EXHIBIT C

United States Patent File History

Tab Listings

A. References (if applicable)
- **A1**–U.S. References
- **A2**–Foreign References

B. Jacket (face of file, contents flap, index of claims, PTO 270, searched)

C. Printed Patent

D. Specification (serial no. Sheet, abstract, specification, claims)

E. Oath
- **E1**–Small Entity Status (if applicable)

F. Drawing Figures (if applicable)

G. USPTO/Applicant Correspondence

H. Original Patent Application (in cases of FWC)

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08/318252

ISSUE CLASSIFICATION	Class	Subclass
	395	605

[redacted]

5694593

UTILITY SERIAL NUMBER	PATENT DATE	PATENT NUMBER
08/318252	DEC 02 1997	5694593

SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
08/318,252	10/05/94	395	600	~~2317~~ 2307	LEWIS

APPLICANTS

KENNETH P. BACLAWSKI, WALTHAM, MA.

CONTINUING DATA********
VERIFIED

CL NONE

FOREIGN/PCT APPLICATIONS********
VERIFIED

CL NONE

FOREIGN FILING LICENSE GRANTED 11/04/94 ***** SMALL ENTITY *****

Foreign priority claimed / 35 USC 119 conditions met / Verified and Acknowledged (Examiner's initials)	AS FILED	STATE OR COUNTRY	SHEETS DRWGS.	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED	ATTORNEY'S DOCKET NO.
☐ yes ☑ no / ☐ yes ☑ no / CL	→	MA	13	17	6	$479.00	NU360XX

ADDRESS

WEINGARTEN SCHURGIN GAGNEBIN & HAYES
TEN POST OFFICE SQUARE
BOSTON MA 02109

TITLE

DISTRIBUTED COMPUTER DATABASE SYSTEM AND METHOD

U.S. DEPT. of COMM./Pat. & TM Office — PTO-436L (rev. 10-78)

PARTS OF APPLICATION FILED SEPARATELY

Applications Examiner

NOTICE OF ALLOWANCE MAILED

6/19/97

Cheryl R. Lewis
Assistant Examiner

CLAIMS ALLOWED

Total Claims	Print Claim
17	1

ISSUE FEE

Amount Due	Date Paid
$1645.00	9/18/97 MA

THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 2300

Thomas G. Black
Primary Examiner

DRAWING

Sheets Drwg.	Figs. Drwg.	Print Fig.
13	13	1

PREPARED FOR ISSUE

ISSUE BATCH NUMBER 031

Label Area

WARNING: The information disclosed herein may be restricted. Unauthorized disclosure may be prohibited by the United States Code Title 35, Sections 122, 181 and 368. Possession outside the U.S. Patent & Trademark Office is restricted to authorized employees and contractors only.

Form PTO-436A
(Rev. 8/92)

GH
ISSUE FEE IN FULL

(FACE)

JAR0002539

LB

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, DC 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.
08/318,252	10/05/94	BACLAWSKI	K	NU060XX

EXAMINER	
LEWIS,C	

E3M1/0416
WEINGARTEN SCHURGIN GAGNEBIN & HAYES
TEN POST OFFICE SQUARE
BOSTON MA 02109

ART UNIT	PAPER NUMBER
2307	3

DATE MAILED: 04/16/96

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

See attached office action.

PTO-90C (REV. 2/95)

1-File Copy

Office Action Summary

Application No.	Applicant(s)
08/318,252	Bacjawski et al.
Examiner	**Group Art Unit**
Cheryl Lewis	2304

☒ Responsive to communication(s) filed on 10/05/94

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-14 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-14 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

1. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

2. Claims 1-17 are rejected under 35 U.S.C. 103 as being unpatentable over Chaturvedi, et al., "Scheduling the Allocation of Data Fragments in a Distributed Database Environment: A Machine Learning Approach", IEEE Transactions On Engineering Management, Vol. 41, No. 2, May 1994 and Houtsma et al., "Parallel Hierarchical Evaluation of Transitive Closure Queries", IEEE, 1991.

