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(54) **MULTIMEDIA SEARCH SYSTEM**

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See application file for complete search history.

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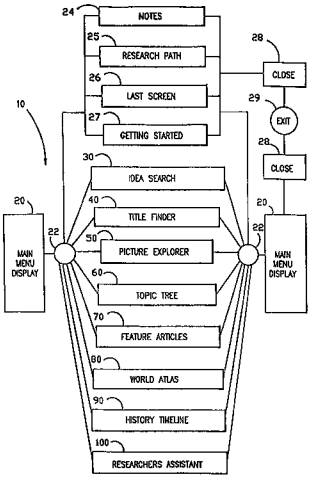
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(57) **ABSTRACT**

A database search system that retrieves multimedia information in a flexible, user friendly system. The search system uses a multimedia database consisting of text, picture, audio and animated data. That database is searched through multiple graphical and textual entry paths. Those entry paths include an idea search, a title finder search, a topic tree search, a picture explorer search, a history timeline search, a world atlas search, a researcher's assistant search, and a feature articles search.

70 Claims, 20 Drawing Sheets



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FIG. 1

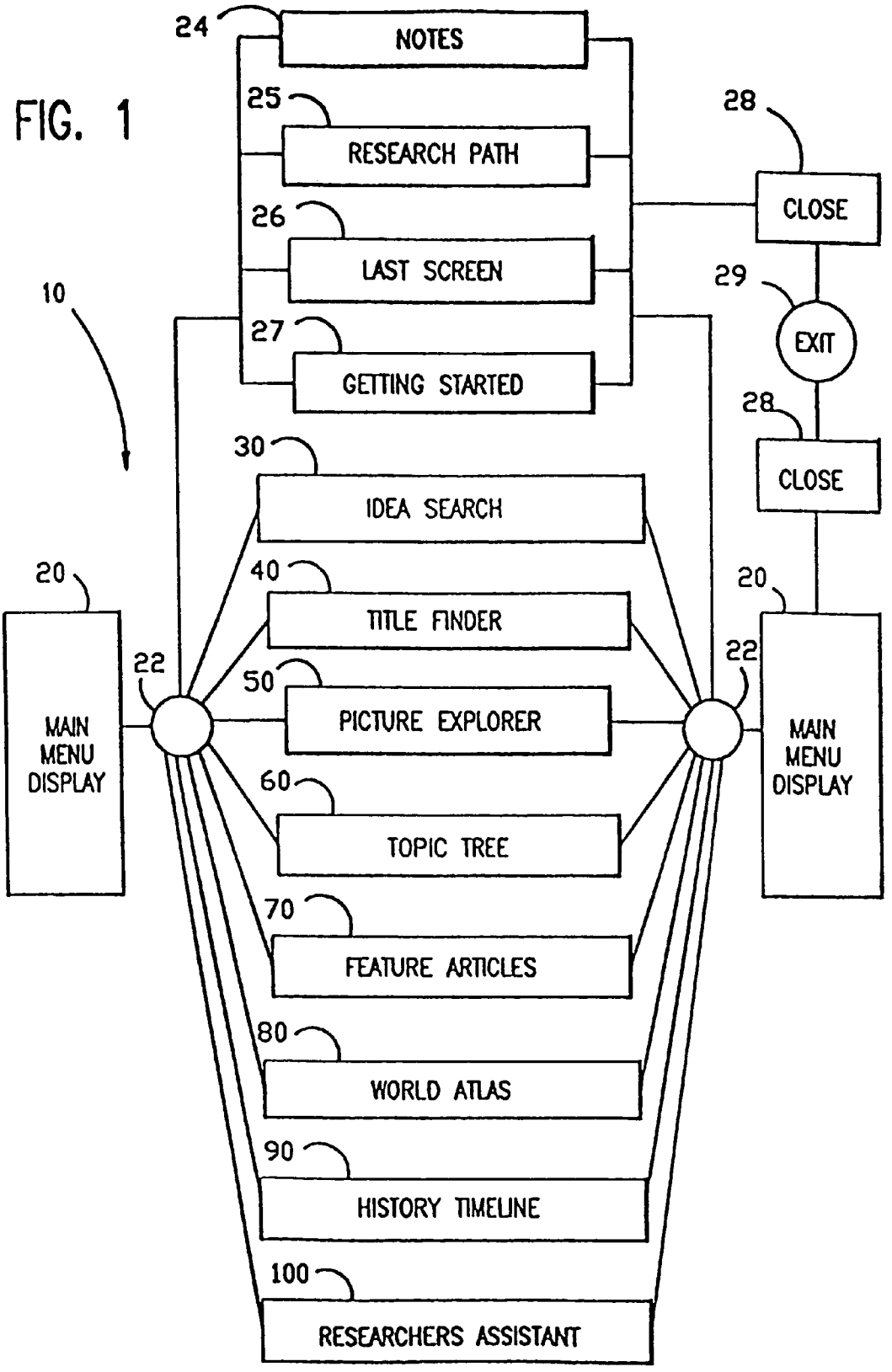

24
NOTES
25
RESEARCH PATH
26
LAST SCREEN
27
GETTING STARTED
28
CLOSE
29
EXIT
28
CLOSE
10
30
IDEA SEARCH
20
40
TITLE FINDER
22
50
PICTURE EXPLORER
MAIN MENU DISPLAY
60
TOPIC TREE
70
FEATURE ARTICLES
80
WORLD ATLAS
90
HISTORY TIMELINE
100
RESEARCHERS ASSISTANT
20
22
MAIN MENU DISPLAY

FIG. 2

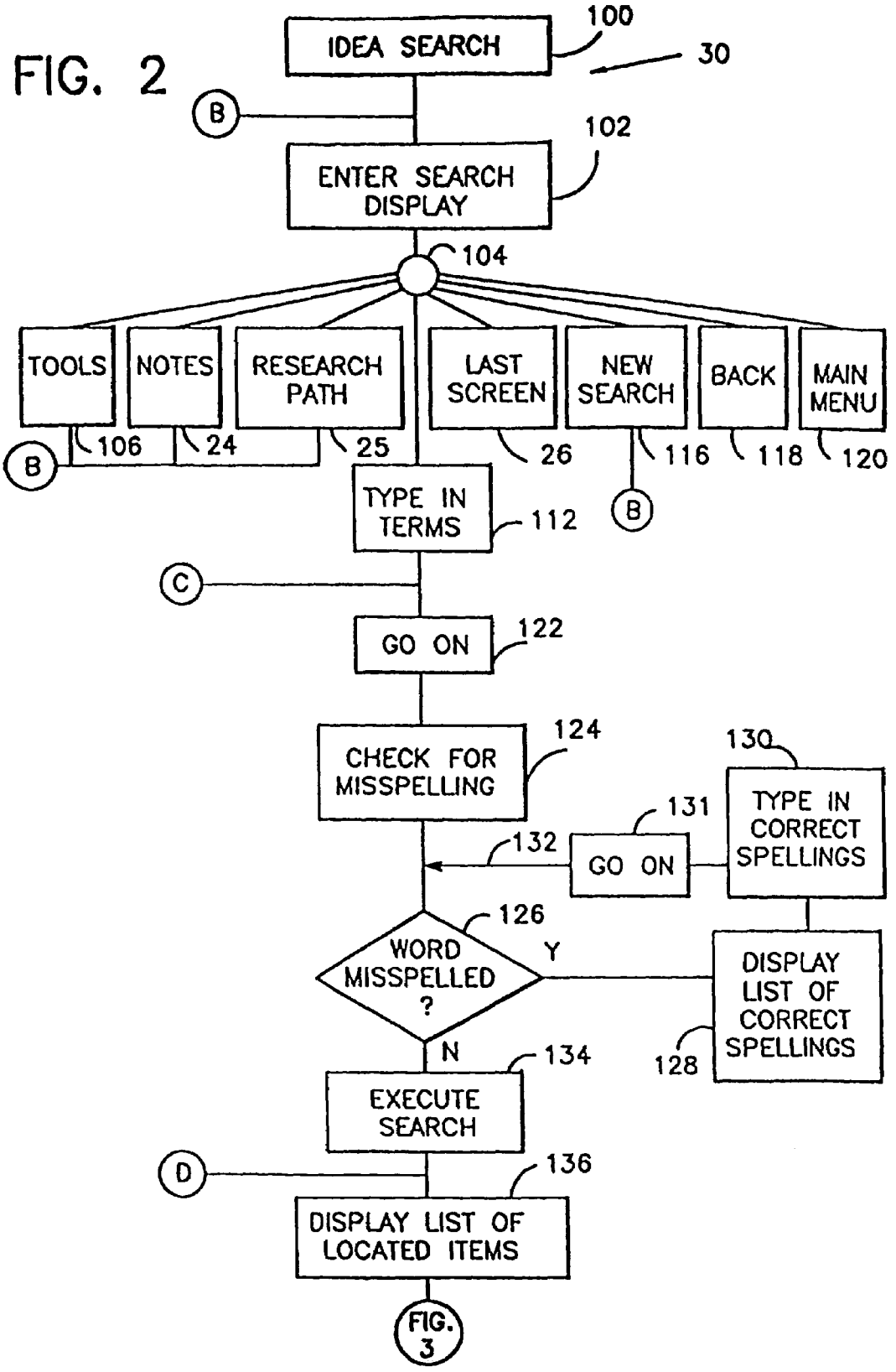

IDEA SEARCH
100
30
B
102
ENTER SEARCH DISPLAY
104
TOOLS
NOTES
RESEARCH PATH
LAST SCREEN
NEW SEARCH
BACK
MAIN MENU
106
24
25
26
116
118
120
B
B
TYPE IN TERMS
112
C
GO ON
122
CHECK FOR MISSPELLING
124
130
TYPE IN CORRECT SPELLINGS
131
132
GO ON
126
WORD MISSPELLED ?
Y
DISPLAY LIST OF CORRECT SPELLINGS
128
N
134
EXECUTE SEARCH
D
136
DISPLAY LIST OF LOCATED ITEMS
FIG. 3

FIG. 3

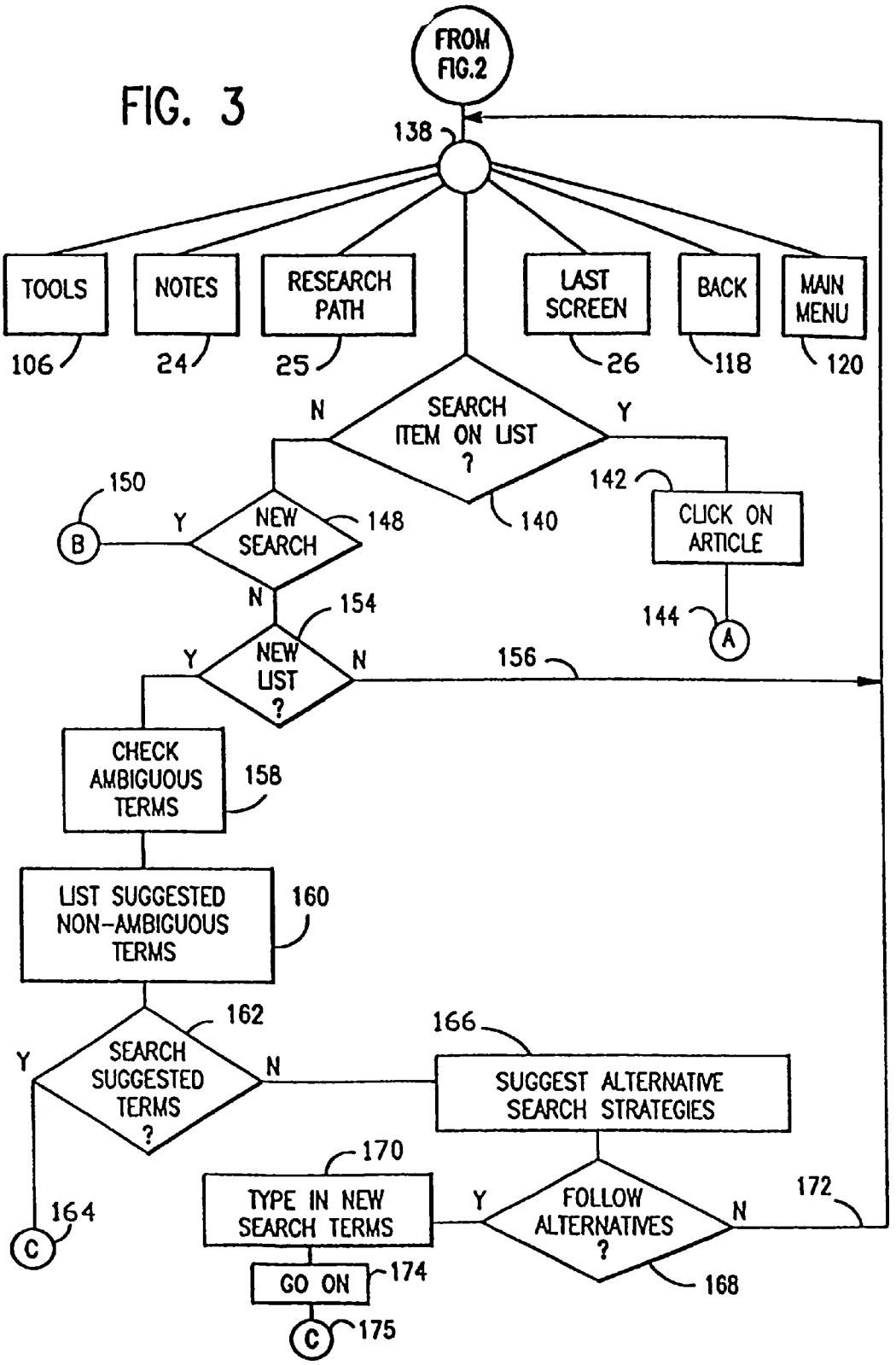

FROM FIG.2
138
TOOLS
106
NOTES
24
RESEARCH PATH
25
LAST SCREEN
26
BACK
118
MAIN MENU
120
SEARCH ITEM ON LIST ?
140
N
Y
142
CLICK ON ARTICLE
144
A
150
B
NEW SEARCH
148
Y
N
154
NEW LIST ?
Y
N
156
CHECK AMBIGUOUS TERMS
158
LIST SUGGESTED NON-AMBIGUOUS TERMS
160
SEARCH SUGGESTED TERMS ?
162
Y
N
164
C
166
SUGGEST ALTERNATIVE SEARCH STRATEGIES
170
TYPE IN NEW SEARCH TERMS
GO ON
174
C
175
FOLLOW ALTERNATIVES ?
Y
N
168
172

FIG. 4

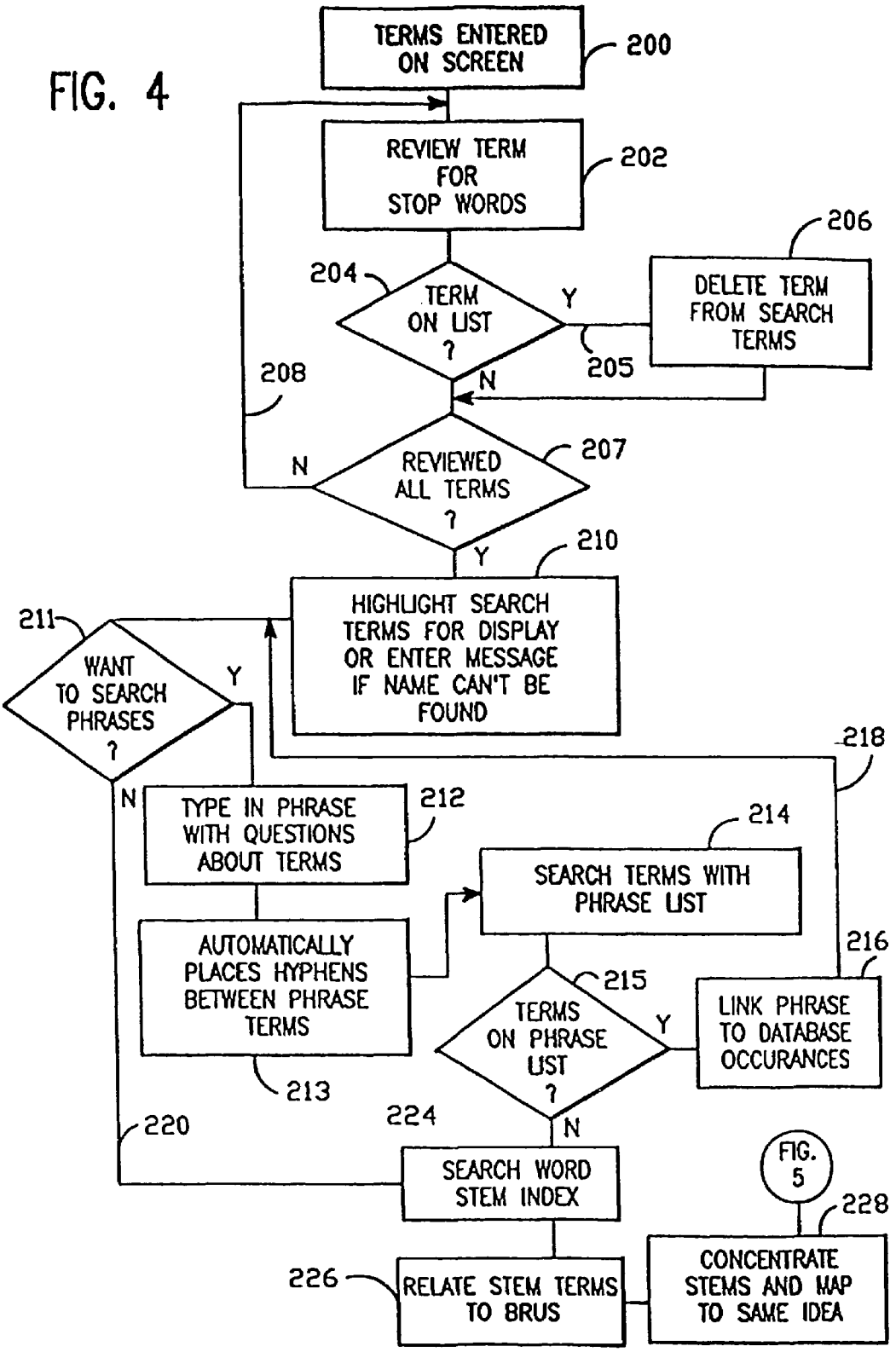

TERMS ENTERED ON SCREEN
200
REVIEW TERM FOR STOP WORDS
202
206
204
TERM ON LIST ?
Y
DELETE TERM FROM SEARCH TERMS
205
208
N
N
REVIEWED ALL TERMS ?
207
Y
210
HIGHLIGHT SEARCH TERMS FOR DISPLAY OR ENTER MESSAGE IF NAME CAN'T BE FOUND
211
WANT TO SEARCH PHRASES ?
Y
218
N
TYPE IN PHRASE WITH QUESTIONS ABOUT TERMS
212
214
SEARCH TERMS WITH PHRASE LIST
AUTOMATICALLY PLACES HYPHENS BETWEEN PHRASE TERMS
216
215
TERMS ON PHRASE LIST ?
Y
LINK PHRASE TO DATABASE OCCURANCES
213
220
224
N
SEARCH WORD STEM INDEX
FIG. 5
228
226
RELATE STEM TERMS TO BRUS
CONCENTRATE STEMS AND MAP TO SAME IDEA

