas of CONTEXT 101,
IDENTITY 102, DESIRE 103 and CONTENT 110 (which may
be broken up into a 3x3 array of CONTENT 104 areas,
where each such CONTENT 104 area may have an area 106
20   for indicating the memorization function). The
manner of progression in the sequence is also
indicated: on each figure is a black dot with a line
extending therefrom, which indicates (by the location
of the black dot) the area which is touched, thereby
25   activating the system in accordance with the
invention as described above and producing a new
display, conforming to the grid layout of Figure 1B
and having the content shown in the next figure in
sequence.

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Figure 9A begins the sequence with a display of
"Interactive Computer Net, Inc.", which may be an
Internet Service whose selection 901 provides access
to the Yellow Pages in Northern Virginia, as shown in

5   Figure 9B. Selection of the Yellow Pages item 902
produces an alphabetical range presentation shown in
Figure 9C. If the user is seeking "restaurants",
that would be found in the selection 903,
"Photographers to Zoos". CLARIFICATION continues in

10 Figure 9D with the selection 904 of "Recording to
Restaurants" and in Figure 9E with the selection 905
of "Restaurant Equipment to Restaurants." Note that
in Figure 9F there are only four options shown within
the "Restaurant Equipment to Restaurants" range.

15 Upon selection 906 of "Restaurants" another
alphabetical list – this time of restaurant names –
appears as shown on Figure 9G.

At this point the user decides to take another
approach to finding the desired restaurant. An

20 alphabetical listing is not the only ordering
principle that may be used by "Interactive Computer
Net, Inc." in structuring the Yellow Pages
information base. These alternatives may be found,
as they apply to "Restaurants", by selecting the

25 CONTEXT area 907 to obtain an overlay of properties
as shown in Figure 9H. Five categories of properties
are shown. Note that none of them may be applied to
the "Restaurant" category, since no MEMORIZATION
indicator is shown. Further CLARIFICATION is needed,

30 and "All Cuisine Types" 908 is selected, with the

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results shown in Figure 9J. CLARIFICATION is
continued through another alphabetical range display
by selection 909 of "Greek to Italian" and
MEMORIZATION of "Italian" 910 as shown in Figure 9K

5   and also "Irish" 911 as shown in Figure 9L. Note
that these selections appear in the DESIRE area as
shown in Figure 9M. The user, having selected his or
her desired types of cuisine then navigates back to
the alternative categories by selecting 912 the

10   IDENTITY area twice, first to return to the
alphabetical range display of "All Cuisine Types"
(see Figure 9J) and then to the alternative
categories shown in Figure 9N. Note in Figure 9N
that "All Cuisine Types" now has a MEMORIZATION

15   indicator of a possible action that may be elicited.
For example, the user might think better of limiting
choices to "Irish" and "Italian" and remove one or
both of those limitations by selecting the
MEMORIZATION indicator for "All Cuisine Types".

20   Depending on how the Yellow Pages information
hierarchy was structured, the elicited action might
be to "clear" all choices of cuisine shown in the
DESIRE area, or it might be to clear individual
choices in a LIFO sequence. If more than one action

25   may be chosen, a DESIRE OVERLAY may be employed, as
described earlier in connection with Figures 6A - 6D.
        Instead, however, the user is satisfied with
choices of cuisine and elects to further CLARIFY
restaurant location properties by selecting 913

30   "North Virginia", which results in the display shown

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in Figure 9P. Further CLARIFICATION leads the user

to select 914 the range "Alexandria to Annandale."

The resulting display is shown in Figure 9Q, where

the user selects 915 "Alexandria" by touching the

5   MEMORIZATION indicator, which is then added to the

DESIRE area as shown in Figure 9R.

At this point the user chooses to limit his or

her restaurant search to Irish or Italian restaurants

located in Alexandria by selecting 916 the REPLICATE

10   button in the DESIRE area. This action completes the

CONTEXT overlay and returns the display to what it

had been in Figure 9J, but modified by the action

just taken so that the display in Figure 9S only

includes restaurants that have the selected

15   attributes. Note that the selection criteria no

longer appear in the DESIRE area (since the desired

action has been completed) but the "Restaurant" item

in the CONTEXT area has been modified to show the

selection criteria. This modification is a new

20   information unit which is temporary and not a

permanent part of the Restaurant data base, but which

is constructed in order to provide the user with a

visual record of selections made while in the CONTEXT

overlay sequence beginning as shown in Figure 9G.

25   Note that this temporary information unit, displayed

in the CONTEXT area, provides continuity of

information display in the transition at the point of

REPLICATION between Figures 9R and 9S: the units

"Italian", "Irish" and "Alexandria" from the DESIRE

30   area and the unit "North Virginia" from the IDENTITY

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area in Figure 9R are removed upon REPLICATION, but
the three units from the DESIRE area - which
constitute selection criteria against the data base
resulting in the CONTENT area as shown in Figure 9S -

5   are retained in the temporary information unit
displayed in the CONTEXT area in Figure 9S.

Note also that the information units displayed
in the IDENTITY area after Figure 9G (namely "All
Cuisine Types" in Figure 9K and "North Virginia" in

10 Figure 9Q) are highlighted (shown by means of a heavy
dashed line around them) to indicate their origin in
the CONTEXT overlay sequence. Similarly, when the
CONTENT area contains information units from the
CONTEXT overlay, a highlighting (shown by means of a

15 heavy dashed line around them in Figures 9H through
9R) is applied to all such information units
displayed in the CONTENT, DESIRE and CONTEXT areas.

The user now elects to find more about one of
the choices, "Gino's" by selecting 917. However, as

20 shown in Figure 9T, this level of the hierarchy
provides only an advertisement framed within one unit
of information. Another alternative for further
information about Gino's is a CONTEXT overlay, which
the user now selects 918. The results of that

25 selection are displayed in Figure 9U, giving several
additional pieces of information about the
restaurant, including hours of operation, price
range, rating, address and phone number. The user
then selects 919 the IDENTITY area in order to

30 navigate back up the hierarchy to display showing

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Irish and Italian restaurants in Alexandria, as shown in Figure 9V. Alternatively (but not shown), the user could have again selected the IDENTITY area, which would have returned the user to the prior
5 Figure 9T.

From Figure 9V, the user is then ready to take action and selects 920 the MEMORIZATION indicator for Gino's Restaurant. Several choices are presented, as shown in Figure 9W, and the user selects 921 to act
10 by telephone. As shown in Figure 9X, the telephone selection has been moved to the DESIRE area. The user then decides to MEMORIZE 922 "Order On Line" instead. The effect of this selection is shown in Figure 9Y. Note that "Order on Line" supplanted
15 "Telephone" in the DESIRE area, reflecting a decision a) to structure these choices as mutually exclusive and b) to allow the user to verify or change an initial choice by using the DESIRE area. The user then elicits an "Order on Line" by selecting 923 the
20 REPLICATE box in the DESIRE area. As noted earlier, if the information base were structured without the (b) characteristic, it might be feasible to implement the structure using the invention without the DESIRE area, e.g. MEMORIZATION of the "Telephone"
25 alternative shown in Figure 9W would have initiated a telephone order.

Operation of the invention has thus far been described in detail with reference to the preferred three-by-three grid embodiment and from the
30 perspective of the user for whom the invention

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provides improved access to information. The
description has been provided using generic
information items from this user perspective in
connection with the discussion of Figures 5A - 5J,
Figures 6A - 6D, and Figures 7A - 7G. A detailed
example using a specific and practical hierarchy of
information items has been provided from this user
perspective in connection with the discussion of
Figures 9A - 9Y. These generic and specific examples
provide an extensive list of descriptive details
which enable a further consolidation and summary of
the invention.

Turning now to a final set of figures, Figures
12A through 12T, we will demonstrate use of the
invention to accommodate a variety of devices and
information programming commonly available to
consumers: a television, a video-cassette-recorder
(VCR; perhaps integrated with the television), and a
keypad (on a remote control for the television, or on
a telephone linked to the television over a wideband
network). The invention provides a unifying
interface enabling the user to both browse and act
upon information. Figure 12A shows a television
screen being used for presentation. Presumably, the
user may have been watching television (with the
video content taking up the entire screen), and then
have invoked the invention by touching a suitable
control on a remote control device or by giving a
voice command to an AUI device. At that point the
grid layout (representing the best mode but not the

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only implementation of the invention) appears on the
screen as shown in Figure 12A, showing (by reference
to the items in the IDENTITY area 2230 and the
CONTEXT area 2240) the relationship of the user's

5   current viewing screen to the hierarchy of
information available for presentation. Not only is
a television screen being used for presentation, but
the television also serves as a content entry point
for information accessible through television

10   programming sources. Appropriately, this entry point
is labeled "TV Portal" in reference to the preset
classification system developed by the television
services provider and adopted for use in this
implementation of the invention.

15   IDENTITY area 2230 shows the user's position
within a hierarchy of information, and indicates that
"TV Portal" is at the top of that hierarchy,
representing hundreds of channels, with the next
level down in the hierarchy being channel groupings

20   such as channel group "200-340", as shown in IDENTITY
area 2230. The user could have begun at "TV Portal"
and then moved (by successively invoking the clarify
down function) to channel group "200-340" and then
(as shown in CONTEXT area 2240) to "Travel Channel

25   233". Nothing is contained in DESIRE area 2220,
indicating that no memorized units of information are
pending action. Note that because of the aspect
ratio on the television screen, and because the
DESIRE, IDENTITY and CONTEXT areas are being

30   displayed across the top, these three areas are

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rectangular, being about twice as wide as they are

high. Similarly, CONTENT area 2210 is also

rectangular. While this rectangular layout may be

pleasing to a user, it reflects a design choice that

5   does not touch upon the invention.

The contents of CONTENT area 2210 is a video

"Visiting Washington" being shown on the travel

channel 233 (as shown in CONTEXT area 2240). Thus,

consistent with the invention, the CONTENT sub-areas

10   may be understood as a temporal sequence of video

frames. If the user is interested in doing something

with the "Visiting Washington" video, he may invoke

the memorize operation of the invention if a memorize

option is available in accordance with the structure

15   of the information, for example, as shown by the

marked rectangle in the upper left of the CONTENT

area in Figure 12B. This operation may be

implemented using a MEMORIZE button (as shown in

Figure 8F) on a remote control device or by giving a

20   verbal command (e.g. "Memorize!") to an AUI device.

One or the other of these implementations may be a

suitable design choice, but only the function itself

touches upon the invention. However invoked,

selection of the memorize operation is represented in

25   Figure 12B by selection paddle 2101.

The result of the memorize operation is shown in

Figure 12C. The video "Visiting Washington" is now

playing in DESIRE area 2220 and the CONTENT area has

been filled (overlayed) with a series of action

30   choices, in the form of a VCR control panel. Note

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that the CONTENT area and the DESIRE area are highlighted with a dotted line, conveniently indicating to the user that an overlay is active. Note also that those control panel functions which

5   are available for selection are shown in black and those functions unavailable are grayed out. This is in accordance with accepted conventions.

The user might choose to further clarify one of the available action options. For example, the user

10   could select "Quick Skip" 1251 and, in accordance with the invention, the "Quick Skip" information item would move to the CONTEXT area, where it could be selected again to display a context overlay of properties, such as the length of time set for

15   skipping. If acting to change this setting were an option, a memorize indicator would be present for selection if the user wished to change this setting, bringing up a desire overlay for determining whether activation of the "Quick Skip" button should skip 30

20   seconds of video or 15 seconds or 45 seconds. Alternatively, those who structure the hierarchy of information and desire and context overlays of the information in accordance with the invention could provide for the same user choice by a different

25   route. For example, in response to user selection of the memorize indicator 1252 in Figure 12C, there could be provided to the user a desire overly of further options allowing the user to select whether the memorized "Quick Skip" should skip 30 seconds of

30   video or 15 seconds or 45 seconds. This approach

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would require the user to select a skip time for each
election of the "Quick Skip" action option, and some
might find this disadvantageous. However, these
various alternatives for structuring of the

5   information hierarchy and desire and context overlays
are matters of design choice and do not touch upon
the invention.

However, as shown in Figure 12C, the user
chooses to record (replicate) the video clip to his

10   VCR, as indicated by the selection paddle 2102. Upon
this action, the memorization process is complete and
the display returns to its prior position (Figure
12B) as shown in Figure 12D. At this point the user
decides to move back up the information hierarchy by

15   selecting the "TV Portal" icon in the IDENTITY area,
as shown by selection paddle 2103 in Figure 12D. In
this implementation of the invention, visually
distinguishable information units in the IDENTITY
area's LIFO queue are individually selectable,

20   permitting the user to move more quickly back up the
hierarchy.

The result of selecting the "TV Portal" icon in
the IDENTITY area is movement of that icon to the
CONTEXT area and display of channel ranges in the

25   CONTENT area, as shown in Figure 12E. The user sees
channel group "595-599 Adult" and wants to censor all
adult movies from the service provider's preset
offerings so children in the house cannot view them.
In order to accomplish this action, the user executes

30   the memorize function as indicated by selection

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paddle 2104 in Figure 12E. This results in moving

the "595-599 Adult" icon into the DESIRE area as

shown in Figure 12F. Note that the memorize

indicator (the upper left corner rectangle in the

5   CONTENT sub-area) for the "595-599 Adult" information

item is no longer present. The user then acts by

invoking the replicate function, indicated in Figure

12F by the selection paddle 2105 inside the REPLICATE

area within the DESIRE area. This brings up an

10   overlay of action options, shown in Figure 12G. The

user chooses to memorize the "Set Locks" option, as

indicated by the selection paddle 2106 in Figure 12G.

This moves the "Set Locks" information item into the

DESIRE area along with the "595-599 Adult"

15   information item, as shown in Figure 12H. The user

then chooses to memorize "All" 2107 which then locks

all the adult channels from further viewing.

In this implementation of the invention, the

"Set Locks" and "595-599 Adult" information items are

20   shown in the DESIRE area as a combined item rather

than as separate information items. This is a design

choice which does not touch upon the invention. Note

that in Figures 12G and 12H the CONTENT and DESIRE

areas are circumscribed by a dotted line, indicating

25   that an overlay is active. This highlighting

approach is a convenient reminder to the user, but is

also a design choice not required to implement the

invention.

Turning now to Figures 12J and 12K, there is

30   shown how the invention may be applied to a

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personalized Internet portal, within a broader category of personalized information. Figure 12J shows "My Stuff" in IDENTITY area 1261 and "My Portal" in CONTEXT area 1262, reflecting a sequence

5 of clarify down operations upon "My Stuff" and then "My Portal". The user executes another clarify down operation upon "My Travel" as shown by the selection paddle 2120. Note that in a typical Internet environment the user will have available standard

10 graphical user interface (GUI) features which may conveniently be mapped to the presentation elements and control structures of the invention. The circumstances of a particular implementation may also allow use of a touch based display screen or an Audio

15 User Interface (AUI) in this mapping.

Figure 12K shows (by the addition of items to the IDENTITY area) the result of a further sequence of clarify down operations by the user upon the information units "Washington DC", "Tourist

20 Attractions", "Landmarks" and, finally, "Lincoln Memorial". The CONTENT area of Figure 12K shows text and a small photograph, as might be displayed on an Internet WEB page. If the text in the information item did not fit on one page, a scroll bar could be

25 provided. Scrolling features available with WEB technology may provide attractive design choices for display of the content of information items in a hierarchy, and may be selectable from a property overlay as an alternative display methodology. But

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these alternatives are mere design choices which do not limit application of the invention.

The user, by selecting CONTEXT area 1263, could bring up a context overlay showing directions to the Lincoln Memorial, address, parking facilities, operating hours, accessibility and other "properties" of the Memorial. Similarly, a desire overlay could be provided to telephone for information to an agency handling the site, in order to buy tickets for an exhibit or a tour package, or to link to a restaurant to accommodations. These aspects are particular to the content and structure of the information, as that content and structure may be developed by service providers or others (including the user if provided with appropriate tools).

Turning now to Figures 12L - 12P there is shown how the invention may be implemented on a small handheld organizer. Figure 12L shows within a CONTENT area 2210 a first layer of information categories below the information unit "My Stuff" shown in CONTEXT area 2240. The user executes a clarify down operation on the "Contacts" information item, as indicated by selection paddle 2130. This causes the "Contacts" item to move into the CONTEXT area, replacing the "My Stuff" item which is moved to the IDENTITY area LIFO queue and shown in the IDENTITY area 2230. As displayed in the CONTENT area of Figure 12M, the layer of information units which are children to the "Contacts" parent are names and phone numbers. These are displayed in a list form,

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rather than in an array. Furthermore, the list may
be scrolled by activating a scroll bar as indicated
by selection paddle 2132. This feature is a design
choice, but could be selectable by the user from an
5   overlay.

We will now show how a keyword search could be
invoked in conformity with the invention. The user
invokes a context overlay by selecting the "Contacts"
item 2131 in the CONTEXT area. The context overlay
10   is shown in Figure 12N, where the user memorizes
"Keywords" as indicated by selection paddle 2133. If
a keyword search is the only action available for the
"Keywords" unit of information, the search criteria
for the "Contacts" list would be displayed
15   immediately in the CONTENT area, as shown in Figure
12P. If multiple actions are available for
"Keywords", these actions would be displayed for user
choice and the display shown in Figure 12P would then
follow user selection of a "search" option.

20   In Figure 12P, the user enters the name "Emily"
2135, who is a friend. This could be done with a
stylus and handwriting conversion software or with an
on-screen alphanumeric keyboard (not shown) overlayed
in the CONTENT area. The user then executes a
25   memorize operation on this form, as shown by the
selection paddle 2134. If "Emily" is on the list,
this will conclude the desire overlay and return the
display to that shown in Figure 12M, except that the
list of names shown will be only those with a first
30   name of "Emily". It will be readily understood that

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the form like that shown in the CONTENT area of
Figure 12P could be used as a data entry form,
accessible from an "enter new contact" action option.
For example, such an action option could have been an
5   alternative to the "search" option in a "Keywords"
desire overlay as suggested above.

      Turning now to Figures 12Q - 12T there is shown
how the invention may be implemented on a digital
voice recorder. This example shows how information
10   can be created and assigned properties for later
retrieval in accordance with the invention. The
digital voice recorder has a set of hardware controls
2150 and a small display screen 2160. However, it
does not have a keyboard, touch screen, stylus or
15   voice command capability. The user operates the
recorder via the hardware controls 2150. One of
those controls -- Mode Select 2151 -- enables the
user to select the CONTENT, CONTEXT, IDENTITY and
DESIRE areas on the display screen 2160. The Mode
20   Select button 2151 can distinguish a short push and a
long push. With each short push, an indicator (e.g.
a highlight or flashing of the display) moves
sequentially (e.g. top to bottom and right to left)
through the various presentation areas on the display
25   screen 2160. A long push selects the area having the
indicator. The voice currently holds three messages.
Each message is a unit of information. Consequently,
there is a very simple single layer structure for
this information.

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The user desires to record a new message, and pushes the "Record" button on the digital voice recorder's control panel, as shown by selection paddle 2140 in Figure 12Q. Note that the CONTEXT

5 area 2240 contains the "Voice Portal" unit that is parent to any messages stored in the recorder. The message which the user desires to create is assigned "Message 4", which appears in the DESIRE area.

Note that the display under "Voice Portal" in

10 the CONTEXT area 2240 also indicates that there are currently three messages stored in the recorder. Also note that the "Record" symbol (a red dot) used on the recorder control bar 2150 also appears in the area 2205 designated as the memorization indicator.

15 The CONTENT area shows the progress of the message being recorded, in real time, including a volume indicator and a duration indicator. These features are convenient feedback to the user, but are design choices which do not touch upon the invention.

20 When finished recording the message the user pushes the "Stop" button on the digital voice recorder's control panel, as shown by the selection paddle in Figure 12R. Momentarily – long enough to provide feedback to the user confirming that the

25 "Stop" button has been pushed – a symbol for the "Stop" button appears in the CONTENT area. Then, since creation of the new message has been completed, the desire overlay is removed, the new information unit – Message 4 – is automatically selected (i.e.

30 the clarify down operation is invoked). This causes

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"Message 4" to be moved to the CONTEXT area 2240,
"Voice Portal" to be moved from the CONTEXT area to
the IDENTITY area 2230, and further detail about
"Message 4" to be displayed in the CONTENT area 2210,

5   as shown in Figure 12S.

Note that there is no project name shown for
"Message 4" in the details displayed in CONTENT area
2210 in Figure 12S. The user desires to assign a
project name. In order to do this, the user pushes

10   the "Mode Select" button 2151 (as indicated by the
selection paddle 2142) with short pushes until the
memorize indicator for the CONTENT area containing
"Message 4" is highlighted. Then the user makes a
long push on "Mode Select" button 2151. This brings

15   into the CONTENT area a desire overlay for the action
options available, as shown in Figure 12T. At this
point the user again uses the "Mode Select" button
2151 (as indicated by the selection paddle 2143) to
memorize the "Assign Project" action option 2152.

20   This would cause another overlay to be displayed in
the CONTENT area, showing the projects 1 through 9
that are programmed into the digital voice recorder.
The user would select one of these using the "Mode
Select" button in the manner described above, which

25   would complete the desire overlay sequence and return
the display to that shown in Figure 12S, except that
the "Project" field would contain the project number
selected by the user.

At various points in the foregoing detailed

30   description of the invention reference has been made

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to alternative embodiments not using the preferred three-by-three grid for display of CONTENT. Turning now to Figure 10B there is shown an implementation of the invention using a circular display motif. In

5   this implementation the CONTENT area is an outer ring 150, the DESIRE area is an intermediate ring 160, and the CONTEXT and IDENTITY areas are included in an inner circle 170. Within content ring 150 are content sub-areas which are in the form of circles

10 151. Within each circle 151 is a selection area 152 for CLARIFICATION and a smaller selection area 153 for MEMORIZATION. It will be evident to those skilled in the art that the CONTENT area could equally well have been divided into a number of ring

15 segments rather than circles without materially altering implementation of the invention.

There is shown within the DESIRE intermediate ring 160 a number of smaller circles 161 which represent information items that have been memorized

20 and await action. It also will be evident to those skilled in the art that memorized information units could be represented by ring segments rather than circles. Selection anywhere within the DESIRE ring 160 has the same effect as described earlier with

25 respect to the three-by-three grid for selection of the DESIRE area.

At the center of inner circle 170 is a CONTEXT area circle 171. In the dictionary example shown, note that the range shown for the information item

30 "A-Z" in the CONTEXT circle 171 encompasses the sub-

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ranges ("A-C", "D-F", "G-I", "J-K", "L-N", "O-Q", "R-T", "U-W", and "X-Z") contained in the content sub-areas in CONTENT outer ring 150. This reflects the relationship described earlier between an information item shown in the CONTEXT area 171 and the information units contained in the next level down in the hierarchy, which are displayed in the CONTENT area 150.

The remaining functionality for the invention is to be able to navigate back up the hierarchical tree and to use an overlay to consider the properties associated with the information item contained in the CONTEXT area 171. These functions are accomplished, in the example shown in Figure 10B, by selecting the CONTEXT area 171 or the area 172 which is within inner circle 170 but outside CONTEXT area 171. Note that this is the reverse of prior examples, where navigation back up the hierarchical tree was accomplished by selecting an IDENTITY area, and selection of the CONTEXT area triggered presentation of a context overlay in the CONTENT display area. As will be appreciated by those skilled in the art, the invention is characterized by interrelated functions each of which are invoked in accordance with selection rules which are well defined for a particular implementation of the invention, but these selection rules involve design choices which provide functionally equivalent alternatives which do not materially alter operation of the invention.

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This functional equivalence of alternative implementations may be better understood with reference to Figures 11A - 11E, to which we now turn. Figure 11A shows the presentation elements and user

5   control elements of the invention, as described above in connection with Figure 8L but arranged in the form of a chart. On the right side of the chart is shown CONTENT area 1110, within which may be contained one or more CONTENT sub-areas 1120 for display of

10   information units in a level of a hierarchy of information. Each information unit in a displayed level may be parent to a further level 1123 of the information hierarchy. In the best mode of implementation, each CONTENT sub-area is also

15   selectable by the user to activate particular functions of the invention, i.e. each CONTENT sub-area has an area 1121 selectable for a CLARIFICATION process (the clarify down function) and an area 1122 selectable for a MEMORIZATION process (the memorize

20   function). In some implementations (e.g. as shown in Figure 8F) the user control structures for these functions may be implemented through an area not associated with particular CONTENT sub-areas, as represented on Figure 11A by clarification area 1111

25   and memorization area 1112, and as described in Figure 8F as a CLARIFY button 810 and a MEMORIZE button 820, respectively.

On the left side of Figure 11A is shown a CONTEXT area 1130, an IDENTITY area 1140 and a DESIRE

30   area 1150. In the best mode of implementation of the

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invention, these areas represent i) visual space for
the display of the unit of information (in the
CONTEXT area 1130) which is parent to the level of
information displayed in CONTENT sub-areas 1120, ii)

5   the navigation history (in the IDENTITY area 1140) of
the CLARIFICATION process, and iii) the units of
information collected (in DESIRE sub-areas 1152) by
the MEMORIZATION function. There is also shown a
context overlay 1135 of one or more context

10   properties 1136, which may be arranged in a hierarchy
(as indicated by the dotted formalism 1137).
Similarly, there is shown a desire overlay 1155 for
choosing between desire actions 1156, which may also
be arranged in a hierarchy (as indicated by the

15   dotted formalism 1157). Note that the context
overlay boxes 1135 and 1136 are bounded by a dashed
line and the desire overlay boxes 1155 and 1156 are
bounded by a dotted line, consistent with the
formalism used in Figures 5, 6, 7 and 9 for

20   displaying overlays. It should also be noted that
comparable methods of distinguishing between overlays
could be applied where the CONTENT sub-areas used for
overlays make use of non-visual protocols (e.g. an
auditory and temporal combination as described

25   earlier in connection with Figure 8L). Finally,
there is shown a REPLICATION area 1151 which is
selectable by the user.

     Operation of the invention may be further
understood with reference to Figure 11B. A user 1160

30   experiences information 1161 presented 1162 in

accordance with the presentation structures of the invention outlined in Figure 11A. In response thereto, having in mind certain objects, and in accordance with the control structures of the

5   invention (i.e. the particular protocol in a given implementation through which the user invokes the functions of the invention), the user seeks to use the CLARIFY 1200 and MEMORIZE 1300 processes of the invention to find a mirror image of the objects which

10   the user has in mind.