3. - With respect to claims 1, 6, 8, 12-13, and 17,

Chaturvedi discloses the distributed database system (Abstract, lin. 3) having the means which essentially comprise the same means as a home node (pg. 199, 2nd col., part B, example 4, node A). Chaturvedi discloses a plurality of query nodes (pg. 199, 2nd col., part B, steps A.1-A.3, pg. 200, part C, Query Processing in TIF Environment) connected by a network (pg. 196, fig. 3). Chaturvedi discloses the fragmenting means (Abstract, lin. 1, pg. 195, Section II) and the means for a query from a user into a plurality of query fragments (pg. 196, fig. 2, 2nd col.,

section A, pg. 198, A. Illustrative Examples, Example 2, & No. 1-4). Chatrvedi discloses the local hash table means located on the query node (pg. 197, col. 1, par. 3, step 3, pg. 199, 2nd col. & Example 4). Chatrevdi discloses the object identifier means (pg. 198, A. Illustrative Examples, Example 2, lins. 1-4, & Site A-Site B). Chatrvedi discloses the means which essentially comprise the same means as the hashing means (Abstract, lins. 1-19).

Houtsma discloses the hashing means (2nd column, par. 3, & lin. 7) and the hashed query fragment means to have a first and second portion (pg. 133, adjacency, non-adjacency, Property 3.2, & Theorem 3.1). Houtsma discloses the hashed query fragment of the plurality of query fragments to a respective one of the query nodes indicating the first portion of each hashed query fragment (pg. 132, 2nd col., & lins. 1-9). Houtsma discloses the hashed query fragment to access data (pg. 130, 2nd col., par. 3, lins. 1-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the hashing means of Houtsma's teachings with the teachings of Chaturvedi because the hashing means could enable Chaturvedi's information retrieval means to provide the queried node with a query value and a query identifier during the query nodes hashing process.

4. - With respect to claims 2, 7, and 14,

Chaturvedi discloses the step of receiving at the claimed home node a query from the user (pg. 196, 1st col., par. 1, lins. 2-11, & figs. 2 & 3) prior to the step of fragmenting a query.

5. - With respect to claim 3,

Chaturvedi discloses the means to determine and return a measure of relevance and a predetermined degree of relevance between the accessed data and the query (pg. 199, Example 4, lins. 1-10, pg. 200, 1st col., base table T2, Node A, & Node B).

6. - With respect to claims 4 and 10,

Houtsma discloses the means which essentially comprise the same means as determining a measure or relevance by a cosine measure (pg. 130, 2nd col., par. 3, & lins. 5 & 6).

7. - With respect to claims 5 and 11,

Chaturvedi discloses where the hashed query fragment means comprises the bit means (pg. 199, 2nd col., & tuple 1).

8. - With respect to claim 15,

Chaturvedi discloses the three query level means (pg. 199, 1st col., steps 1, 2, and 4).

9. - With respect to claim 16,

Chaturvedi discloses where a query node returns a content label in response to a predetermined query level (pg. 198, 2nd col., Example 3).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheryl Lewis whose telephone number is (703) 305-8750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

PAUL V. KULIK
PRIMARY EXAMINER
GROUP 2300

Form PTO 948 (Rev. 10-93) U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office Application No. 318252

NOTICE OF DRAFTSPERSON'S PATENT DRAWING REVIEW

PTO Draftpersons review all originally filed drawings regardless of whether they are designated as formal or informal. Additionally, patent Examiners will review the drawings for compliance with the regulations. Direct telephone inquiries concerning this review to the Drawing Review Branch, 703-305-8404.

The drawings filed (insert date) 10/5/94, are
A. ___ not objected to by the Draftsperson under 37 CFR 1.84 or 1.152.
B. X objected to by the Draftsperson under 37 CFR 1.84 or 1.152 as indicated below. The Examiner will require submission of new, corrected drawings when necessary. Corrected drawings must be submitted according to the instructions on the back of this Notice.

1. DRAWINGS. 37 CFR 1.84(a): Acceptable categories of drawings:
Black ink. Color.
___ Not black solid lines. Fig(s)_____
___ Color drawings are not acceptable until petition is granted.

2. PHOTOGRAPHS. 37 CFR 1.84(b)
___ Photographs are not acceptable until petition is granted.

3. GRAPHIC FORMS. 37 CFR 1.84 (d)
___ Chemical or mathematical formula not labeled as separate figure. Fig(s)_____
___ Group of waveforms not presented as a single figure, using common vertical axis with time extending along horizontal axis. Fig(s)_____
___ Individuals waveform not identified with a separate letter designation adjacent to the vertical axis. Fig(s)_____

4. TYPE OF PAPER. 37 CFR 1.84(e)
X Paper not flexible, strong, white, smooth, nonshiny, and durable. Sheet(s) 1-3-8
___ Erasures, alterations, overwritings, interlineations, cracks, creases, and folds not allowed. Sheet(s)_____

COPY MACHINE MARKS OBJ.

5. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable paper sizes:
21.6 cm. by 35.6 cm. (8 1/2 by 14 inches)
21.6 cm. by 33.1 cm. (8 1/2 by 13 inches)
21.6 cm. by 27.9 cm. (8 1/2 by 11 inches)
21.0 cm. by 29.7 cm. (DIN size A4)
___ All drawing sheets not the same size. Sheet(s)_____
___ Drawing sheet not an acceptable size. Sheet(s)_____

6. MARGINS. 37 CFR 1.84(g): Acceptable margins:

Paper size

21.6 cm. X 35.6 cm. (8 1/2 X 14 inches)	21.6 cm X 33.1 cm. (8 1/2 X 13 inches)	21.6 cm. X 27.9 cm. (8 1/2 X 11 inches)	21 cm. X 29.7 cm. (DIN Size A4)
T 5.1 cm. (2")	2.5 cm. (1")	2.5 cm. (1")	2.5cm.
L .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	2.5 cm.
R .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	1.5 cm.
B .64 cm. (1/4")	.64 cm. (1/4")	.64 cm. (1/4")	1.0 cm.

Margins do not conform to chart above.
Sheet(s) 1-3-7, 8
X Top (T) X Left (L) ___Right (R) ___Bottom (B)

7. VIEWS. 37 CFR 1.84(h)
REMINDER: Specification may require revision to correspond to drawing changes.
___ All views not grouped together. Fig(s)_____
___ Views connected by projection lines. Fig(s)_____
___ Views contain center lines. Fig(s)_____
Partial views. 37 CFR 1.84(h)(2)
___ Separate sheets not linked edge to edge. Fig(s)_____
___ View and enlarged view not labeled separately. Fig(s)_____
___ Long view relationship between different parts not clear and unambiguous. 37 CFR 1.84(h)(2)(ii) Fig(s)_____
Sectional views. 37 CFR 1.84(h)(3)
___ Hatching not indicated for sectional portions of an object. Fig(s)_____
___ Hatching of regularly spaced oblique parallel lines not spaced sufficiently. Fig(s)_____
___ Hatching not at substantial angle to surrounding axes or principal lines. Fig(s)_____
___ Cross section not drawn same as view with parts in cross section with regularly spaced parallel oblique strokes. Fig(s)_____
___ Hatching of juxtaposed different elements not angled in a different way. Fig(s)_____
Alternate position. 37 CFR 1.84(h)(4)
___ A separate view required for a moved position. Fig(s)_____

Modified forms. 37 CFR 1.84(h)(5)
___ Modified forms of construction must be shown in separate views. Fig(s)_____

8. ARRANGEMENT OF VIEWS. 37 CFR 1.84(i)
___ View placed upon another view or within outline of another. Fig(s)_____
___ Words do not appear in a horizontal, left-to-right fashion when page is either upright or turned so that the top becomes the right side, except for graphs. Fig(s)_____

- REMOVE BOX AROUND FIG. (FIG. 1, 2)

9. SCALE. 37 CFR 1.84(k)
___ Scale not large enough to show mechanism without crowding when drawing is reduced in size to two-thirds in reproduction. Fig(s)_____
___ Indication such as "actual size" or "scale 1/2" not permitted. Fig(s)_____
___ Elements of same view not in proportion to each other. Fig(s)_____

10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(l)
X Lines, numbers & letters not uniformly thick and well defined, clean, durable, and black (except for color drawings). Fig(s) 1-8, 9

11. SHADING. 37 CFR 1.84(m)
___ Shading used for other than shape of spherical, cylindrical, and conical elements of an object, or for flat parts. Fig(s)_____
___ Solid black shading areas not permitted. Fig(s)_____

12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR 1.84(p)
X Numbers and reference characters not plain and legible. 37 CFR 1.84(p)(l) Fig(s) 1-9
___ Numbers and reference characters used in conjuction with brackets, inverted commas, or enclosed within outlines. 37 CFR 1.84(p)(l) Fig(s)_____
___ Numbers and reference characters not oriented in same direction as the view. 37 CFR 1.84(p)(l) Fig(s)_____
___ English alphabet not used. 37 CFR 1.84(p)(2) Fig(s)_____
X Numbers, letters, and reference characters do not measure at least .32 cm. (1/8 inch) in height. 37 CFR(p)(3) Fig(s) 1, 3-9