FIG. 5

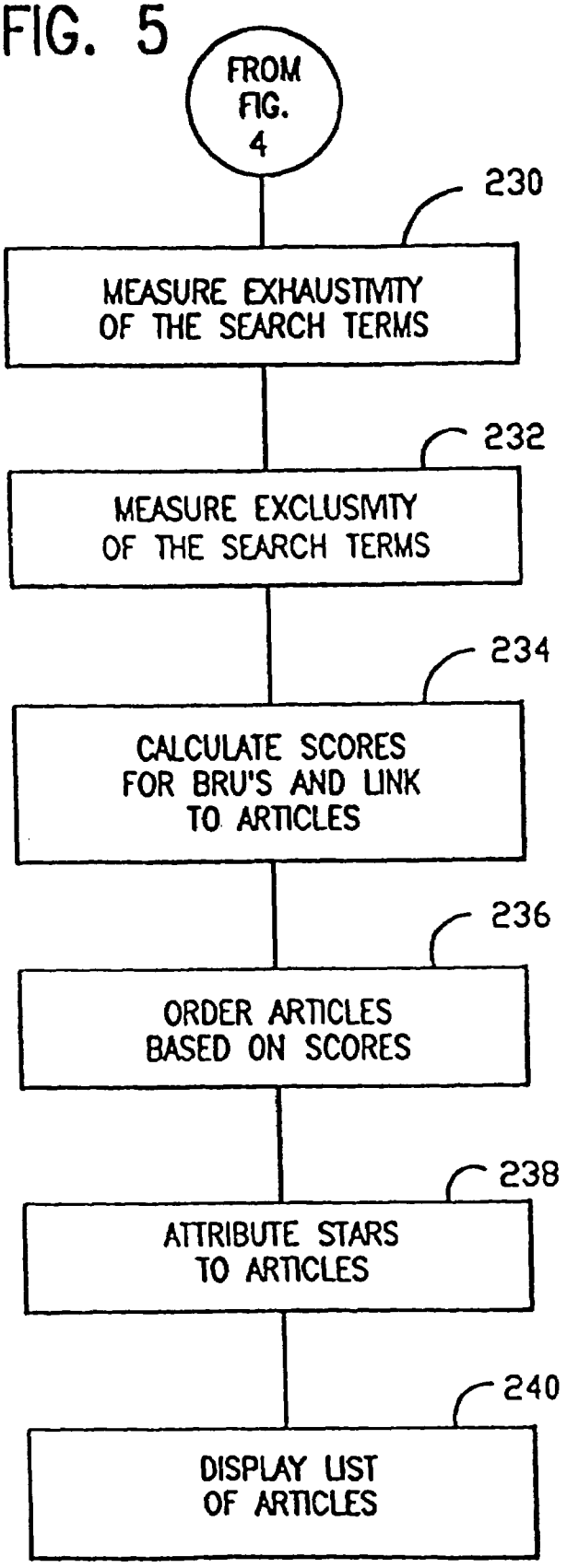

FROM FIG. 4
230
MEASURE EXHAUSTIVITY OF THE SEARCH TERMS
232
MEASURE EXCLUSIVITY OF THE SEARCH TERMS
234
CALCULATE SCORES FOR BRU'S AND LINK TO ARTICLES
236
ORDER ARTICLES BASED ON SCORES
238
ATTRIBUTE STARS TO ARTICLES
240
DISPLAY LIST OF ARTICLES

FIG. 6

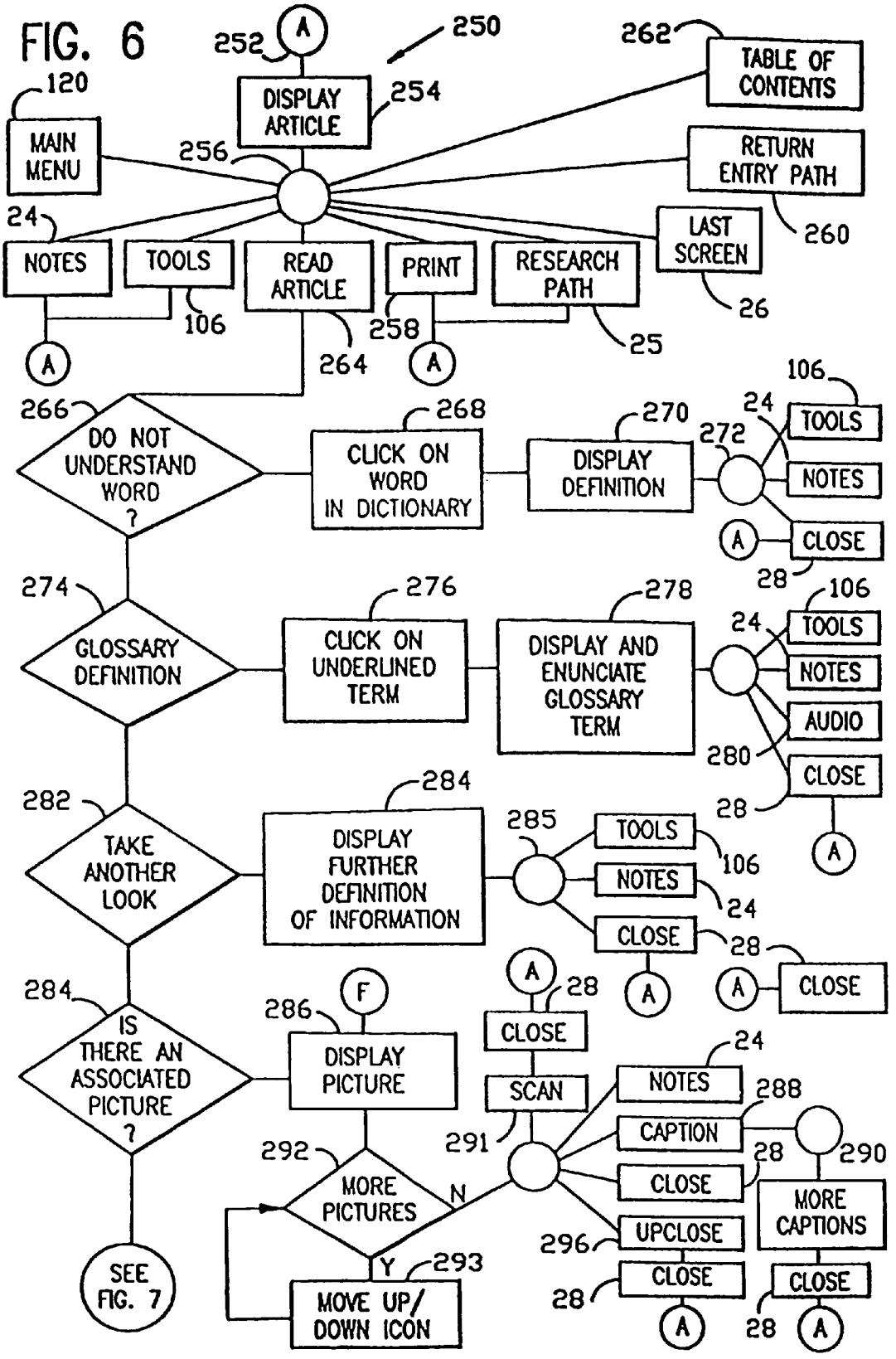

252
A
250
DISPLAY ARTICLE
254
262
TABLE OF CONTENTS
120
MAIN MENU
256
RETURN ENTRY PATH
260
24
NOTES
TOOLS
READ ARTICLE
PRINT
RESEARCH PATH
LAST SCREEN
26
106
258
264
25
266
DO NOT UNDERSTAND WORD ?
268
CLICK ON WORD IN DICTIONARY
270
DISPLAY DEFINITION
272
106
TOOLS
NOTES
CLOSE
28
274
GLOSSARY DEFINITION
276
CLICK ON UNDERLINED TERM
278
DISPLAY AND ENUNCIATE GLOSSARY TERM
AUDIO
280
282
TAKE ANOTHER LOOK
284
DISPLAY FURTHER DEFINITION OF INFORMATION
285
F
286
DISPLAY PICTURE
284
IS THERE AN ASSOCIATED PICTURE ?
SEE FIG. 7
292
MORE PICTURES
N
Y
293
MOVE UP/ DOWN ICON
SCAN
291
288
CAPTION
290
MORE CAPTIONS
296
UPCLOSE

FIG. 7

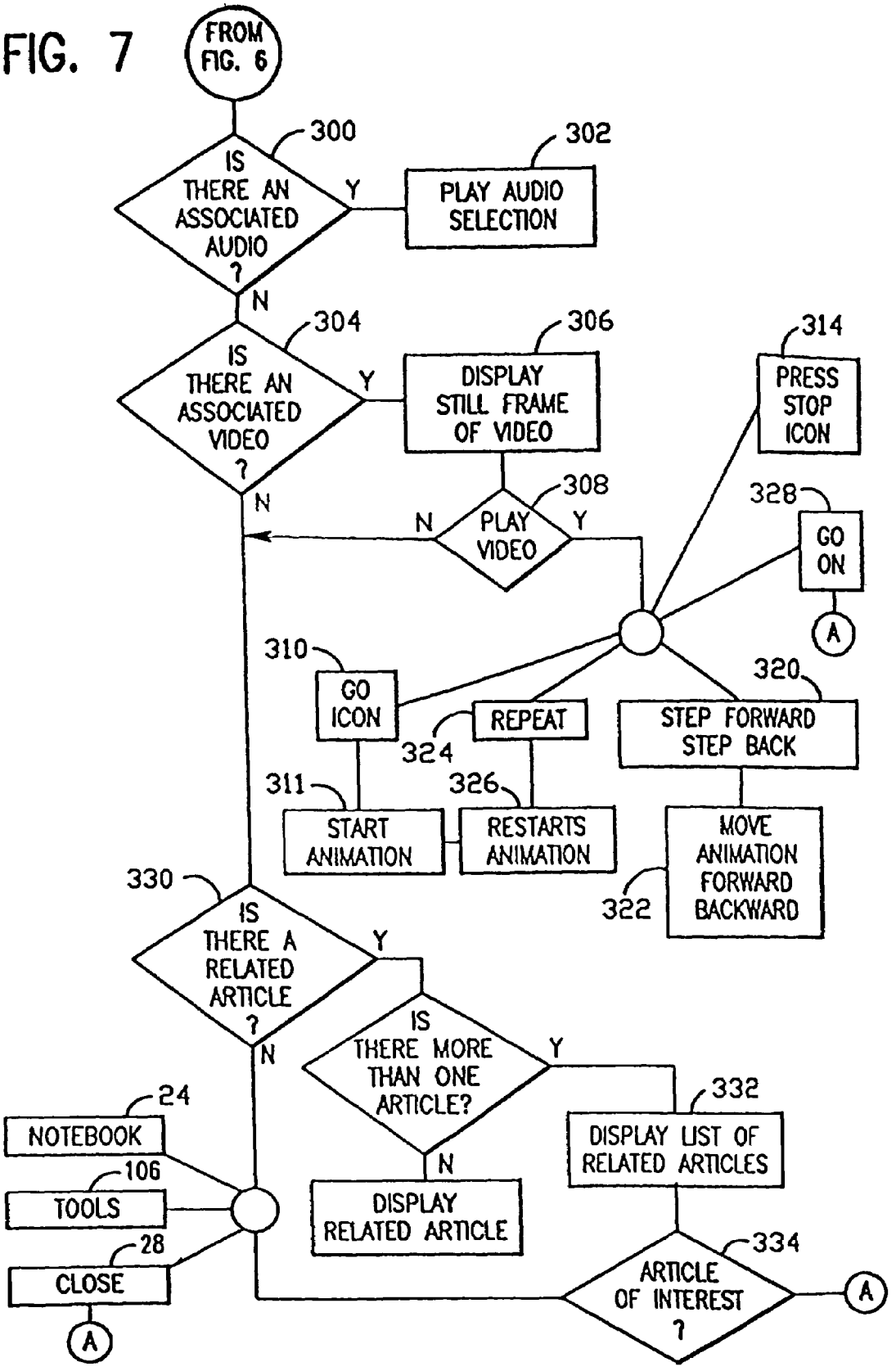

FROM FIG. 6
300
IS THERE AN ASSOCIATED AUDIO ?
Y
302
PLAY AUDIO SELECTION
N
304
IS THERE AN ASSOCIATED VIDEO ?
Y
306
DISPLAY STILL FRAME OF VIDEO
N
308
PLAY VIDEO
N
Y
314
PRESS STOP ICON
328
GO ON
A
310
GO ICON
320
STEP FORWARD STEP BACK
REPEAT
324
311
START ANIMATION
326
RESTARTS ANIMATION
322
MOVE ANIMATION FORWARD BACKWARD
330
IS THERE A RELATED ARTICLE ?
Y
N
IS THERE MORE THAN ONE ARTICLE?
Y
N
332
DISPLAY LIST OF RELATED ARTICLES
DISPLAY RELATED ARTICLE
334
ARTICLE OF INTEREST ?
A
24
NOTEBOOK
106
TOOLS
28
CLOSE
A

FIG. 8

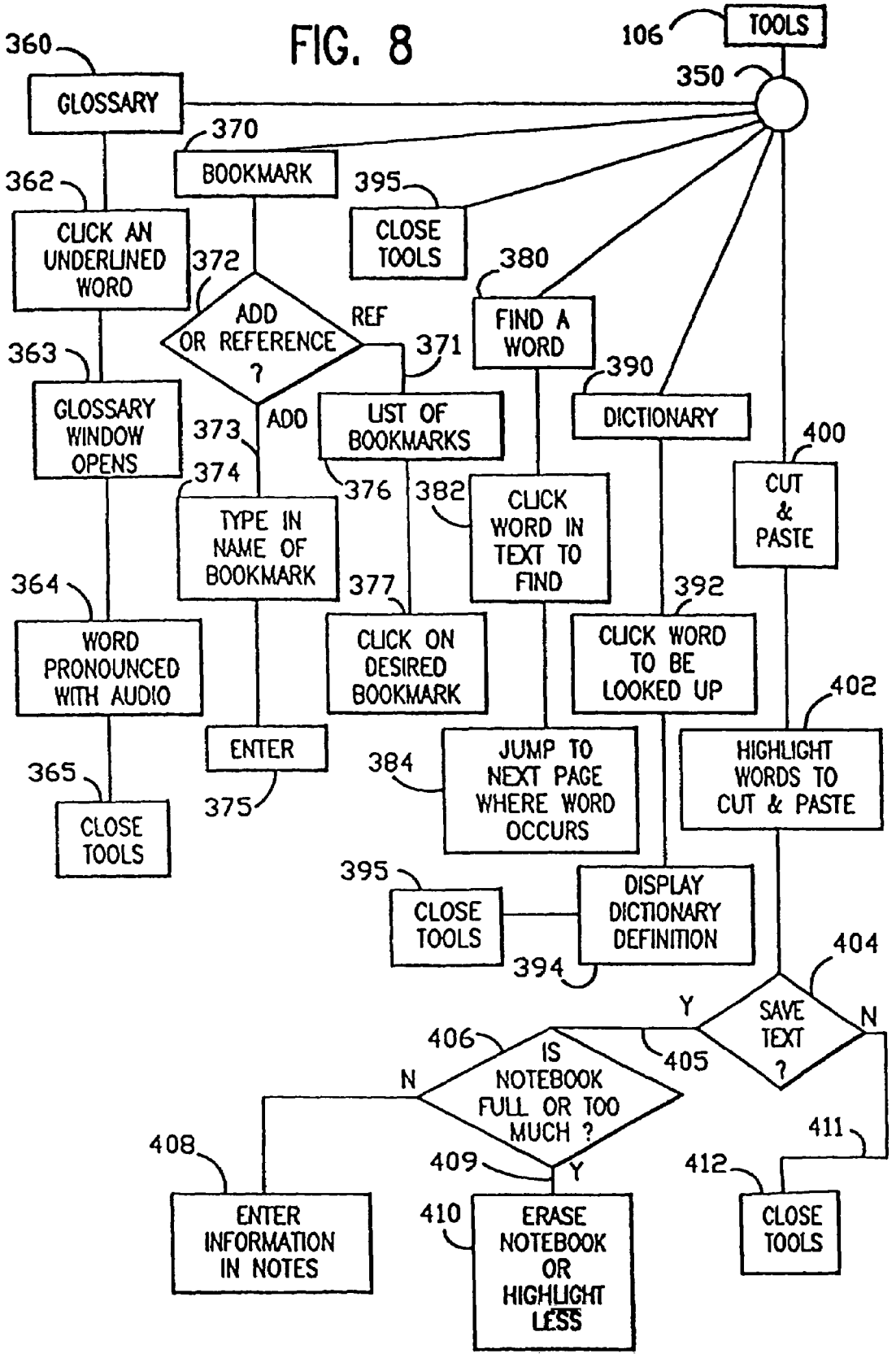
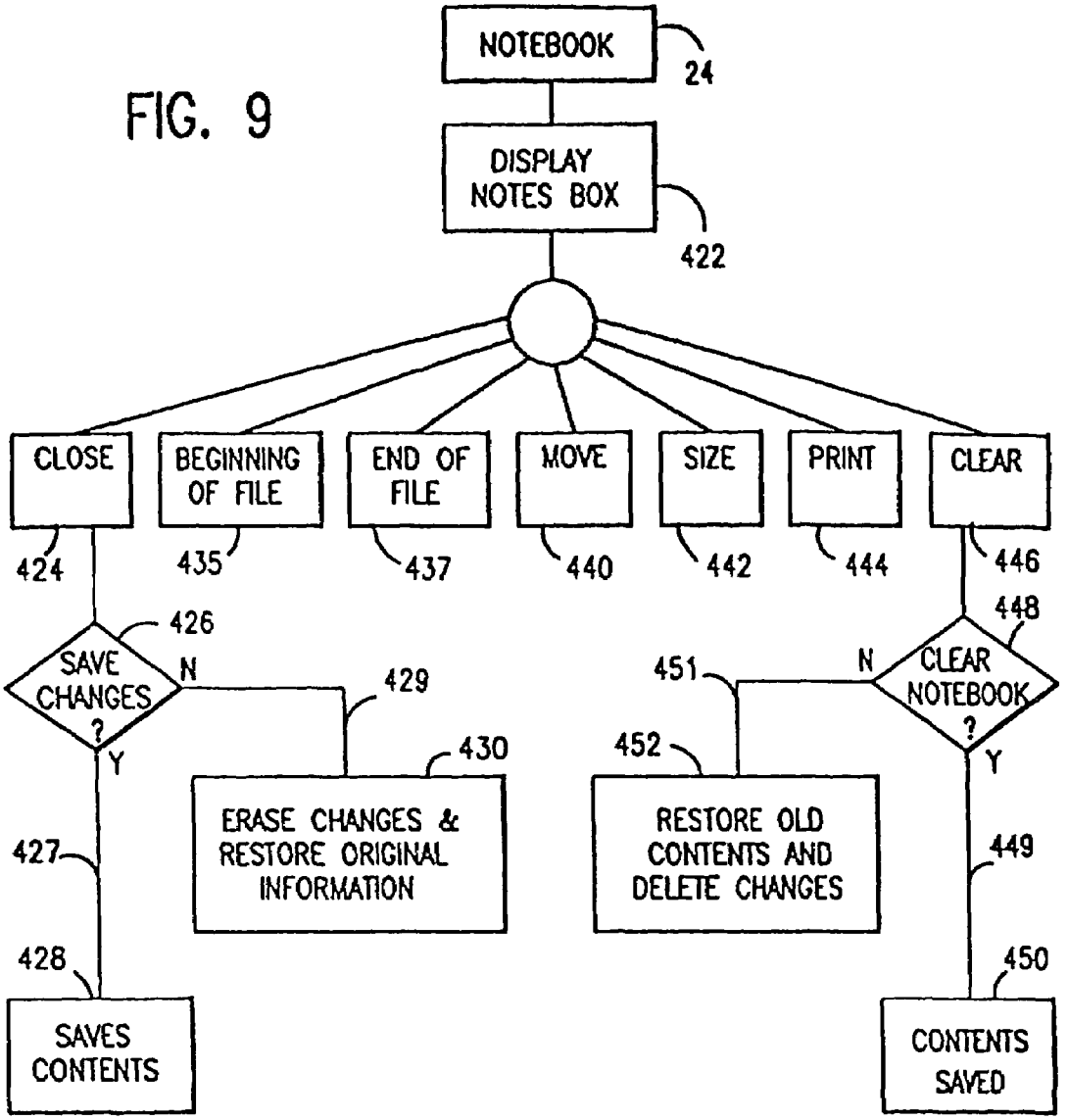

106
TOOLS
350
360
GLOSSARY
370
BOOKMARK
395
CLOSE TOOLS
362
CLICK AN UNDERLINED WORD
372
ADD OR REFERENCE ?
REF
371
380
FIND A WORD
363
GLOSSARY WINDOW OPENS
ADD
373
LIST OF BOOKMARKS
390
DICTIONARY
400
CUT & PASTE
374
376
382
CLICK WORD IN TEXT TO FIND
TYPE IN NAME OF BOOKMARK
364
377
392
WORD PRONOUNCED WITH AUDIO
CLICK ON DESIRED BOOKMARK
CLICK WORD TO BE LOOKED UP
402
ENTER
384
JUMP TO NEXT PAGE WHERE WORD OCCURS
HIGHLIGHT WORDS TO CUT & PASTE
365
375
CLOSE TOOLS
395
CLOSE TOOLS
DISPLAY DICTIONARY DEFINITION
394
404
Y
SAVE TEXT ?
N
406
IS NOTEBOOK FULL OR TOO MUCH ?
405
N
411
408
409
Y
412
ENTER INFORMATION IN NOTES
410
ERASE NOTEBOOK OR HIGHLIGHT LESS
CLOSE TOOLS