These functions of the invention are identified in Figure 11C and shown in greater detail in Figures 11D and 11E. The CLARIFY process 1200 is comprised, minimally, of functions for navigating down 1210 and

15   up 1220 through an information hierarchy and, optimally, for applying a context overlay 1330 for filtering the information in the hierarchy. The MEMORIZE process 1300 is comprised, minimally, of functions for memorizing 1310 selected units of

20   information which mirror the content of the user's desire and then, when the user 1160 considers that a sufficient mirror content has been found, acting upon the memorized units by replication 1320; optimally, the MEMORIZE process 1300 also includes a function

25   for applying a desire overlay 1330 for choosing among alternative actions. After each function is invoked, the presentation 1162 is altered and the user 1160 experiences 1161 the revised information, and then the user 1160 can continue the process by invoking

30   another function.

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With respect to each function, the user is provided (through a particular implementation protocol established in accordance with the invention) with a means for invoking the function,

5   whereupon the presentation 1162 is altered, as will now be described with reference to Figures 11D and 11E. Figure 11D is a detailed flow chart of the CLARIFY process 1200. Clarify down 1210 is invoked in the best mode of implementation by user selection

10   1211 of the CONTENT sub-area displaying the content item. In other implementations of the invention, the user control protocol for the clarify down function 1210 may in some other way associate the CLARIFY function with a particular unit of information, for

15   example, by use of a temporal sequence and a CLARIFY button as shown in Figure 8F or by use of an auditory and temporal combination as suggested in connection with Figure 8L. However invoked, when the clarify down function 1210 is selected, the presentation is

20   altered: first, if there is an item in the CONTEXT area (i.e. the parent item for the level displayed in the CONTENT area), that item is moved 1215 to the IDENTITY LIFO queue; second, the selected content item is moved 1216 to the CONTEXT area; and third,

25   the CONTENT area is filled 1217 with the information items in the level under the selected content item which is now the parent item shown in the CONTEXT area.

Clarify up 1220 is invoked in the best mode by

30   user selection 1221 of the IDENTITY area. In other

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implementations of the invention, the user control

protocol for the clarify up function 1220 may in some

other way allow the user to select the services of

the IDENTITY LIFO queue, for example, by use of an

5   arrow button as shown in Figure 8F or by use of an

auditory control as suggested in connection with

Figure 8L. However invoked, clarify up 1220 causes

the last item in the IDENTITY LIFO queue to be moved

1225 back to the CONTEXT area; also, the CONTENT area

10   is then filled 1226 with the information items in the

level under the item which has been moved back to the

CONTEXT area.

        Overlay 1230 is invoked in the best mode by user

selection 1231 of the CONTEXT area, which causes the

15   CONTENT area to be filled 1235 with overlay items

associated with the item in the CONTEXT area. These

overlay items may be arranged in a hierarchy and may

be operated on by the CLARIFY 1200 and MEMORIZE 1300

processes in the same manner as described herein for

20   any other body of information arranged in a

hierarchy, except that it is a design choice whether

to allow the context overlay function to operate when

a context overlay is active, because in certain

circumstances (such as use of the context overlay to

25   handle properties applicable across all units in a

hierarchy) the overlay function 1230 will have no

effect since the context overlay is already active.

        Figure 11E is a detailed flow chart of MEMORIZE

process 1300. Memorize 1310 is invoked by user

30   selection 1311 of a memorize indicator applicable to

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an item displayed in a CONTENT sub-area. Not every
item in a CONTENT sub-area may have an applicable
memorize indicator. In the best mode of
implementation, a memorize indicator would be an area
5   marked in the upper left corner of a CONTENT sub-area
in a three-by-three grid. Replicate 1320 may be
invoked by user selection of a replicate indicator,
which in the best mode of implementation would be an
area marked in the upper left corner of the DESIRE
10   area. Replicate 1320 may also happen automatically
following activation of a memorize indicator. While
it is possible to implement the invention otherwise,
a preferred embodiment would act automatically if no
user choice between multiple alternatives is
15   available.

Overlay 1330 is typically invoked automatically
when alternate choices for action are available to
the user immediately following activation of a
memorize function or a replicate function. Activation
20   of the overlay 1330 causes the CONTENT area to be
filled 1335 with overlay items associated with the
item(s) which have been memorized to the DESIRE area.
These overlay items may be arranged in a hierarchy
and may be operated on by the CLARIFY 1200 and
25   MEMORIZE 1300 processes in the same manner as
described herein for any other body of information
arranged in a hierarchy. Indeed, an implementation
of the invention may involve recursive application of
context overlays upon desire overlays.

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While the invention has been described in terms of preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the 5   appended claims.

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CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1   1.   A user interface, comprising:
2   means for displaying a body of information for a
3   user;
4   means for said user to clarify units of
5   information in said body of information; and
6   means for said user to memorize said units of
7   information.

1   2.   The interface of claim 1, further comprising
2   context overlay means for said user to clarify and
3   memorize properties of said units of information.

1   3.   The interface of claim 1, further comprising
2   desire overlay means for said user to clarify and
3   memorize alternative choices for said memorized units
4   of information.

1   4.   The interface of claim 1, further comprising:
2   context overlay means for said user to clarify
3   and memorize properties of said units of information;
4   and
5   desire overlay means for said user to clarify
6   and memorize alternative choices for said memorized
7   units of information.

1   5.   The interface of claim 1, wherein said body of

2   information is a hierarchy of said units of

3   information, said hierarchy being multi-hierarchical

4   and having layers.

1   6.   The interface of claim 5, wherein said

2   displaying means includes a content area for

3   displaying a layer of said multi-hierarchy, said

4   layer containing one or more of said units of

5   information.

1   7.   The interface of claim 6, wherein said content

2   area is divided into one or more content sub-areas as

3   necessary for conveniently displaying said units of

4   information.

1   8.   The interface of claim 7, wherein said

2   clarifying means further comprises:

3   means for selecting one of said displayed units

4   of information; and

5   means for subsequently displaying in said

6   content area a layer of said multi-hierarchy which is

7   subordinate to said selected unit of information,

8   said subsequent display of said subordinate layer

9   thereby replacing said display of said layer.

1   9.   The interface of claim 8, further comprising a

2   navigational control for subsequent redisplay in said

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3   content area of the layer most recently replaced by

4   said clarifying means.

1   10.   The interface of claim 9, wherein said

2   memorizing means further comprises means for

3   selecting a memorization indicator, said memorization

4   indicator being associated with a displayed unit of

5   information.

1   11.   The interface of claim 10, wherein said

2   memorizing means further comprises means for acting

3   upon said selected units of information.

1   12.   The interface of claim 11, wherein said

2   memorizing means further comprises optional means for

3   collecting one or more of said selected units of

4   information prior to activation of said acting means.

1   13.   The interface of claim 12, wherein said acting

2   means are activated automatically.

1   14.   The interface of claim 12, wherein said acting

2   means operates upon said body of information.

1   15.   The interface of claim 12, wherein said acting

2   means operates to connect said interface to an

3   external system.

1   16.   The interface of claim 12, wherein said acting

2   means further comprise a user selectable replication

3   indicator.

1   17.   The interface of claim 16, wherein said

2   navigational control is a last-in-first-out identity

3   area.

1   18.   The interface of claim 17, wherein said identity

2   area contains representations of successively

3   selected and clarified units of information, moved

4   successively upon clarification into said context

5   area and then into said identity area, and moved

6   successively upon selection of said identity area out

7   of said identity area into said context area.

1   19.   The interface of claim 18, wherein said

2   representations of units of information contained in

3   said identity area are arranged in a symmetrical

4   array.

1   20.   The interface of claim 18, wherein said

2   memorization indicator is a small area of said sub-

3   area.

1   21.   The interface of claim 20, wherein said

2   selection is made by touching in said small area.

3   22.   The interface of claim 20, wherein said

4   selection is made by clicking a pointing device in

5   said small area.

1   23.   The interface of claim 20, wherein said content

2   area is a two-dimensional array of said content sub-

3   areas, said array having an equal number of said

4   content sub-areas along each of said dimensions.

1   24.   The interface of claim 23, wherein said array is

2   a three-by-three array of said content sub-areas,

3   each said sub-area being a square.

1   25.   The interface of claim 23, wherein said context

2   area has the dimensions of said content sub-area and

3   is positioned above the rightmost column of said

4   three-by-three array, said desire area has the

5   dimensions of said content sub-area and is positioned

6   above the leftmost column of said three-by-three

7   array, and said identity area has the dimensions of

8   said content sub-area and is positioned between said

9   context area and said desire area.

1   26.   The interface of claim 20, wherein said content

2   area is a symmetrical array of said content sub-

3   areas.

1   27.   The interface of claim 26, wherein said array is

2   symmetrical about a center point.

1   28. The interface of claim 23, wherein said

2   memorization indicator small area is positioned

3   within said sub-area such that the relationship of

4   said small area to said sub-area is the same as the

5   relationship of said desire area to said content

6   area.

1   29. The interface of claim 25, wherein said

2   memorization indicator small area is an upper left

3   corner of said sub-area.

1   30. The interface of claim 2, wherein said context

2   overlay means further comprises means for initiating

3   operation of said clarifying means and said

4   memorizing means upon a hierarchy of properties

5   associated with said clarified unit of information,

6   wherein said body of information is a hierarchy of

7   said units of information, said hierarchy being

8   multi-hierarchical and having layers, and wherein

9   said displaying means includes a content area for

10   displaying a layer of said multi-hierarchy, said

11   layer containing one or more of said units of

12   information.

1   31. The interface of claim 30, wherein said context

2   initiating means further comprises:

3   a context area for displaying the unit of

4   information most recently clarified, said content

5   area displaying a layer subordinate to said clarified

6   unit; and

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7   means for selecting said context area;

8   wherein said context overlay means further

9   comprises means, operable upon completion of said

10   properties memorizing means, for redisplay in said

11   content area of said layer subordinate to said

12   clarified unit, as filtered by said properties

13   memorized and acted upon.

1   32.   The interface of claim 12, further comprising:

2   context overlay means for said user to clarify

3   and memorize properties of said units of information;

4   and

5   desire overlay means for said user to clarify

6   and memorize alternative choices for said memorized

7   units of information.

1   33. The interface of claim 32, wherein said context

2   overlay means further comprises means for initiating

3   operation of said clarifying means and said

4   memorizing means upon a hierarchy of properties

5   associated with said clarified unit of information.

1   34. The interface of claim 33, wherein said context

2   initiating means further comprises:

3   a context area for displaying the unit of

4   information most recently clarified, said content

5   area displaying a layer subordinate to said clarified

6   unit; and

7   means for selecting said context area;

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8   wherein said context overlay means further

9   comprises means, operable upon completion of said

10   properties memorizing means, for redisplay in said

11   content area of said layer subordinate to said

12   clarified unit, as filtered by said properties

13   memorized and acted upon.

1   35.   The interface of claim 34, wherein said acting

2   means further comprise a user selectable replication

3   indicator.

1   36.   The interface of claim 35, wherein said

2   navigational control is a last-in-first-out identity

3   area.

1   37.   The interface of claim 36, wherein said identity

2   area contains representations of successively

3   selected and clarified units of information, moved

4   successively upon clarification into said context

5   area and then into said identity area, and moved

6   successively upon selection of said identity area out

7   of said identity area into said context area.

1   38.   The interface of claim 37, wherein said

2   representations of units of information contained in

3   said identity area are arranged in a symmetrical

4   array.

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1   39.   The interface of claim 37, wherein said

2   memorization indicator is a small area of said sub-area.

1   40.   The interface of claim 39, wherein said content

2   area is a two-dimensional array of said content sub-

3   areas, said array having an equal number of said

4   content sub-areas along each of said dimensions.

1   41.   The interface of claim 32, wherein said desire

2   overlay means further comprises means for initiating

3   operation of said clarifying means and said

4   memorizing means upon a hierarchy of alternative

5   choices associated with units of information

6   memorized but not acted upon.

1   42.   The interface of claim 41, wherein said desire

2   initiating means further comprises:

3   a desire area for displaying said units of

4   information memorized but not acted upon; and

5   means for selecting said desire area.

1   43.   The interface of claim 42, wherein said desire

2   overlay means further comprises optional means,

3   operable upon completion of said alternative choice

4   memorizing means, for redisplay in said content area

5   of said layer subordinate to said clarified unit.

1   44.   The interface of claim 42, wherein said units of

2   information memorized but not acted upon are

3   displayed in a symmetrical array.

1   45.   The interface of claim 43, wherein said acting

2   means further comprise a user selectable replication

3   indicator.

1   46.   The interface of claim 45, wherein said

2   navigational control is a last-in-first-out identity

3   area.

1   47.   The interface of claim 46, wherein said identity

2   area contains representations of successively

3   selected and clarified units of information, moved

4   successively upon clarification into said context

5   area and then into said identity area, and moved

6   successively upon selection of said identity area out

7   of said identity area into said context area.

1   48.   The interface of claim 47, wherein said

2   representations of units of information contained in

3   said identity area are arranged in a symmetrical

4   array.

1   49.   The interface of claim 47, wherein said

2   memorization indicator is a small area of said sub-

3   area.

1   50.   The interface of claim 49, wherein said content

2   area is a two-dimensional array of said content sub-

3   areas, said array having an equal number of said

4   content sub-areas along each of said dimensions.

1   51.   A user interface, comprising:

2   a protocol for presenting a body of information

3   to a user, said body being comprised of units of

4   information, said presentation protocol using

5   structural elements, each said element being

6   distinguishable by said user from each other said

7   element, at least one of said units of information

8   being presented in at least one of said structural

9   elements;

10   a protocol for clarifying said body of

11 information, said clarifying protocol having user

12 operable functions uniquely associated with said

13 structural elements, operation of said functions

14 being further associated with changes in presentation

15 of said body of information through said structural

16 elements; and

17   a protocol for memorizing selected units of said

18 body of information, said memorizing protocol having

19 user operable functions uniquely associated with said

20 structural elements, operation of said functions

21 being further associated with changes in presentation

22 of said body of information through said structural

23 elements.

1   52.   The interface of claim 51, further comprising a

2   context overlay for filtering said body of

3   information, said context overlay applying said

4   clarifying protocol to a body of property information

5   and applying said memorizing protocol in order to

6   select units of said body of property information for

7   said filtering.

1   53.   The interface of claim 51, further comprising a

2   desire overlay for choosing among alternative action

3   options with respect to said selected units of said

4   body of information, said desire overlay applying

5   said clarifying protocol to a body of action option

6   information and applying said memorizing protocol in

7   order to select units of said body of action option

8   information for action.

1   54.   The interface of claim 51, further comprising:

2   a context overlay for filtering said body of

3   information, said context overlay applying said

4   clarifying protocol to a body of property information

5   and applying said memorizing protocol in order to

6   select units of said body of property information for

7   said filtering; and

8   a desire overlay for choosing among alternative

9   action options with respect to said selected units of

10   said body of information, said desire overlay

11   applying said clarifying protocol to a body of action

12   option information and applying said memorizing

13   protocol in order to select units of said body of

14   action option information for action.

1   55.   The interface of claim 51, wherein said body of

2   information is a hierarchy of said units of

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3   information, said hierarchy being multi-hierarchical

4   and having layers.

1   56.   The interface of claim 55, wherein said

2   structural elements include

3   a content area for displaying a layer of said

4   multi-hierarchy, said layer containing one or more of

5   said units of information;

6   a context area for displaying a unit of

7   information which is parent to said layer displayed

8   in said content area; and

9   an identity area for displaying a history of

10   parents of said displayed layers.

1   57.   The interface of claim 56, wherein said content

2   area is divided into one or more content sub-areas as

3   necessary for conveniently displaying said units of

4   information.

1   58.   The interface of claim 57, wherein said

2   clarifying functions comprise:

3   a clarifying down function, said down function

4   being operable by user selection of one of said

5   displayed units of information, said selected unit

6   then being displayed in said context area, there

7   being then displayed in said content area a layer of

8   said multi-hierarchy which is child to said selected

9   unit of information;

10   a clarifying up function, said up function being

11   operable by user selection of said identity area,

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12 there being then redisplayed in said content area the

13 layer of said multi-hierarchy most recently replaced

14 by said clarifying down function; and

15   an optional context overlay function, operable

16 by user selection of said context area, for

17 displaying in said content properties associated with

18 said parent unit displayed in said context area.

1   59. The interface of claim 58, wherein said

2   structural elements include a desire area for

3   collecting units of information selected by said

4   user.

1   60. The interface of claim 59, wherein said

2   memorizing functions comprise:

3   a memorize function for moving a selected unit

4   of information to said desire area;

5   a replicate function for acting upon units of

6   information collected in said desire area; and

7   an optional desire overlay function for

8   displaying in said content area alternative actions

9   applicable to said collected units of information.

1   61. The interface of claim 60, wherein said memorize

2   function is operable by user selection of a

3   designated area within a content sub-area

4   corresponding to said selected unit of information.

1   62. The interface of claim 60, wherein said memorize

2   function is operable by sequential user selection,

3   first, of a content sub-area corresponding to said

4   selected unit of information and, second, of one of

5   said structural elements designated for memorization.

1   63. The interface of claim 62, wherein said selected

2   unit of information is displayed using a first

3   structural element and said user selection is made

4   using a second structural element.

1   64. The interface of claim 62, wherein said first

2   structural element is a designated portion of a

3   television screen and wherein said second structural

4   element is a designated key on a telephone keypad,

5   there being a unique correspondence evident to said

6   user between said first structural element and said

7   second structural element.

1   65. The interface of claim 60, wherein said

2   replicate function is operable by user selection of a

3   designated area within said desire area.

1   66. The interface of claim 60, wherein said

2   replicate function is activated automatically

3   following operation of said memorize function.

1   67. A method for finding, collecting and acting upon

2   information, comprising the steps of:

3   presenting a body of information, said body

4   being comprised of units of information;

5   clarifying said body of information, said

6 clarification enabling a user to find desired

7 information; and

8   memorizing selected units of said body of

9 information, said memorization enabling said user to

10 collect and act upon said desired information.

1 68. The method of claim 67, wherein said body of

2 information is organized into a hierarchy of said

3 units of information and wherein said presenting step

4 further comprises the steps of:

5   defining a CONTENT element for presenting a

6 layer of said hierarchy, said CONTENT element being

7 comprised of a plurality of CONTENT sub-elements,

8 each unit of information in said layer being

9 associated with one of said CONTENT sub-elements;

10   defining a CONTEXT element representing an

11 information unit which is the parent of said layer;

12   defining an IDENTITY element representing a

13 history of said clarifying step; and

14   defining a DESIRE element for presenting units

15 of information selected by said memorizing step.

1 69. The method of claim 68, wherein said clarifying

2 step further comprises the steps of:

3   clarifying down said hierarchy;

4   clarifying up said hierarchy; and

5   optionally using a context overlay to filter

6 said hierarchy.

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1   70. The method of claim 69, wherein said memorizing

2   step further comprises the steps of:

3   memorizing units of information;

4   replicating said memorized units of information;

5   and

6   optionally using a desire overlay to choose

7   among alternatives for acting upon said memorized

8   units of information.

1   71. A method for finding, collecting and acting upon

2   information, comprising the steps of:

3   defining an interface of structural elements for

4   presenting a body of information to a user, said body

5   being comprised of units of information, said

6   structural elements being distinguishable by a user,

7   said interface providing functions, operable by

8   selection of said structural elements, for clarifying

9   said units of information and for memorizing said

10 units of information;

11   using said interface to present said body of

12 information, to clarify said presented body of

13 information, and to memorize selected units of said

14 body of information.