- DESCRIP. MATTER OBJ. (FIG. 1)

13. LEAD LINES. 37 CFR 1.84(q)
___ Lead lines cross each other. Fig(s)_____
___ Lead lines missing. Fig(s)_____
___ Lead lines not as short as possible. Fig(s)_____

14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1.84(t)
___ Number appears in top margin. Fig(s)_____
___ Number not larger than reference characters. Fig(s)_____
___ Sheets not numbered consecutively, and in Arabic numerals, beginning with number 1. Sheet(s)_____

15. NUMBER OF VIEWS. 37 CFR 1.84(u)
___ Views not numbered consecutively, and in Arabic numerals, beginning with number 1. Fig(s)_____
___ View numbers not preceded by the abbreviation Fig. Fig(s)_____
___ Single view contains a view number and the abbreviation Fig.
___ Numbers not larger than reference characters. Fig(s)_____

16. CORRECTIONS. 37 CFR 1.84(w)
___ Corrections not durable and permanent. Fig(s)_____

17. DESIGN DRAWING. 37 CFR 1.152
___ Surface shading shown not appropriate. Fig(s)_____
___ Solid black shading not used for color contrast. Fig(s)_____

ATTACHMENT TO PAPER NO. 3 REVIEWER TCR DATE 11/7/94

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JAR0002798

Notice of References Cited

Application No.	Applicant(s)		
08/318,252	Baclawski		
Examiner		Group Art Unit	Page 1 of 1
Cheryl Lewis		2307	

U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A					
B					
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J					
K					
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M					

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						

NON-PATENT DOCUMENTS

	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
U	Chaturvedi, et al., "Scheduling the Allocation of Data Fragments in a Distributed Database Environment: A Machine Learning Approach", IEEE Transactions On Engineering Management, Vol. 41, No. 2	5/94
V	Houtsma et al., "Parallel Hierarchical Evaluation of Transitive Closure Queries", IEEE	4/1991
W		
X		

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application	:	Kenneth P. Baclawski
Serial No.	:	08/318,252
Filed	:	October 5, 1994
For	:	DISTRIBUTED COMPUTER DATABASE SYSTEM AND METHOD
Examiner	:	C. Lewis
Attorney's Docket	:	NU-360XX

Group Art Unit: 2307

* *

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: BOX NON-FEE AMENDMENT, Assistant Commissioner for Patents, Washington, D.C. 20231 on 6/7/96.

By _____
Stanley M. Schurgin
Registration No. 20,979
Attorney for Applicant(s)

* *

AMENDMENT

BOX NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated April 16, 1996, please amend the above-identified patent application as follows:

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

Serial No.: 08/318,252
Filed: October 5, 1994
Group Art Unit: 2307

In the Claims

Please amend claims 1, 6, 8, 12, 13 and 17 as follows:

Sub B1

1. (Amended) A method for information retrieval using fuzzy queries [of accessing data] in a distributed database system having a plurality of home nodes [node] and a plurality of query nodes connected by a network, said method comprising the steps of:

randomly selecting a first one of said plurality of home nodes;

fragmenting, by said selected home node, a query from a user into a plurality of query fragments;

hashing, by said selected home node, each said query fragment of said plurality of query fragments, said hashed query fragment having a first portion and a second portion;

transmitting, by said selected home node, each said hashed query fragment of said plurality of query fragments to a respective one of said plurality of query nodes indicated by said first portion of each said hashed query fragment;

using, by said query node, said second portion of said respective hashed query fragment to access data according to a local hash table located on said query node; and

returning, by each said query node accessing data according to said respective hashed query fragment, an object identifier corresponding to said accessed data to said selected home node.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

6. (Amended) A method of storing data in a manner which is conducive to information retrieval using fuzzy queries in a distributed database system having a plurality of home nodes [node] and a plurality of query nodes connected by a network, said method comprising the steps of:

randomly selecting a first one of said plurality of home nodes;

fragmenting, by said selected home node, data from a user into a plurality of data fragments;

hashing, by said selected home node, each said data fragment of said plurality of data fragments, said hashed data fragment having a first portion and a second portion;

transmitting, by said selected home node, each said hashed data fragment of said plurality of data fragments to a respective one of said plurality of query nodes indicated by said first portion of each said hashed data fragment; and

using, by said query node, said second portion of said respective hashed data fragment to store data according to a local hash table located on said query node.