FIG. 9


NOTEBOOK
24
DISPLAY NOTES BOX
422
CLOSE
BEGINNING OF FILE
END OF FILE
MOVE
SIZE
PRINT
CLEAR
424
435
437
440
442
444
446
426
SAVE CHANGES ?
N
Y
429
430
ERASE CHANGES & RESTORE ORIGINAL INFORMATION
427
428
SAVES CONTENTS
448
CLEAR NOTEBOOK ?
N
Y
451
452
RESTORE OLD CONTENTS AND DELETE CHANGES
449
450
CONTENTS SAVED

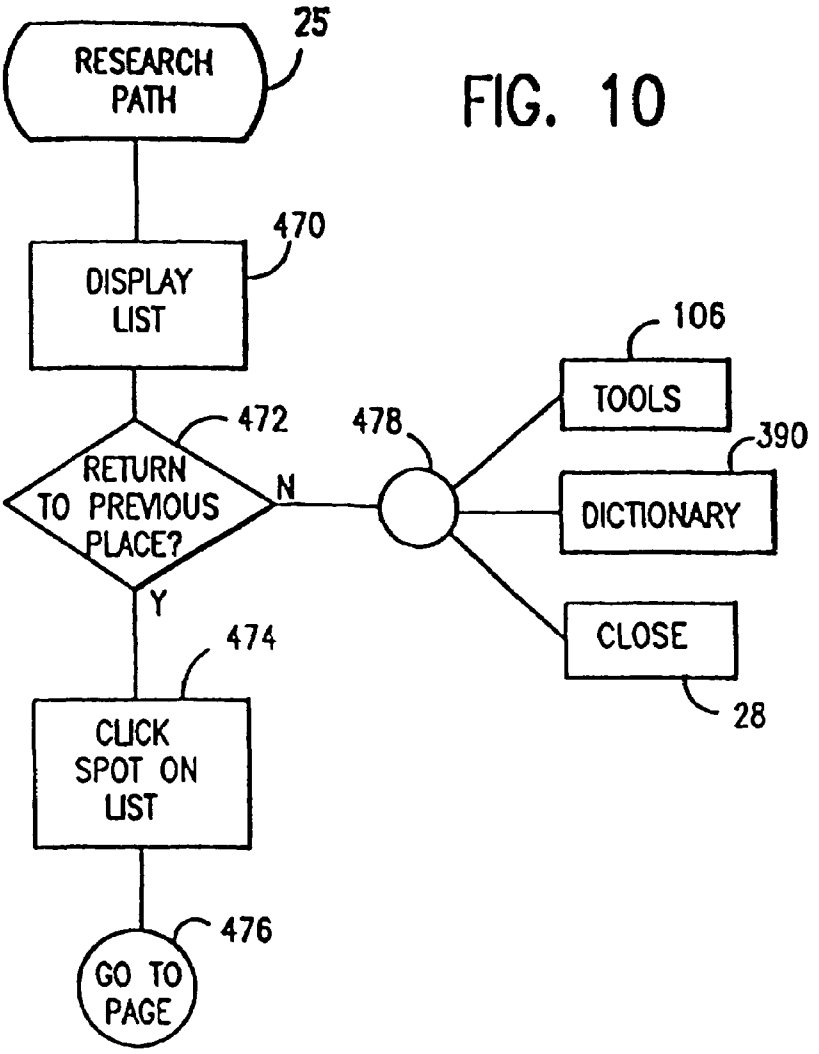


FIG. 10

FIG. 11

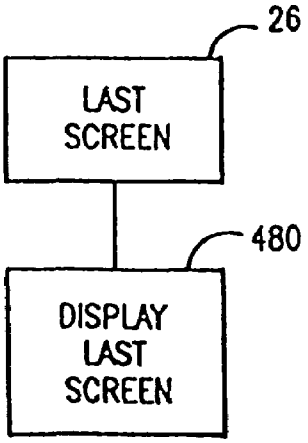
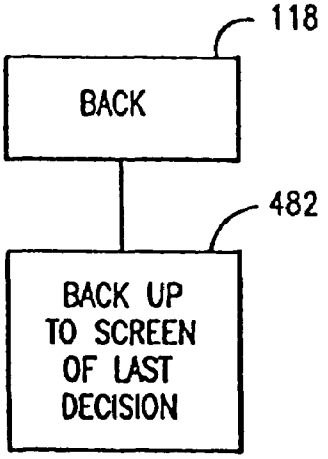


FIG. 12



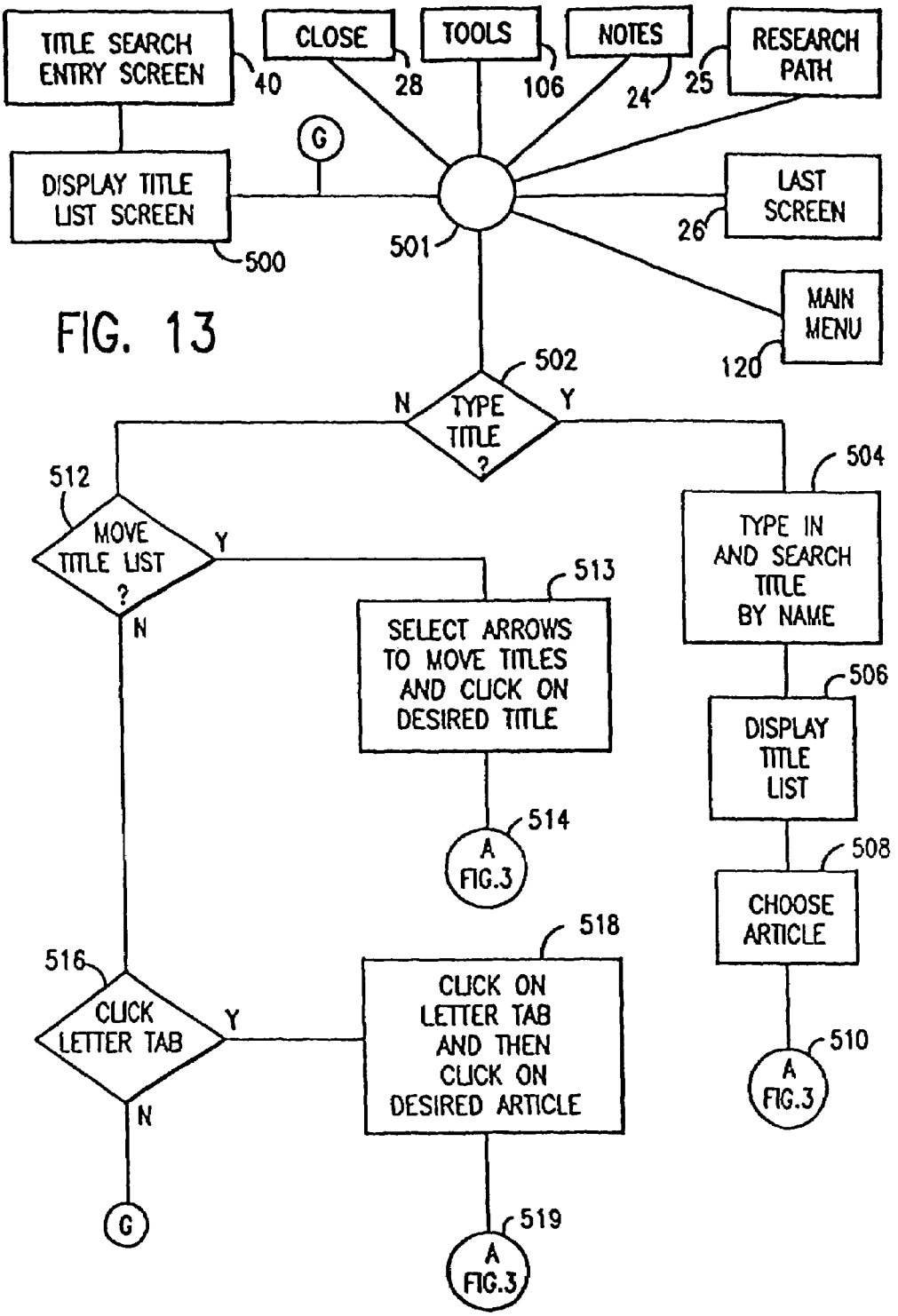

TITLE SEARCH ENTRY SCREEN
40
CLOSE
28
TOOLS
106
NOTES
24
25
RESEARCH PATH
G
DISPLAY TITLE LIST SCREEN
500
501
LAST SCREEN
26
MAIN MENU
120
502
N
TYPE TITLE ?
Y
504
TYPE IN AND SEARCH TITLE BY NAME
506
DISPLAY TITLE LIST
508
CHOOSE ARTICLE
510
A FIG.3
512
MOVE TITLE LIST ?
Y
N
513
SELECT ARROWS TO MOVE TITLES AND CLICK ON DESIRED TITLE
514
A FIG.3
516
CLICK LETTER TAB
Y
N
518
CLICK ON LETTER TAB AND THEN CLICK ON DESIRED ARTICLE
519
A FIG.3
G

FIG. 13

FIG. 14

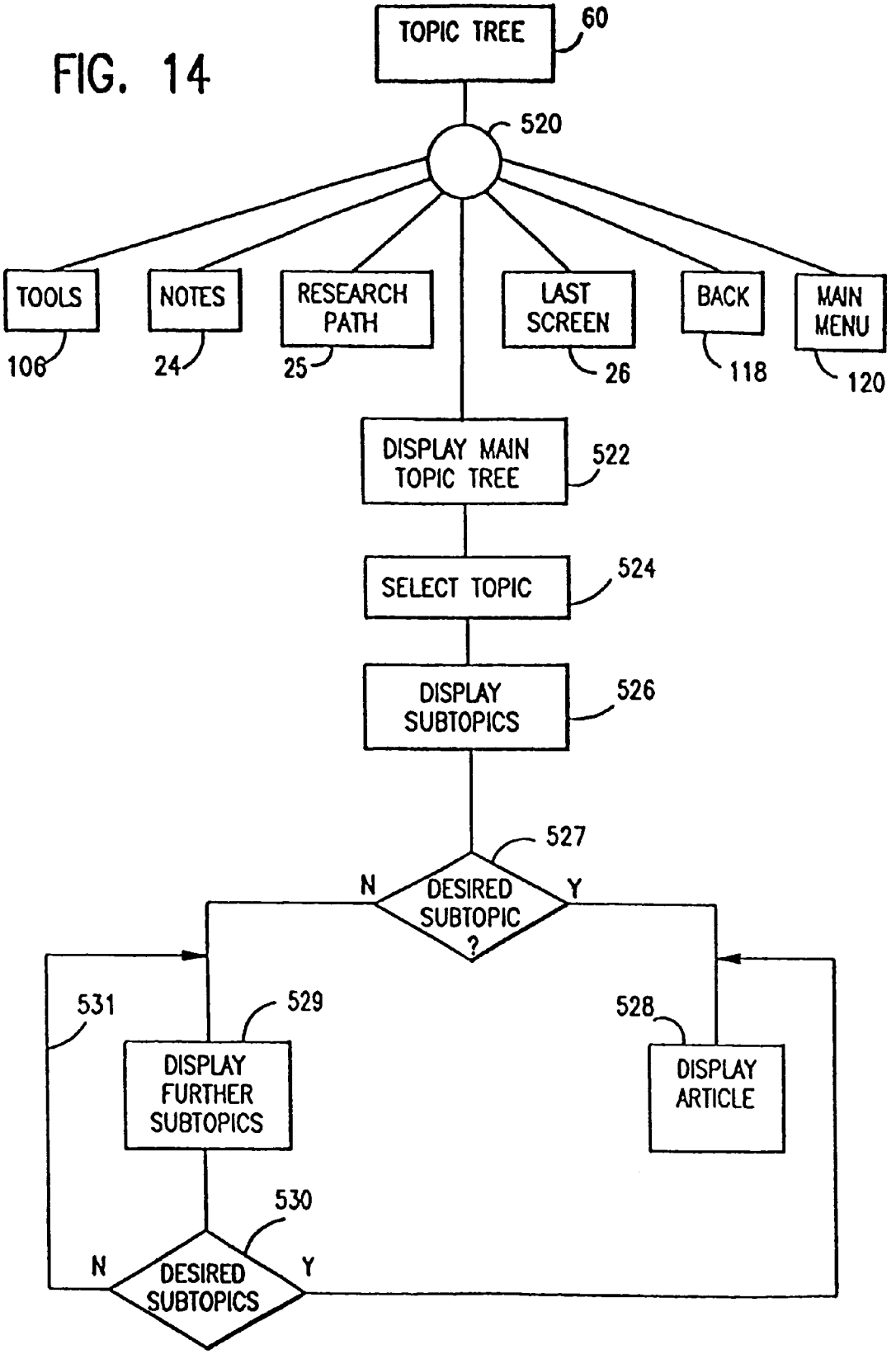
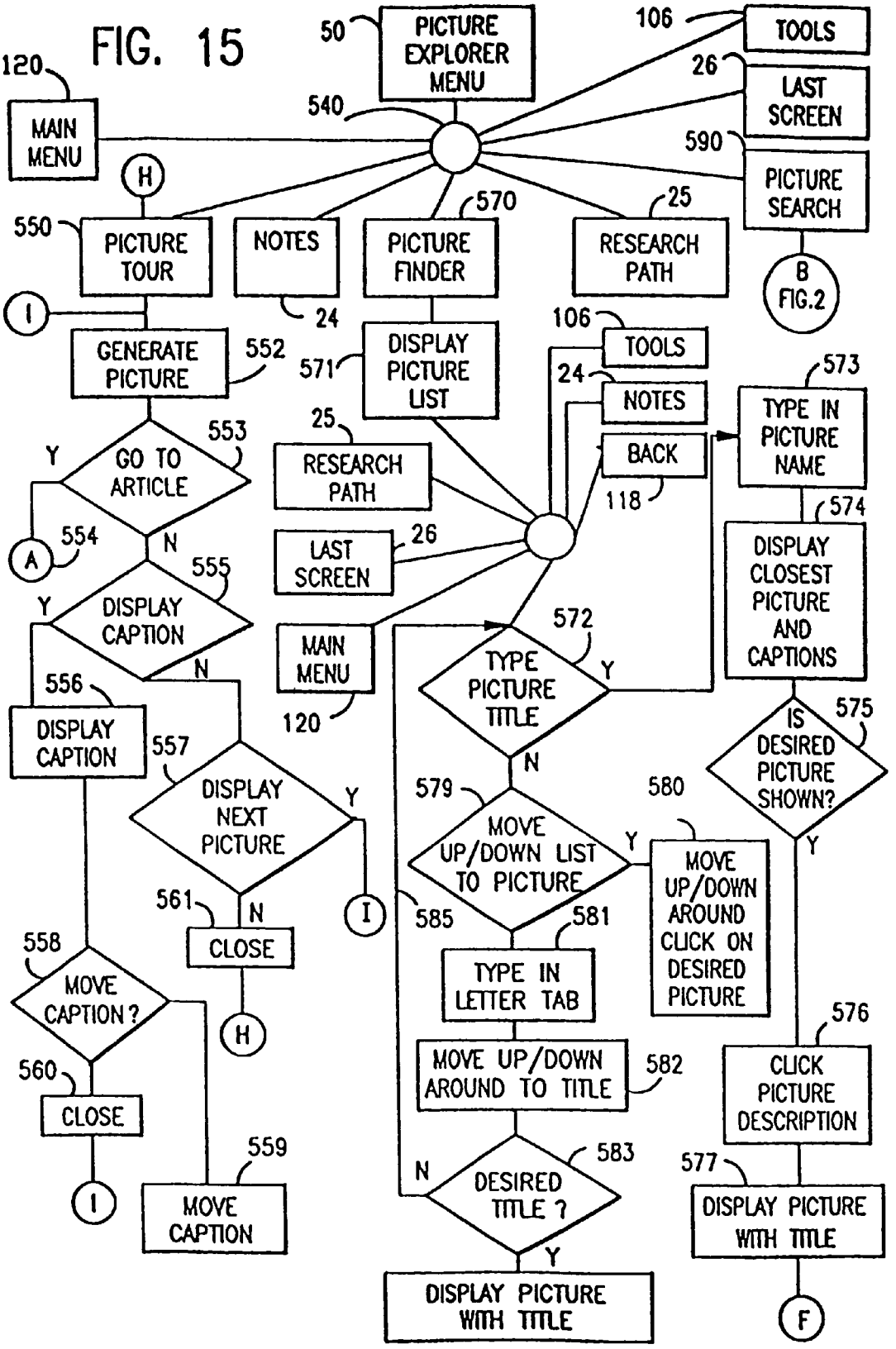

TOPIC TREE
60
520
TOOLS
106
NOTES
24
RESEARCH PATH
25
LAST SCREEN
26
BACK
118
MAIN MENU
120
DISPLAY MAIN TOPIC TREE
522
SELECT TOPIC
524
DISPLAY SUBTOPICS
526
527
N
DESIRED SUBTOPIC ?
Y
531
529
528
DISPLAY FURTHER SUBTOPICS
DISPLAY ARTICLE
530
N
DESIRED SUBTOPICS
Y

FIG. 15


120
MAIN MENU
50
PICTURE EXPLORER MENU
540
106
TOOLS
26
LAST SCREEN
590
PICTURE SEARCH
B FIG.2
H
550
PICTURE TOUR
NOTES
24
570
PICTURE FINDER
25
RESEARCH PATH
I
GENERATE PICTURE
552
571
DISPLAY PICTURE LIST
106
TOOLS
24
NOTES
BACK
118
573
TYPE IN PICTURE NAME
574
DISPLAY CLOSEST PICTURE AND CAPTIONS
553
GO TO ARTICLE
Y
N
A
554
25
RESEARCH PATH
LAST SCREEN
26
555
DISPLAY CAPTION
MAIN MENU
120
572
TYPE PICTURE TITLE
575
IS DESIRED PICTURE SHOWN?
556
DISPLAY CAPTION
557
DISPLAY NEXT PICTURE
579
MOVE UP/DOWN LIST TO PICTURE
580
MOVE UP/DOWN AROUND CLICK ON DESIRED PICTURE
561
CLOSE
585
581
TYPE IN LETTER TAB
558
MOVE CAPTION?
576
CLICK PICTURE DESCRIPTION
560
CLOSE
MOVE UP/DOWN AROUND TO TITLE
582
559
MOVE CAPTION
583
DESIRED TITLE ?
577
DISPLAY PICTURE WITH TITLE
DISPLAY PICTURE WITH TITLE
F