FIGURE 1

Clarification

Memorization

FIGURE 3

Clarification

Clarification

Clarification

Memor-
ization

Clarification

Clarification

Clarification

Memor-
ization

Clarification

Clarification

Clarification
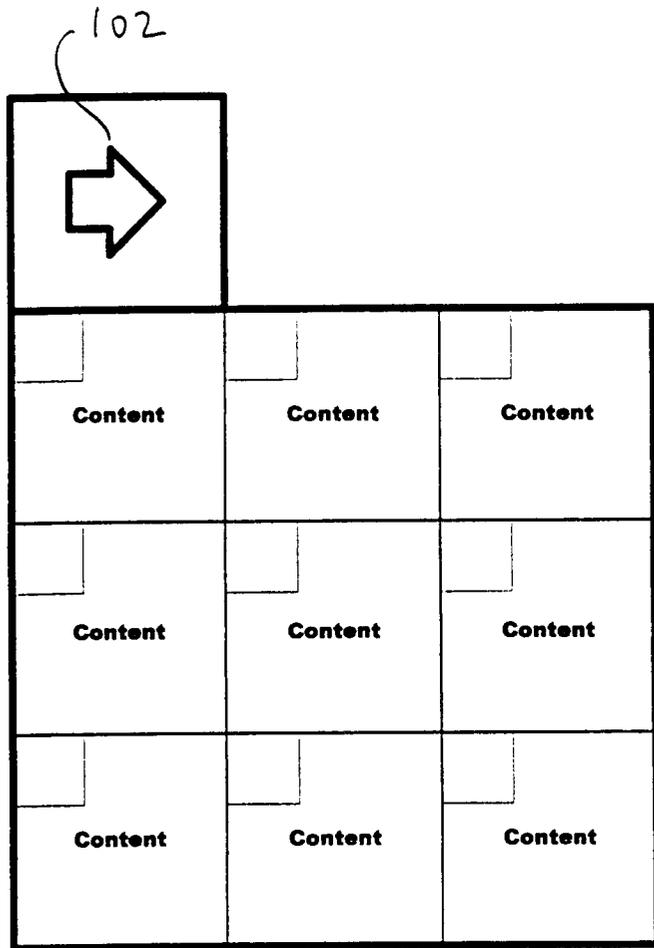
Memor-
ization

FIGURE 2

FIGURE 4

1.1

501
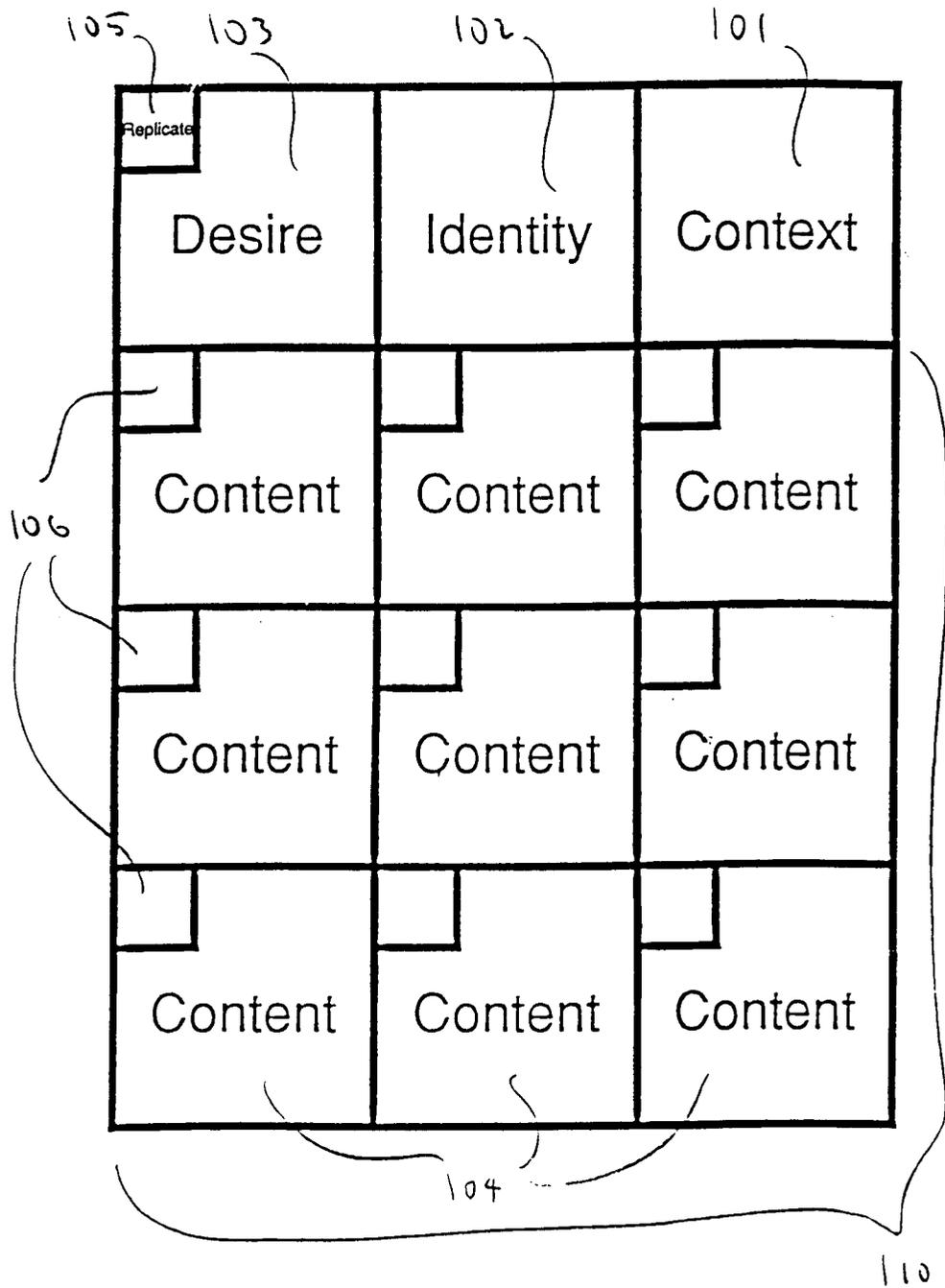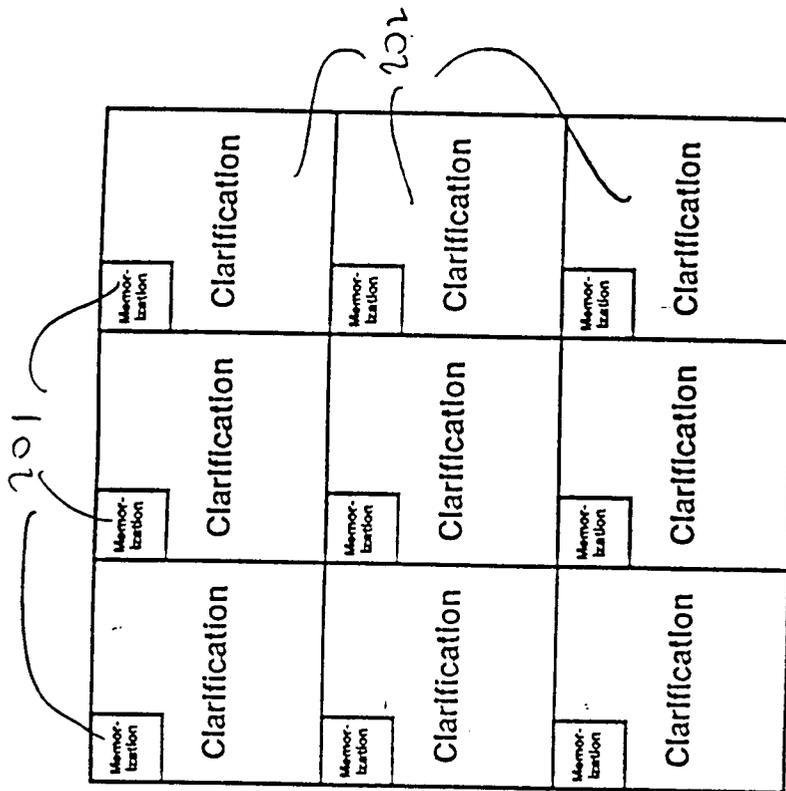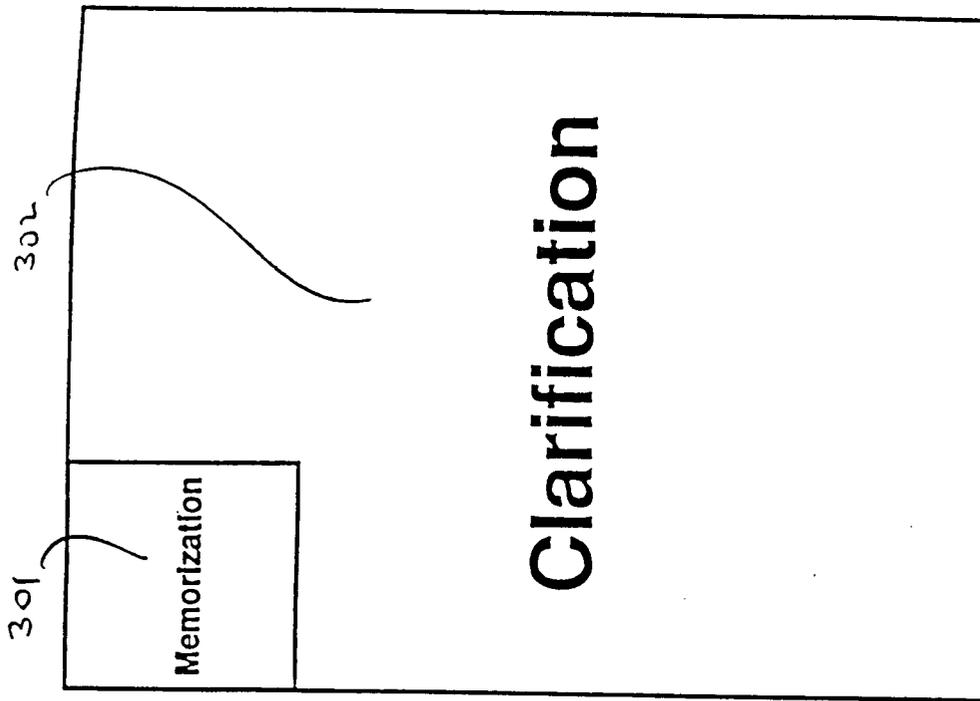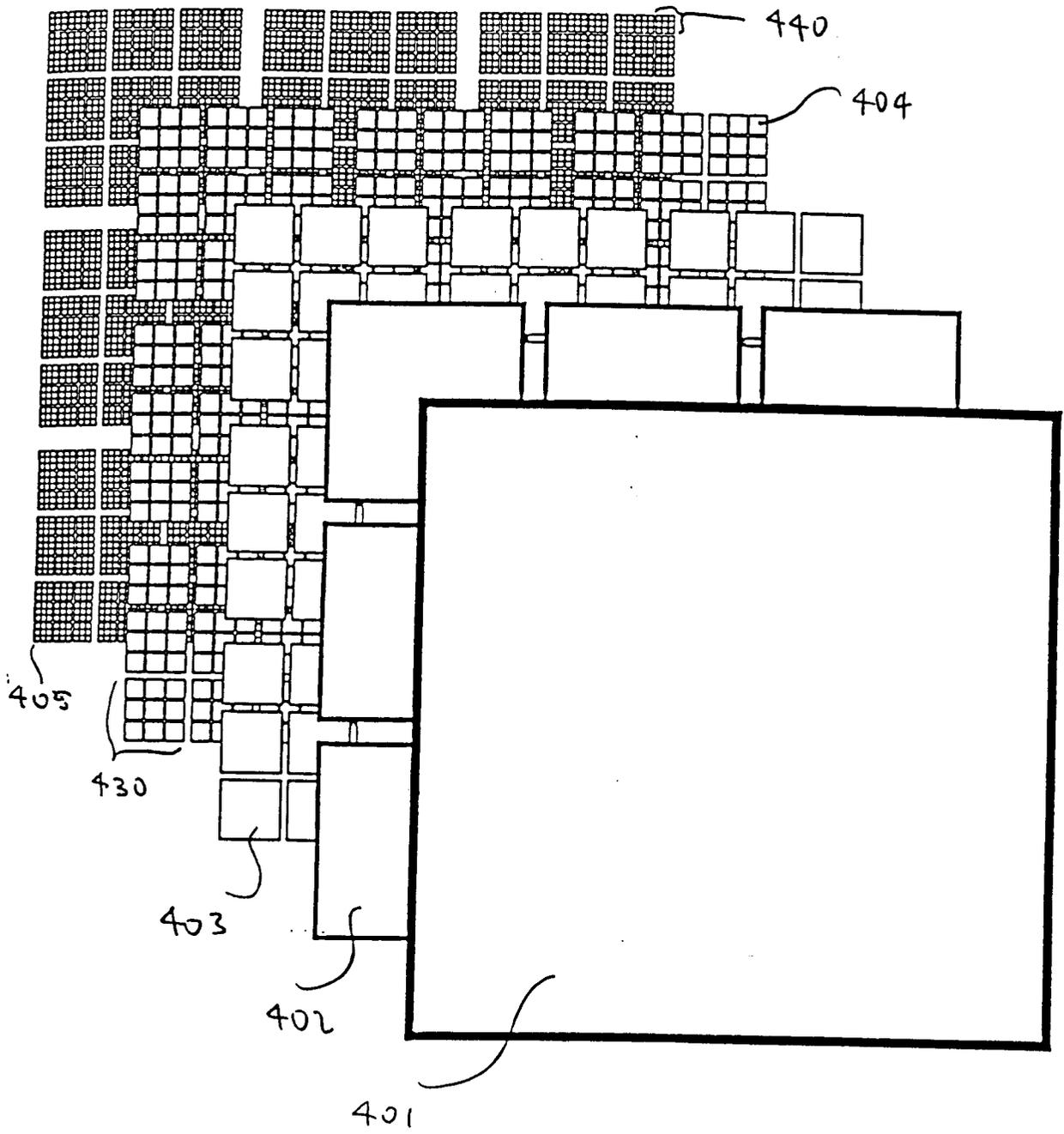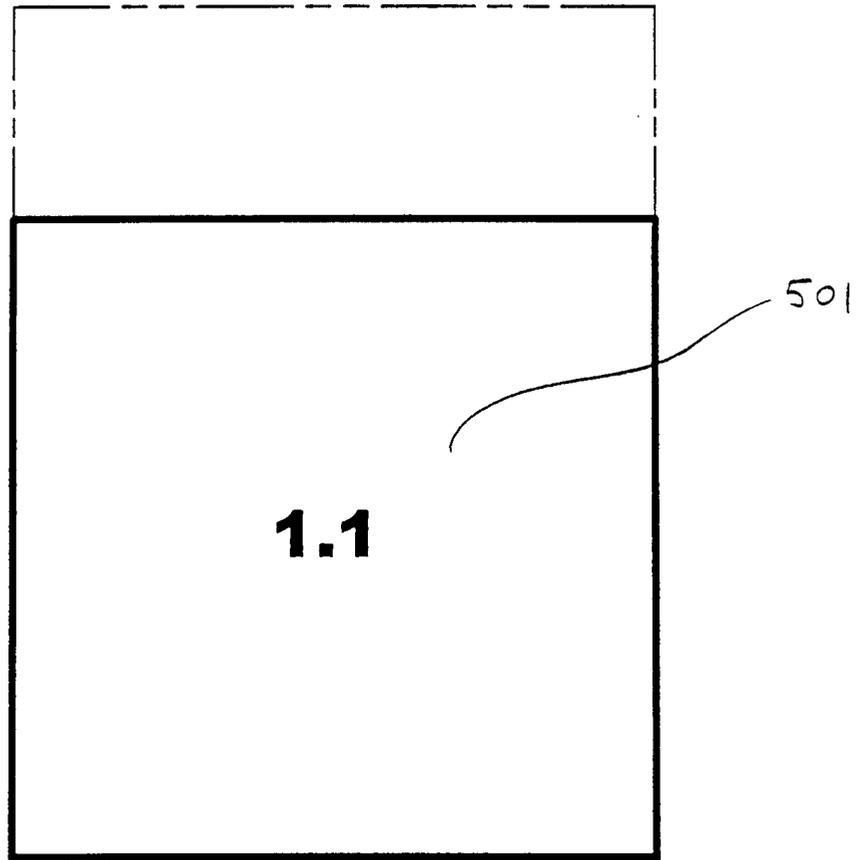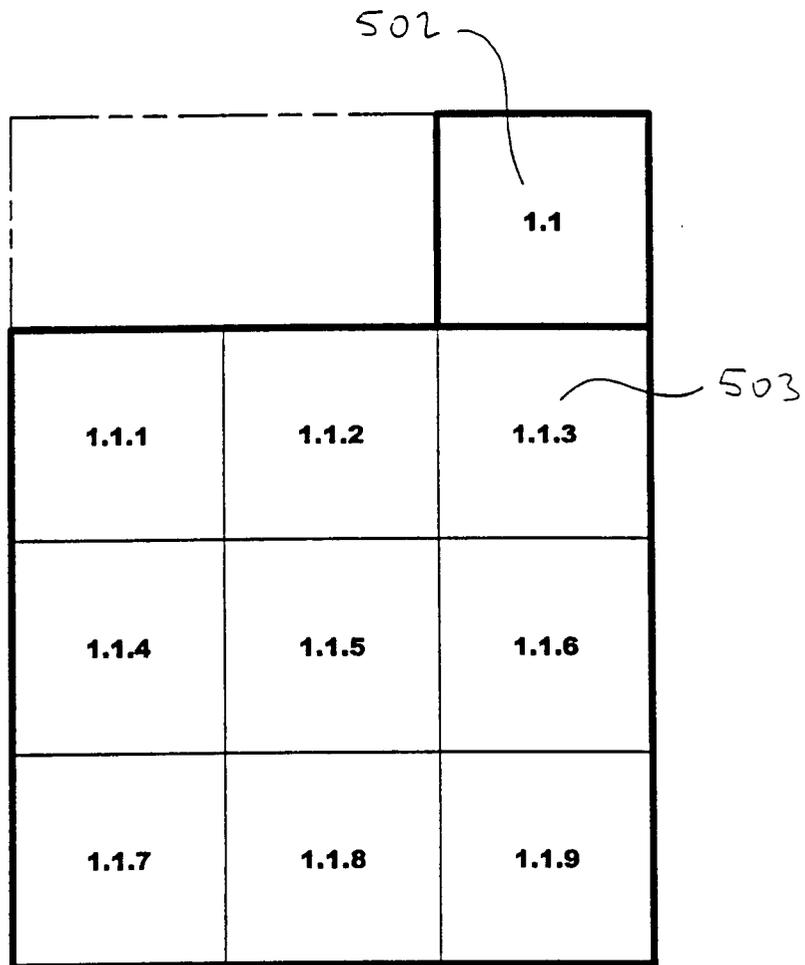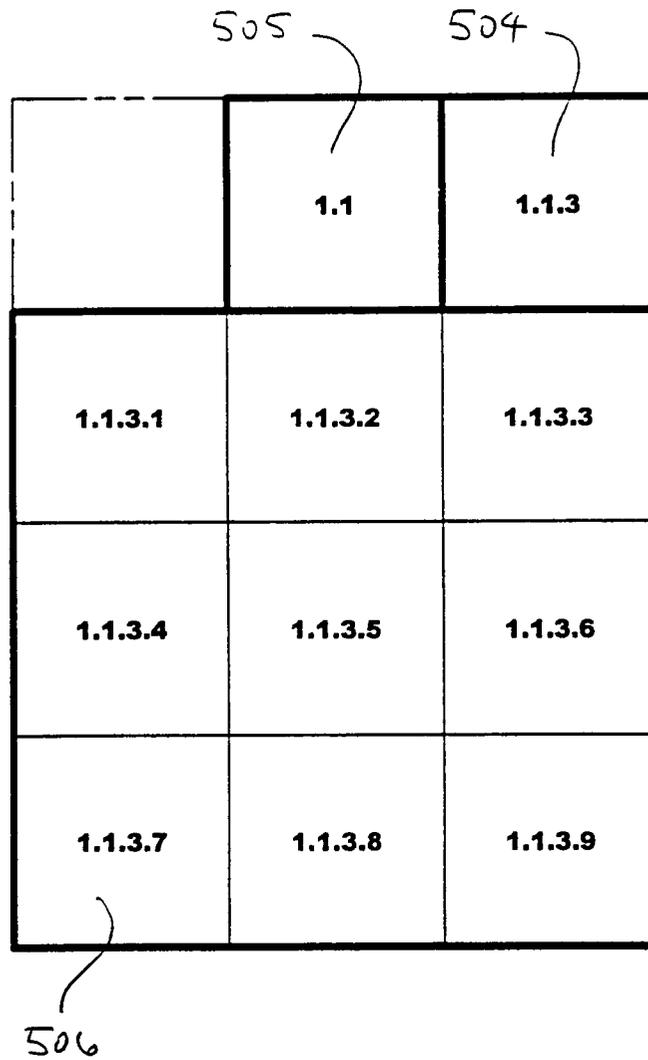
Figure 5A

Figure 5B

Figure 5C
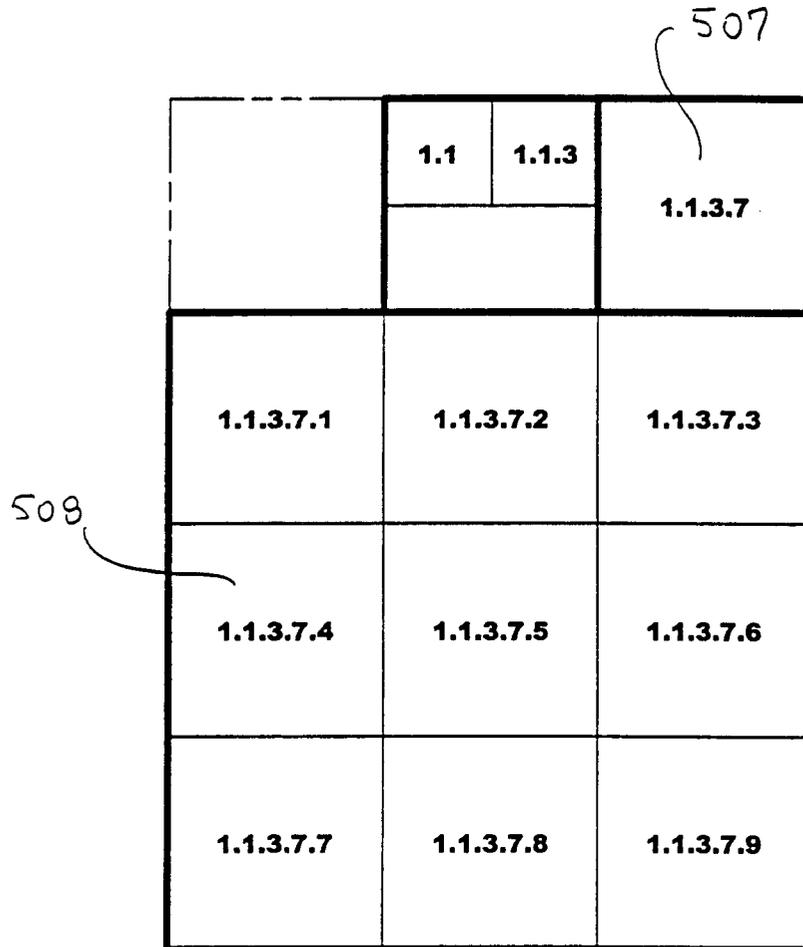
Figure 5D
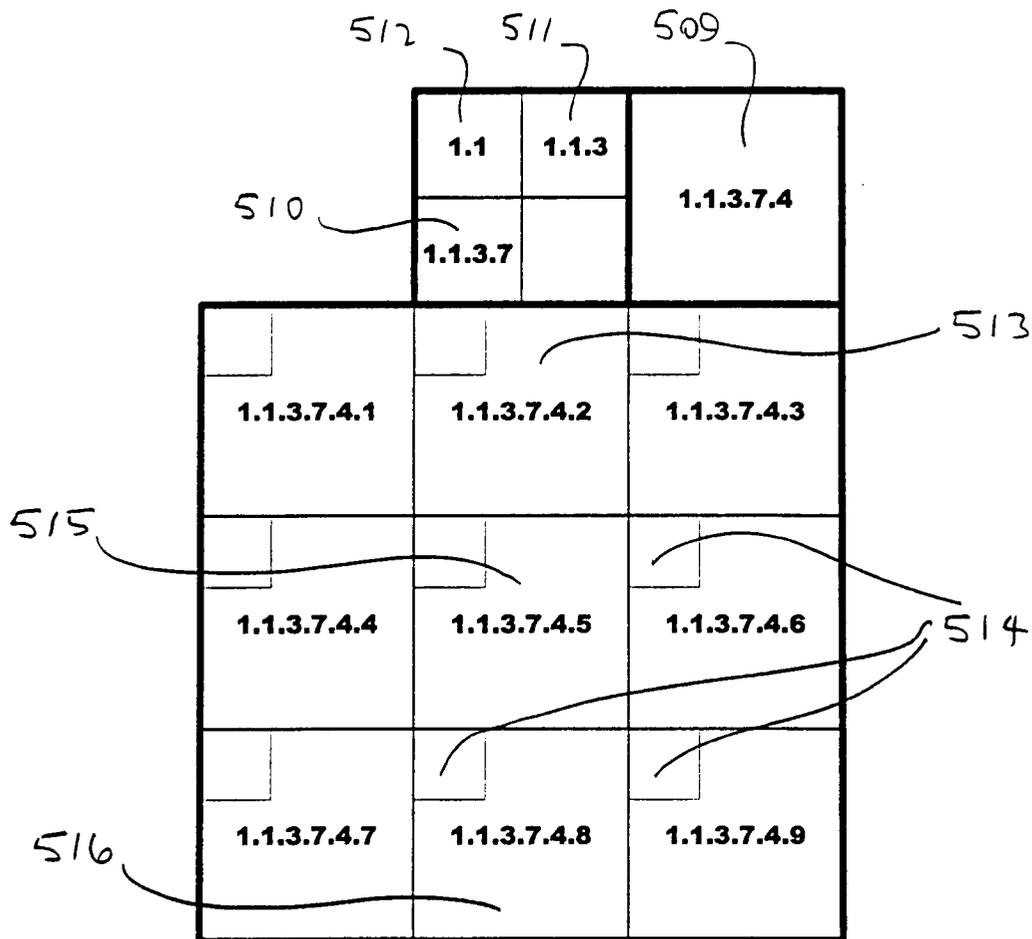
Figure 5E
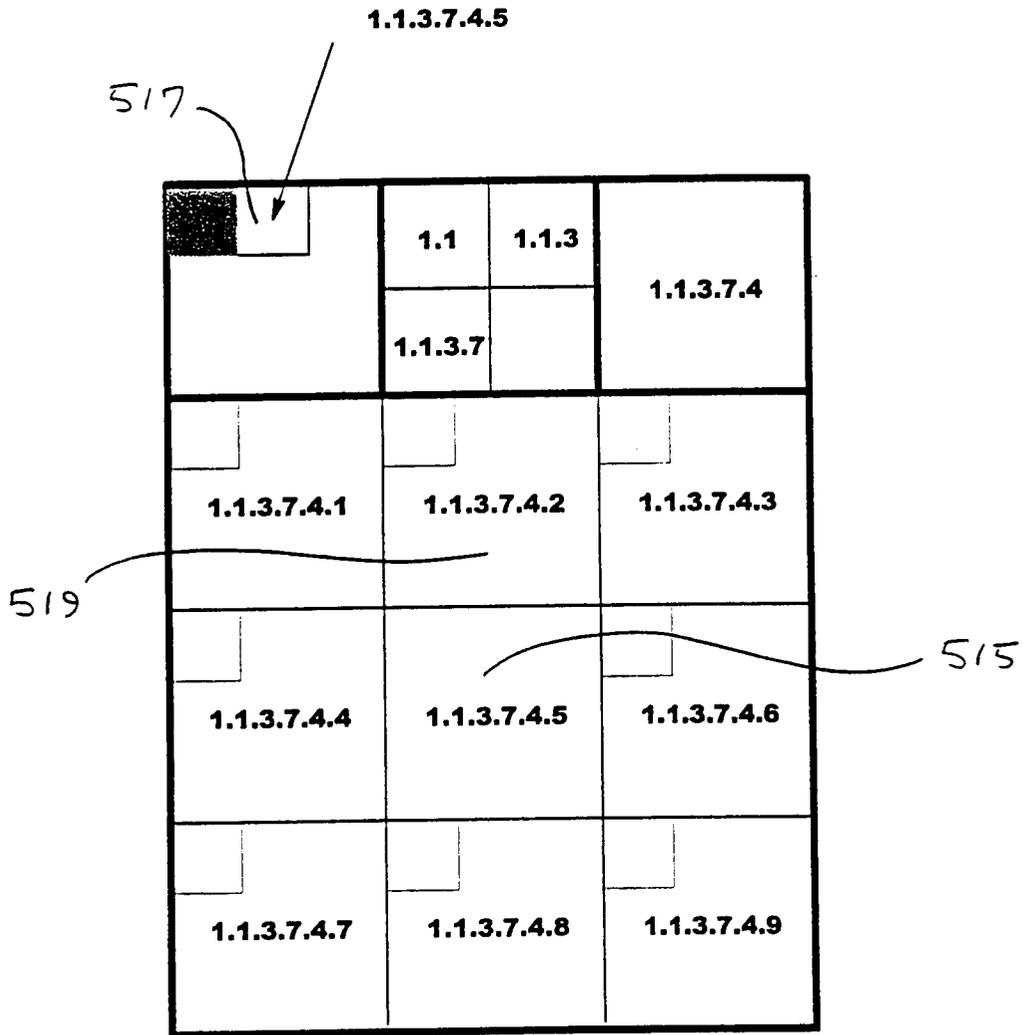
Figure 5F
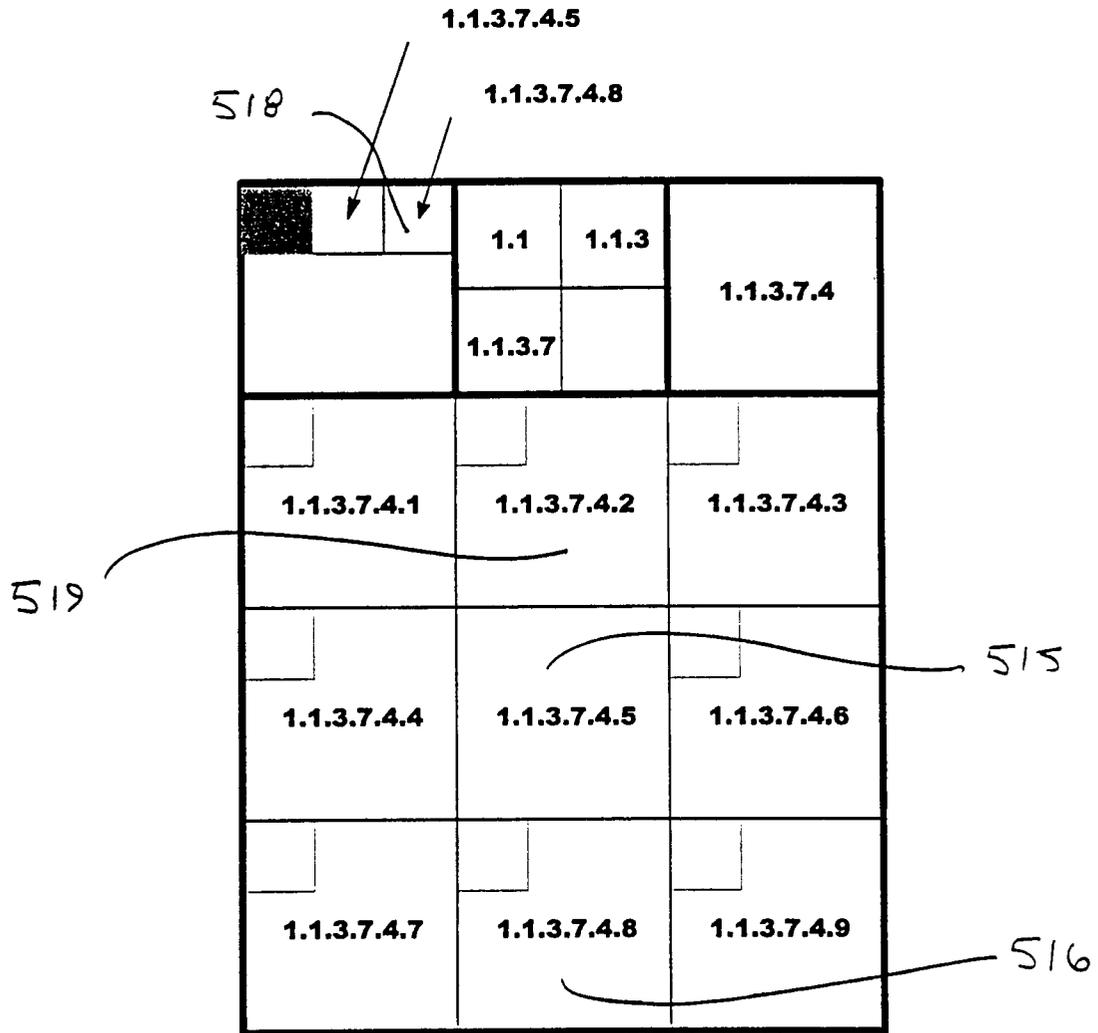
Figure 5G