8. (Amended) A distributed database system having an information retrieval tool for handling queries from a user, comprising:

a plurality of home nodes [node]; and

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GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

a plurality of query nodes;

said plurality of home nodes [node] and said plurality of query nodes connected by a network,

wherein each said home node, upon receiving a query from a user, fragments said query into a plurality of query fragments, hashes each said query fragment of said plurality of query fragments into a hashed query fragment having a first portion and a second portion, and transmits each said hashed query fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed query fragment, and

further wherein each said query node [,] uses said second portion of said hashed query fragment to access data according to a local hash table located on said query node and returns [,] an object identifier corresponding to said accessed data to said home node.

12. (Amended) A distributed database system for storage and retrieval of information, comprising:

a plurality of home nodes [node]; and

a plurality of query nodes;

said plurality of home nodes [node] and said plurality of query nodes connected by a network,

wherein each said home node, upon receiving data from a user, fragments said data into a plurality of data fragments, hashes each

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GAGNEBIN & HAYES
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FAX (617) 451-0313

said data fragment of said plurality of data fragments into a hashed data fragment having a first portion and a second portion, and transmits each said hashed data fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed data fragment, and

wherein each said query node [,] uses said second portion of said hashed data fragment to store data according to a local hash table located on said query node.

13. (Amended) A distributed database system having an information retrieval tool for handling queries from a user, comprising:

a plurality of home [node] nodes; and

a plurality of query nodes, said plurality of home nodes and said plurality of query nodes connected by a network,

each said home node, upon receiving a command from a user, enqueueing a predetermined task in response to said command,

a query task enqueued being resultant in, in response to a query command from said user, fragmenting a query contained in said query command into a plurality of query fragments, hashing each said query fragment of said plurality of query fragments into a hashed query fragment having a first portion and a second portion, and transmitting a query message containing each said hashed query fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed query fragment,

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GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

said query node, upon receipt of said query message, using said second portion of said hashed query fragment to access data according to a local hash table located on said query node and transmitting a message returning an object identifier corresponding to said accessed data to said home node.

17. (Amended) A distributed database system for storage and retrieval of information, comprising:

a plurality of home node nodes; and

a plurality of query nodes, said plurality of home nodes and said plurality of query nodes connected by a network,

each said home node, upon receiving a command from a user, enqueueing a predetermined task in response to said command,

an insert task enqueued, in response to an insert command from said user, fragmenting data contained in said insert command into a plurality of data fragments, hashing each said data fragment of said plurality of data fragments into a hashed data fragment having a first portion and a second portion, and transmitting an insert message containing each said hashed data fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed data fragment,

said query node, upon receipt of said insert message, using said second portion of said hashed data fragment to store data according to a local hash table located on said query node.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

Serial No.: 08/318,252
Filed: October 5, 1994
Group Art Unit: 2307

R E M A R K S

The above-identified patent application has been amended and reconsideration is respectfully requested. Claims 1-17 are pending and stand rejected. Claims 1, 6, 8, 12, 13 and 17 have been amended.

Claims 1-17 are rejected under 35 U.S.C. §103 as being unpatentable over Chaturvedi, et al., "Scheduling the Allocation of Data Fragments in a Distributed Database Environment: A Machine Learning Approach", IEEE Transactions on Engineering Management, Vol. 41, No. 2, May 1994 and Houtsma et al., "Parallel Hierarchical Evaluation of Transitive Closure Queries", IEEE, 1991. With respect to claims 1, 6, 8, 12-13, and 17, the Examiner states that, "It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the hashing means of Houtsma's teachings with the teachings of Chaturvedi because the hashing means could enable Chaturvedi's information retrieval means to provide the queried node with a query value and a query identifier during the query nodes hashing process" (Paper No. 3, page 3). However, such a combination would not provide the distributed database and method of the present invention.

Both the Chaturvedi and Houtsma references describe techniques for partitioning files in a Distributed Relational Database System. These two references, and each of the papers cited by these two references, are in the field of **relational** database systems. A

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

relational database system consists of one or more relations, also known as tables or files. Each relation is a set of records, also known as rows or tuples. Each record in a relation has a set of attributes, also known as fields or columns. Every record in a relation has exactly the same number of fields and the fields have the same types. For example, a customer relation might consist of a 40 character name field, a 60 character address field and a 6 digit customer identifier.