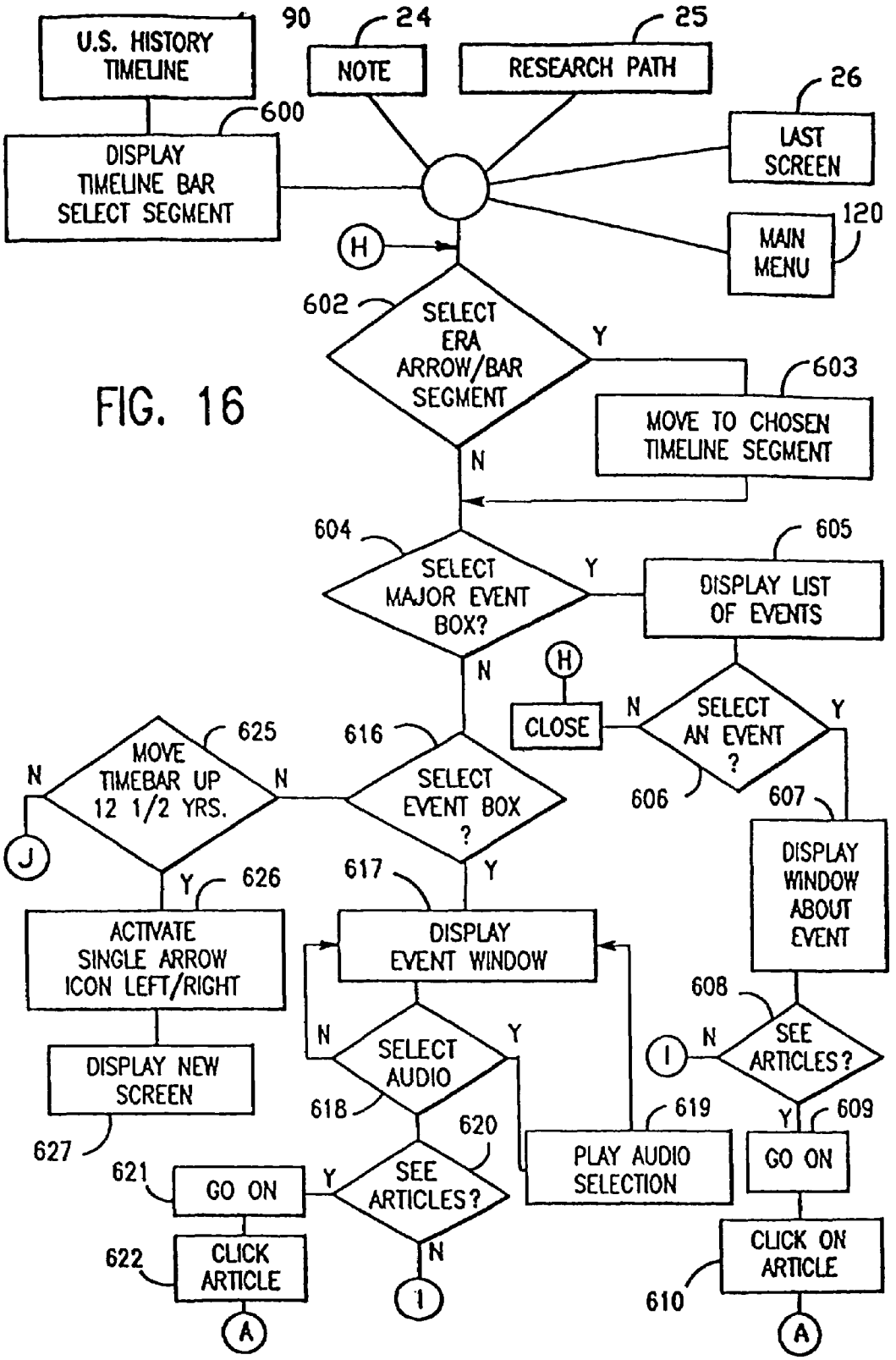
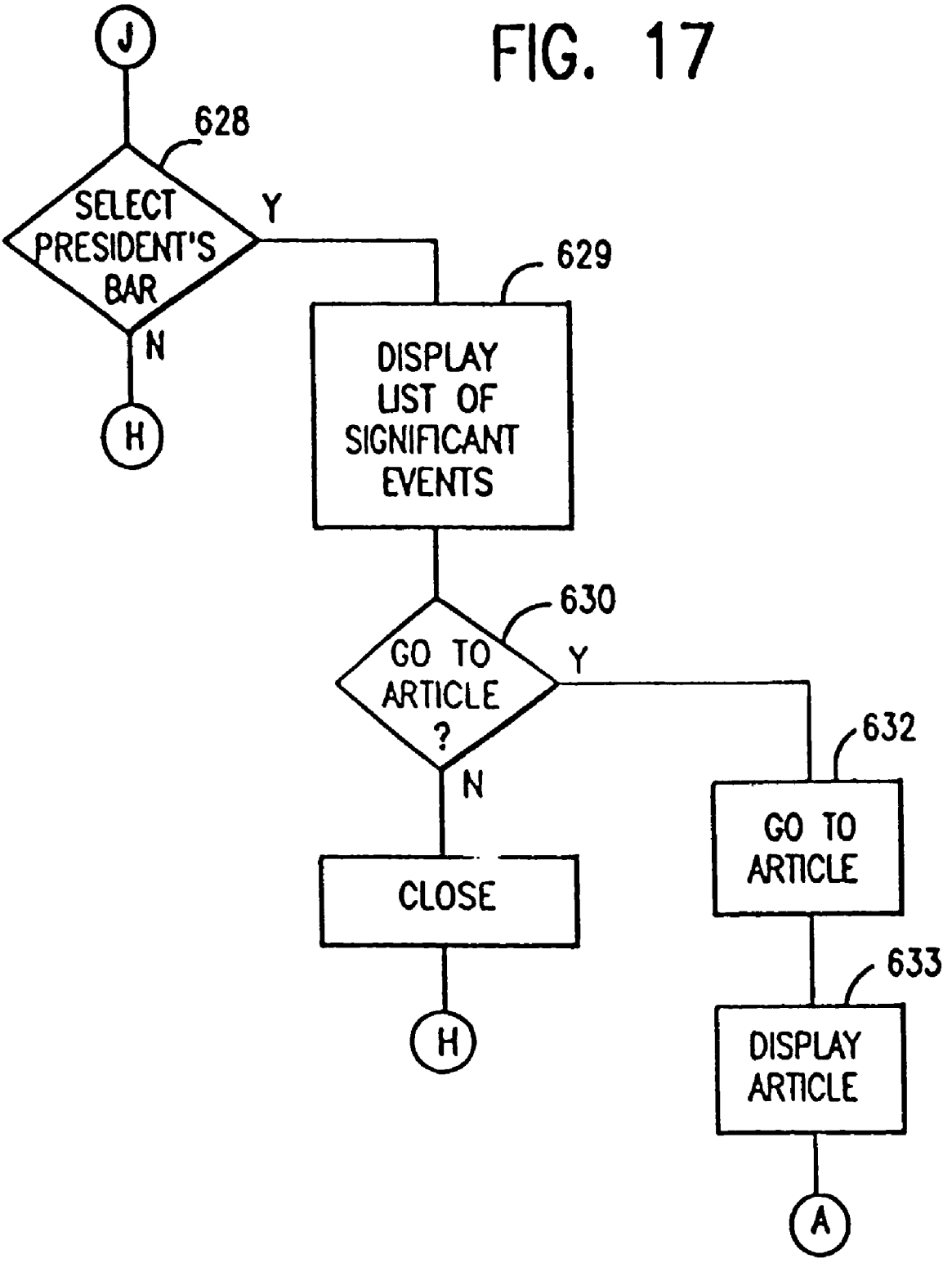

U.S. HISTORY TIMELINE
90
24
NOTE
25
RESEARCH PATH
26
LAST SCREEN
600
DISPLAY TIMELINE BAR SELECT SEGMENT
120
MAIN MENU
H
602
SELECT ERA ARROW/BAR SEGMENT
Y
603
MOVE TO CHOSEN TIMELINE SEGMENT
N
604
SELECT MAJOR EVENT BOX?
Y
605
DISPLAY LIST OF EVENTS
N
H
CLOSE
N
SELECT AN EVENT ?
Y
606
607
DISPLAY WINDOW ABOUT EVENT
625
MOVE TIMEBAR UP 12 1/2 YRS.
N
616
SELECT EVENT BOX ?
N
J
Y
626
ACTIVATE SINGLE ARROW ICON LEFT/RIGHT
617
Y
DISPLAY EVENT WINDOW
608
I
N
SEE ARTICLES?
DISPLAY NEW SCREEN
N
SELECT AUDIO
Y
618
620
627
621
GO ON
Y
SEE ARTICLES?
619
PLAY AUDIO SELECTION
Y
609
GO ON
622
CLICK ARTICLE
N
I
CLICK ON ARTICLE
610
A
A

FIG. 16

FIG. 17


J
628
SELECT PRESIDENT'S BAR
Y
N
H
629
DISPLAY LIST OF SIGNIFICANT EVENTS
630
GO TO ARTICLE ?
Y
N
CLOSE
H
632
GO TO ARTICLE
633
DISPLAY ARTICLE
A

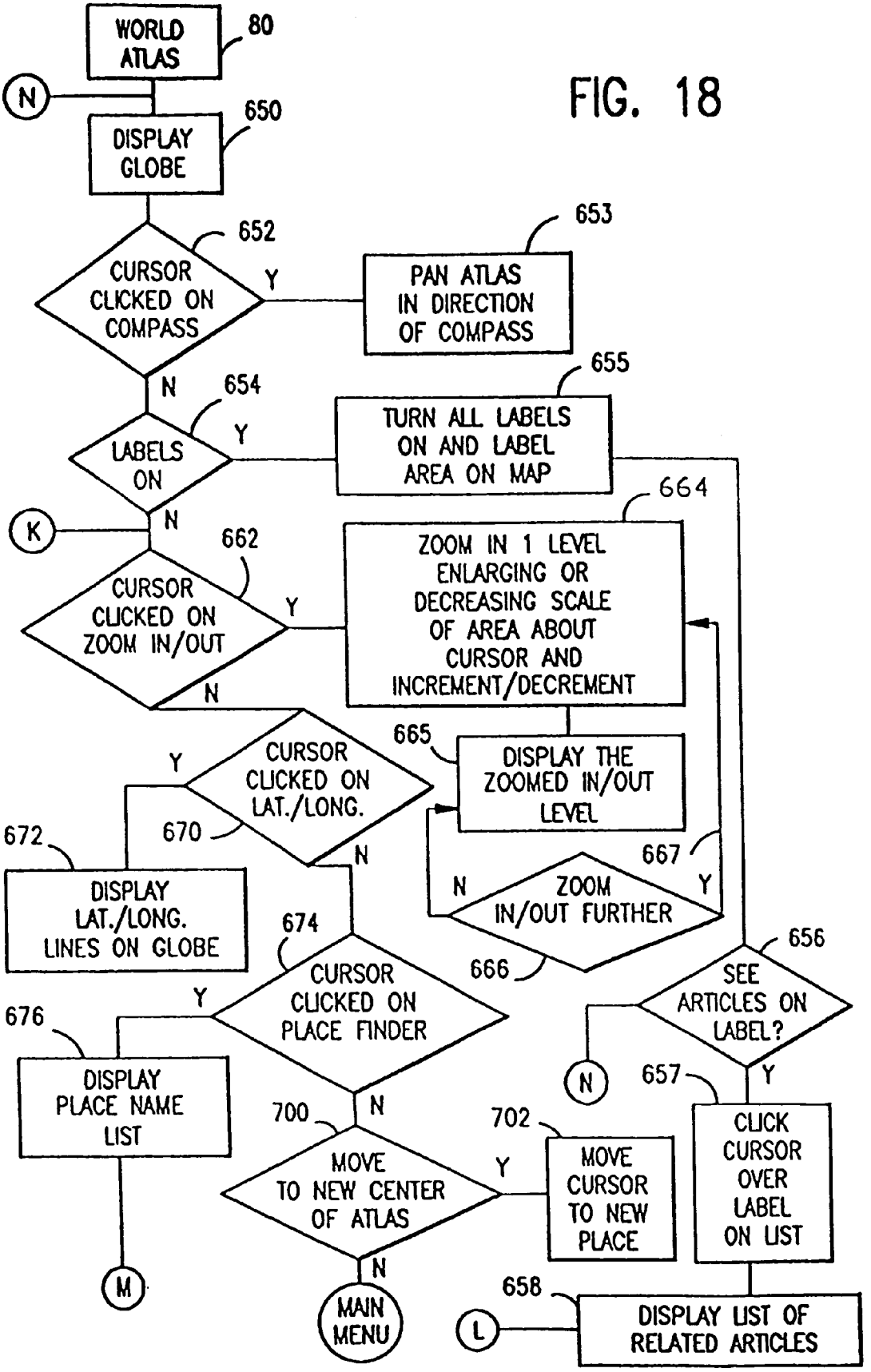

WORLD ATLAS
80
N
DISPLAY GLOBE
650
652
CURSOR CLICKED ON COMPASS
Y
653
PAN ATLAS IN DIRECTION OF COMPASS
N
654
LABELS ON
Y
655
TURN ALL LABELS ON AND LABEL AREA ON MAP
K
N
662
CURSOR CLICKED ON ZOOM IN/OUT
Y
664
ZOOM IN 1 LEVEL ENLARGING OR DECREASING SCALE OF AREA ABOUT CURSOR AND INCREMENT/DECREMENT
N
665
DISPLAY THE ZOOMED IN/OUT LEVEL
667
N
ZOOM IN/OUT FURTHER
Y
666
Y
CURSOR CLICKED ON LAT./LONG.
670
672
DISPLAY LAT./LONG. LINES ON GLOBE
N
674
CURSOR CLICKED ON PLACE FINDER
Y
676
DISPLAY PLACE NAME LIST
N
700
MOVE TO NEW CENTER OF ATLAS
Y
702
MOVE CURSOR TO NEW PLACE
N
M
MAIN MENU
656
SEE ARTICLES ON LABEL?
N
Y
657
CLICK CURSOR OVER LABEL ON LIST
658
L
DISPLAY LIST OF RELATED ARTICLES

FIG. 18

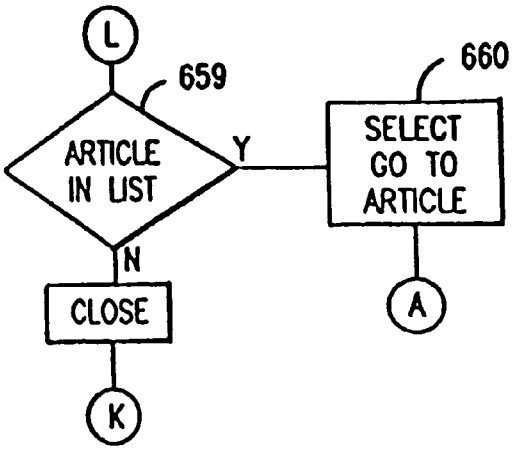
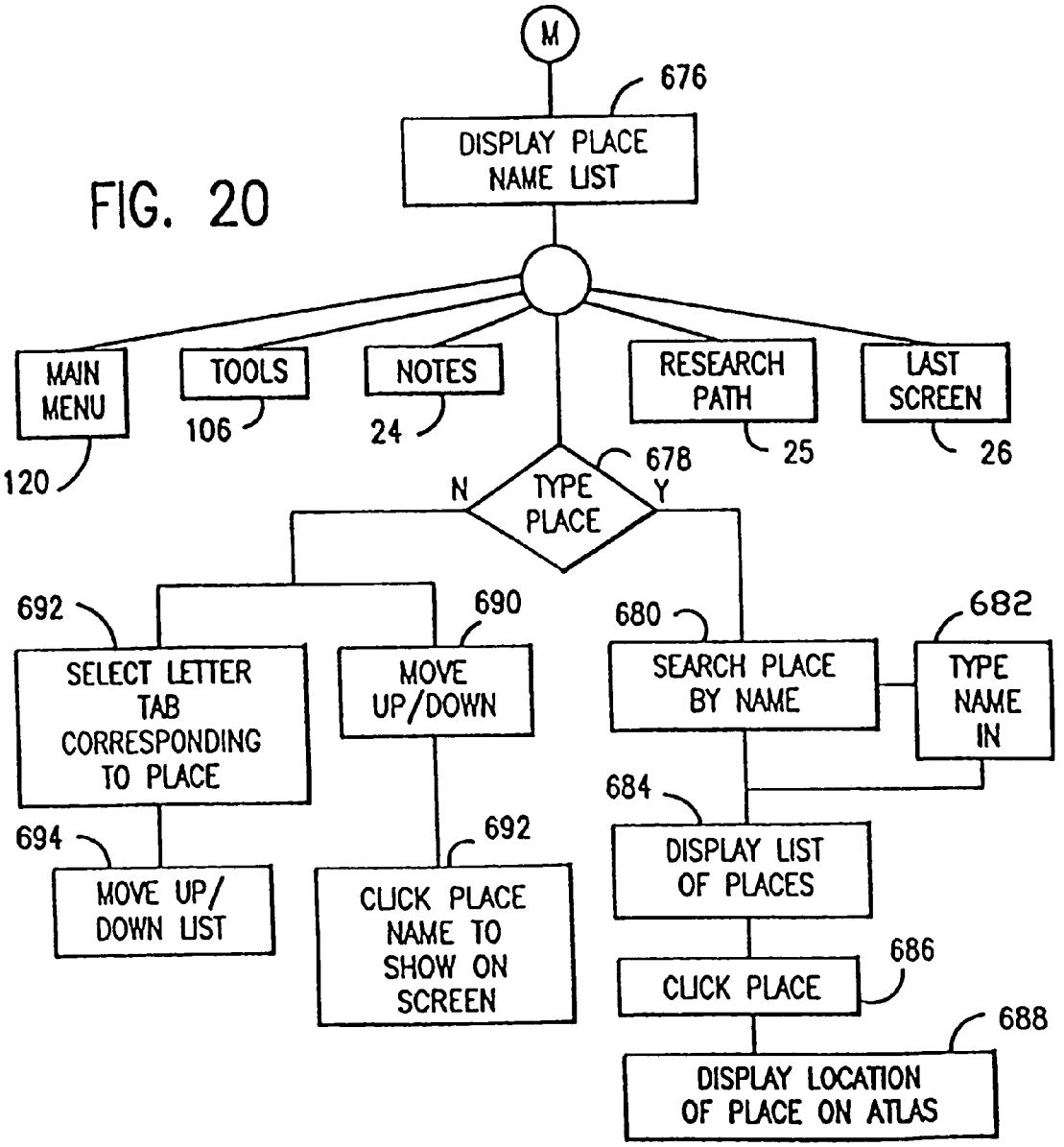

L
659
ARTICLE IN LIST
Y
660
SELECT GO TO ARTICLE
N
CLOSE
A
K

FIG. 19

FIG. 20


M
676
DISPLAY PLACE NAME LIST
MAIN MENU
120
TOOLS
106
NOTES
24
RESEARCH PATH
25
LAST SCREEN
26
678
N
TYPE PLACE
Y
692
SELECT LETTER TAB CORRESPONDING TO PLACE
694
MOVE UP/ DOWN LIST
690
MOVE UP/DOWN
692
CLICK PLACE NAME TO SHOW ON SCREEN
680
SEARCH PLACE BY NAME
682
TYPE NAME IN
684
DISPLAY LIST OF PLACES
686
CLICK PLACE
688
DISPLAY LOCATION OF PLACE ON ATLAS