Figure 5H

Figure 5J

1.1.3.7.4.5

1.1.3.7.4.8

610

Figure 6A

1.1.3.7.4.5

1.1.3.7.4.8

620

9.1.5

9.1.5.1

9.1.5.2

9.1.5.3

9.1.5.4

9.1.5.5

9.1.5.6

9.1.5.7

9.1.5.8

9.1.5.9

Figure 6B

1.1.3.7.4.5

1.1.3.7.4.8

620

	9.1.5	9.1.5.2
9.1.5.2.1	9.1.5.2.2	9.1.5.2.3
9.1.5.2.4	9.1.5.2.5	9.1.5.2.6
9.1.5.2.7	9.1.5.2.8	9.1.5.2.9

630

Figure 6C

9.1.5.2.8

640

	9.1.5	**9.1.5.2**
9.1.5.2.1	**9.1.5.2.2**	**9.1.5.2.3**
9.1.5.2.4	**9.1.5.2.5**	**9.1.5.2.6**
9.1.5.2.7	**9.1.5.2.8**	**9.1.5.2.9**
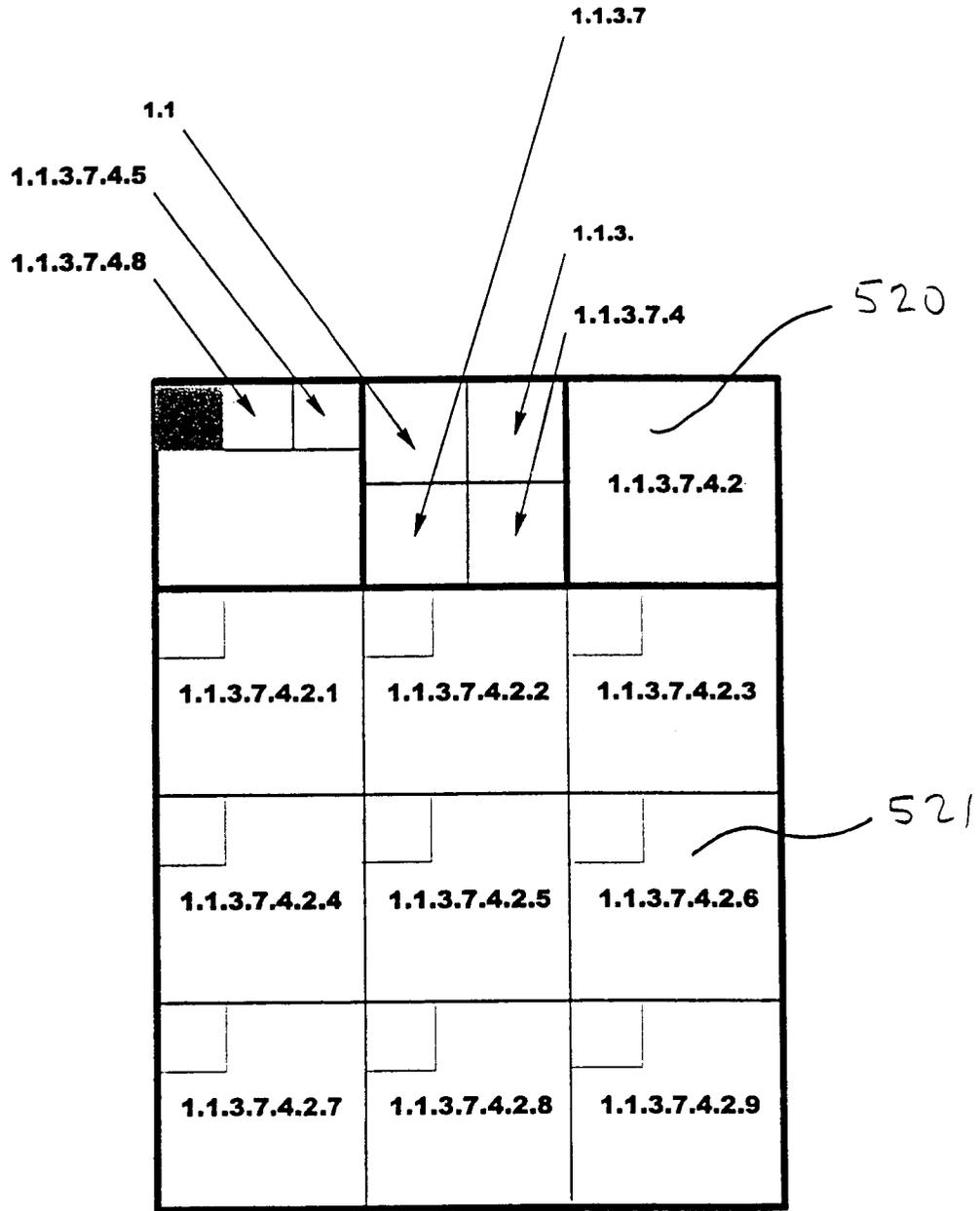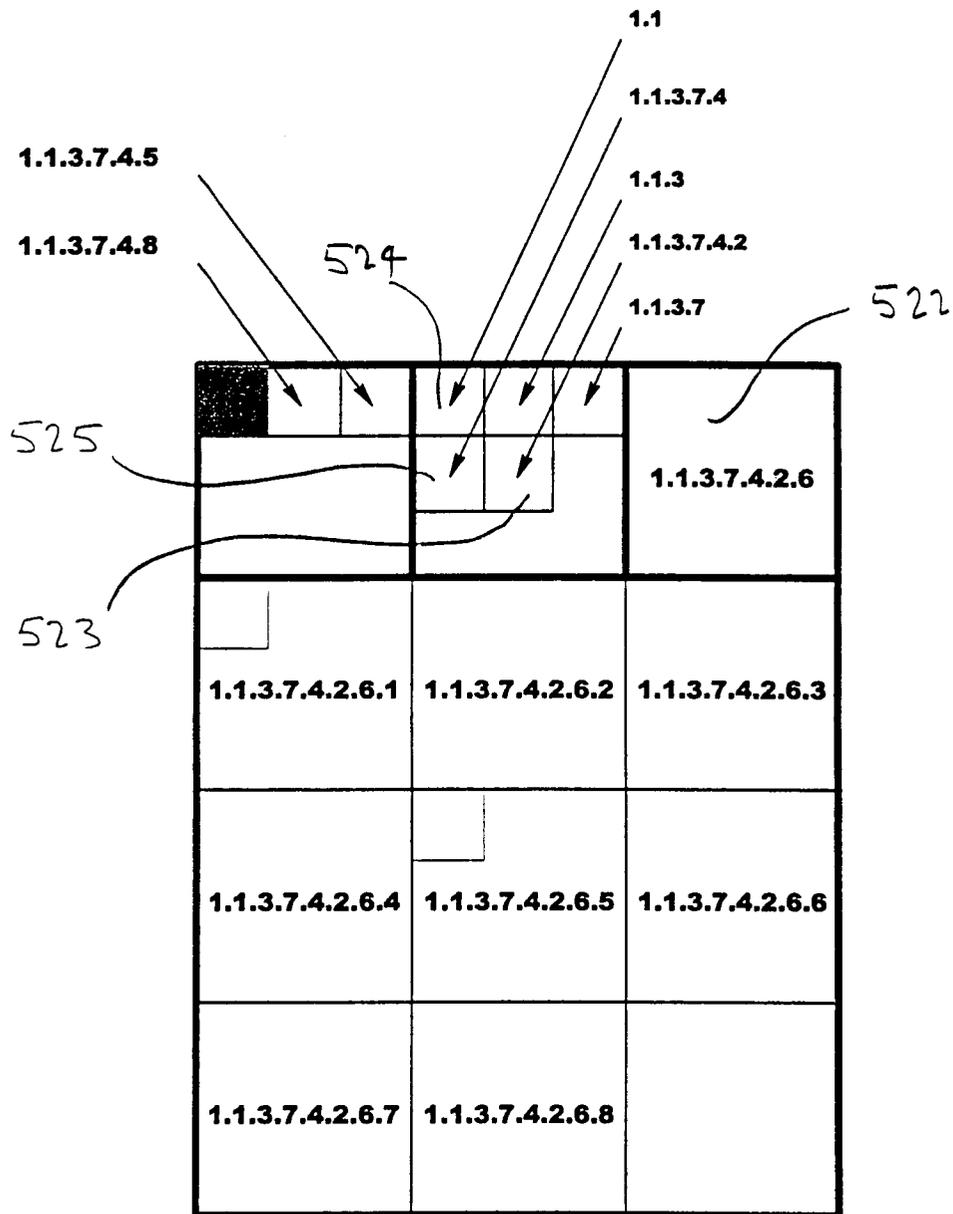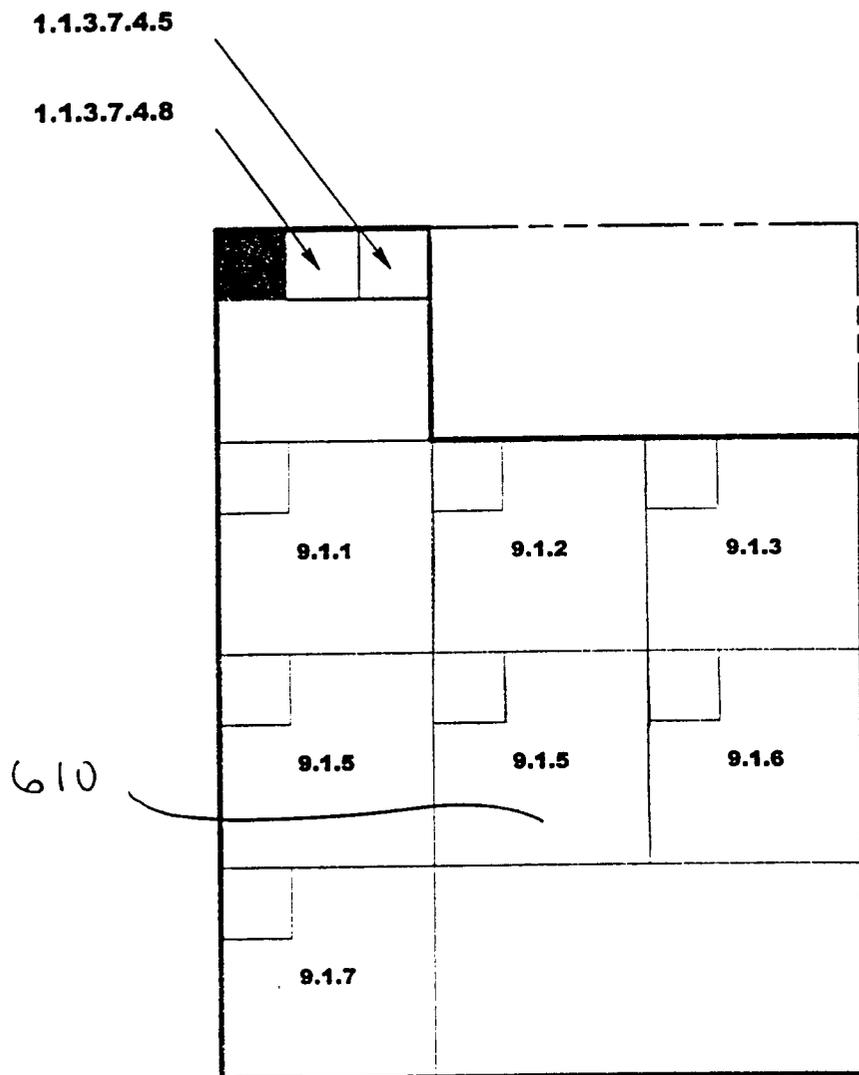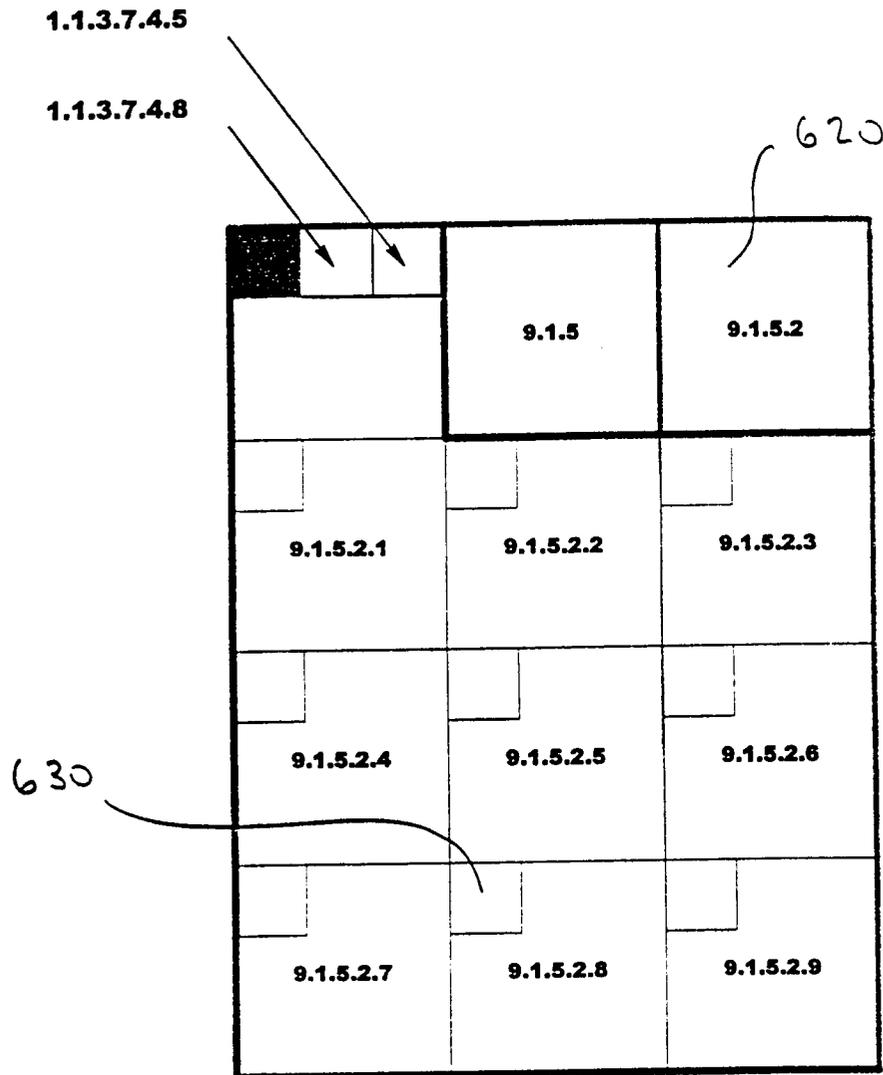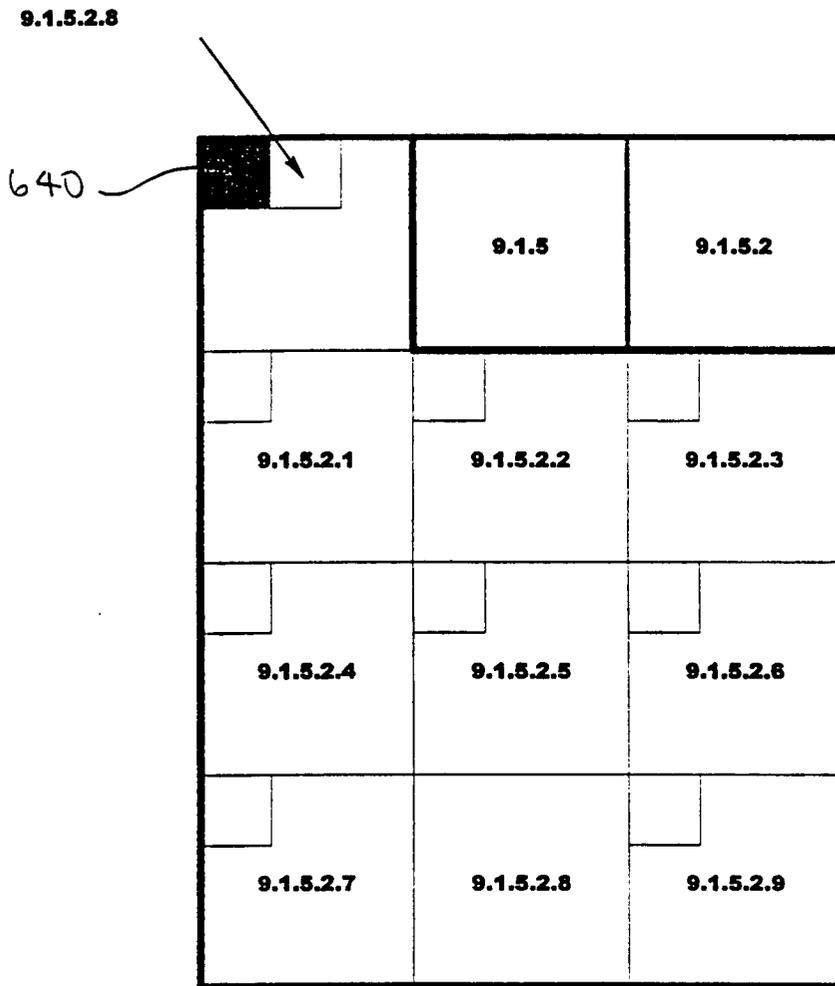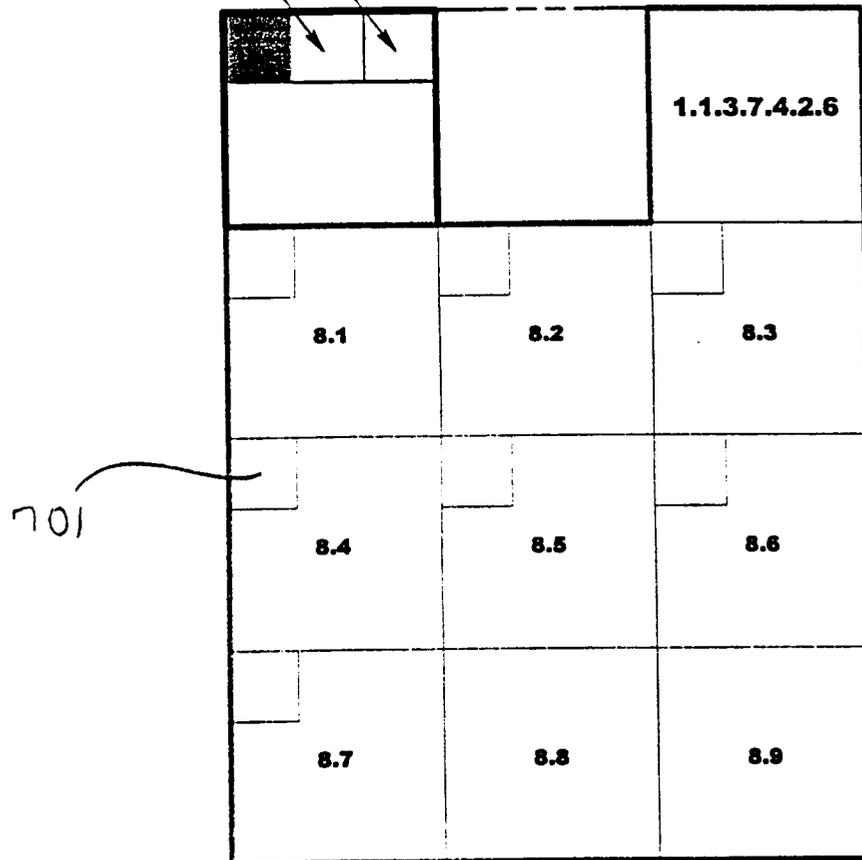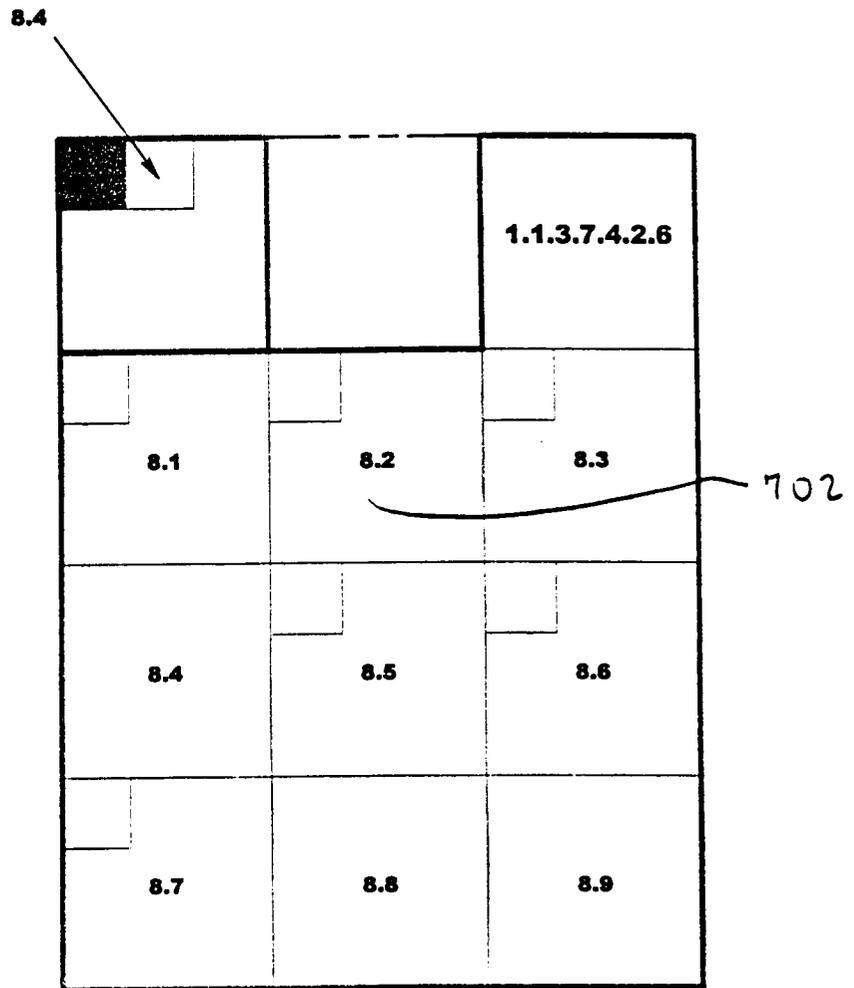
Figure 6D