A fundamental characteristic of relational databases is that records **do not have object identity.** More particularly, each record is uniquely determined by the values of its fields. By contrast, data models other than the relational model generally assume that the basic objects do have object identity, i.e., an object exists independently of any attribute values it might have, and changing the attribute values will not change the object identity.

Another fundamental characteristic of relational databases is the use of a relational query language called the relational algebra. The relational algebra is roughly equivalent to what mathematicians call the "first order predicate calculus," and is primarily used for extracting information from a relational database system. However, the relational algebra may also be used for other purposes. For example, relational algebra expressions can be used to specify database views, security and authentication

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conditions, integrity constraints and database partitions. This can be confusing, and has apparently caused confusion in the examination of the present application, since these other uses of the relational algebra have nothing to do with extracting information from the database, and yet the word "query" is frequently used in connection with these other uses.

Modern relational databases typically deal with very large relations, i.e., relations that contain several terabytes (million megabytes) of data are common. The need to deal with such large relations along with the reduction in cost of computing equipment has driven the development of distributed relational database systems. A distributed relational database system is a relational database system that is distributed among a collection of computers which are connected by a communication network. Very large relations are distributed among the computers in the network by partitioning or otherwise breaking up the relations into disjoint pieces known as "fragments." These fragments are themselves relations, and typically contain in excess of tens or even hundreds of megabytes, even though the fragments are much smaller than the larger relation of which they are parts. Significantly, these relational fragments are **disjoint**.

The fragments of a distributed relational database system are defined by using the relational algebra. Perhaps as a result, the term "fragment query" is often used to refer to the relational

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algebra expression that defines a relational database fragment. This can be confusing, and has apparently caused confusion in the examination of the present application, since the relational algebra expression "fragment query" **does not describe extraction of information**, but rather provides the defining condition for the fragment.

The present invention does not utilize the relational model, and in particular does not utilize the relational models of Chaturvedi and Houtsma. A primary purpose of the present invention is to allow **information retrieval** for information objects that are more general than the simple records of a relational model system. For example, documents such as papers, books, World Wide Web pages, annotated images, and other documents can all be indexed using a search engine in accordance with the present invention. Significantly, none of these documents would be considered searchable records according to the relational model.

The present invention and the relational model express queries and records differently. The query language used by the present invention is the same language used to express the information objects, or more precisely their content labels, that are indexed by the search engine of the present invention (claims 1, 6, 8, 12, 13 and 17). This has the advantage that no additional language is required for expressing queries. In contrast, relational database system queries are expressed in the relational algebra and the

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records are expressed in other ways. The result of a query provided to the search engine of the present invention is a set of **object identifiers** (claim 1, line 17) with **weights** (claim 3, lines 2-3, claim 9) attached thereto. The weight attached to an object identifier represents ambiguous and fragmentary queries, which are also known as "fuzzy" queries. There is no analogous concept in the relational algebra. A relational algebra expression is a precise and unambiguous specification of a set of records. Using colloquial language, there is no "fuzziness" in the relational algebra.

The fragmentation technique of the present invention is different from fragmentation in the relational model. The present invention introduces a fragmentation technique that is utilized in the indexing algorithm. Information objects, or more precisely their content labels, are broken up into a collection of small overlapping fragments (claim 1, lines 4-5). The size of each fragment may typically be around 20 bytes. By contrast, the fragments of the relational model never overlap, are millions of times larger, and have a structure that is both conceptually and practically different. Furthermore, the present invention fragments both queries and information objects in the same way. This is impossible for relational model database systems, since queries and records have different structures.

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With regard to the comment on Page 2, heading 3, sentence 1, Charturvedi introduces a new algorithm for defining fragments in a partitioned, distributed relational database system. As noted above, these relational fragments are unrelated to the object fragments of the present invention. This difference is illustrated by the cited example which uses the value of an attribute (named c) to break apart a base table (named T1) into two relation fragments, according to whether the attribute has value 'A' or 'B'.