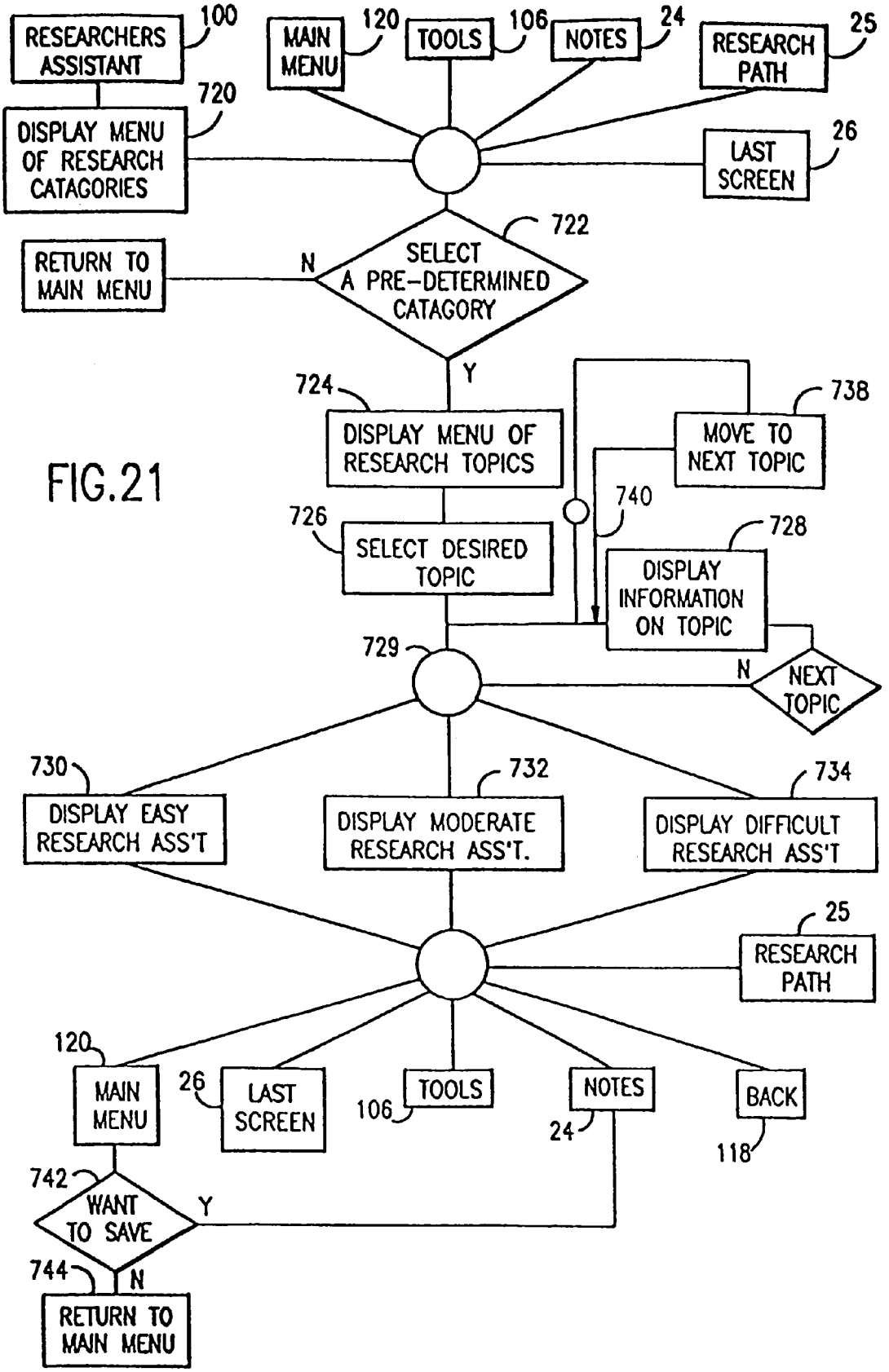
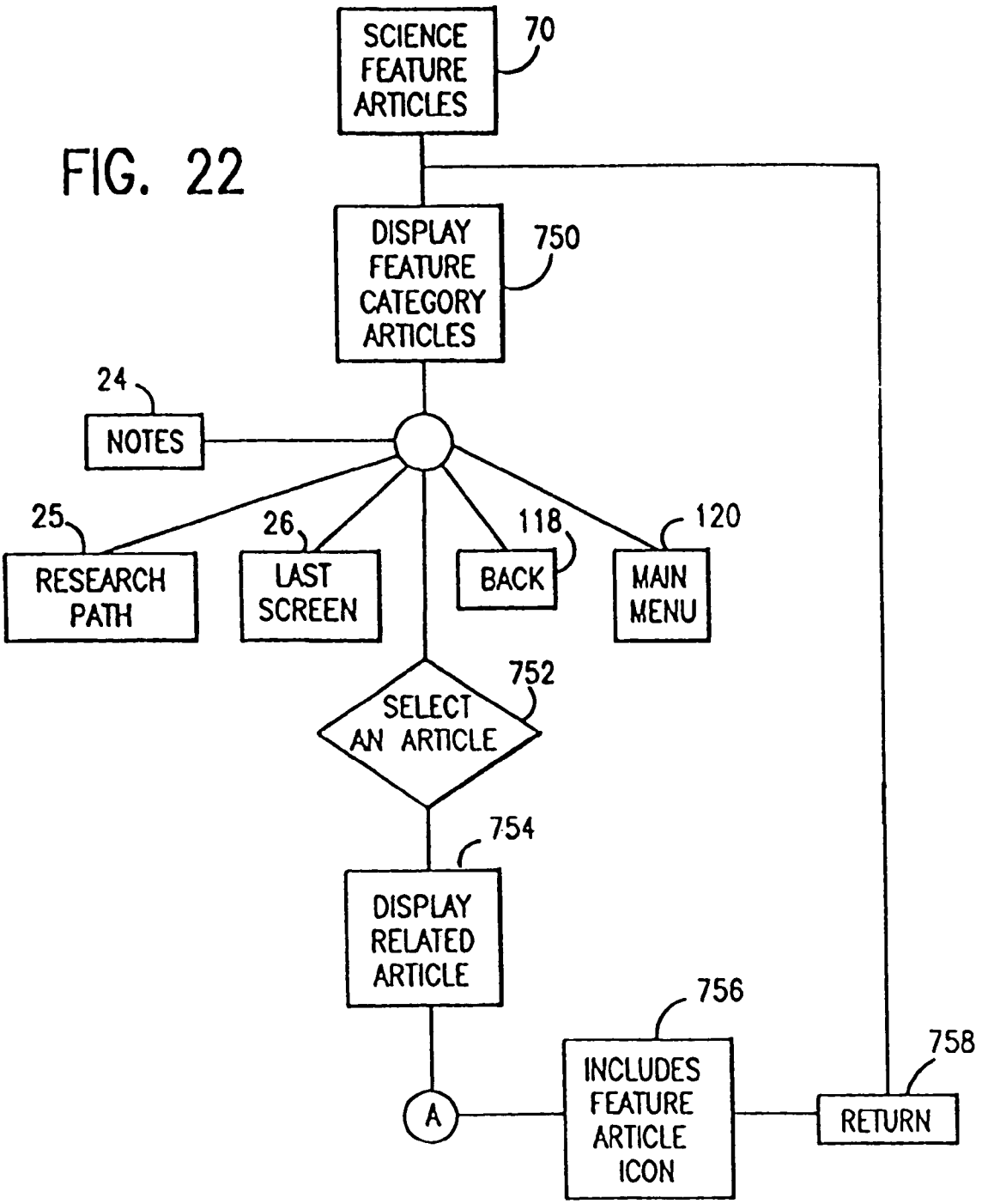

RESEARCHERS ASSISTANT
100
MAIN MENU
120
TOOLS
106
NOTES
24
RESEARCH PATH
25
720
DISPLAY MENU OF RESEARCH CATAGORIES
LAST SCREEN
26
722
RETURN TO MAIN MENU
N
SELECT A PRE-DETERMINED CATAGORY
Y
724
DISPLAY MENU OF RESEARCH TOPICS
738
MOVE TO NEXT TOPIC
740
726
SELECT DESIRED TOPIC
728
DISPLAY INFORMATION ON TOPIC
729
N
NEXT TOPIC
730
DISPLAY EASY RESEARCH ASS'T
732
DISPLAY MODERATE RESEARCH ASS'T.
734
DISPLAY DIFFICULT RESEARCH ASS'T
25
RESEARCH PATH
120
MAIN MENU
26
LAST SCREEN
106
TOOLS
NOTES
24
BACK
118
742
WANT TO SAVE
Y
744
N
RETURN TO MAIN MENU

FIG.21

FIG. 22


SCIENCE FEATURE ARTICLES
70
DISPLAY FEATURE CATEGORY ARTICLES
750
24
NOTES
25
RESEARCH PATH
26
LAST SCREEN
118
BACK
120
MAIN MENU
752
SELECT AN ARTICLE
754
DISPLAY RELATED ARTICLE
756
INCLUDES FEATURE ARTICLE ICON
A
758
RETURN

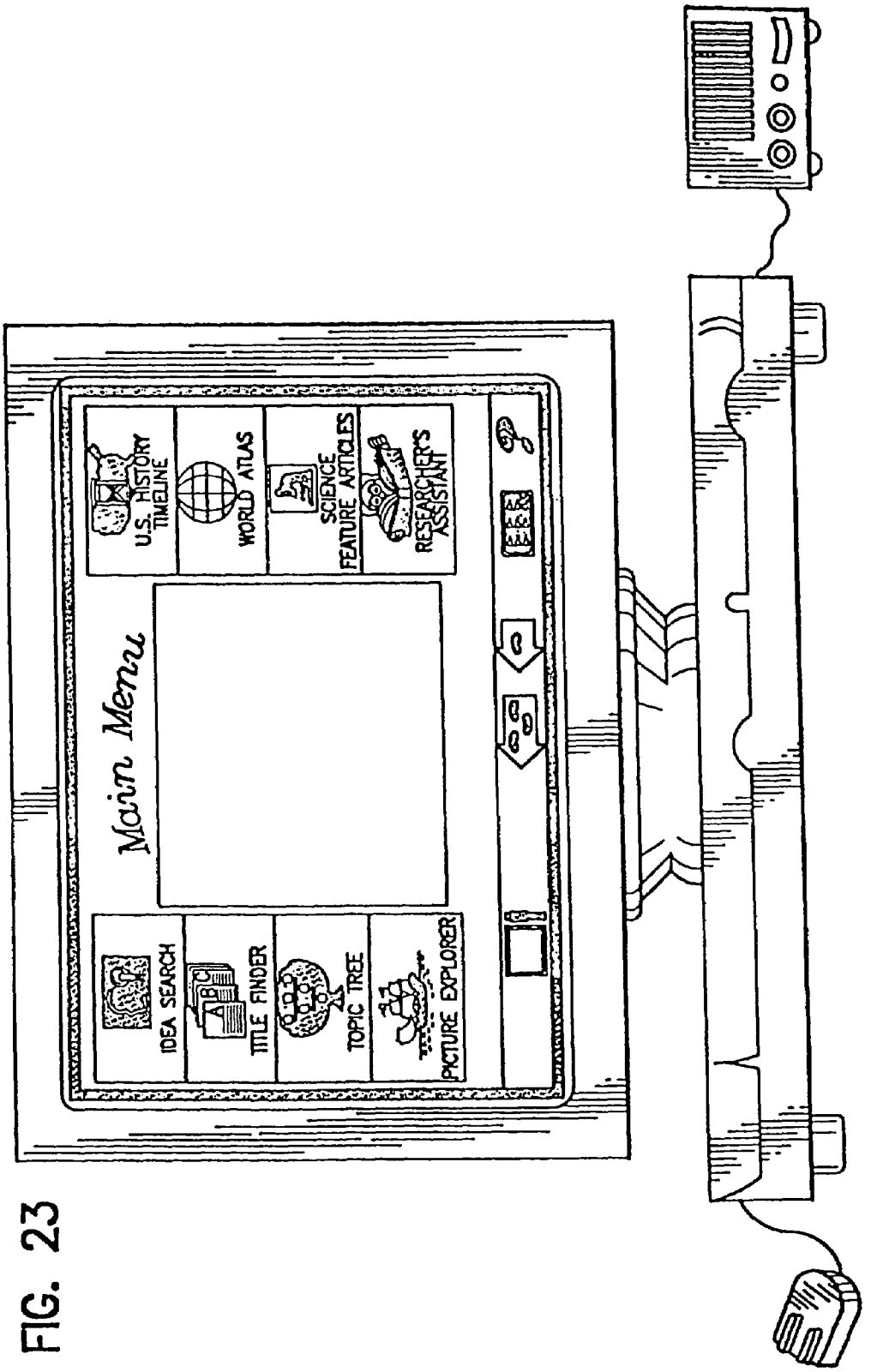

Main Menu
U.S. HISTORY TIMELINE
WORLD ATLAS
SCIENCE FEATURE ARTICLES
RESEARCHER'S ASSISTANT
IDEA SEARCH
TITLE FINDER
TOPIC TREE
PICTURE EXPLORER

FIG. 23

MULTIMEDIA SEARCH SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 10/103,814, filed Mar. 25, 2002, which is a continuation of U.S. application Ser. No. 08/202,985, filed Feb. 28, 1994, now U.S. Pat. No. 6,546,399, issued Apr. 8, 2003, which is a continuation of application Ser. No. 08/113,955, filed Aug. 31, 1993, now abandoned, which is a continuation of U.S. application Ser. No. 07/426,917, filed Oct. 26, 1989, now U.S. Pat. No. 5,241,671, the disclosures of which are incorporated herein by reference in their entireties.

BACKGROUND OF THE INVENTION

This invention relates to a computer search system for retrieving textual and graphical information through multiple textual and graphical entry paths into a database.

Recently, there has been a rapidly growing interest in using CD-ROM technology as a dynamically interactive way of presenting material contained in books, encyclopaedias, magazines, catalogs, etc. CD-ROMS offer a set of characteristics that are unique for this purpose. First, they have a very high information storage density (approximately 50 times magnetic material), rapid random access of addressable information, low cost mass produced copies, and relatively low cost playback equipment. Second, by interfacing a CD-ROM player and CRT monitor to a computer, stored audio/visual data can be accessed interactively in a variety of user friendly ways.

Yet with this explosion in storage capacity and quality, there arises a need for software that readily and easily accesses this full spectra of data in a user friendly manner. Despite the great potential for interactive CD-ROM systems, however, many of the current commercially available versions have important limitations in meeting this need. These limitations include products lacking entry paths into the CD-ROM database to retrieve graphical information, products that cannot flexibly search and retrieve different types of data formats, or products that will not allow the combination of search strategies to uncover graphical and related textual information or vice versa. Other limitations exibited by some software products include the lack of interactive search tools adapted for non-expert users, and the lack of interactive search tool that fully explore and exploit the full capabilities of a CD-ROM database.

An example of some of the above limitations is demonstrated by the *Grolier* CD-ROM based encyclopaedia. The *Grolier* product provides an interactive search tool that allows for the access of textual data through four search modes. The first search mode involves a Browse capability where the user types in the first few letters or words of a particular topic and the software then displays a menu listing the article titles that are closest in the alphabet to the search terms. The user can then scan forward or backward through the alphabetically arranged titles until an article of interest is found.

The second search mode is known as the Browse Word Index. In this mode, the user selects the word occurring in any of the articles in the display. The software then sorts entries in descending order of the words, based upon the number of times that the specific search word occurs in the text. A third search mode involves expanding the Browse Word Index Mode to combine Boolean operators such as "and", "or", or "not", and the fourth search mode involves

linking terms appearing in the articles that are designated by capital letters. In particular, by depressing the RETURN key while the cursor is located on the linking word, the search software will retrieve a menu of article titles centered on that linked term.

However, the *Grolier* system only accesses textual data by means of text-based entry paths. No facility exists for taking advantage of the CD-ROM's capacity to store pictures, sound, or video information.

This shortcoming of a full text/graphics interactive search system is not overcome by those products that are directed to searching graphical databases. That is because the graphics oriented systems fail to either include any text-based entry paths or text entry paths that would enable the user to employ the full capacity of the CD-ROM.

For example, The World GeoGraph computer program provides a graphics based atlas exploration program where a user can search through multiple layers (each layer having a greater degree of detail) of an on-screen map. The GeoGraph database is also integrated with information relating to each country of the atlas and the search program includes a feature for using plain English selection rules contained in dialogs to search and sort information pertaining to the maps. The World GeoGraph program, however, pertains to a textual search of only that textual information that explains the graphical database and the text information is retrieved only by means of a single entry path. World GeoGraph thereby does not appear to provide full textual search capabilities of an entire textual database that is distinct from the graphical database.

SUMMARY AND OBJECTS OF THE INVENTION

In view of the foregoing, it should be apparent that a need still exists for a database search system that retrieves multimedia information in a flexible, user friendly system. It is, therefore, a primary object of the invention to provide a search system in which a multimedia database consisting of text, picture, audio and animated data is searched through multiple graphical and textual entry paths.

It is a further object of the invention to provide for a search system wherein both the textual and graphical entry paths are interactive.

It is yet an additional object of the invention to provide for a search system where the textual and graphical entry paths are interrelated such that textual information is fully accessible from the graphical entry paths and graphical information is fully accessible from the textual entry paths.

It is still an additional object of the invention to provide for a search system where the graphical and textual information are contained in a single database and the information consists of words, phrases, numbers, letters, maps, charts, pictures, moving images, animations and audio information.

It is yet an additional object of the invention to provide for a search system which is stored on a CD-ROM disc.

It is yet a further object of the invention to provide for a search system which is adapted to operate on a microcomputer in either a stand-alone capacity or on a network.

It is still a further object of the invention to provide for a search system where one of the graphical entry paths involves interactively narrowing a search of graphical images to a point in which related textual information about each image becomes accessible.

It is still an additional object of the invention to provide for a search system wherein the textual search can be

narrowed to a point where graphical information related to the uncovered text is accessible.

It is a further object of the invention to provide for a search system where both textual and graphical entry paths include functions which enhance the efficacy of the searches and the accessibility of information retrieved from those searches.

It is also an object of the invention to provide for a search system in which an idea search entry path is provided which can retrieve textual information stored in stem indexes in the database.

It is yet a further object of the invention to provide for a search system that compares misspelled search terms with definitions stored in a database dictionary. The search system then automatically suggests alternative spellings to the user.

It is an additional object of the invention to provide for a new list function if the initial information uncovered by the search does not meet the user's expectation. The system will then suggest alternative terms for ambiguous search terms.

It is a further object of the invention to provide for a search system where phrases, paragraphs or sentences can be entered by the user to be searched. The entered search terms are then compared to a list of stop words, and those stop words are then automatically eliminated, such that a search is performed only on particular terms occurring in the phrases, sentences or paragraphs.

It is still a further object of the invention to provide for a search system whereby phrases can be searched together rather than being broken up as a group of individual searches for key terms.

It is yet an additional object of the invention to provide for a system whereby the graphical and textual information comprise an encyclopaedia. The textual information of the database also includes a dictionary, a thesaurus, a glossary and a stored fact index.

It is still another object of the invention to provide for a search system where one of the textual entry paths consists of a title finder search.

It is a further object of the invention to provide for a search system where one of the textual entry paths consists of a topic tree program that divides all textual information into topics, sub-topics and so on, in order to assist a user in finding an article of interest.

It is yet a further object of the invention to provide for a picture explorer entry path which enables a user to find pictures and then retrieve related textual information for each picture.

It is yet a further object of the invention to provide for a search system where one of the textual entry paths consists of a history timeline search program.

It is an additional object of the invention to provide for a search system wherein a portion of the graphical and textual entry paths consist of a world atlas entry path.

It is still a further object of the invention to provide for a textual entry path which highlights particular feature articles. This entry path takes a user directly to one of a plurality of articles located in the search system.

It is also an object of the invention to provide for a search system where one of the textual entry paths consists of a researcher's assistant program.

Briefly described, these and other objects of the invention are accomplished by providing a search system for retrieving information comprising multiple textual entry paths for searching textual information and multiple graphical entry paths for searching graphical information such that the search system retrieves information through both the textual and graphical entry paths.

The textual and graphical entry paths are made up of eight separate and interrelated entry paths such that textual information is fully accessible from the graphical entry paths and graphical information is fully accessible from the textual entry paths. A first textual entry path consists of the Idea Search entry path which retrieves textual information stored in the stem indexes in the database. Each stem is identified with a root and stems are linked to each root so that they represent all related endings for that root. Each stem is related to units of textual information in the database. Stem terms are then concatenated by the Idea Search in order to map the stems to the same idea. The concatenation step involves linking the stems together based on grammatical linkages and based on thesaurus linkages. Information retrieved from the Idea Search is then ranked based upon two coefficients: exhaustivity and exclusivity. Exhaustivity measures the number of occurrences for that stem in the database. The exclusivity coefficient measures the degree to which that stem is related to the idea. The exclusivity and exhaustivity coefficients are then calculated, combined with other stems and calculated for each article. A list of articles is then ranked based upon the coefficients in order of relevance to the search terms.

Another textual entry path consists of a title finder search. The title finder assists the user in uncovering articles stored in the search system. Those article titles are uncovered either by moving through an alphabetical list of article titles until a desired title is located, clicking a letter tab for the first letter of the subject so that a list of article titles having the first letter is provided, or typing in the article title name such that the page listing the article title is then displayed.

One of the graphical entry paths consists of the picture explorer which enables the user to find pictures and then retrieve related textual information for the picture. In operation, the picture explorer is provided in three modes: a picture tour mode where pictures are presented in random order, a picture finder mode which allows the user to select from a list of alphabetically ordered pictured captions, or a picture search mode where the user searches picture captions by entering search terms and having the computer search those entered search terms. A further textual entry path consists of a history timeline program. The timeline displays events on a graphical timeline in order that a user may select an event and retrieve further information about that event. The timeline is divided into a year interval bar, major event boxes, and a president's bar. Any one of the elements on the bars are activated by a user in order to retrieve related textual information.

A further entry path which is graphically and textually based is the world atlas entry path. This program enables the user to search maps of an atlas. The atlas can be searched by having the user either identify a place name, or by scanning, or rotating the atlas. If the place name search is implemented, the program draws a corresponding map around the specified place. The atlas can then be viewed at multiple levels of increasing detail for any part of the atlas. Textual information related to any place labeled on the atlas is then retrieved.