Figure 7A

Figure 7B

Figure 7C

Figure 7D

8.2.7.9

1.1.3.7.4.2.6

8.4

8.2

720

		8.2.7
8.2.7.1	8.2.7.2	8.2.7.3
8.2.7.4	8.2.7.5	8.2.7.6
8.2.7.7	8.2.7.8	8.2.7.9

Figure 7E

1.1

1.1.3.7.4

1.1.3

1.1.3.7.4.5

1.1.3.7.4.2

1.1.3.7.4.8

1.1.3.7

1.1.3.7.4.2.6

1.1.3.7.4.2.6.1 **1.1.3.7.4.2.6.2** **1.1.3.7.4.2.6.3**

1.1.3.7.4.2.6.4 **1.1.3.7.4.2.6.5**

Figure 7F

Desire ~ 103

Identity ~ 102

Content

Context ~ 101
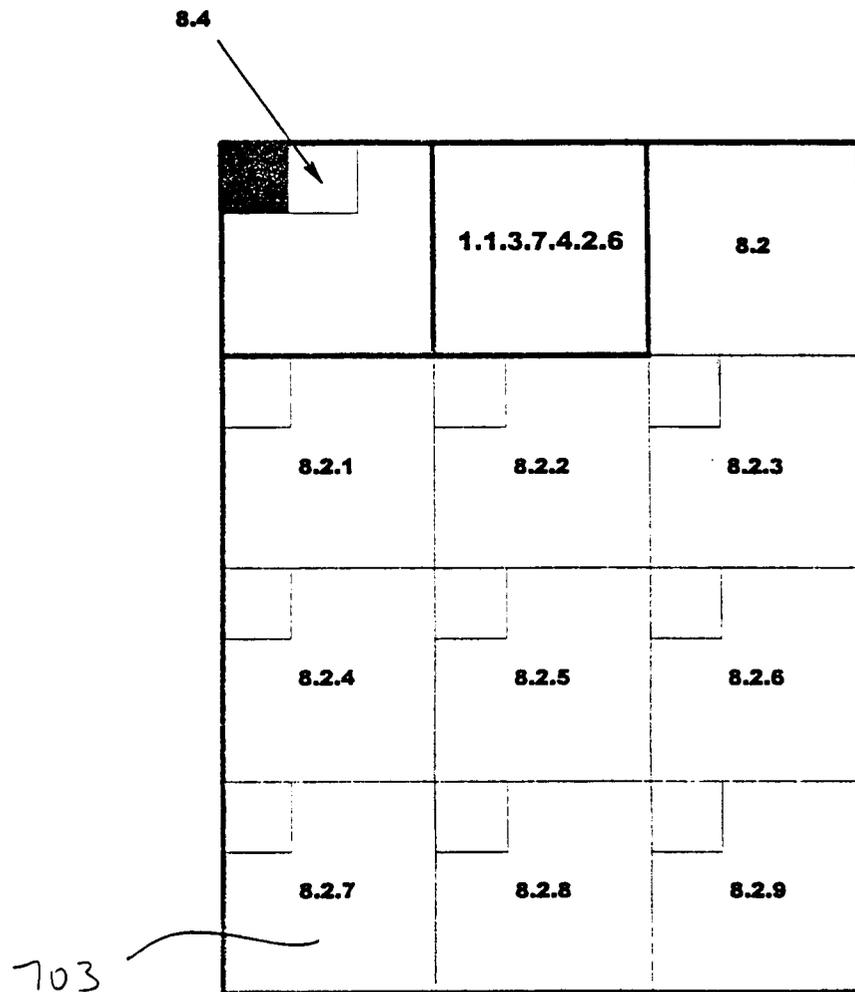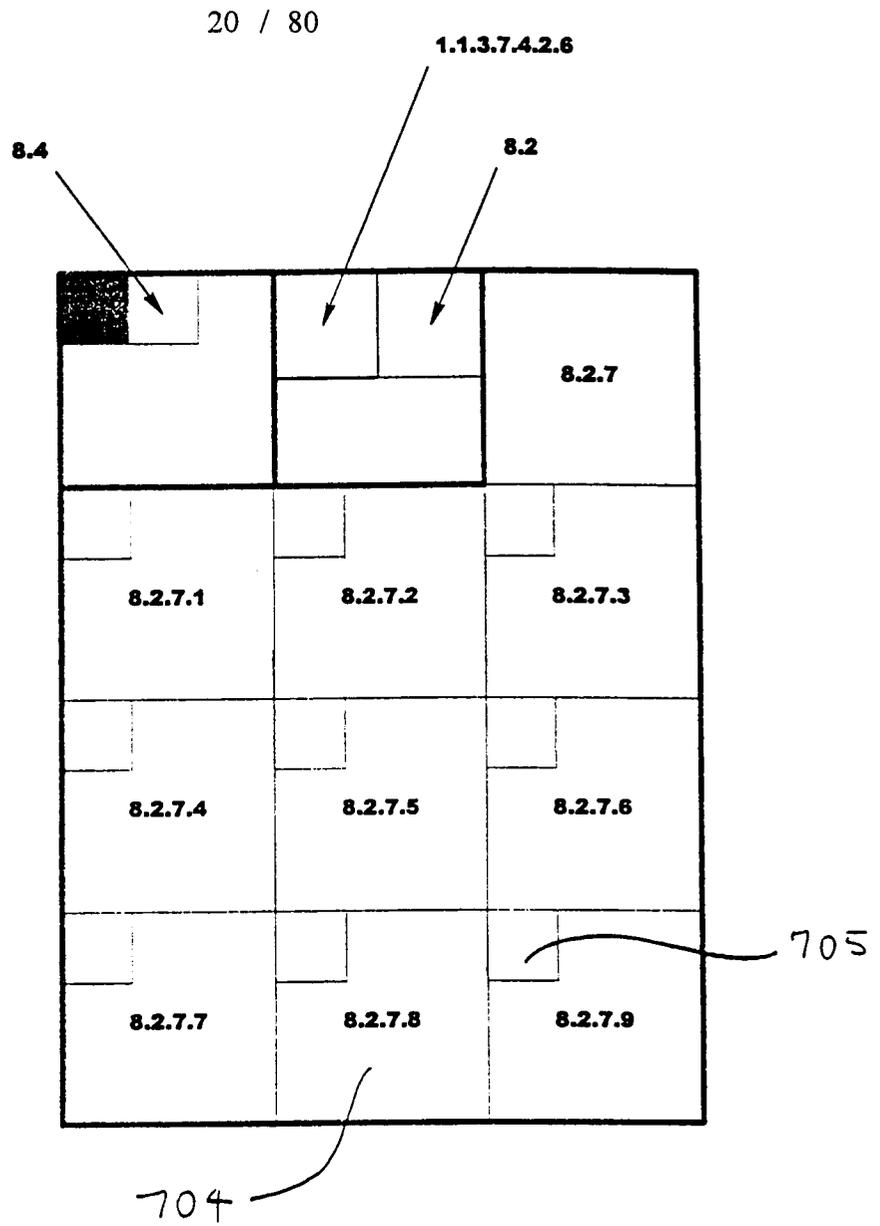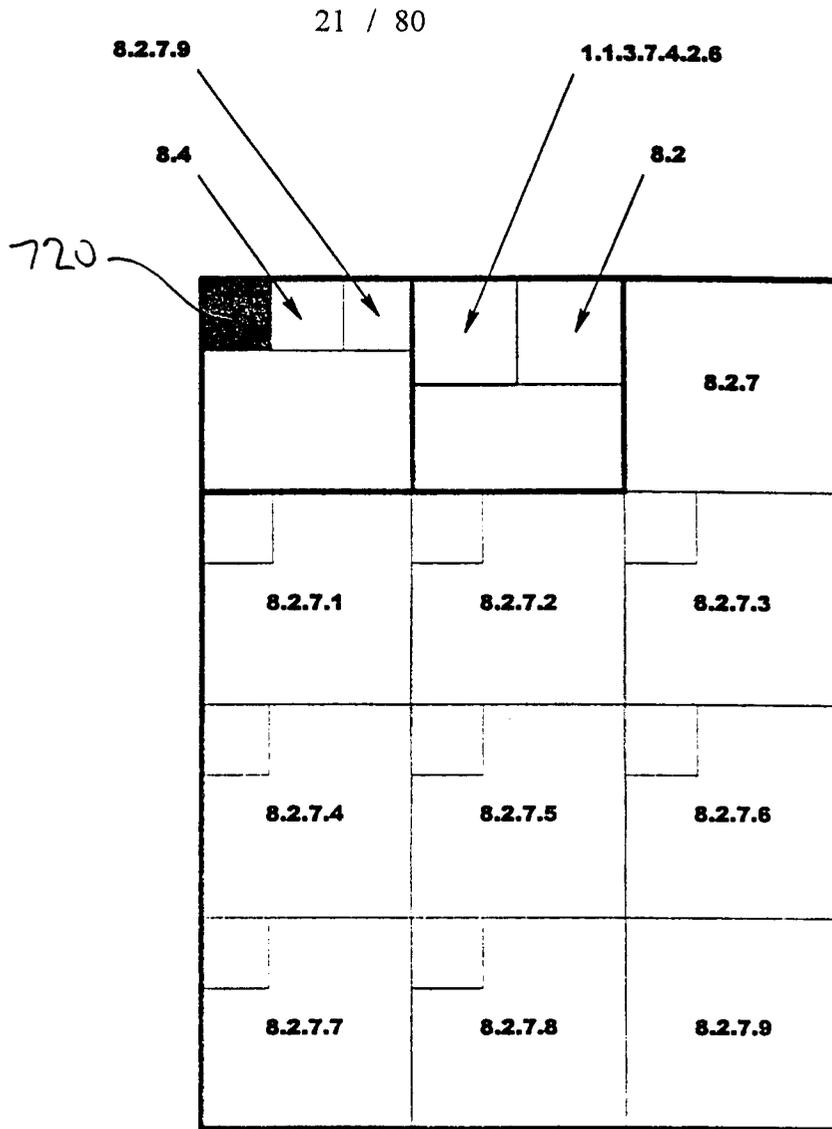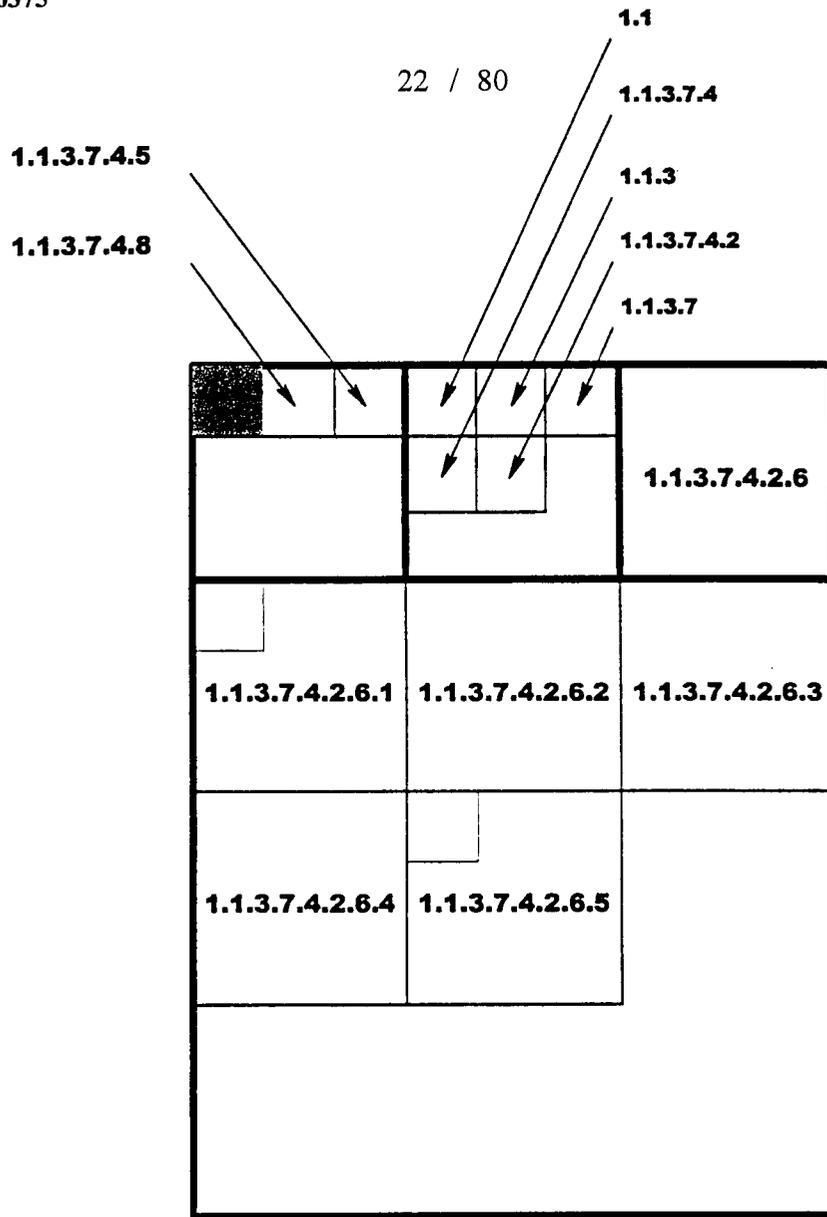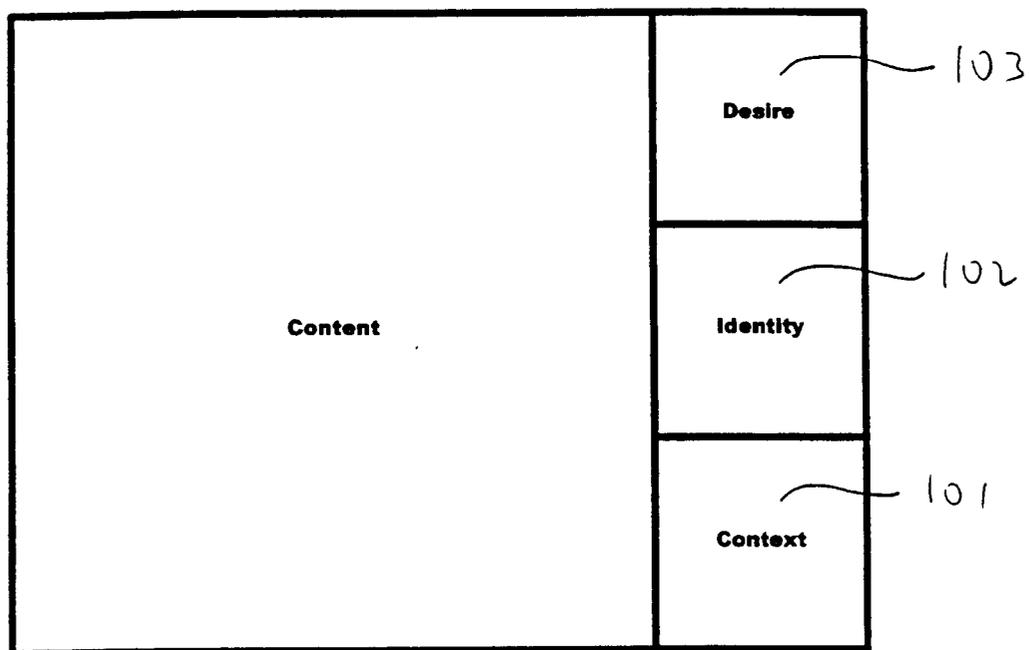
Figure 8A

Figure 8B

Figure 8C

102

	Context
Content	Content	Content
Content	Content	Content
Content	Content	Content

Figure 8D

102

Content | Content | Content

Content | Content | Content

Content | Content | Content
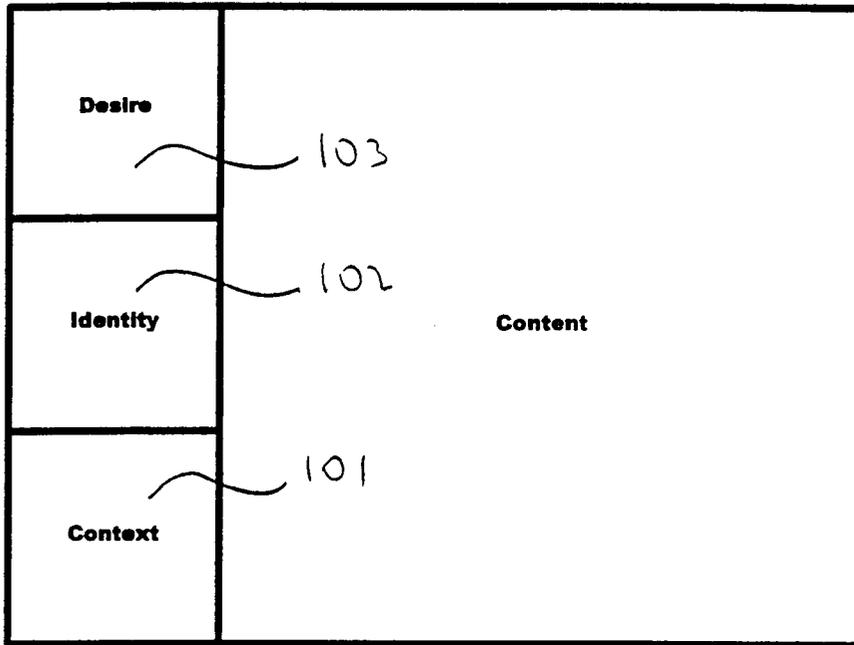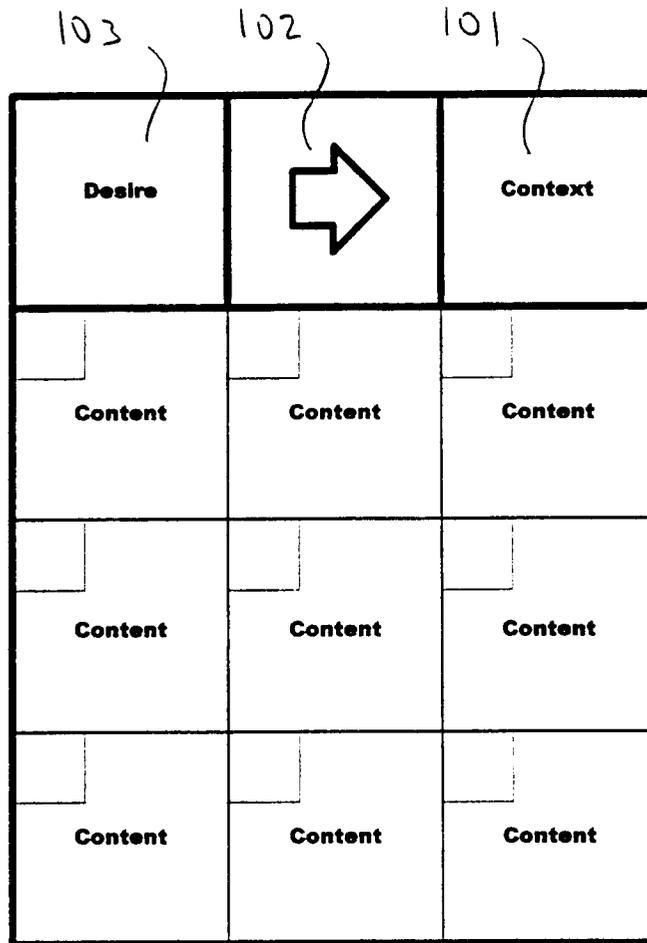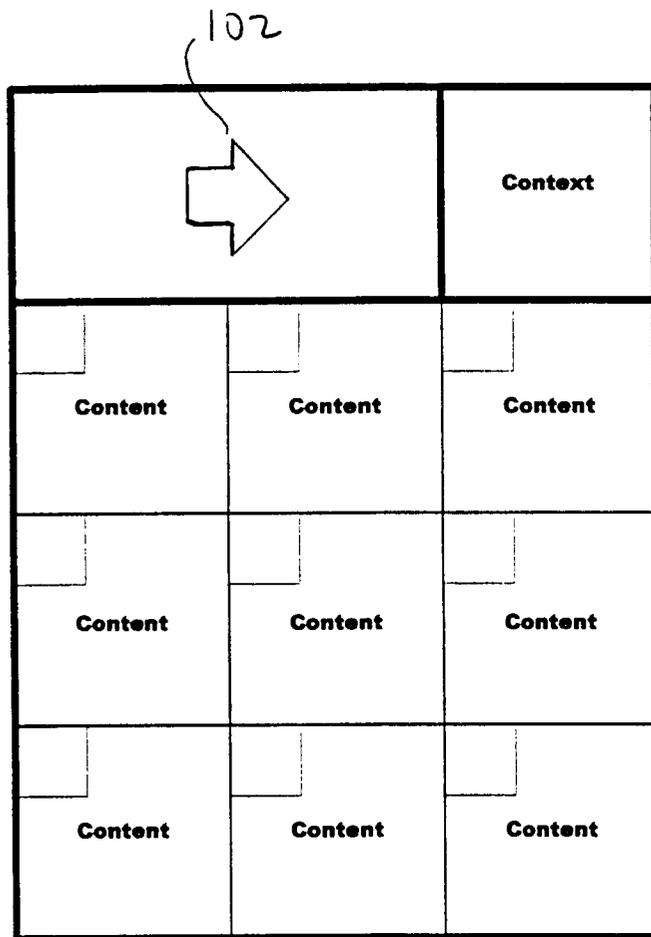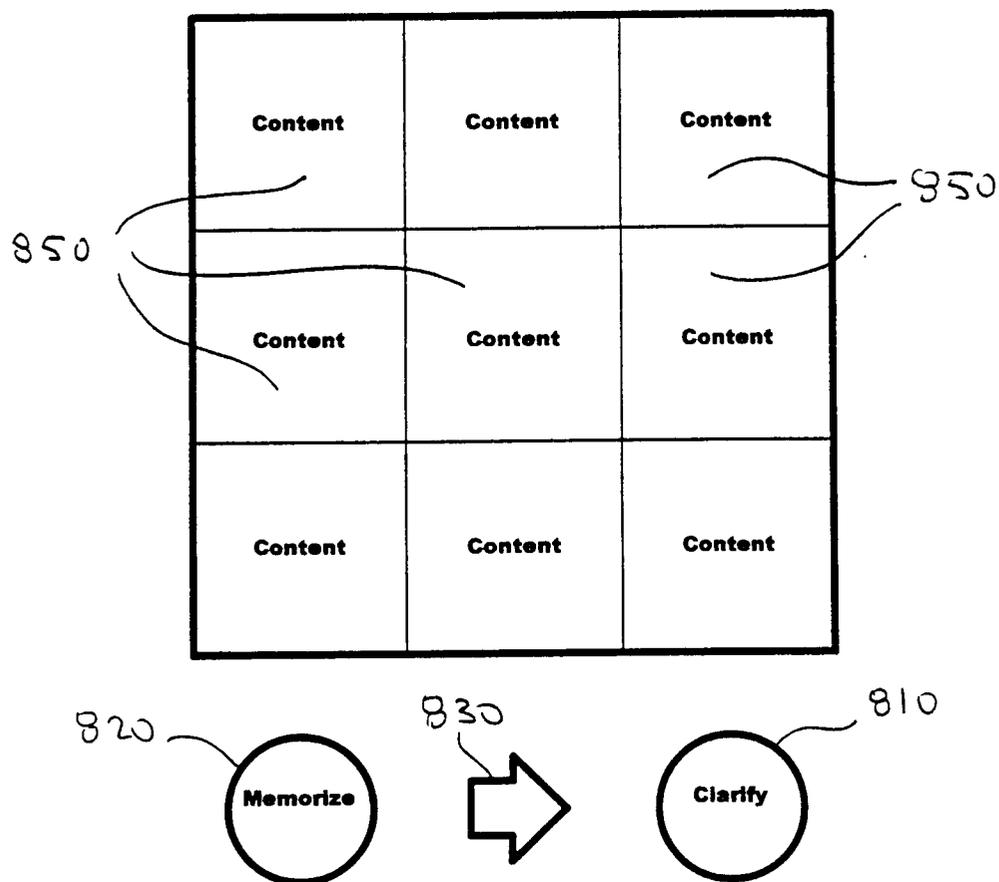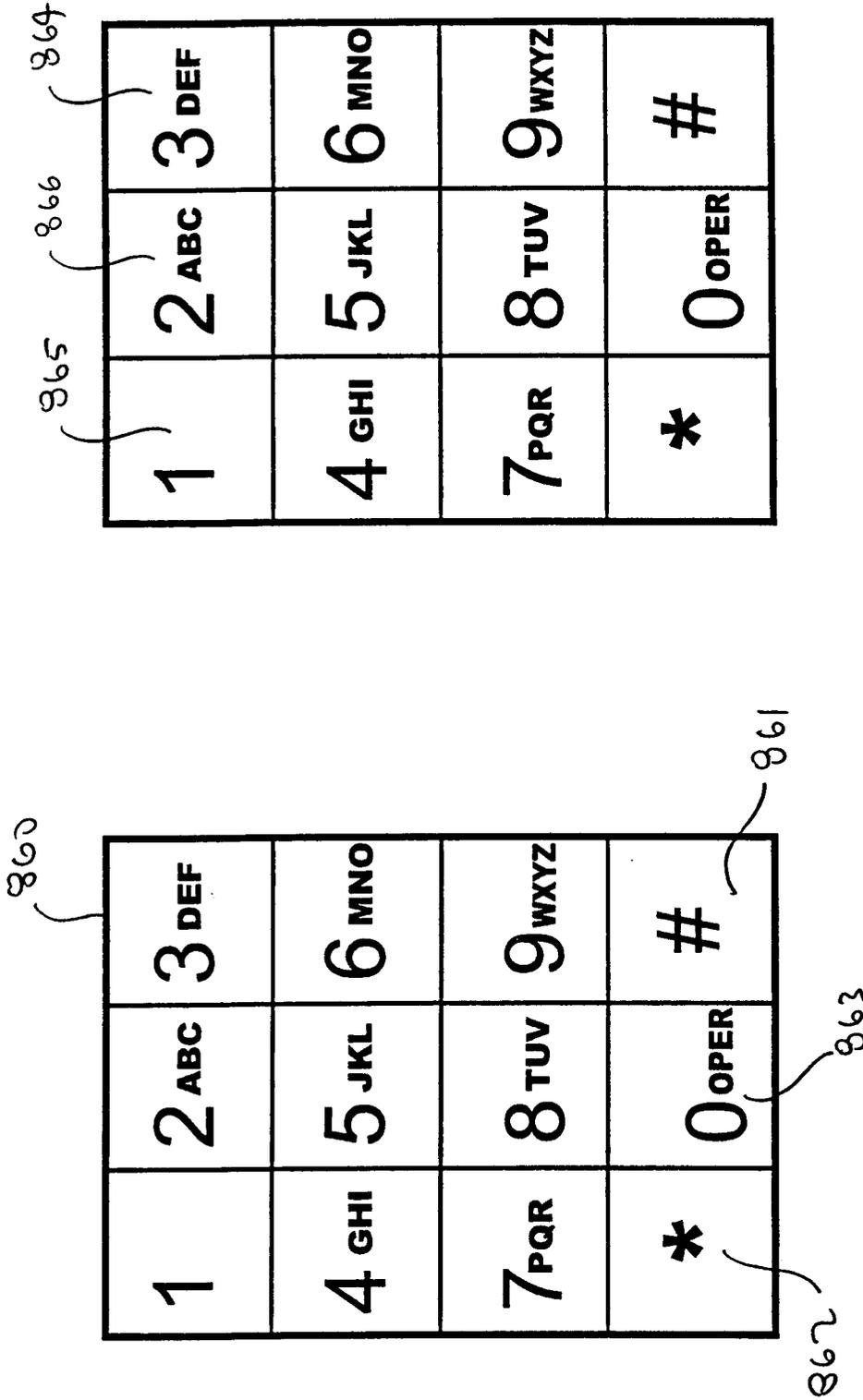
Figure 8E

Figure 8F

Figure 8H

Figure 8G

Figure 8J

Figure 8K

Desire

Identity

Content

Content

Content

Content

Content

Content

Context

Figure 8L

interactive
computer
net. INC.