A further entry path consists of the researcher's assistant program. The researcher's assistant contains subject matter categories divided into topics and the topics are then divided into assignments. Each assignment is then ranked by its level of difficulty.

Finally, the invention includes a textual entry path which highlights particular feature articles. This entry path is designed to take the user directly to one of a plurality of articles located in the database.

With these and other objects, advantages and features of the invention that may become hereinafter apparent, the nature of the invention may be more clearly understood by reference to the following detailed description of the invention, the appended claims and to the several drawings attached herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a functional flow chart showing the logical operations of the Main Menu program of the present invention;

FIG. **2** is a flow chart of the logic operations of the Idea Search entry path of the present invention;

FIG. **3** is a first flow chart of the logic operations of the Idea Search entry path;

FIG. **4** is a second flow chart of the logic operations of the Idea Search entry path;

FIG. **5** is a third flow chart of the logic operations of the Idea Search entry path;

FIG. **6** is a first flow chart of the logic operations of the Article Display program;

FIG. **7** is a second flow chart of the logic operations of the Article Display program;

FIG. **8** is a flow chart of the logic operations of the Tools function;

FIG. **9** is a flow chart of the logic operations of the Notebook function;

FIG. **10** is a flow chart of the logic operations of the Research Path function;

FIG. **11** is a flow chart of the logic operations of the Last Screen function;

FIG. **12** is a flow chart of the logic operations of the Back function;

FIG. **13** is a flow chart of the logic operations of the Title Search entry path;

FIG. **14** is a flow chart of the logic operations of the Topic Tree entry path;

FIG. **15** is a flow chart of the logic operations of the picture Explorer entry path;

FIG. **16** is a first flow chart of the logic operations of the History Timeline entry path;

FIG. **17** is a second flow chart of the logic operations of the History Timeline entry path;

FIG. **18** is a first flow chart of the logical functions of the World Atlas entry path;

FIG. **19** is a second flow chart of the World Atlas entry path;

FIG. **20** is a flow chart of the logical operations of the Place Name subroutine for the World Atlas entry path of FIG. **18**;

FIG. **21** is a flow chart of the logical operations of the Researcher's Assistant entry path;

FIG. **22** is a functional flow chart of the logical operations of the Feature Articles entry path; and

FIG. **23** is a plan view of the search system and related hardware.

DETAILED DESCRIPTION OF THE INVENTION

In the context of this disclosure and the claims appended hereto, references to an information database can apply to any type of data, any type of data format, or any type of storage medium. A preferred embodiment of this invention involves CD-ROM technology. However, the system can also include DVI, CD-I, or any other suitable optical memory devices. The system is adapted to run on any computer device. As an example, the system may run on an IBM AT or other 286, 386 or 486 based computer having similar characteristics as a stand-alone unit. In a network environment, for example, the preferred embodiment can run on an IBM host and on a Novell communications network. However, any computer having sufficient processing speed and memory capability can be employed.

That system also may include a VGA card and a VGA or multi-sync type monitor, a 20 MB Hard Disk Drive, a Speech Adaptor and Card and a mouse with related software. Other features for the preferred hardware can include a computer with at least 1 MB RAM, a DOS Version 3.3 (or later release) and a CD-ROM drive with a controller card. Compatible CD-ROM drives include the CD V100 by Sony Corp., or models by Hitachi or AMDEK. Any other compatible CD-ROM drives must use the MS-DOS standards (CCD-ROM extension).

Although the system forming the present invention can be used for any application, a preferred embodiment is as a multimedia encyclopaedia database and search system. The database for the preferred embodiment consists of approximately 8.8 million words, 5,200 articles, 26,023 concise capsule articles, 63,503 entries in a Fact-Index, 65,000 entries in a full database dictionary, 1500 glossary terms, and a thesaurus.

The database also consists of 15,000 graphics comprising photographs/charts/diagrams and animations. Those graphics can include low resolution images, depending on the capabilities of the hardware. Supported graphic standards include VGA (640×480×16 colors) and super VGA images (640×480×256 colors), though standards within or beyond these are also envisioned for this product. Nothing contained herein precludes the possibility of releasing this invention on computers which support different graphics standards. The preferred embodiment includes 60 minutes of audio, including 1,500 glossary terms, and other audio selections, and some 45 animation sequences. The amount of audio and animation is expected to increase depending on the hardware and software capabilities.

Referring to the Figures, wherein like references refer to like elements, FIG. **1** illustrates a functional flow chart of the logical operations of the Main Menu program **10**. It is from the Main Menu **10** that a user can enter the multimedia database in order to view articles, pictures, illustrations and other special features including sound and moving pictures.

There are eight entry paths available from the Main Menu program **10** into the database. Those paths include the Idea Search **30**, the Title Finder **40**, the Picture Explorer **50**, the Topic Tree **60**, the Feature Articles **70**, the World Atlas **80**, the History Timeline **90** and the Researcher's Assistant **100**. Additionally, upon turning on the Main Menu program **10**, various functions become available to the user. Those functions include a Notes function **25**, a Close command **28** and a Help function (not illustrated). Brief descriptions of each of the entry paths are provided below.

The Idea Search entry path **30** assists the user in finding information regarding any topic for exploration. In this entry path **30**, the user types in words, questions or descriptions for the search, causing the computer to search for any articles related to that search request.

The Title Finder **40** provides the user with an alphabetical list of all articles in the database. The user can then choose

the title of an article that he wants to review by either scrolling through a title list, typing in a desired title or browsing through the title list after choosing a letter tab.

The Picture Explorer entry path **50** allows the user to view pictures that are stored in the database. The Picture Explorer accesses information in three modes: (1) by allowing a user to randomly browse through a collection of pictures, (2) by displaying a list of captions and enabling a user to select corresponding pictures or, (3) by allowing a user to enter a description of the picture which then triggers the entry path to automatically search the terms of that description for corresponding picture captions.

The Topic Tree entry path **60** provides the user with both a means for browsing through a list of topics and sub-topics and also for iteratively refining the topical subject matter. Specifically, Topic Tree divides all of the information in the database into lists of topics and sub-topics so that by browsing through successive lists, the user can iteratively narrow his search until he finds an article of interest.

The Feature Articles entry path **70** provides a selection of special interest or focus articles for the user. The user then picks one of the article titles in the menu in order to be taken directly to the article.

The World Atlas entry path **80** draws maps of the earth after interactive selection by the user. The maps can be enlarged or contracted, rotated or viewed along longitudinal and latitudinal lines. Moreover, a place finder function is available which helps the user choose a place on the map. Once that place name is selected, the computer will then draw a map around the selected location. By then clicking a place label with a mouse on the map, an article corresponding to that label can be accessed from the database.

The History Timeline entry path **90** enables the user to browse through a timeline containing references to historical events. Choosing any of those events will cause the system to provide a summary of the event and then list articles related to that event, historical person, etc.

The Researcher's Assistant entry path **100** contains a set of research categories and sub-topics. Each topic, in turn, includes three assignments which are classified according to level of difficulty. The user may then choose one of those assignments which then refers him to the Main Menu to complete his research.

The Main Menu **10** also includes several functions. The functions are Notes **24**, which allows the user to take notes; the Research Path function **25** which opens a window on the screen displaying a list of previous steps that the user has taken in his searches; the Last Screen function **26** which backs-up along the research path one step to return the user to the last screen he saw; and the Getting Started function **27** which provides a step-by-step tutorial that guides the user through the multimedia database. A Close command **28** also is available in order to exit the system.

When turning the system on, the Main Menu display **20** is shown. The user may then select at step **22** any of the above identified entry paths or functions. The selection activates the designated function or entry path program.

Upon exiting from a selected entry path or function, the user can return to the Main Menu display **20**. Upon choosing the Close command **28**, the user exits the system at step **29**. The Close command **28** is always available as an option in the Main Menu display. Hence, the program can always be exited at any time the Main Menu display is available.

FIGS. **2**–**5** illustrate the Idea Search entry path **30**. As previously noted, the function of the Idea Search **30** is to aid the user in finding information about any topic he wishes to explore in the database. The Idea Search entry path **30** is based upon a term based search that responds to user entered search information. The computer then isolates "legal" search terms and searches through the database. Following the search, a list of article titles ordered by relevance to the search request are then provided by the computer.

The Idea Search **30** is entered by clicking a mouse over an associated icon in the Main Menu display **20** (FIG. **1**). A call to the Idea Search program **100** raises the Idea Search entry screen **102**. The Idea Search entry display **102** includes a number of functions located on a prompt line at the bottom of the screen. Those functions include Tools **106**, Notes **24**, Research Path **25**, Last Screen **26**, New Search **116**, Back **118** and Main Menu **120**. Some of the functions, as denoted by the letter "B", return the user directly back to the search display when completed. Others, however, do not. A description of each of the functions will be provided in more detail below.

After the user has made a selection **104** to enter search terms **112**, the user then types in those terms in a window on the display. The search terms can be entered as words, phrases, whole sentences or entire paragraphs. The only limitation is that these terms describe the topic or question to be searched. The user then clicks the mouse on the icon for the Go On command **122** which tells the computer to begin searching. If a search word is misspelled, the computer will then access an internal dictionary and an internal thesaurus stored in the database if it does not recognize the misspelled word. A check for misspelling thus occurs in step **124**. If the word is found to be misspelled at step **126**, then the Idea Search will display a list of other spellings **128** that closely approximate the misspelled word. The user may then use a mouse, for example, to click the proper word on the list which automatically makes the correction **130**. The user then actuates the Go On command **131** which causes the properly spelled word to be returned to the list of search terms at step **132** and the system to execute the search on the correctly spelled word. The correctly spelled term will then be displayed in a list of the located items **136** following their search at step **134**. Details regarding step **134** are provided in FIGS. **4**–**5**.

Items on the displayed list, for example, can be titles to articles containing the search terms. It is contemplated, however, that any information representing the search term can be represented in this list.

More particularly, in addition to the items of the list, the display screen **136** shows search words that have actually been searched. Those words are highlighted to set them off from the non-searched terms. The Idea Search **20** entry path automatically decides which terms to highlight and which terms not to search, based on a review of stop terms stored in the database. Examples of stop terms include "what", "the", "and", "or", punctuation, etc. The items listed also are arranged in the display **136** in order of relevance to the entered search terms. A further description of the relevance ranking algorithm is provided.

Some of the items listed are preceded by one or more asterisks. The asterisk(s) indicate that the adjacent item in the list is likely to contain highly relevant information. In order to choose the item, the user can then move through the list using Up and Down arrow keys located on the display adjacent to the list. When a user sees the article that he wants, he then clicks that article that is likely to have the best information about the search word.

Referring now to FIG. **3**, further details regarding the Idea Search **30** are shown. In particular, a screen **136** is presented along with icons for several functions located on the prompt bar. The user selects any one of the functions by clicking a

mouse on an appropriate icon representing that function. Those functions include Tools **106**, Notes **24**, Research Path **25**, Last Screen **26**, Back **118** and Main Menu **120**. A description for each function is provided with reference to FIGS. **8**–**12**.

If the user is interested in looking at the items on the list at step **140**, he can then move through the list of items, as previously described, and click the mouse on a desired item at step **142**. As a result, the user goes into the (article) program at step **144**. If, however, the user does not see an item that he desires, or wishes to search for different terms, he branches at step **146** to select the New Search mode **148**. If the user then decides to pursue a new search he branches to the beginning of the Idea Search program **150**. If, however, the user is only interested in improving his original search request, he then clicks the icon representing the New List function **155**.

The New List function **155** improves the original search request by either providing non-ambiguous alternate search terms **158** or by suggesting alternate search strategies.

The ambiguous term check **158** acts like a thesaurus. For example, should the user type in the word "rain," alternate search terms for that word (e.g. "rainfall", "snow", "storm", "water", "weather") would be listed on the display at step **160**. The user may then click the desired non-ambiguous terms in the list, or enter the non-ambiguous terms in the Idea Search window **162**, and then search for non-ambiguous search terms **164** (see FIG. **2**). Following the ambiguous term search, the program then automatically returns the user to a new display list of the located non-ambiguous terms **136** (see FIG. **2**).

However, if none of the listed non-ambiguous alternate search terms presents a viable alternative, the computer will then display the original search request and will also suggest ways to modify that request at step **166**. To modify the search, the user then retypes new search words **170**, **173** that conform to the alternate strategies. The Go On command **174** is then activated to generate a new search **175** (see FIG. **2**).

The ambiguity check feature operates as follows: suppose this search involves different forms of "rainfall" and the user types in the word "rain". The list generated from the Idea Search might then include a list of articles entitled CLOUD, MISSISSIPPI, TENNESSEE, ENGLAND and KANSAS. Although the search concerned "rain", the last four articles were included on the list because those articles contain sections on climate and weather. To improve upon that search, therefore, the New List function **154** is selected.

The original request for rain, will then reappear but will not be highlighted. The user can then move the cursor over the "r" in rain and click the mouse. As a result, non-ambiguous suggestions for the term "rain" will be presented. To improve the search, one suggestion would be to change "rain" to "forms of rain". Once the mouse is clicked over this suggestion and then the Go On is clicked, the computer will begin a search for new articles which may relate more closely to "rainfall".

FIG. **4** illustrates further details of the Idea Search **30**. More particularly, FIG. **4** is an expanded logical flow chart of the Execute Search step **134** shown in FIG. **2**. When the terms are entered onto the screen, as described previously, at step **200**, the Idea Search program then reviews those terms against a list of stop words **202**. As previously described, stop words consist of terms such as "the", "a", punctuation and other terms normally deemed non-essential. The existence of the stop list allows the user to type in entire sentences or paragraphs of search information which will then be reviewed and edited so as to avoid inefficient searches.

If a term appears on the stop list in step **204**, then that term is deleted from the legal search terms actually searched by the computer at step **206**. The computer then determines if all of the search terms have been reviewed by the stop list at step **207**. If not, it loops back for further stop checks at step **208**. Once the entire search inquiry is reviewed and all the stop terms removed, then the search terms are appropriately highlighted for subsequent display **210** (see FIG. **2**, **136**) If a search term is not found in the stop list or in the database, an appropriate message is generated. The non-existent term is also excluded from the search inquiry.

The entered search terms are then compared to a phrase list **211**. The purpose of the phrase list is to avoid inefficient search strategies for terms that have a unique meaning when combined in a phrase. For example, if the user wishes to search the phrase "German Shepherd" a database search of the individual terms would bring up information on the country Germany, or men who watch flocks of sheep. Articles involving dogs would likely be ranked towards the bottom of the list. However, if the phrase itself were searched, the search may be more efficiently accomplished and more accurate results provided.

The phrase search is entered only when the software finds a phrase that matches phrases stored in an internal phrase list. The phrase search program then inquires; do you want this (display phrase terms) phrase searched? If the user answers yes, then the system internally links the terms together by placing hyphens between adjacent phrase terms **213**. Step **214** involves comparing the linked terms to a phrase list. If the entered phrase is matched to the phrase list **215**, then the occurrences of that phrase are linked to the articles in the database **216**. A discussion of how articles are linked and listed is provided with reference to FIG. **5**. Once the phrase search is complete, the program loops back **218** to step **211** to see if the user wishes to search additional phrases; if the user does not **220**, then the program skips down to step **224**.

Although not illustrated, two other search modes are available. The expert mode allows users to search literals without having those literals subjected to the stop list or stemming (discussed below). The expert mode is actuated when the user surrounds literals by quotation marks.

Furthermore, the user also can designate priority search terms by typing at least one "+" symbol next to a term. The computer will then rank the terms by priority so that those terms will be weighed in advance of the structured query. The user can also order multiple priorities by placing more than one "+" sign.

Step **224** involves the step of building the search inquiry structure through stem indexing. The purpose of stem indexing is to provide a search of not only the entered terms, but all related terms. Accordingly, if the user types in the word "leaf" in the search window at step **112** (FIG. **2**), stem indexing will link all other stems to the root "leaf" that exist in that index, i.e., "leaves", "leafing". Following stem indexing, the stems are linked to a Basic Receiving Unit ("BRU") **226** in order to map the stem to the idea.

A BRU represents the lowest common denominator for the database. BRU's are discrete data elements defined by subject matter. Thus, the size of BRU's may vary depending upon the amount of information for a distinct subject. In the encyclopaedia embodiment, BRU's represent each of the subjects listed in the table of contents for an article. Accordingly, when stems are concatenated at step **228** to the BRU,

those stems are thus linked to a subject matter-based data entity. The linked stems for the root are then concatenated at step **228**.

Referring now to FIG. **5**, the remaining steps of the Idea Search algorithm are described. At steps **230** and **232** the concatenated stems are measured using two coefficients. The first coefficient **230** involves the measure of exhaustivity of the search term. Exhaustivity represents a mathematical measure of the number of occurrences of the stem in the BRU's. The exclusivity coefficient **232** involves the relatedness of the search term to the idea being searched.

An example of the difference between exhaustivity and exclusivity can be seen when comparing the term "small" to the term "German". It is highly likely that "small" would have a high exhaustivity coefficient but low exclusivity coefficient. "German" would have the opposite result.

Once the coefficients are calculated they are then combined to provide a score for each BRU at step **234**. The BRU's scores are then combined to provide article scores **235**. The article titles are then ranked by relevance in step **236**. As previously noted, one or more asterisks may be appended to article titles in the lists. Asterisks denote articles whose combined coefficients scores exceed a pre-set threshold **238**. The list of article titles is then displayed at step **240** (same as step **136**, FIG. **2**).

Referring now to FIG. **6** the program for displaying the article is shown. The database of the instant invention, as previously mentioned, is particularly applicable for use as multimedia encyclopaedia. A large part of the encyclopaedia database consists of articles which contain text, color photographs, tables, charts and maps as well as audio and animation data. The instant computer program is thereby designed so that the user may easily access the various types of data without losing track of his place in the encyclopaedia. Each screen is also set up to give the name of the article that is being viewed and the page number relative to that article. Side notes are available in the articles to indicate the focus of particular paragraphs of interest.

The text of the article is comprised of underlined and non-underlined words. If the user places the mouse and clicks on any of the non-underlined words an automatic dictionary definition for that word is displayed. Upon clicking it closed, the dictionary window will then disappear and the user returns to the article. The underlined text designates glossary terms. By clicking an underlined word with the mouse, a window appears showing the definition of that word. An audio pronunciation of that word also occurs. An audio sound icon is also displayed in the glossary window prompt line. The icon leaves the user with the option of hearing that word pronounced again.

Accompanying the text are numerous functions represented by icons. The functions include a Picture display function, a More About function, a Take Another Look function, a Moving Picture display function, and an Audio function. Each of the functions will be described in more detail below.

The article display program **250** is entered at **252** where the text of the article is immediately displayed **254**. In addition to the previously mentioned text and functions represented by the article display program **250**, a plurality of functions are represented on prompt line **252**. Those functions include the Main Menu function **120**, Notes **24**, Tools **106**, Print **258**, Research Path **25**, Last Screen **26**, Return to Entry Path **260** and the Table of Contents **262**. The user may select any of those functions at select step **256**. Details regarding the operation of the various functions are discussed further in connection with FIGS. **8**–**12**.

Should the user wish to read the article in step **264** he moves the mouse and/or cursor to the Up/Down icons or keys. If in reading the article, the user does not understand a word **266** or wishes to receive a further definition of that word, he may then click the mouse on the word in question in step **268**. The definition for that word is then automatically displayed at step **270**.

The user may then choose a number of dictionary-related functions in step **272**, including Tools **106** and Notes **24**. However, should the user desire to return to the article, he activates the Close command **28**.

If the user wishes to obtain a glossary definition for an underlined word at **274**, he clicks the mouse on the underlined term in step **276**. The underlined term, as previously described, is then displayed and the pronunciation of that term enunciated at step **278**. The glossary window also provides the user with a variety of functions including Tools **106**, Notes **24**, and Audio **280**. By actuating the Audio function **280**, the user can replay the enunciation of the glossary term. Activating the close command **28** returns to the article display **252**.

Articles are organized so that by activating an icon showing "a pair of eyes", the user calls the Take Another Look function **282**. This function is used to explain a difficult concept through pictures or language that is simpler than that used in the article text. The prompt line in the Take Another Look function **282** includes the Tools function **106**, Notes function **24** or the Close command **28**.

If a Picture icon (represented by a camera) is shown adjacent to text **284**, the user may activate an associated picture by clicking the icon on step **284**. The picture is then displayed. Multiple pictures **292** can be reviewed by clicking the mouse on up and down arrow icons **293**.

The picture display mode **284** also includes a number of functions to facilitate a review of the picture. The caption function **288**, for example, provides a window over the picture describing the contents of that picture. The user is then presented with several functions for manipulating the caption. The move caption function **290** moves the caption to the top of the screen so that the user can see the portion of the photograph or picture under the caption. By clicking the move caption icon again at step **290**, the caption is returned to the bottom of the window. Activating the Close command **28**, closes the window, and the user can then return by clicking close **28** again **254**.

The scan function **291** enables the user to scan up, down, left or right.

Finally, pictures can also be viewed using an up-close function **296**. When activated, the system enlarges the picture one or more levels. Activation of the close command **28** will return the user to the article display.

FIG. **7** illustrates additional logical operations of the article display program. In particular, if an associated audio icon exists adjacent to text at step **300**, then the user can click the icon, on causing a digitized audio selection to be played at step **302**. The user can select the audio function **300** as many times as desired.

If the text has an associated video icon **304**, then the user can activate a display of a still frame of that video at step **306** by clicking the video icon with the mouse. The animation sequence commences by activation of the Go icon command **310**, **311**. The Go command can be re-activated again to review the same video. Any time the user wants to stop the animation, he can click the mouse on an associated Stop icon **314**. Once the animation has been stopped, clicking the Go icon **310** causes the animation to start again **311**. Moreover, to see the animation in a step by step sequence, the user can

employ step options **320** which allow the animation to move one frame at a time backwards or forwards **322**. Additionally, the user has the option of repeating the entire animation. This occurs by clicking the Repeat icon **324**. To exit the video animation function **324** the user must activate the Go On command **328** which returns him to the article display program entry point **252** (FIG. **6**).

The final function available in the article display program is the See Also or Cross Word function **330**. This function is displayed when there is material related to the article being displayed. If the user activates an appropriate icon for this function, a list of related articles is displayed only if more than one related article exists. Otherwise the function takes the user directly to the related article **332**. If the user then finds an article of interest **334**, he then calls that article **335**.

Referring now to FIG. **8**, a functional flow diagram of the logical elements of the Tools function **350** is illustrated. The Tools function includes five functions: Glossary **360**, Bookmark **370**, Find-a-Word **380**, Dictionary **390** and Cut and Paste **400**. In addition, a Close-Tools command **395** is available to close the Tool function **350**. Brief descriptions of the Tools functions are set forth below.

The Glossary function **360** operates in the same manner as described in FIG. **6**. The Glossary function **360** operates by first prompting the user at step **362** to click on an underlined word. Once the word has been clicked, a window then opens at **363** and the word is spoken **364**. By activating the Close Tools command **395**, the window is removed.

The bookmark function **370** marks a specific place in the database so that a user can return to that place at a later point in his research. When the bookmark function **370** is clicked on, if there are no bookmarks, the user is allowed to type in a bookmark in the database. Otherwise the user is presented with a menu having two choices **372**: (a) add a bookmark to the section **373** or (2) select a previously-stored bookmark **377**. The first option opens a window **364** which requests the user to type in the name of the bookmark. Once that has been done, the user then must press the enter key **375** to save the bookmark. Selecting the second option causes the bookmark to display a list containing the names of all the bookmarks that have been saved **376**. Selection of a desired bookmark **377** will cause associated articles to be displayed.

The Find-a-Word function **380** enables the user to look up the next occurrence of a word found in the text of an article. The Find-a-Word function **380** operates as follows: the user activates the Find-a-Word function through an appropriate icon. A window **382** is then opened which instructs the user to click a word in the text. The computer display then jumps to the next page that the user is currently viewing and displays that page **384**. Each time the subject word appears on that page, it is highlighted.

For example, suppose a user is on page 1 of the ASTRONOMY article and wants to find the next occurrence of the word "sky". Clicking Find-a-Word **380** and then clicking the word "sky" will take the user to page 3 of the article where he can see the word "sky" highlighted several times.

The Dictionary function **390** allows the user to look up the meaning of any word he does not know or recognize. In operation, when the Dictionary function icon **390** is clicked, a window **392** first opens. The window prompts the user to click the word that he wants to look up in the dictionary. After selecting a word, a dictionary display **394** is opened up. The display provides the actual dictionary entries for that word as it would appear in a published dictionary. An example of a dictionary that could be used in such a database is the Merriam Webster Intermediate Dictionary. To return to the text without using the dictionary again, the Close Tools command **395** is activated.

The Dictionary may be scrolled up or down by clicking a mouse over up arrows on the display (not shown). By clicking the up arrow, the definition of the word that precedes the one just viewed can be seen while the down arrow takes the user to the next word in the dictionary. If the word definition covers more area than available on the screen, clicking the down arrow then displays the rest of the definition.

The Dictionary function **390** is available any time a mouse or cursor is placed on a word **392** that does not activate a separate function. The purpose of the Dictionary function **390** is, therefore, to remind users that this feature is available.

The Cut and Paste function **400** lets the user copy part of an article that he is viewing and place that information directly into his Notes (see FIG. **9**). When the Cut and Paste function **400** is activated, the computer will ask the user to highlight words to cut and paste **402**. Highlighting the text involves moving a mouse and/or cursor to the beginning of the place in the text that the user wishes to underline. He then depresses one of the mouse buttons and holds the button down while dragging the cursor to the end of the text that he wants to cut-out. Words will be highlighted as the mouse moves across that area. When the mouse button is released, the computer will then ask whether the user wishes to save that text **404**. If the user clicks "yes" **405**, then the computer will transfer information into the Notebook **408**.

If the Notebook is full, or if the user tries to cut and paste too much text **406**, then a message will appear on the display **410** instructing the user to either erase the Notebook or highlight less information. If the user chooses not to save text **411**, then by activating the Close Tool command **412**, the user returns to the appropriate screen.

Referring now to FIG. **9**, the Notes or Notebook function **24** is activated when the user wishes to take notes on information appearing anywhere in the database. When the icon representing the Notebook function **24** is activated, a window opens **422** which provides an available space for the user to enter his notes. As the user enters information in this window, letters will be added in the box where a flashing line on the cursor appears. Text is inserted by moving the cursor to where the user wants new text to appear. The notes window **422** also includes up and down arrows for scrolling the text up and down, one line at a time. The Notebook window **422** is adapted to hold approximately 108 lines of text. If the window **422** becomes full, some information will need to be erased before any new text is added. Text is erased by depressing the BACKSPACE key.

The Notebook window **422** is accompanied by a variety of functions and commands. The Close function **424** queries the user whether he wishes to save his changes that were made in the Notebook window **426**. If the user enters "yes" **427**, then the contents of the Notebook, along with any changes made in those contents, will be saved. The user is then returned to the screen from which he opened the Notebook. Clicking "yes" **427** also provides a safety function. If the user accidentally clears information in the Notebook, then by clicking "yes" **427** that information will be restored. If the user does not want to save any changes, he enters "no" **429** causing all of the changes made in the Notebook to be erased. As a result, the original information that had been in the Notebook before the changes were made will be available **430**.

The Beginning of File function **435** lets the user move up to the first line of the Notebook. The End of File function **437** takes the cursor to the last line of text appearing in the Notebook window.

The Move function **440** moves the Notebook window to the top of the screen. Activating the function a second time, puts the Notebook window back at the bottom of the screen. The purpose of the Move function **440**, therefore, is to place the window in an appropriate area so that the user can still see information on the screen.

The Size function **442** changes the size of the Notebook window display. When activated, the size of the Notebook window **422** is doubled. By clicking the size function **442** again, the Notebook window **422** is reduced to its original size so that more of the underlying text is visible.

The Print function **444** activates printing of the contents of the Notebook window **422**.

The Clear function **446** removes all text from the Notebook. When the Clear function **446** is clicked on, the computer will ask the user at **448** whether he wishes to save his changes. If he answers "yes" **449**, then the contents of the Notebook, along with any changes, are saved at step **450**. If the user enters "no" **451**, whatever was originally in the Notebook is restored and the changes are deleted at step **452**.

FIG. **10** illustrates a flow chart of the logical operations of the Research Path function **25**. When entering Research Path **25**, the user clicks on the research path icon whereupon a display list showing the major steps that the user has previously taken, is displayed at step **470**. The major steps listed on the display include the entry paths previously taken, the title of the articles that the user has previously reviewed and any headings or subheadings of those articles that the user has seen.

For example, the following list represents a typical research path for an encyclopaedia search:

Science Feature Articles
ASTRONOMY
Eclipses
ANIMALS, DOMESTICATED
Title Finder

Aardvark

The entry at the top of this list, "Science Features Articles", represents the first entry path while the article "Aardvark" is the last place the user was before his present location. From this list, it also is clear what research has already been done. The two entry paths, "Science Feature Articles" and "Title Finder", were accessed and the articles on "Astronomy", and "Domesticated Animals" were uncovered. The "Aardvark" and "Eclipses" subjects within the articles were then specifically accessed.

Should the user desire to return to a previous spot **472** listed on the Research Path display **470**, the user employs his mouse to click that item on the list **474** which will then return him to the first page for that item **476**. If, however, the user does not wish to call any of the items on the Research Path, then he may select at step **428** the Tools function **106**, the Dictionary function **390**, or exit by turning on the close command **28**.

FIG. **11** illustrates the Last Screen function **26**. This function enables the user to take one step back, returning to the last screen. The Last Screen **20** can, for example, be used to retrace steps through a series of screens. Thus, if the user is looking at page 3 of an article and wishes to click back to page 1, the last screen can be clicked twice, retracing his steps back to page 2 and then to page 1. The user can, therefore, activate the last screen function **26** as many times as needed to retrieve an earlier screen. However, those windows that have appeared on a previous screen cannot be opened by using the Last Screen function **26**. To operate this function, the user presses the Last Screen icon whereupon a display of the last screen will occur at step **480**.

Referring now to FIG. **12**, a flow chart of the logical operation for the Back function **118** is shown. When the user selects this function, the system automatically backs up to the screen where a change in the decision had previously been made at step **482**.

FIG. **13** illustrates the Title Finder entry path **40**. The Title Finder **40** is activated from the Main Menu (FIG, **1**) by clicking the Title Finder icon located on the Main Menu display. A title list screen is immediately displayed at step **500**. At this point, the user has a number of options for searching titles as well as a number of functions he can activate **501** to assist his search. Those functions include Tools **106**, Notes **24**, Research Path **25**, Last Screen **26** and Main Menu **120**. The search for titles can be done in three modes. In the first mode, the user enters the title in a box on the display whereupon the Title Finder searches the title list. The decision to enter the title occurs at step **502** and the user then types in the title at step **504**. The computer then searches the title list. Whether or not the title is found, the computer will go to that part of the title list that is the nearest match to the typed title **506**. The user may then go to the article by clicking his mouse on the desired title **508**, **510**. The second method of searching involves scrolling through the title list **512** by activating up/down arrows **513** until the title of an article is found. The user can then go to the article **514**.

The third mode of searching occurs when the user has a subject in mind but is not sure of the exact title or spelling. He can then click a letter tab shown in the display representing the first letter of the subject that he wishes to search **516**. The computer will then move to the page of the alphabetical title list **518** for the identified letter. The user can then click the up/down arrows until he finds the article he wants, and then retrieves the article at step **519**.

FIG. **14** illustrates the Topic Tree entry path **60**. As previously noted (see discussion of FIG. **1**), Topic Tree **60** is the entry path that divides all of the articles in the database into topics and sub-topics enabling a user to progressively narrow his/her search through the tree. In operation, upon entering Topic Tree **60**, a list of topics **522** is displayed along with a prompt line of functions. The functions include Tools **106**, Notes **24**, Research Path **25**, Last Screen **26**, Back **118** and Main Menu **120**. Should the user decide to search through the Topic Tree, he moves the cursor over the topic of interest and clicks his mouse on at step **524**. A list of sub-topics is then provided at **526**.

Sub-topics exist in two forms. If the sub-topics are listed with an initial capital letter, then that sub-topic covers further sub-topics. Those additional sub-topics are shown on later screens. However, if the sub-topic shown on the list is capitalized, then it directly corresponds to an article. By clicking that sub-topic with a mouse **527**, an article is displayed at **528**. Further sub-topics are displayed at step **529** and the process loops down to further sub-topic levels, at steps **530** and **531**, until the desired article is uncovered. If the user then decides to go back a level to return to a previous menu screen, he may do so by clicking the Back function **118**. Actuating the Main Menu function **120** will, in turn, return the user to the Main Menu so that he may choose another entry path or exit the multimedia search program altogether.

FIG. **15** is a flow chart showing the Picture Explorer entry path **50**. The purpose of Picture Explorer is to give the user three ways to find pictures in the database. Once a picture is retrieved that is of interest, the user can go directly to an article to learn more about that picture.

To use, upon entering the Picture Explorer menu **50**, the user can select one of several options at step **540**. Those options include the three separate search paths: picture tour **550**, picture finder **570** and picture search **590**. Additionally, a number of functions are available including Tools **106**, Notes **24**, Research Path **25**, Last Screen **26**, Tools **106** and Main Menu **120**.

The picture tour search path **550** presents a randomly ordered selection of pictures from the database. To move forward through the pictures, the user moves the up/down arrows **552**. If the picture appears to be of interest, then the user can retrieve an article at steps **553** and **554**, display a caption for each picture at steps **555** and **556** or simply move down to the next picture at step **557**. Additionally, the caption can be moved at steps **558**, **559** or the user can return to the picture, to an article or to the Main Menu of the Picture Explorer entry path at steps **560** and **561**.

The picture finder entry path **570** lets the user read through a list of picture captions which are grouped alphabetically. The organization of the caption list and the method for searching that list, is similar to the Title Finder entry path algorithm **40** (FIG. **13**). In operation, upon entering the Picture Finder **570** a number of functions become available for user selection, including Tools **106**, Notes **24**, Research Path **25**, Last Screen **26**, Main Menu **120** or Back **118**. As in title search, the picture finder provides three ways of searching for picture captions. The first method **572** involves typing in the picture name **573** whereupon picture titles closest to that typed in are then displayed **514**. If the user then wishes to learn more about a picture **575**, he can activate the caption **576**. The second method involves scrolling up or down through the picture list at step **579** to review the desired picture **580**. The third method involves clicking a mouse on a letter tab **575** which will then move to the page in which the picture titles, starting with the tab letter, appear. The user may then move up and down that page **582** until he finds the desired picture caption **583**. Step **585** loops back to the first decision point for the picture finder search path **570**.

Picture search **590** operates in a manner similar to that previously described with regard to the idea search (See FIGS. **2**–**5**). Generally, the picture search program **590** operates when a search term describing the picture caption is entered in the picture search window. For example, should the user want to know how automobile engines work, he types in the picture search window "how do automobile engines work?" The user then activates the Go On command (FIG. **2**) to tell the computer to begin the search. When the computer completes its search, search words are re-displayed as highlighted terms. A list of pictures with captions also is presented and the user can see the picture described by a caption in the list by clicking the mouse on that caption. The user then calls the associated article by activating the Go To Article function.

The user also can scroll through the list to see adjacent captions. Captions preceded by at least one asterisk most likely contain information directly relevant to the search request. The New List or New Search functions are also available in this program. These functions operate in the same manner described previously for Idea Search.

FIG. **16** is a flowchart of the logical operations of the History Timeline entry path **90**. This entry path contains numerous events of historical significance organized along various timelines. When a user clicks a mouse on the name of an event appearing on a timeline, a window opens and summarizes that event. Each window includes a list of articles that relate to the event. Clicking a mouse on a listed article will take the user directly to the portion of that article involving that event. The History Timeline is entered by activating an identifying icon in the Main Menu (FIG. **1**). As a result, a timeline display **600** is provided.

The timeline display **600** consists of a year bar marked in 5 year intervals. Each interval is expanded into a separate display. Each display includes a plurality of major event boxes, event boxes and a president bar. An era banner is also provided in the display which groups dates and historical events into major periods. The president bar operates to open a window that gives the full name and dates the president was in office and a list of the major legislation or other significant events of that president's administration. Information is ordered by the years in which those events occurred. By clicking the Go To Article function the user can then view a particular article relating to that event.

When the History Timeline is entered through display **600**. That display will introduce the entry path and also display the beginning period for the timeline. The user may then either click the 5 year segment of the year bar, or click the mouse on an arrow to move the timeline display ahead 12½ years **602**, **603**. Once the user has reached the desired timeline segment, he may then choose among several ways to retrieve information. A number of functions including Notes **24**, Research Path **25**, Last Screen **26** and Main Menu **120** are available on all timebar screens

The first way to retrieve information is by activating a major event box **604**. Major Events represent historical occurrences consisting of at least two events. For example, if the user chooses the "Discovery and Exploration" major event box, then a window will open **605** listing several events that took place during the time period covered by the major event (between the years 1490–1625). If the user then selects an event appearing on the list at step **606**, i.e., "1492—Christopher Columbus discovers the New World", another window opens containing a description of that event at step **607**. The user may click the mouse on the up/down arrows to read more about the event.

If the user then wishes to see articles relating to that event **608**, he then activates the Go On command **609**. A window with a list of article titles is then set forth. The user can then call a related article e.g. "Columbus" by clicking the mouse over the listed title **610** as previously described. When in reviewing the article, the user is ready to return to the History Timeline **90**, he activates an icon representing the timeline.

A second search option in History Timeline **90** is the event box **616**. The event box operates in a similar manner to the major event box, except that it only represents one event. Accordingly, when clicking a mouse on the event box, a window opens **617** displaying information about the event. Often included in the event window **617** is an audio feature **618** which is played by clicking an audio icon **619**. Articles can then be selected in steps **620**–**622** in the same manner as for major events. The option for moving the next display screen by the arrow icons is shown in steps **625**–**627**.

Turning now to FIG. **17**, the third method of searching the History Timeline **90** is shown. This third method involves activating the president's bar **628**. To use, a user clicks on a display box containing a president's name. A display listing

significant events during that president's administration **629** is then shown. If the user wishes to see a related article **630**, he clicks the Go To Article command **632** which causes a display of the article at step **633**. To exit from the article and return to the History Timeline icon, the user must then activate an appropriate icon appearing in the prompt line.

FIG. **18** is a flow chart showing the logical operations of the World Atlas entry path **80**. The purpose of this entry path is to allow a user to see and use maps of the earth. The user can specify a place he wants to see, then the computer can draw a corresponding map. To find out more about places shown on the map, the user can then retrieve articles relating to a desired part of the map.

The World Atlas program is entered by clicking the World Atlas icon in the Main Menu (FIG. **1**). Immediately upon entering World Atlas, an atlas is displayed at step **650**. There are seven levels from which the user can display a map from the atlas. Each level corresponds to the scale of the atlas. When the user first enters World Atlas, he will see a map of the Western Hemisphere drawn at level **1**. The user may then choose to rotate, zoom-in, or zoom-out of each level. By moving a cursor on the Atlas, the center of the Atlas may be moved to correspond to the cursor's position. The user also rotates the globe by clicking the mouse on a compass direction icon at step **652** which will cause the atlas to pan in the direction of the compass **653**.

A further feature of the World Atlas entry path is the labels function **654**. Labels operates as follows: when the user turns Labels on **655**, place name labels are written onto the atlas. If the user is interested in seeing an article that is related to a place name label **656**, he can click the cursor over the label **657** which will then display a list of articles related to the place name **658**. If an article of interest appears in the list **659** (FIG. **19**), the user can then select that article **660**. The user returns from the article to the timeline by pressing a timeline icon, as previously described.

Another viewing function for the World Atlas entry path is the zoom-in and zoom-out feature. As previously mentioned, there are seven levels from which the earth can be viewed. If the zoom-in is initiated **662**, the user can focus on one or more levels to see a closer view of that area of the map **665**. The map can be zoomed-in all the way at steps **666** and **667** to level **7**. When the lowest level is reached, the zoom-in clickspot disappears and the user can only zoom-out.

When the maps are displayed at levels **3** and **7**, a mileage scale appears on the lower right corner of the screen. Mileage scales are not given for levels **1** and **2** because these levels give two global views of the earth. In other words, measuring distances between two points on the globe must take into account the curvature of the earth. Mileage scales are most useful when distances can thus be represented as straight lines. At levels **3** through **7**, therefore, distances between two points can be measured by a straight line. A further viewing function for the Atlas is the latitude-longitude option **670**. By clicking on the latitude-longitude function, the computer adds lines **672** to the Atlas indicating latitude and longitude markings. This will thus give the user a better idea of the location of various places on the map.