901
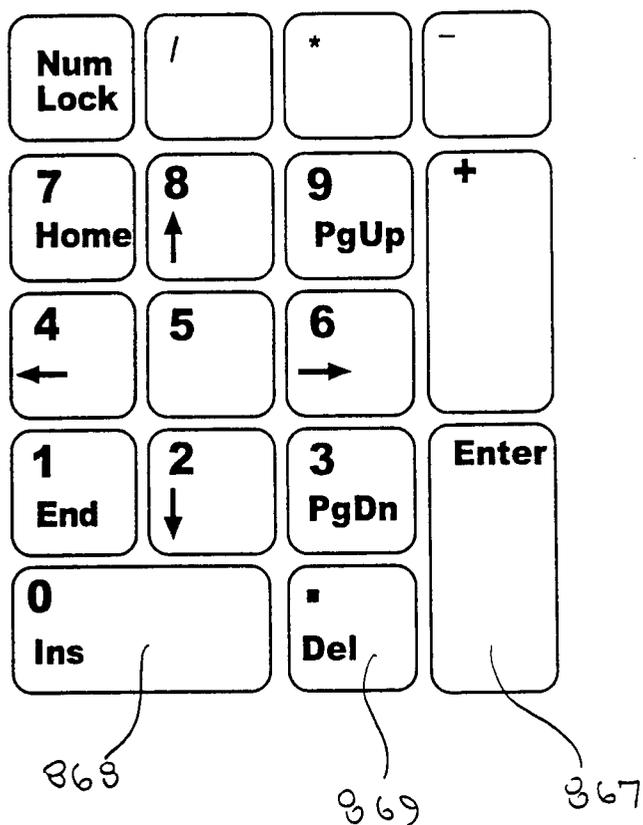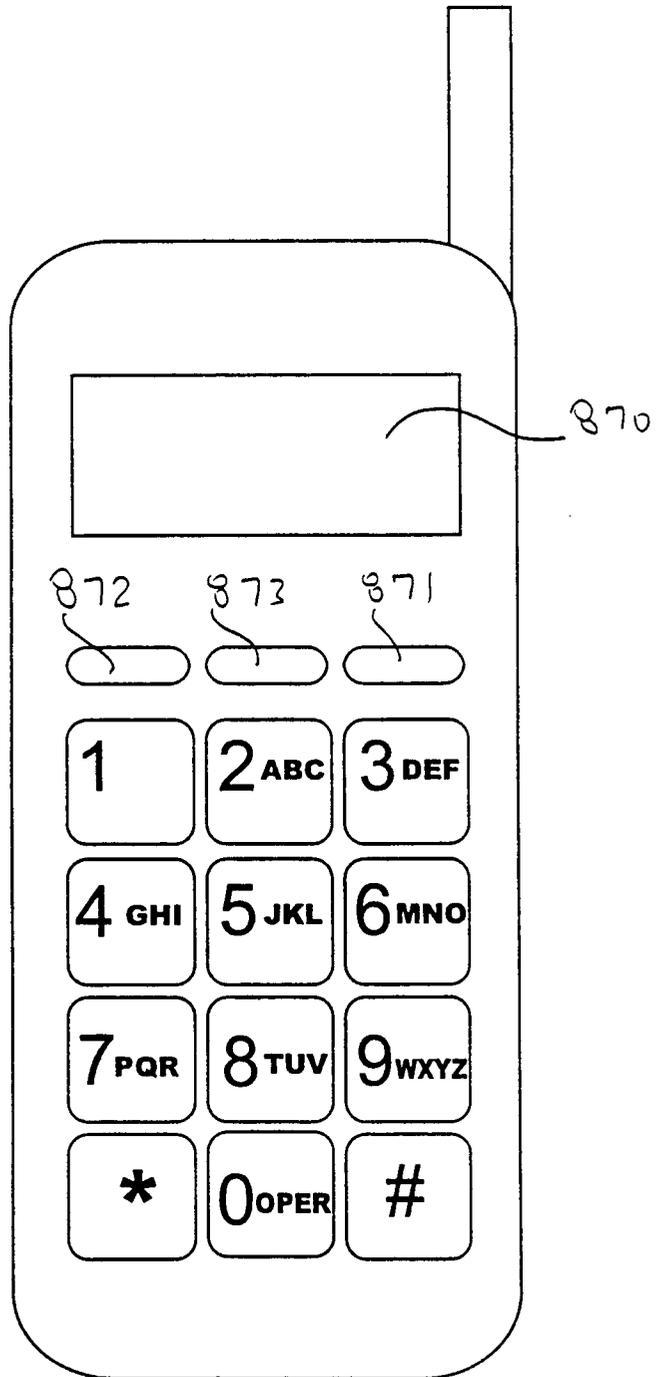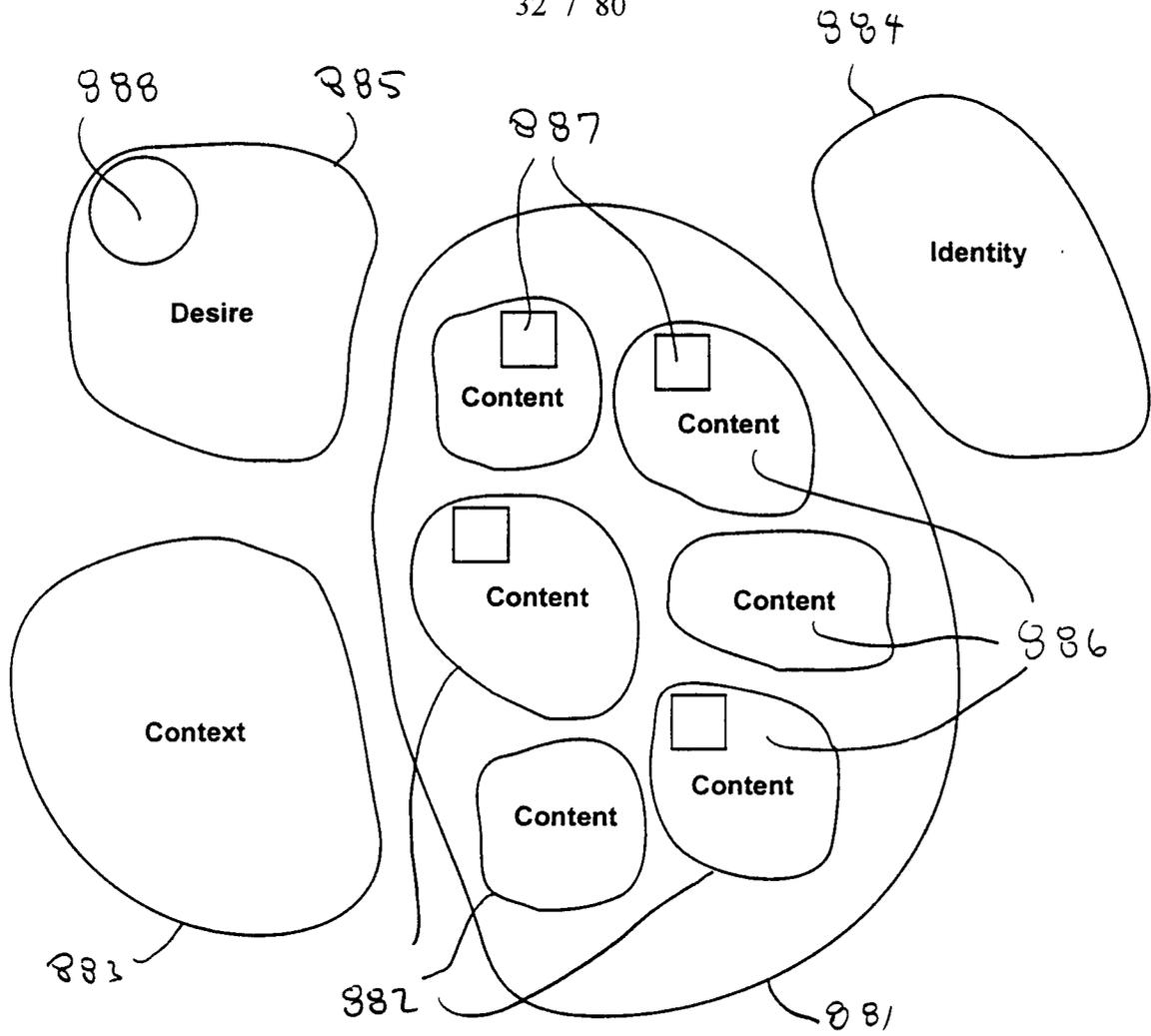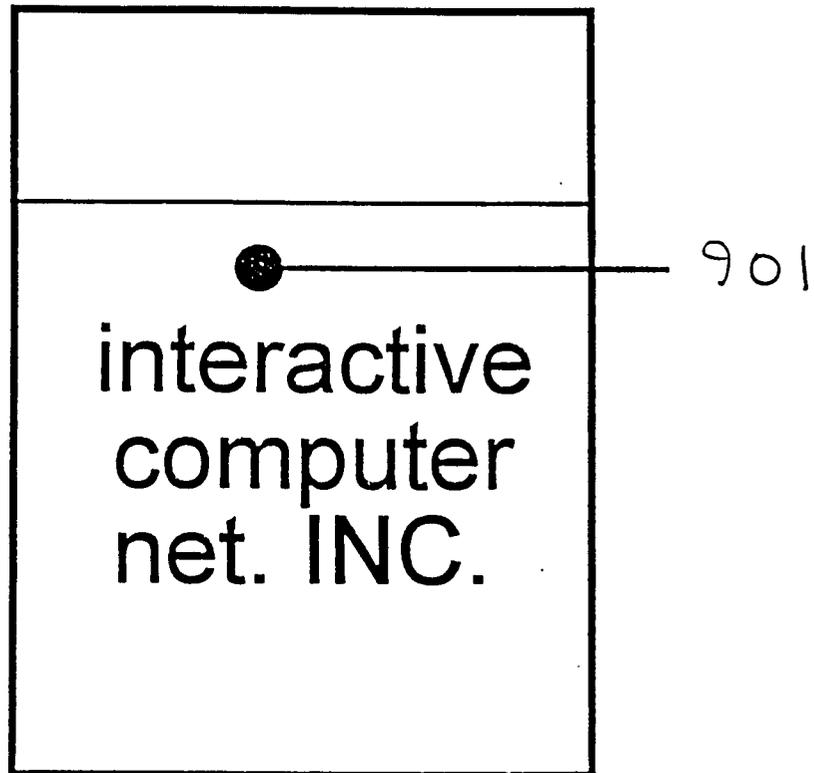
DENOTES TOUCH
ACTIVATED AREA

FIGURE 9A

interactive
computer
net. INC.

● —————————— 902

NORTHERN VIRGINIA
**YELLOW PAGE
DIRECTORY**
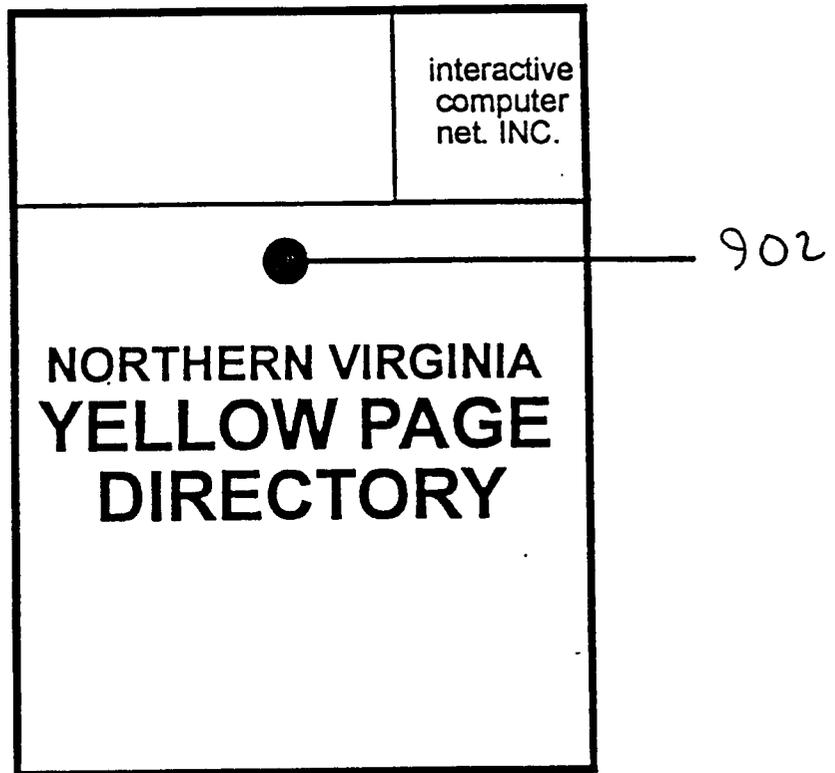
FIGURE 9B

	interactive computer net. INC.	NORTHERN VIRGINIA YELLOW PAGE DIRECTORY
ACCOUNTANTS TO AUTOMOBILES	BANKS TO CHIROPRACTORS	CHURCHES TO DENTISTS
DRAPERIES TO FLORISTS	FURNITURE TO HOSPITALS	IMPORTERS TO JEWELERS
KITCHENS TO LAWYERS	LIGHTING TO PET SHOPS	PHOTOGRAPHERS ● ZOOS

903

FIGURE 9C

	Interactive computer net INC.	NORTH ●● VIRGINIA YELLOW PAGE DIRECTORY	PHOTOGRAPHERS TO ZOOS
PHOTOGRAPHERS TO PHYSICAL THERAPISTS	PHYSICIANS TO PYSCHOLOGISTS		PUBLISHERS TO REAL ESTATE
RECORDING ● RESTAURANTS	RESUMES TO SCHOOLS		SCIENTISTS TO SKATING
SKIING TO STORAGE	STORES FRONTS TO THEATRES		THRIFT SHOPS · TO ZOOS

904

FIGURE 9D

	Interactive computer net. INC.	NORTHERN VIRGINIA YELLOW PAGE DIRECTORY	RECORDING TO RESTAURANTS
	PHOTOGRAPHERS TO ZOOS		
RECORDING TO RECORDS, TAPES & COMPACT DISCS	RECREATION CENTERS TO RECREATIONAL VEHICLES	RECYCLING CENTERS TO REFLEXOLOGISTS	
REFIGERATORS TO RELIGIOUS ORGANIZATIONS	REMODELING TO RENTAL SERVICES	RENTAL STORES TO REPORTERS	
REPOSSESSING SERVICES TO RESIDENTIAL CARE	RESORTS TO RESTHOMES	RESTUARANT EQUIPMENT TO RESTAURANTS	

905

FIGURE 9E

	Interactive computer net. INC.	NORTHERN WALLESS YELLOW PAGE DIRECTORY	RESTUARANT EQUIPMENT
	PHOTOGRAPHERS TO ZOOS	RECORDING TO RESTAURANTS	TO
			RESTAURANTS
RESTAURANT EQUIPMENT		RESTAURANT MANAGEMENT	
RESTAURANT SUPPLIES		RESTAURANTS ●	

906

FIGURE 9F

	interactive computer net, INC.	YELLOW PAGE DIRECTORY	TO	RESTAURANTS 907
	RECORDING TO RESTAURANTS	TO		

AKASAKA RESTAURANT TO BLACK-EYED PEA	BLACK ORCHID TO CANTINA ROMANO	CANTINA HAVANA CAFE TO EASBY'S BUFFET
EASTWIND RESTAURANT TO GREAT AMERICAN RESTAURANT	GREEK TRAVENA TO HUNAN WEST	HUNAN WOK TO JOE THEISMANS
JOE'S PIZZA TO McDONALD'S RESTAURANTS	McKEEVERS PUB TO RED LOBSTER RESTAURANTS	REDMOON STEAKHOUSE TO ZIGGY'S FINEST

FIGURE 9G

FIGURE 9H

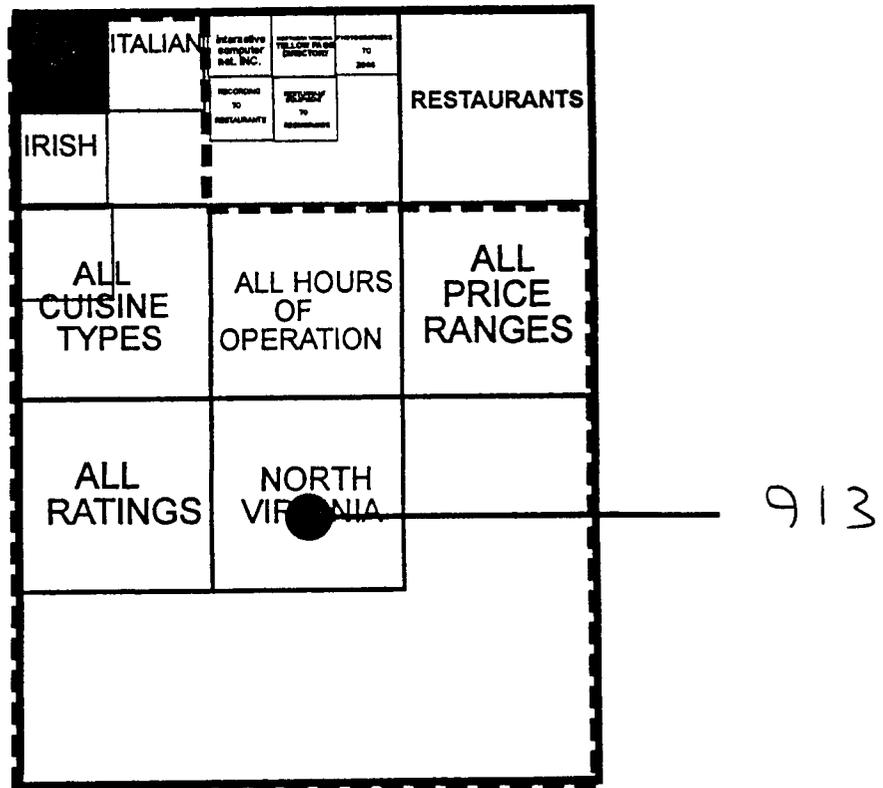|		ALL CUISINE TYPES
AFRICAN TO BEEF HOUSES	CAJUN TO CRABHOUSES	ETHIOPIAN TO GERMAN
GREEK TO ITALIAN	JAPANESE TO MEXICAN	PEKING-SZECHUAN TO PHILLIPINE
PIZZA TO RUSSIAN	SEAFOOD TO SPANISH	THAI TO VIETNAMESE

909
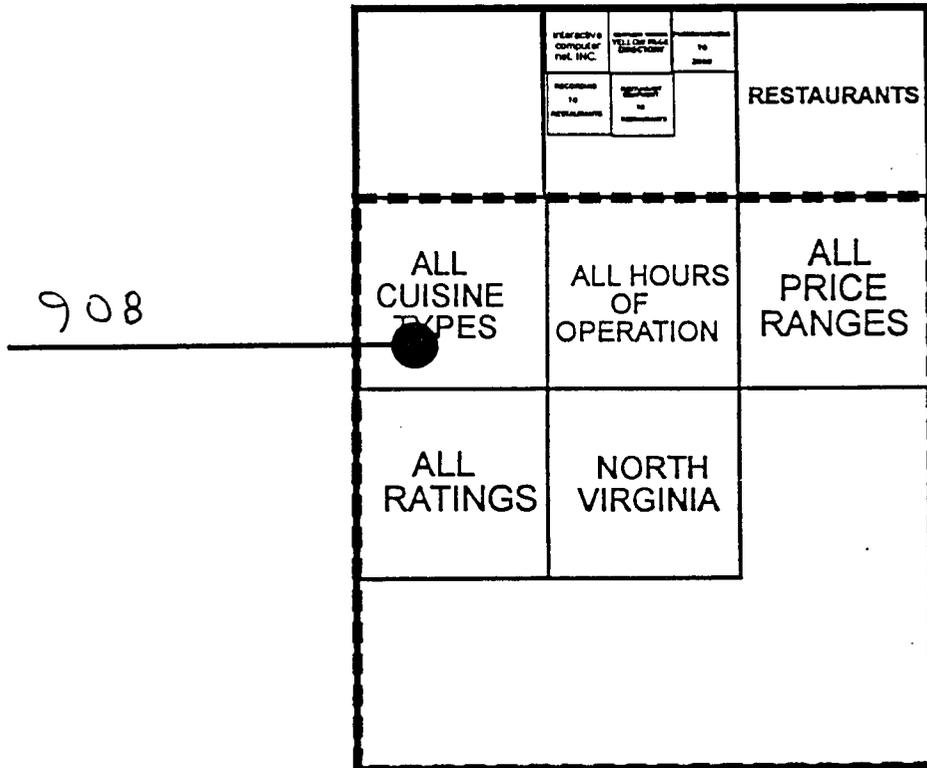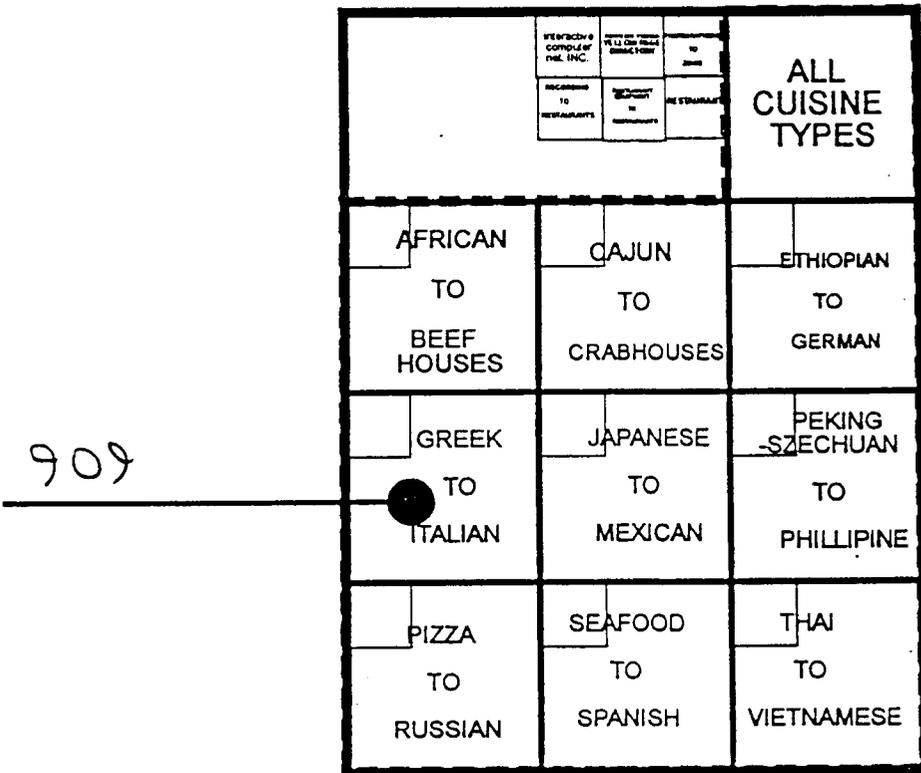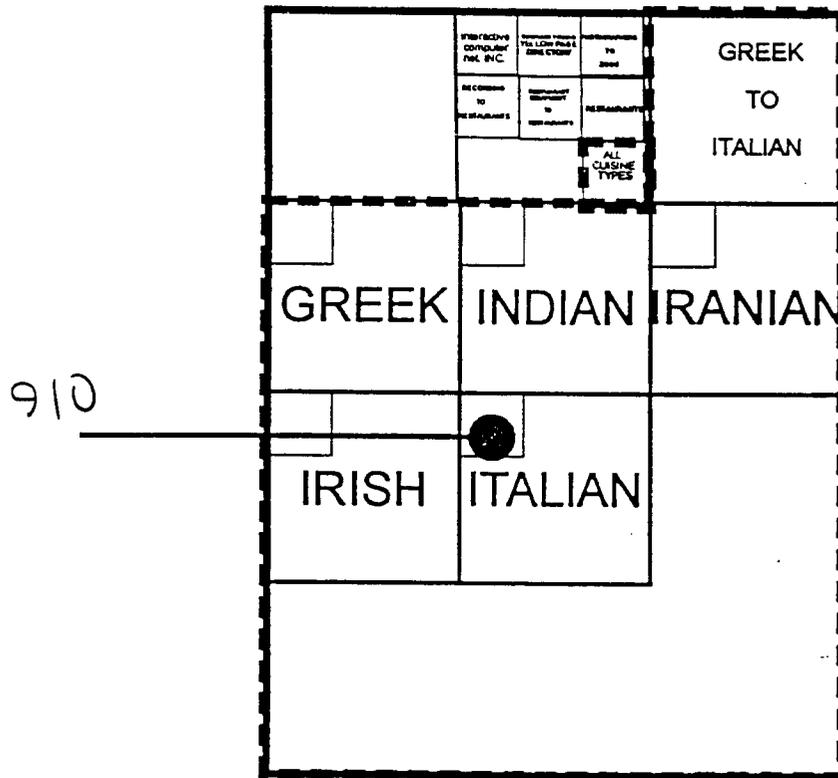
FIGURE 9J

FIGURE 9K

FIGURE 9L

912

FIGURE 9M

	ITALIAN	Interactive computer net, INC.	YELLOW PAGE DIRECTORY	TO 2046	
IRISH		RECORDING TO RESTAURANTS	TENDY TO RESTAURANTS		RESTAURANTS

ALL CUISINE TYPES	ALL HOURS OF OPERATION	ALL PRICE RANGES
ALL RATINGS	NORTH VIRGINIA	

913

FIGURE 9N

914

	TALIAN	Interactive computer int. INC.	YELLOW PAGE DIRECTORY	TO	NORTH VIRGINIA
IRISH		RECORDS TO RESTAURANTS	YELLOW PAGES TO	RESTAURANTS	

ALEXANDRIA	ARLINGTON	CENTERVILLE
● ANNANDALE		TO CHANTILLY

CLIFTON	FAIRFAX TO FALL CHURCH	GREAT FALLS

HERNDON TO MCLEAN	RESTON	SPRINGFIELD TO VIENNA

FIGURE 9P

915

FIGURE   9Q

916

FIGURE 9R

	interactive computer net, INC.	YELLOW PAGES DIRECTORY TO 3040
	RECORDING TO RESTAURANTS	RESTAURANT EQUIPMENT TO RESTAURANTS

RESTAURANTS
ALEXANDRIA
ITALIAN
IRISH

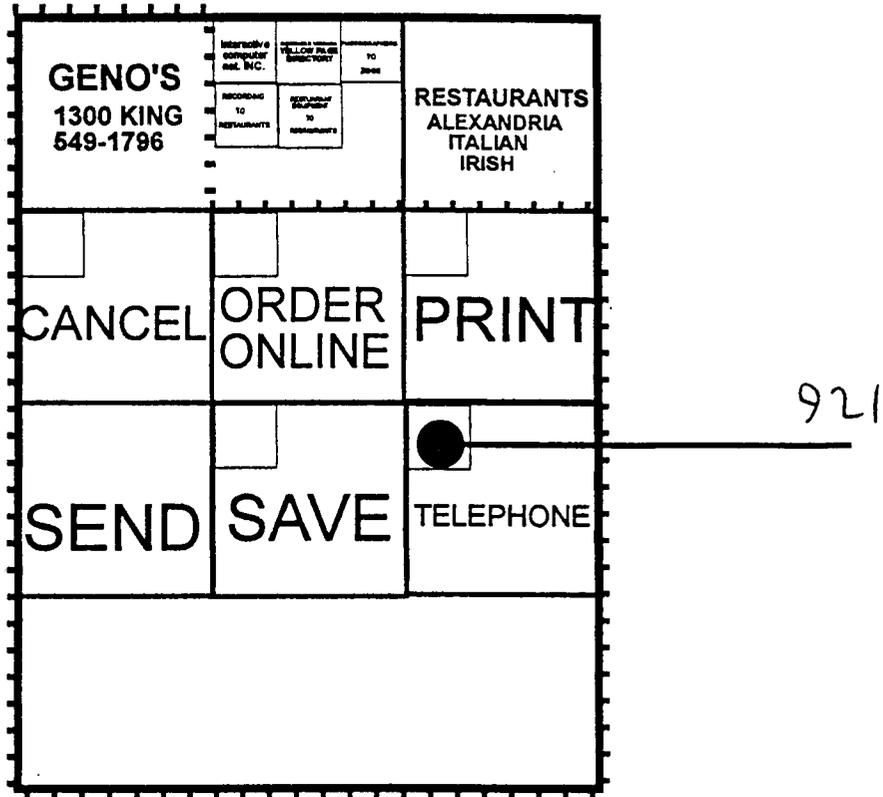| ATLANTIS PIZZERIA 367 KING 671-0250	ECCO CAFE 220 LEE ST. 684-0321	GENO'S 130 NG 549-1796
IRELAND'S OWN 132 N.ROYAL 549-4535	MURPHY'S IRISH-PUB 713 KING 548-1717	VIA VENETO 1309 SHENANDOAH 765-6661

917

FIGURE 9S

918

FIGURE 9T

919

	Interactive computer net, INC	YELLOW PAGE Data Factory	PROGRAMMING TO BASE	GENO'S
	RECORDING TO RESTAURANTS	RESTAURANT TO BASE	RESTAURANTS ALEXANDRIA BASE BASE	1300 KING 549-1796

ITALIAN	12 P.M. TO 12 A.M.	$ 15.00 TO $ 25.00
★ ★ ★	1300 KING ST. ALEXANDRIA, VA 22307 TEL:703 549 1796	

FIGURE 9U

FIGURE 9V

GENO'S
1300 KING
549-1796

Interactive computer est. INC. | YELLOW PAGE DIRECTORY | TO

RECORDING TO RESTAURANTS | RESTAURANT REQUEST TO RESTAURANTS

RESTAURANTS
ALEXANDRIA
ITALIAN
IRISH

CANCEL ORDER ONLINE PRINT

SEND SAVE TELEPHONE

921

FIGURE 9W

FIGURE 9X

923

ORDER
ONLINE

Interactive
computer
est. INC.