Step **674** relates to the Place Finder search path. This feature enables a user to search the globe in three ways: (1) by clicking a mouse on the up/down arrow and moving through an alphabetical list of places, (2) by clicking a letter tab that appears along the side of the list of places, or (3) by typing in the first few letters of a place that the user wants to see. Once the place is found on the list, by any of the above methods, the user then clicks the mouse on that place entry, and that entry will be immediately displayed on the globe. Operations of the place finder program are shown in more detail in FIG. **20**. Specifically, the place name list is first displayed upon activating the place finder icon **676**. The user is then provided with a selection of functions including Tools **106**, Notes **24**, Research Path **25**, Last Screen **26** and Main Menu **120**. In addition to these functions, the user may search the place name list at step **678**.

If the user decides to search the place name list **678** by name **680**, he must first type in the name in the place box **682**. A search by the computer of the list of names **684** then occurs. If the user then clicks the mouse on the place name **686** on the list, a map having the place identified at its center is shown **688**. Activating the up/down icons **690** or selecting a letter tab corresponding to the first letter of the place name list **692** and **694** also will turn up place names for the list.

Returning to FIG. **18**, the Atlas also may be rotated by moving the mouse to a new place on the Atlas **700** and then clicking on the mouse **702**. As a result, the Atlas will be redisplayed with the cursor positioned as it's center.

The World Atlas entry path **80** can be used to approximate the latitude and longitude of many places. For example, whenever a map is on the screen, the coordinates of the latitude and longitude of that point in the center of the screen appear across the top of the screen. Reference coordinates are available whether or not the latitude and longitude lines appear on the map. Moreover, when the place name search path is used in conjunction with the latitude and longitude functions, the exact coordinates of that place are thereby made available. However, if a place that does not have a discrete location is searched (e.g., river, region) then the computer draws a map around the center-point of the screen region or area displayed.

For example, suppose the user accesses the place name search path to draw a map of Shanghai, China. A circle representing the geographic location of Shanghai then appears at the center of the screen and the highlighted word "Shanghai" is displayed next to it. The latitude and longitude of the city (31N 121E) also appear on the display. If the user then clicks the mouse on the "Lat/Long On" icon at step **670**, the computer will add lines for the latitude and longitude. This will then give the user a better idea of the location of various places on the map.

Alternatively, if the user decides to see a rap of "Korea", the computer will then re-draw the map so that Korea is at the center of the screen. The latitude and longitude reading in the title line (36N 127E) thereby represents the coordinates of the approximate center of the country of Korea.

Another feature of the World Atlas entry path, is that when a map is drawn, the arrow cursor remains in the prompt line and cannot be moved up into the map area. Only after a map has been completely drawn, shaded and labelled (if labels are turned on), can the cursor be moved onto the map.

All cities that appear on the map have a circle next to their labels. A circle indicates the geographic location of the city. Cities that are capitals of countries are marked with a star surrounded by a circle. Cities that are capitals of states have a star located next to their labels. When the place finder is used, the place label will be highlighted on the map that is drawn, and a symbol will be located at the center of the screen.

FIG. **21** illustrates the logical operations of the Researcher's Assistant entry path **70**. The purpose of the Researchers Assistant is to set-up research questions for users. Researcher's Assistant contains numerous articles divided into several categories. Each particular category consists of topics containing three assignments. The assignments are marked

according to their level of difficulty for the user. To use the Researcher's Assistant **100**, a display **720** is provided to the user which allows him to select from one of several available topic categories. A number of other options are available on the display's prompt line including Notes **24**, Research Path **25**, Last Screen **26**, Tools **106** and the Main Menu **120**.

If a research category is selected **722** from display **720**, then a list of research topics appears **724**. The user may then select the research assignment after reviewing the displayed description of the topic **728**. The selection step **729** involves three levels of difficulty **730**, **732** and **734**. An assignment is selected by clicking a mouse on the chosen assignment. The user may then review information about the topic and about the assignment. Once the user makes a decision about which assignment to work on, he can then cut and paste that assignment into his Notes **24** and then return to the Main Menu through function **120**. In the Main Menu, the user can then choose an appropriate entry path for that assignment. The other options include the ability to go back and view the last screen **26**, to go to another program from the Research Path list **25**, to go back to the last decision step through the Back function **118** or to employ Tools **106**.

For example, if the user is interested in doing research on "spiders" he then selects "Living Things" from the research categories at step **720**. The term "spider" would then be selected from the topic list at step **726**. The user would then read the screens of introductory text for that topic and move through those screens using the down arrow at step **728**. At the end of the topic, three assignments would be available:

Make That Four Pairs Of Shoes Please
Spiders Have Feelings Too
Beautiful But Deadly

To make a selection **729**, the user clicks the name of the assignment **730**, **732** and **734** so that the information on the assignment will then be displayed. That information includes the name of articles where the user will find the information for that assignment.

Should a different assignment on the same topic be desired, the Back function **118** returns the user to the screen where the three assignments **730**, **732** and **734** are listed. Should the user want to then select a different topic from the same category, the Back function **118** is activated again, returning to the topic menu **724**. Clicking Back **118** once more, returns to the menu of research categories where the user can select a new category of topics.

Any time the user is looking at the introductory text for a topic, the user can click the next topic function **736** which will move them ahead **738** to the next topic in the same category without having to return to the topic menu **740**. To change a research category, however, the Back function **118** must be employed as described above.

Once the user has determined which assignment he wants to search by clicking the Main Menu **120**, the user is then prompted by the display about whether or not he wishes to save that assignment stored in his notes **24**. If the answer is "no", the user will return to the Main Menu at step **744**.

As an alternative, the Researcher's Assistant path can be designed to be played as a game. The goal of the game is to encourage users to compete in obtaining information from the database. The game is arranged as a competitive scavenger hunt. Each user is asked to collect information about a question and is encouraged to collect facts and store the collected facts in a single storage area. The user then is scored on the time it takes him to retrieve facts and the number of correct facts he collected. The game is played at different levels of difficulty.

FIG. **22** illustrates the Feature Articles entry path **70**. This entry path takes the user directly to a number of the most interesting articles in the database. All articles have been enhanced with additional text, sound and pictures. In use, when the user clicks on the entry path icon, a display of the feature categories for Feature Articles are presented **750**. The user then selects an article **752** by moving a cursor over one of the titles shown on the display screen **750** and by clicking the mouse. As a result, the display will show page one of the article **754** that is selected. The user then goes to the article display which includes on its prompt line the Feature Articles **756**. By clicking the icon on at step **758**, the user will return to the Feature Articles menu **70**. Other functions available in the Feature Articles entry path **70** are Notes **24**, Research Path **25**, Last Screen **26**, Back **118** and Main Menu **120**.

While a particular embodiment of the present invention has been disclosed, it is to be understood that various different modifications are possible and are contemplated as being within the true spirit and scope of the claims. There is no intention, therefore, of limiting this invention to the exact abstract or disclosure presented herein. More particularly, it is contemplated that this invention can be used with any information that can be stored in a database. While the present invention has largely been described with reference to an encyclopaedia, other databases of published graphical or textual information could be included.

We claim:

1. A machine-implemented method for retrieving information, comprising:

storing textual information and graphical information of any type on a computer-readable medium in at least one database;

providing a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieving textual information based on input of the user in the textual browse entry path or the textual search entry path;

providing a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieving the associated graphical information in response to input of the user associated with the first indicator;

retrieving graphical information based on input of the user in the graphics entry path;

providing a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieving the associated textual information in response to input of the user associated with the second indicator.

2. The method according to claim **1**, wherein said textual information comprise words, phrases, numbers and letters stored in said at least one database.

3. The method according to claim 1, wherein said graphical information include maps, charts, pictures, and moving images.

4. The method according to claim 1 wherein one of said graphical and textual information comprises audio information.

5. The method according to claim 1, wherein said graphical and textual information are stored on a CD-ROM disc.

6. The method according to claim 1, further comprising referencing stems through a stem index wherein each stem is identified with all associated stems in said stem index, and are associated with units of said textual and graphical information, said stem terms being concatenated in order to map each stem to other stems and to units of textual information which express a similar idea.

7. The method according to claim 6, wherein said concatenation comprises linking said stems together based on grammatical linkages and based on thesaurus linkages.

8. The method according to claim 2, wherein said textual information comprises articles from an encyclopedia.

9. The method according to claim 1, wherein a portion of said graphical and textual information comprises an encyclopedia.

10. The method according to claim 1, wherein a portion of said graphical and textual information comprises a dictionary.

11. The method according to claim 1, wherein a portion of said graphical and textual information comprises a thesaurus.

12. The method according to claim 1, wherein a portion of said textual and graphical information comprises audio information.

13. The method according to claim 1, wherein a portion of said graphical information comprises photographs, maps, charts, graphs, drawings and animations.

14. The method according to claim 1, wherein said textual information includes titles whereby said titles are searched by said title finder entry path by moving through an alphabetical list of titles associated with said textual information.

15. The method according to claim 1, wherein said textual information is divided into topics and sub-topics.

16. The method according to claim 1, further comprising locating at least one picture and retrieving textual information associated with said at least one picture.

17. The method according to claim 16, further comprising using picture tour search entry paths for presenting pictures in random order.

18. The method according to claim 17, further comprising searching picture captions based upon said search inquiry inputs.

19. The method according to claim 1, further comprising displaying events arranged on a timeline in order wherein a user may select information about one of said events by activating said event on a display.

20. The method according to claim 19, wherein said information about an event includes audio information.

21. The method according to claim 1, wherein the graphics entry path comprises a map, the method further comprising placing a marker on a location on the map, and redrawing the map centered on the location in response to input from the user.

22. The method according to claim 1, further comprising dividing subject matter categories into topics, dividing said topics into research assignments, and ordering said research assignments by level of difficulty.

23. The method according to claim 1, wherein the graphical and textual information is interrelated.

24. Software for retrieving information, the software embodied on a computer-readable medium and, when executed by a computer, operable to:

store textual information and graphical information of any type in at least one database;

provide a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieve textual information based on input of the user in the textual browse entry path or the textual search entry path;

provide a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieve the associated graphical information in response to input of the user associated with the first indicator;

retrieve graphical information based on input of the user in the graphics entry path;

provide a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieve the associated textual information in response to input of the user associated with the second indicator.

25. A machine-implemented method for retrieving information, comprising:

storing textual information and graphical information of any type on a computer-readable medium in at least one database;

providing a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieving textual information based on input of the user in the textual search entry path;

providing a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieving the associated graphical information in response to input of the user associated with the first indicator;

retrieving graphical information based on input of the user in the graphics entry path;

providing a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieving the associated textual information in response to input of the user associated with the second indicator.

26. Software for retrieving information, the software embodied on a computer-readable medium and, when executed by a computer, operable to:

store textual information and graphical information of any type in at least one database;

provide a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieve textual information based on input of the user in the textual search entry path;

provide a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieve the associated graphical information in response to input of the user associated with the first indicator;

retrieve graphical information based on input of the user in the graphics entry path;

provide a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieve the associated textual information in response to input of the user associated with the second indicator.

27. A machine-implemented method for retrieving information, comprising:

storing textual information and graphical information of any type on a computer-readable medium in at least one database;

providing a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieving at least a portion of the textual or graphical information through a selected entry path based on the input of the user;

providing an indicator associated with the retrieved textual or graphical information indicating the availability of associated graphical or textual information accessible through another entry path; and

retrieving the associated graphical or textual information in response to input of the user associated with the indicator.

28. Software for retrieving information, the software embodied on a computer-readable medium and, when executed by a computer, operable to:

store textual information and graphical information of any type in at least one database;

provide a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieve at least a portion of the textual or graphical information through a selected entry path based on the input of the user;

provide an indicator associated with the retrieved textual or graphical information indicating the availability of associated graphical or textual information accessible through another entry path; and

retrieve the associated graphical or textual information in response to input of the user associated with the indicator.

29. A machine-implemented method for retrieving information, comprising:

storing textual information and graphical information of any type on a computer-readable medium in at least one database;

providing a plurality of entry paths for searching at least a portion of the stored textual and graphical information, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieving textual information based on input of the user in the textual browse entry path or the textual search entry path;

providing a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieving the associated graphical information in response to input of the user associated with the first indicator;

retrieving graphical information based on input of the user in the graphics entry path;

providing a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieving the associated textual information in response to input of the user associated with the second indicator.

30. Software for retrieving information, the software embodied on a computer-readable medium and, when executed by a computer, operable to:

store textual information and graphical information of any type in at least one database;

provide a plurality of entry paths for searching at least a portion of the stored textual and graphical information, the entry paths comprising:

at least one textual browse entry path allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieve textual information based on input of the user in the textual browse entry path or the textual search entry path;

provide a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieve the associated graphical information in response to input of the user associated with the first indicator;

retrieve graphical information based on input of the user in the graphics entry path;

provide a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieve the associated textual information in response to input of the user associated with the second indicator.

31. A machine-implemented method for retrieving information, comprising:

storing textual information and graphical information of any type on a computer-readable medium in at least one database;

providing a plurality of entry paths for searching at least a portion of the stored textual and graphical information, the entry paths comprising:

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieving textual information based on input of the user in the textual browse entry path or the textual search entry path;

providing a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieving the associated graphical information in response to input of the user associated with the first indicator;

retrieving graphical information based on input of the user in the graphics entry path;

providing a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieving the associated textual information in response to input of the user associated with the second indicator.

32. Software for retrieving information, the software embodied on a computer-readable medium and, when executed by a computer, operable to:

store textual information and graphical information of any type in at least one database;

provide a plurality of entry paths for searching at least a portion of the stored textual and graphical information, the entry paths comprising:

at least one textual search entry path allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

retrieve textual information based on input of the user in the textual browse entry path or the textual search entry path;

provide a first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

retrieve the associated graphical information in response to input of the user associated with the first indicator;

retrieve graphical information based on input of the user in the graphics entry path;

provide a second indicator associated with the retrieved graphical information indicating the availability of associated textual information; and

retrieve the associated textual information in response to input of the user associated with the second indicator.

33. A machine-implemented search system for retrieving information, comprising:

a storing unit for storing textual information and graphical information of any type on a computer-readable medium, said storing unit including at least one database;

a plurality of entry paths for searching at least a portion of the stored textual and graphical information, each of the entry paths capable of being used without regard to the other entry paths, the entry paths comprising:

at least one textual browse entry path for allowing a user to select textual information from a predetermined list of textual information;

at least one textual search entry path for allowing a user to enter text to search for in the stored textual information; and

at least one graphics entry path for graphically searching at least a portion of the graphical information;

a first text retriever for retrieving textual information based on input of the user in the textual browse entry path or the textual search entry path;

first indicator associated with the retrieved textual information indicating the availability of associated graphical information;

a first graphics retriever for retrieving the associated graphical information in response to input of the user associated with the first indicator;

a second graphics retriever for retrieving graphical information based on input of the user in the graphics entry path;

a second indicator associated with the retrieved graphical information indicating the availability of associated textual information;

a second text retriever for retrieving the associated textual information in response to input of the user associated with the second indicator; and

an output unit for receiving search results and providing said search results to the user.

34. The search system according to claim **33**, wherein said textual information comprise words, phrases, numbers and letters stored in said at least one database.

35. The search system according to claim **33**, wherein said graphical information includes maps, charts, pictures, and moving images.

36. The search system according to claim **33** wherein one of said graphical and textual information comprises audio information.

37. The search system according to claim **33**, wherein said graphical and textual information are stored on a CD-ROM disc.

38. The search system according to claim **33**, further comprising a micro-computer for executing operations of said search system, and for storing said graphical and textual information.

39. The search system according to claim **33**, wherein said graphical entry path comprises interactively narrowing a search of graphical images to a point indicated by said second graphical indicator which provides a path to associated textual information.

40. The search system according to claim **39**, wherein said textual entry path comprises interactively narrowing a search of textual information to a point indicated by said first text indicator which provides a path to associated graphical information.

41. The search system according to claim 33, wherein said textual entry path and said graphical entry path include an assistor for assisting a user in searching said graphical and textual information.

42. The search system according to claim 33, wherein said textual search entry path comprises an idea entry path for searching said plurality of types of information for terms and phrases that closely resemble a search inquiry.

43. The search system according to claim 42, wherein said idea entry path eliminates stop words by comparing terms in said search inquiry to terms stored in a stop term list and eliminating any search inquiry terms that match words stored in said stop term list.

44. The search system according to claim 42, wherein said idea entry path operates on phrases consisting substantially of two or more entered terms.

45. The search system according to claim 42, wherein said idea entry path includes a spell checker for checking the spelling of said search inquiry and provides alternate versions of misspelled words to a user.

46. The search system according to claim 42, wherein said idea entry path includes a new list function which compares said search inquiry with a thesaurus contained in the at least one database to provide alternate non-ambiguous terms for said search inquiry.

47. The search system according to claim 46, wherein if more than one alternate non-ambiguous term is retrieved by said new list function, then said new list function orders said alternatives in order of relevance to said ambiguous terms.

48. The search system according to claim 42, wherein said search system includes a plurality of databases which include stems which are referenced through a stem index where each stem is identified with all associated stems in said stem index, and are associated with units of said textual and graphical information, said stem terms being concatenated in order to map each stem to other stems and to units to textual information which express a similar idea.

49. The search system according to claim 48, wherein said concatenation comprises linking said stems together based on grammatical linkages and based on thesaurus linkages.

50. The search system according to claim 42, wherein said textual search path entry further comprises a ranking mode for ordering said textual information in order of relevance to said search inquiry inputs.

51. The search system according to claim 50, wherein said ranking mode bases said ordering on an exhaustivity coefficient for said inputted search inquiry terms or phrases and an exclusivity coefficient for said inputted search inquiry terms or phrases.

52. The search system according to claim 51, wherein all of said textual information ranked above a predetermined exhaustivity and exclusivity threshold is separately designated.

53. The search system according to claim 42, wherein said textual information comprises articles from an encyclopedia.

54. The search system according to claim 33, wherein a portion of said graphical and textual information comprises an encyclopedia.

55. The search system according to claim 33, wherein a portion of said graphical and textual information comprises a dictionary.

56. The search system according to claim 33, wherein a portion of said graphical and textual information comprises a thesaurus.

57. The search system according to claim 33, wherein a portion of said textual and graphical information comprises audio information.

58. The search system according to claim 33, wherein a portion of said graphical information comprises photographs, maps, charts, graphs, drawings and animations.

59. The search system according to claim 33, wherein said textual entry path comprises a title finder entry path for locating titles, wherein said titles are searched by said title finder entry path by moving through an alphabetical list of titles associated with said textual information.

60. The search system according to claim 33, wherein said textual search entry path comprises a topic tree entry path for dividing said textual information into topics and sub-topics in order to assist in browsing through said textual information.

61. The search system according to claim 33, wherein said graphics search entry path further comprises a picture explorer entry path for locating at least one picture and for employing said retriever to retrieve said textual information associated with said at least one picture.

62. The system search according to claim 61, wherein said picture explorer entry path further comprises picture tour search path for presenting pictures in random order.

63. The search system according to claim 61, wherein said picture explorer entry path includes a picture finder entry path which searches picture captions based upon said search inquiry inputs.

64. The search system according to claim 33, wherein one of said textual entry paths comprises a history timeline entry path for displaying events arranged on a timeline in order that a user may select information about one of said events by activating said event on a display.

65. The search system according to claim 64, wherein said information about an event includes audio information.

66. The search system according to claim 33, wherein the graphics entry path comprises a map enabling the placement of a marker on a location on the map such that the map is re-drawn to be centered around the specified place in response to an input from the user.

67. The search system according to claim 66, wherein the map provides substantially multiple levels of increasing detail for any part of the map.

68. The search system according to claim 66, wherein the second indicator provides an indication of textual information associated with a place labeled on the map which can be accessed through the retriever.

69. The search system according to claim 33, wherein said entry path further comprises a feature articles entry path which takes a user directly to at least one article in said computer search system.

70. The search system according to claim 33, wherein one of said entry paths comprises a researcher's assistant entry path which contains subject matter categories divided into topics and said topics are further divided into research assignments and wherein said research assignments are ordered by level of difficulty.

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