YELLOW PAGE
DIRECTORY

TO
2046

RECORDING
TO
RESTAURANTS

RESTAURANT
EQUIPMENT
TO

RESTAURANTS
ALEXANDRIA
ITALIAN
IRISH

CANCEL

ORDER
ONLINE

PRINT

SEND

SAVE

TELEPHONE

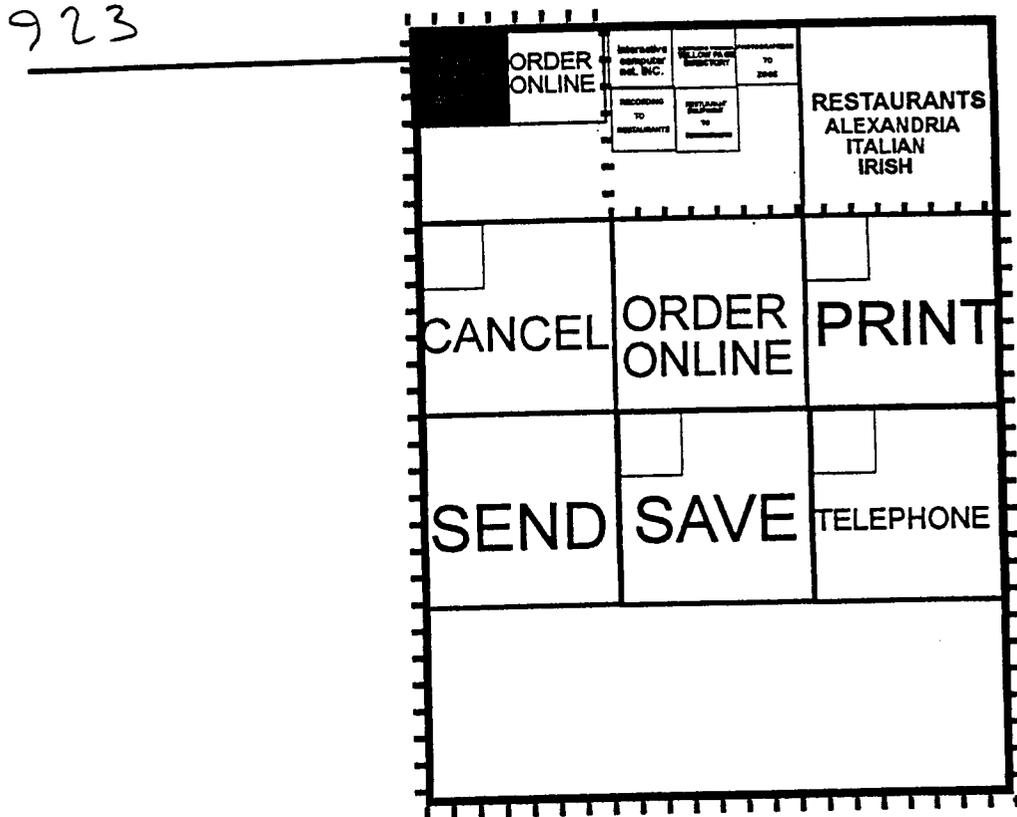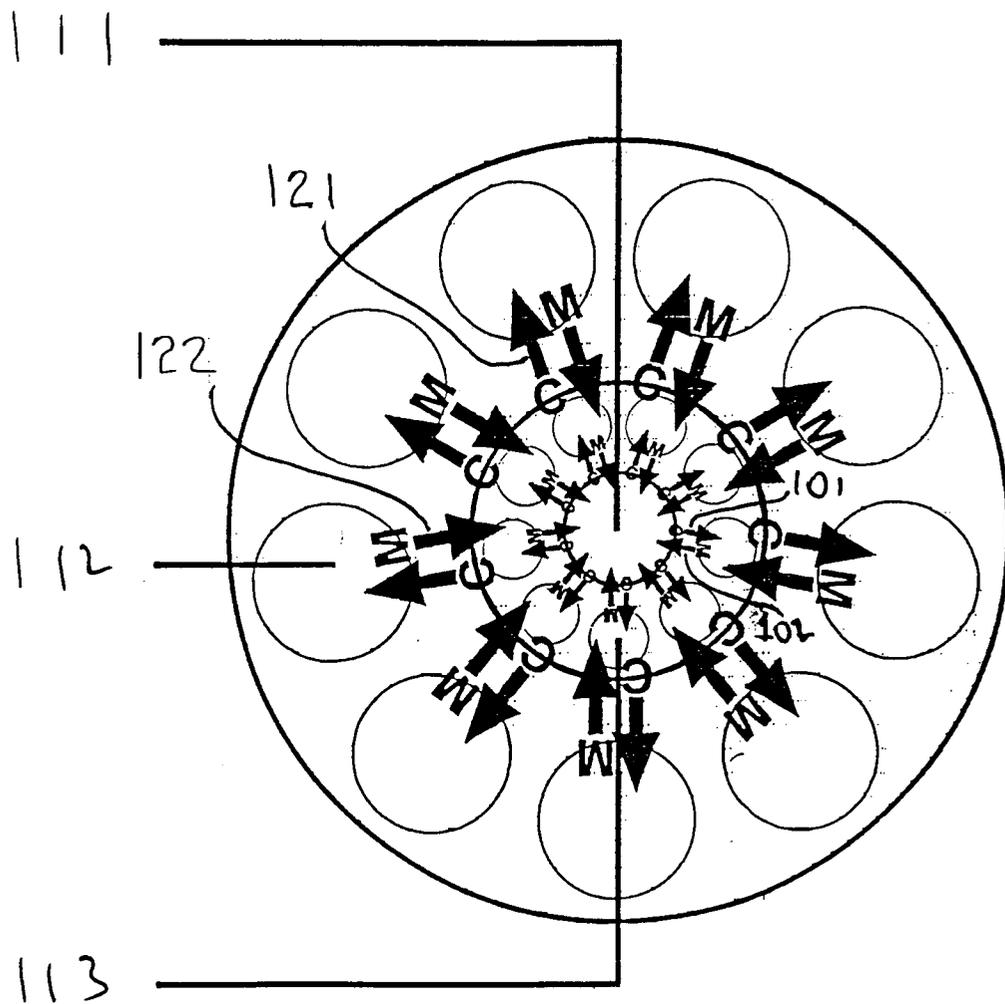# FIGURE 9Y

FIGURE 10A
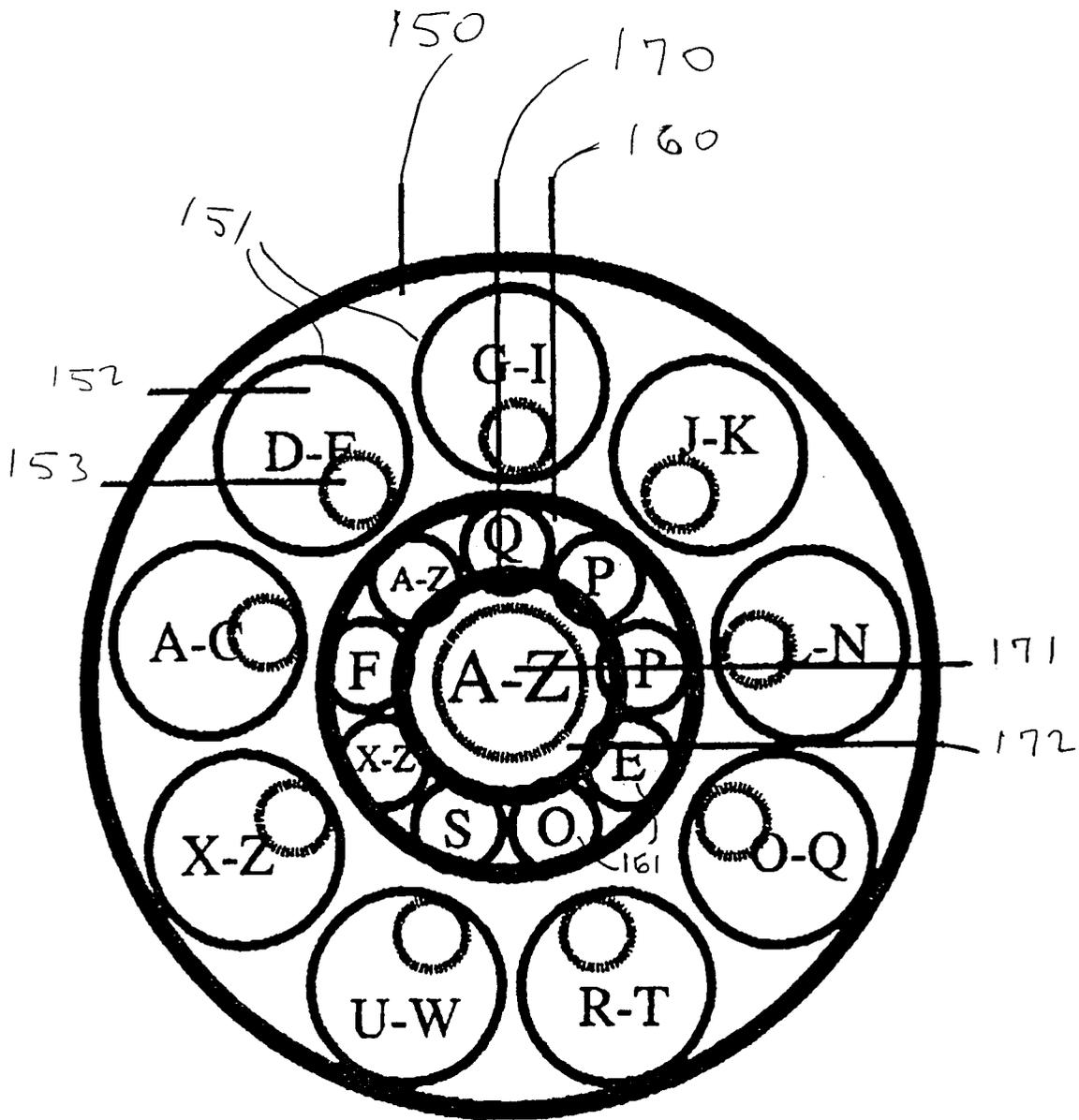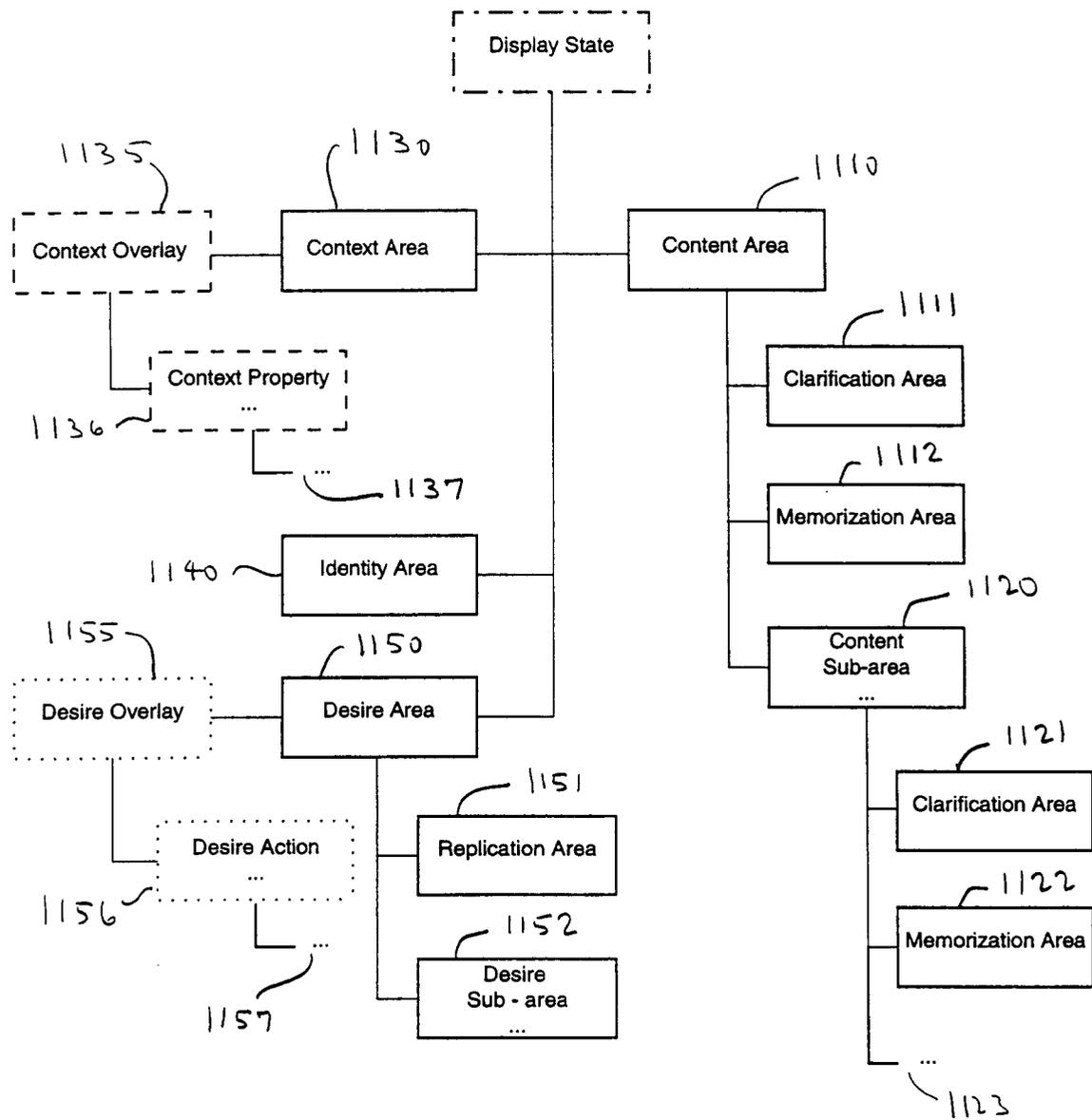
FIGURE 10B

Figure 11A

Figure 11B

1160

1161 *1162*

User

Experience Information

1200

Clarify

Down *1210*

Up *1220*

Overlay *1230*

1300

Memorize

Memorize *1310*

Replicate *1320*

Overlay *1330*

Present Information
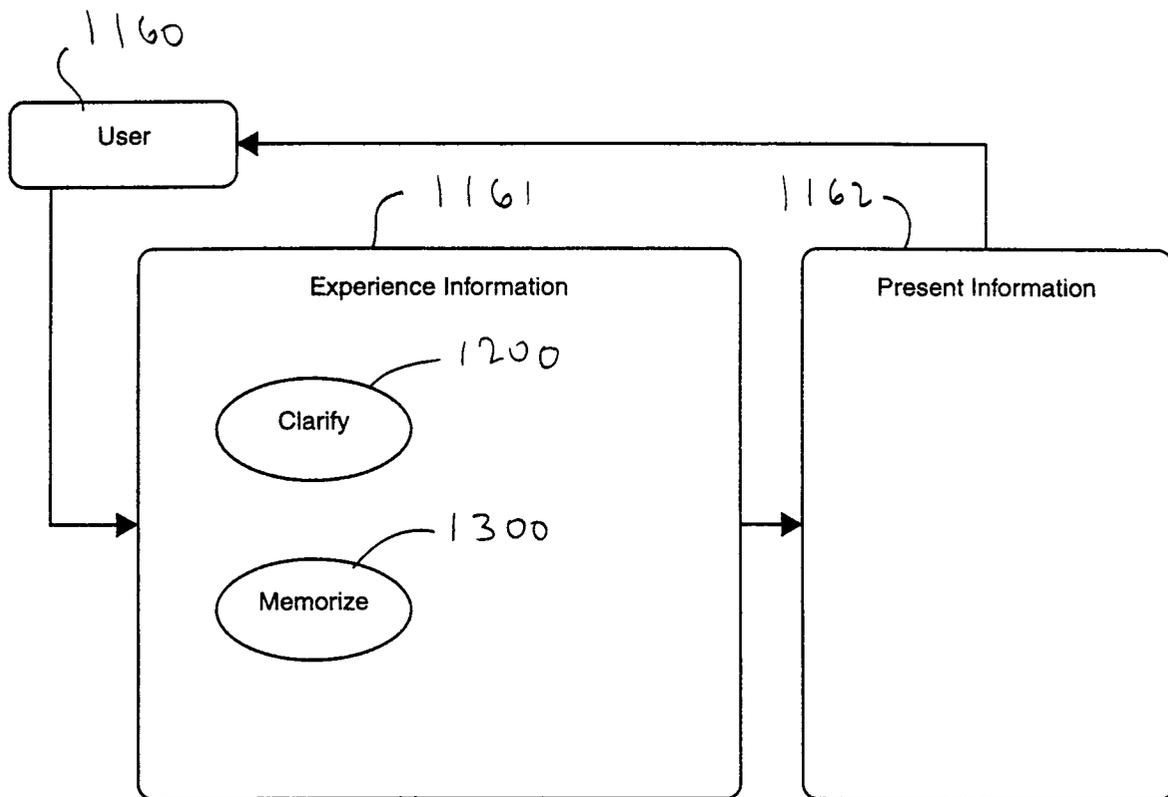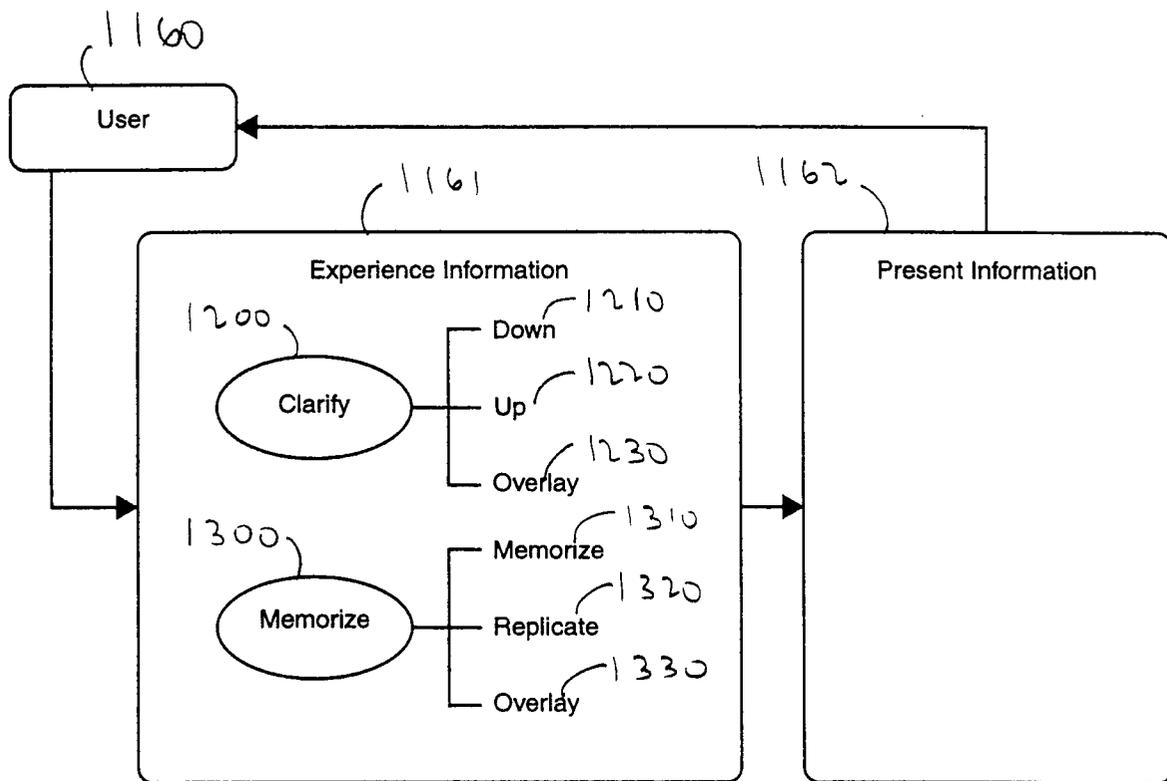
Figure 11C

Figure 11D

Figure 11E

2220　　　　　　　2230　　　　　　　2240

2210

Figure 12A

	TV Portal 2-1-99 5:00 PM CHANNELS 100-999	**200 ⊸ 340** Entertainment & the Arts	**233** Travel channel "Visiting Washington"

2101

Figure 12B

2102

2220

		233 Travel channel "Visiting Washington"
Cancel/Stop	**Pause**	**Record**
Fast Rewind	**Play**	**Fast Forward**
Instant Replay	**Slow Motion**	**QuickSkip**

1252   1251
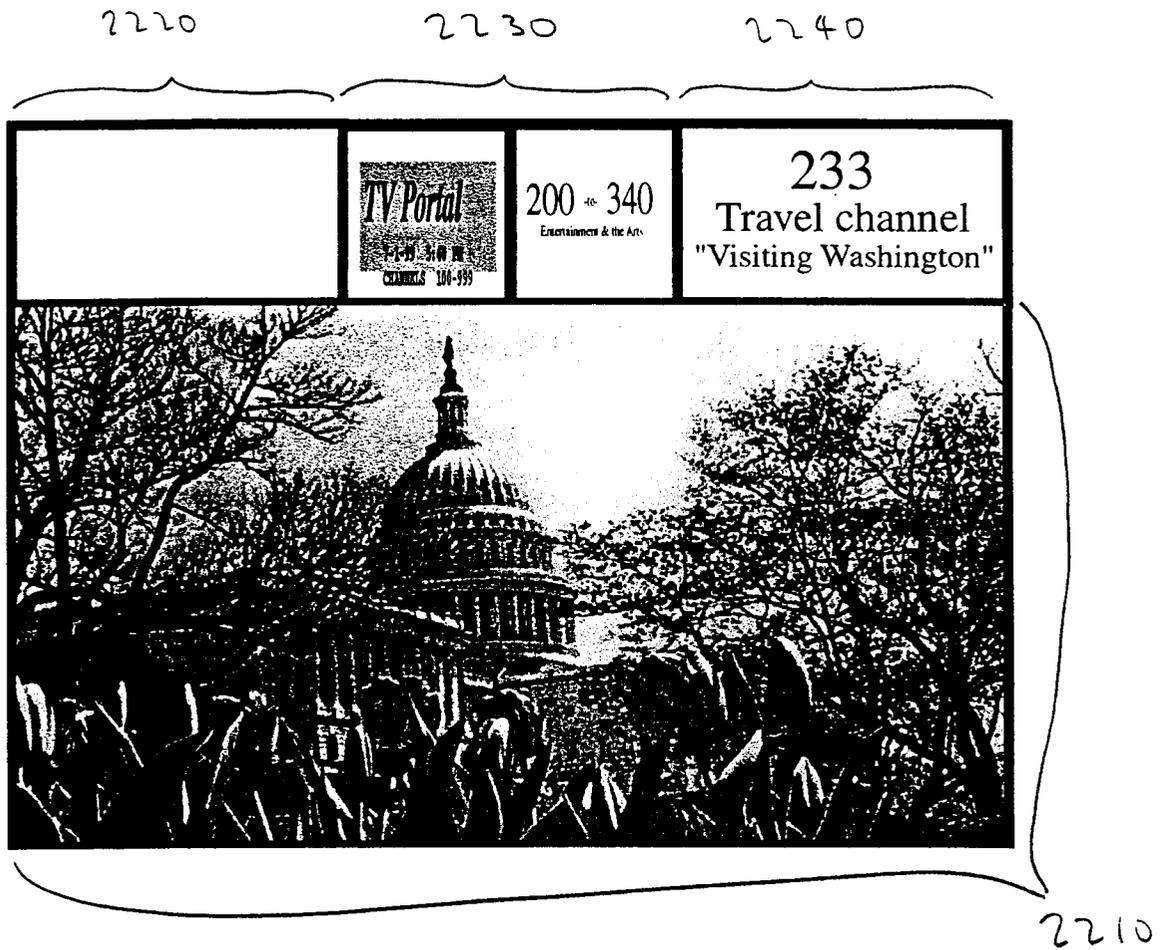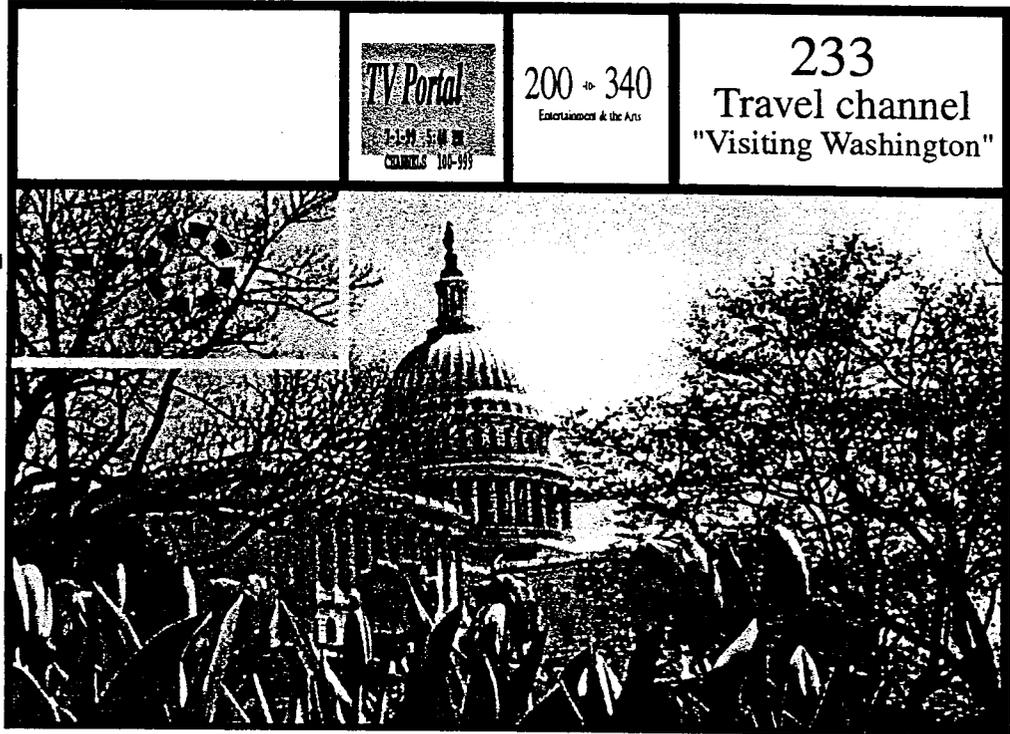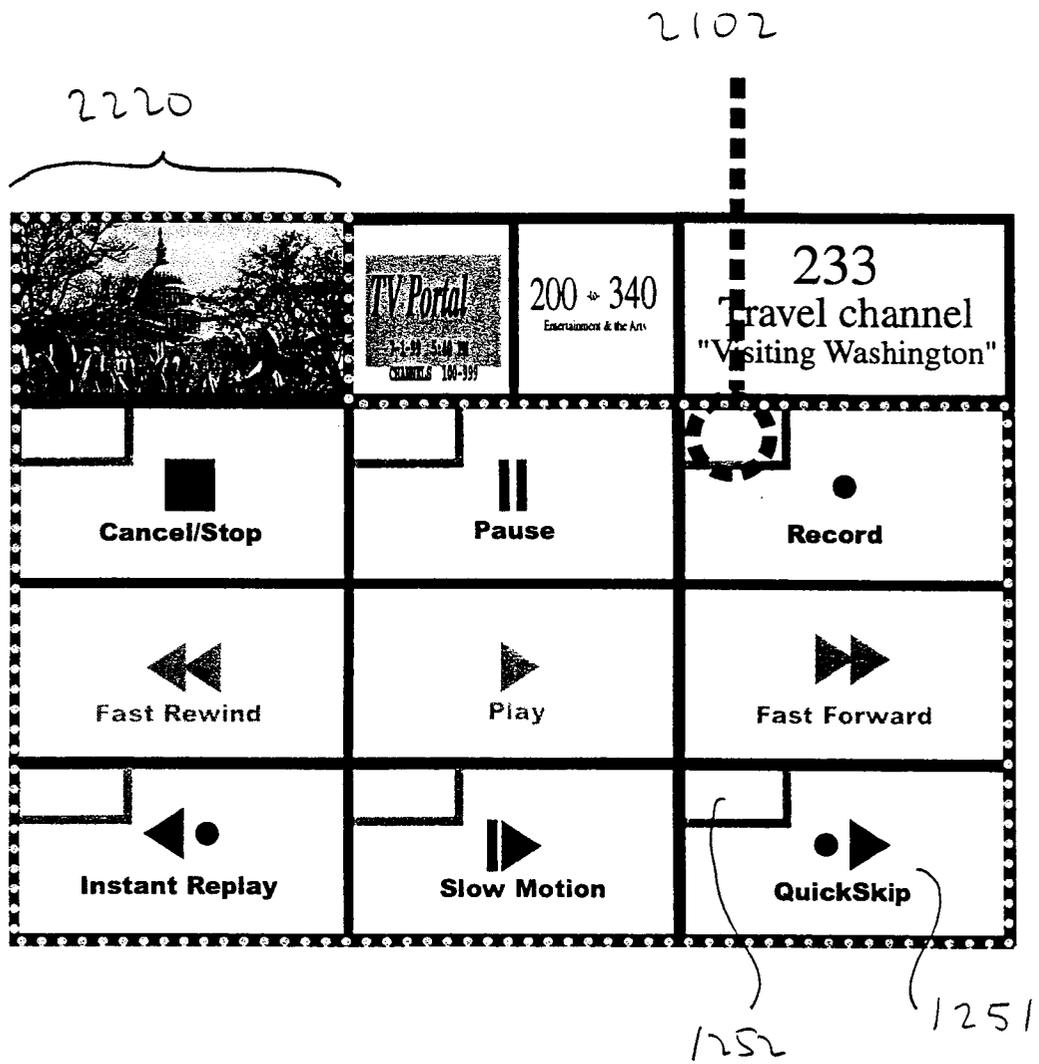
Figure 12C

2103

Figure 12D

TV Portal
7-1-99 5:40 PM
CHANNELS 100-999

100 -to- 199 Pay Per View Movies	200 -to- 340 Entertainment & the Arts	350 -to- 399 News & Information
500 -to- 550 Premium Movies	595 -to- 599 Adult	600 -to- 799 Premium Sports
800 -to- 899 Music	900 Chat	999 Email

2104

Figure 12E

		TV Portal 7-1-99 5:40 PM CHANNELS 100-999
595 - 599 Adult		
100 -to- 199 Pay Per View Movies	200 -to- 340 Entertainment & the Arts	350 -to- 399 News & Information
500 -to- 550 Premium Movies	595 -to- 599 Adult	600 -to- 799 Premium Sports
800 -to- 899 Music	900 Chat	999 Email

Figure 12F

2106

595 -to- 599 Adult		TV Portal 7-1-99 5:40 PM CHANNELS 100-999
Cancel	Set Locks	Set Ratings
Store in My TV Portal		

Figure 12G

2107

Set Locks
595 - 599
Adult

TV Portal
7-1-99 5:40 PM
CHANNELS 100-999

Cancel

All

None

Custom

Figure 12H

1261   1262

	My Stuff	My Portal
Entertainment	Health	Lifestyles
MyNews & Media	Reference	My Shopping
Sports	My Travel	My Weather

2120

Figure 12J

1263

		My Stuff	My Portal	My Travel	
		Washington D.C. Guide	Tourist Attractions	Landmarks	The Lincoln Memorial

The Lincoln Memorial is a tribute to President Abraham Lincoln and the nation he fought to preserve during the Civil War (1861-1865).

The nation's bloodiest conflict, the Civil War, which followed the secession of southern states, was the supreme test of the durability of the Union created by the founding fathers. Lincoln's stewardship of the Union cause contributed to the final victory of the Union and the abolishment of slavery in the United States. These victories earned him the sobriquets of "Savior of the Union." Lincoln was assassinated while attending a play at Ford's Theatre in Washington, D.C. For many he then became a martyr to the causes of union and emancipation.

Damaged over the years by heavy visitation and environmental factors, the Lincoln Memorial is currently undergoing a major restoration.

In 1911, Congress authorized the building of the Lincoln Memorial on the undeveloped west end of the Mall. Construction took place between 1914 and 1922. President Warren G. Harding attended the 1922 dedication. In 1933, the Lincoln Memorial was transferred to the jurisdiction of the National Park Service.

Architect Henry Bacon modeled his design for the building after the Greek Parthenon. Built into the design are symbols of Union like the 36 exterior Doric columns representing the 36 states in the Union at the time of Lincoln's death—the Union he had fought to preserve. Those states are listed on the frieze above the columns. Above those states are listed the 48 states in the Union when the memorial was built, making the memorial a tribute to the Union as much as a tribute to Lincoln himself. Alaska and Hawaii are represented with a plaque on the front steps.

The exterior is made of Colorado Yule marble with a walkway made of Massachusetts granite and Potomac River stones. The interior walls and columns are Indiana limestone, the floor Tennessee Pink marble, and the ceiling is made of panels of Alabama marble soaked in paraffin to make them translucent.

Dominating the interior is Daniel Chester French's Lincoln statue along with allegorical murals by Jules Guerin, and carved inscriptions of two of Lincoln's most important speeches.
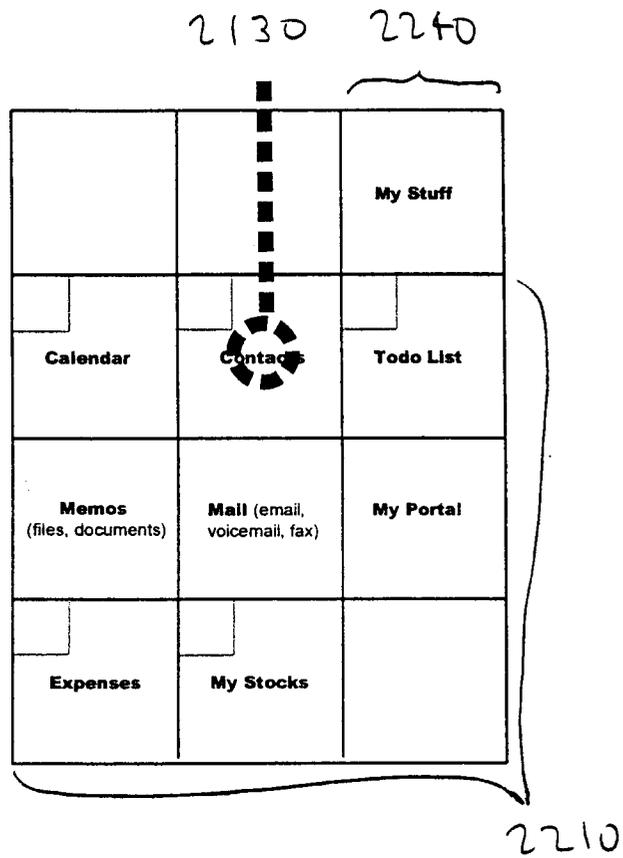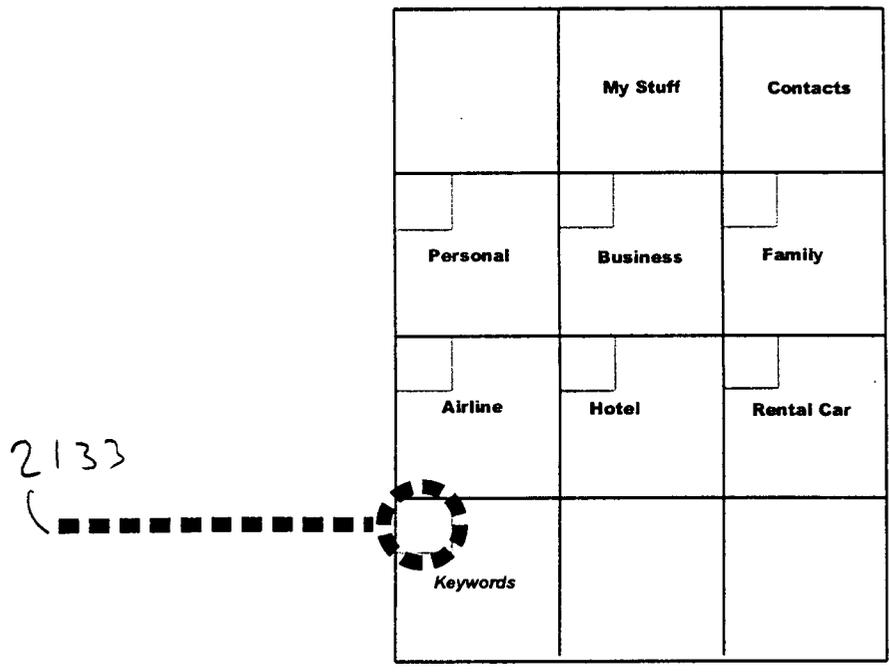
Figure 12K

2130 2240

		My Stuff
Calendar	Contacts	Todo List
Memos (files, documents)	Mail (email, voicemail, fax)	My Portal
Expenses	My Stocks	

2210

Figure 12L

2230

2131

	My Stuff	Contacts

Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here
Name of person here	telephone number here

2132

Figure 12M

	My Stuff	Contacts
Personal	Business	Family
Airline	Hotel	Rental Car
Keywords		

2133

Figure 12N

2134

2135

Keyword (Search)	My Stuff	Contacts

Name: First Last   Emily

Address:

Telephone:

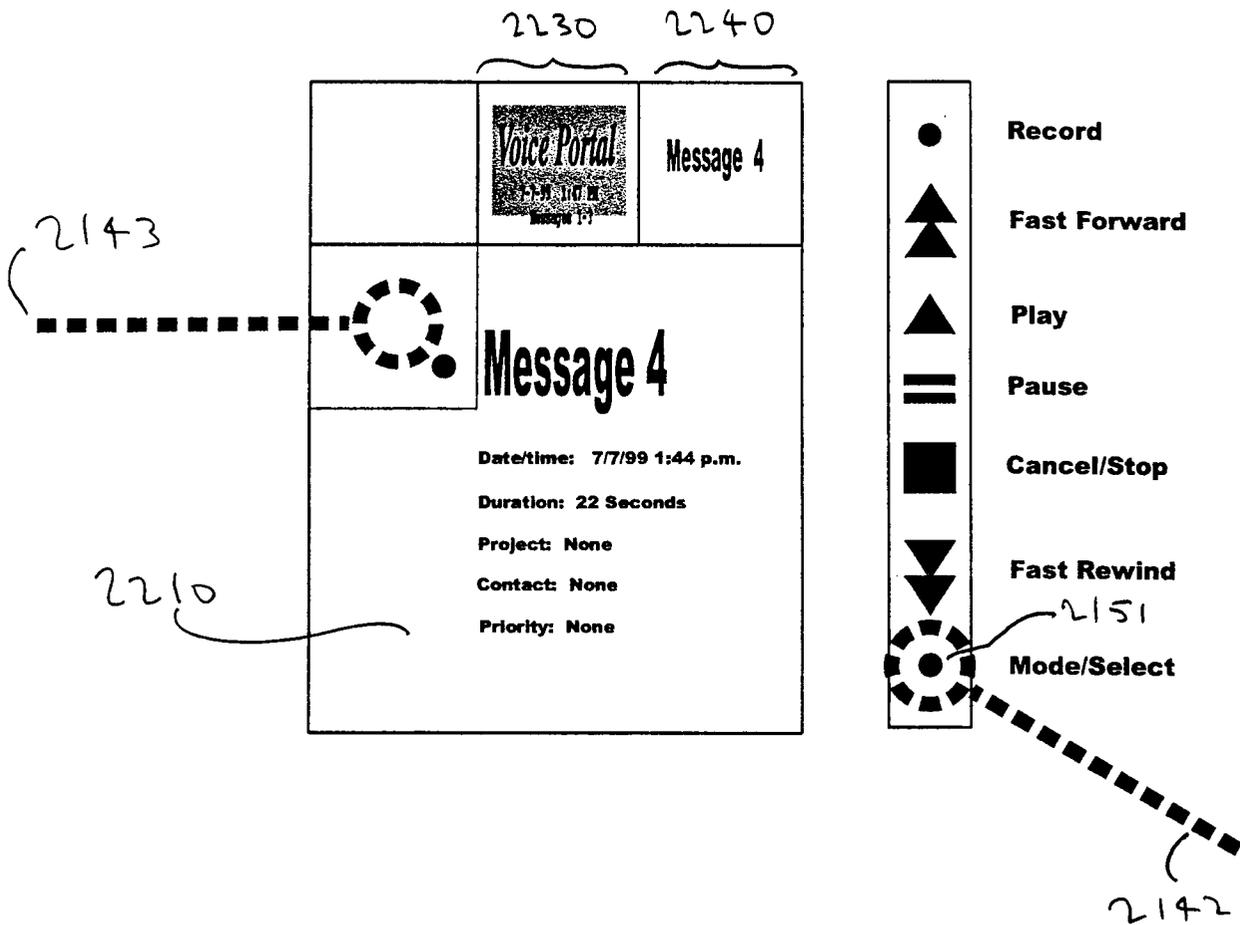Business:

Figure 12P

Figure 12Q

Figure 12R

2230　　2240

2143

2210

Voice Portal

Message 4

Message 4

Date/time: 7/7/99 1:44 p.m.

Duration: 22 Seconds

Project: None

Contact: None

Priority: None

● Record

▲▲ Fast Forward

▲ Play

= Pause

■ Cancel/Stop

▼▼ Fast Rewind

2151

● Mode/Select

2142
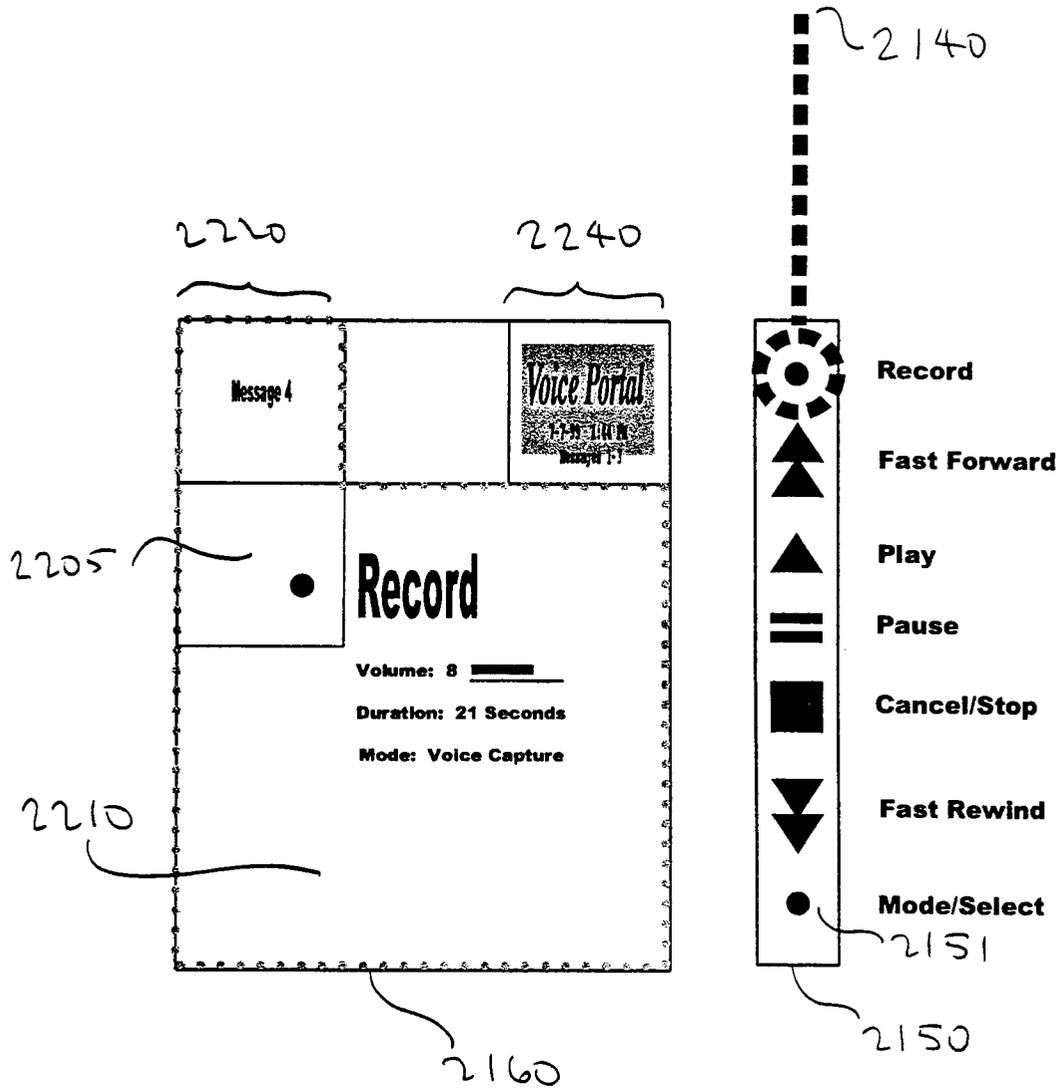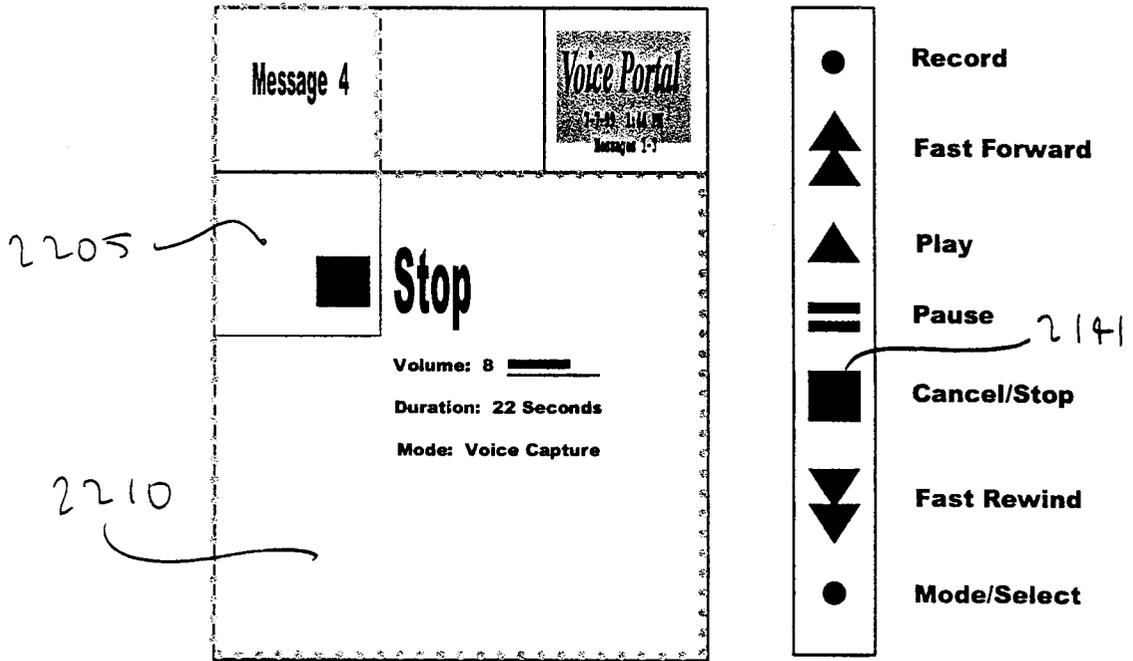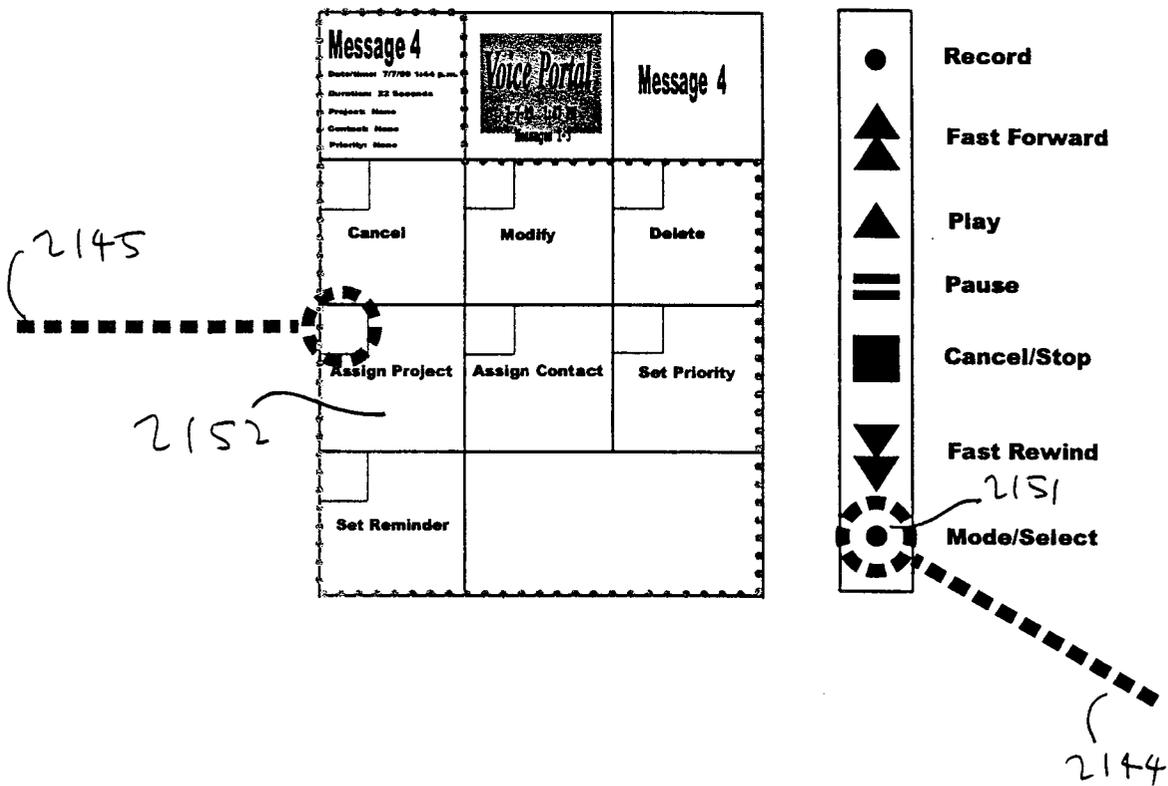
Figure 12S

Figure 12T

INTERNATIONAL SEARCH REPORT

A.	CLASSIFICATION OF SUBJECT MATTER

IPC(7)   :GO6F 13/00; GO6K 15/00
US CL   : 345/356, 357, 339, 346, 341, 342
According to International Patent Classification (IPC) or to both national classification and IPC

B.	FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. :   345/356, 357, 339, 346, 341, 342

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

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

East

C.	DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6,020,889 A (TARBOX et al.) 1 February 2000, entire patent	1-71
A, E	US 6,081,263 A (LEGALL et al.) 27 June 2000, entire patent	1-71
A, E	US 6,069,625 A (NIELSEN) 30 May 2000, entire patent	1-71
A, E	US 6,057,845 A (DUPOUY) 2 May 2000, entire patent	1-71
A, E	US 6,101,498 A (SCAER et al.) 8 August 2000, entire patent	1-71

☐ Further documents are listed in the continuation of Box C.   ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 OCTOBER 2000	**14 NOV 2000**

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer STEVE SAX
Facsimile No. (703) 305-3230	Telephone No. (703) 305-9582

Form PCT/ISA/210 (second sheet) (July 1998)★