With regard to the comment on Page 2, heading 3, sentence 2, Chaturvedi introduces a variation on the well known semijoin algorithm for computing a join. The join is one of the operators of the relational algebra, and computing it efficiently is important in relational database systems. Significantly, the algorithm for the two-way join described in Chaturvedi is very different from the algorithm used by the present invention. The Chaturvedi join query is split into two single-table sub-queries and then provided to the two nodes containing the base tables specified in the sub-queries. This splitting technique is commonly employed in Distributed Relational Database Systems. It is an algebraic factoring of the relational algebra expression that is the query. Algebraic factoring is a technique unrelated to the fragmentation of the present invention. More particularly, in the present invention each fragment is hashed in its entirety (claim 1, lines 6-8), and the hash value is provided to a node determined by

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the hash value itself. In the splitting technique in Chaturvedi, sub-queries are not hashed at all; they are shipped to the node containing the base table specified in the sub-query. This is hardly surprising as it would not make any sense to hash a relational query because the resulting hash value would not have any uses.

With regard to the comments associated with Figs. 2 and 3 of Chaturvedi, the architecture of Chaturvedi shown in those Figs. is quite different from the architecture of the present invention. More particularly, there is no central server in the present invention, and neither the nodes of the network nor the object fragments in the index have any kind of hierarchical structure. In the present invention the home node of a query is randomly chosen, and different queries will generally have different home nodes.

With regard to the comment on Page 2, heading 3, sentence 3, the database fragmentation mentioned by Chaturvedi in the Abstract is relational fragmentation and is unrelated to the fragmentation of the present invention. The fragment queries in Chaturvedi's Illustrative Examples (Page 198) are not query fragments, but rather relational algebra expressions used to define relation fragments. Numbers 1-4 in Example 2 on page 198 are queries that are in the query history at Site A. They are queries that at some time in the past were processed at Site A. They are used by the MLTIF to compute relational algebra expressions for defining

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relation fragments that would be better suited for evaluating the queries in the history than the current relation fragments. The presumption is that the past history is a good indicator of what the future will be. The MLTIF is **not a query evaluation algorithm** but rather a dynamic method for choosing good relation fragments in a Distributed Relational Database System. Therefore, the cited passages of the Chaturvedi reference are irrelevant to the present invention.

With regard to the comment on Page 3, heading 3, sentence 1, nowhere on Page 197, column 1 or Page 199, column 2 of Chaturvedi is there any mention of a local hash table or any hashing operation.

With regard to the comment on Page 3, heading 3, sentence 2, no object identifiers are mentioned on page 198 of Chaturvedi. Indeed, since the relational model explicitly rejects object identity, it would be amazing if it did mention object identifiers. The Illustrative Example on page 198 simply discusses how to find relational algebra expressions for defining time invariant relational fragments.

With regard to the comment on Page 3, heading 3, sentence 3, no hashing operation is mentioned anywhere in the Abstract.

With regard to the comment on Page 3, heading 3, sentence 4, Houtsma does not teach use of hashing. Indeed, on page 130, column 2, par. 3, Houtsma refers to a number of papers that use different

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methods to solve the transitive closure problem, including hash-based methods. Houtsma teaches a disconnection set approach that does not use hashing. Further, the graph shown in Houtsma is an auxiliary structure used in the algorithm. The graph defines a notion of adjacency between relation fragments. This is unrelated to the graphs (semantic networks) used in the present invention. As discussed above, the fragments of the present invention are quite different from the fragments of the relational model. Since the fragments of the present invention are parts of the semantic network, there is no concept of fragment adjacency in the present invention. In Houtsma, the graph has the relation fragments as the vertices, with unlabeled edges defined by relation fragment adjacency, while in the present invention the fragments may be regarded as fragments of a graph having labeled edges (semantic relationships) that connect concept instantiations with one another.

With regard to the comment on Page 3, heading 3, sentence 5, no hashing operation is mentioned here or anywhere in the reference. The fragment H is the high speed fragment. The term "high speed" was probably chosen because of their motivating example: the railway network of many European countries. It could equally well have been called the "special fragment" or the "wide-connection fragment."

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The Examiner has also rejected claims 2, 7 and 14 based on the Chaturvedi and Houtsma references. However, Houtsma does not use hashing and Chaturvedi does not solve the **information retrieval** problem of the present invention. The Chaturvedi network architecture is very different from the architecture of the present invention. In Chaturvedi, except for the central server node, it is presumed that the servers are located where the queries will be presented by users. By contrast, the architecture of the present invention is a search engine that is entirely remote from any user nodes. The "home node" in Chaturvedi is the user node itself, i.e., the node where the query is presented to the distributed system. The "home node" in the present invention is one of the nodes in the search engine, and it can be randomly chosen by one of the front end processors. Further, Chaturvedi never fragments a query.

In addition to the architectural differences, there are no concepts of measure of relevance or degree of relevance (claims 3, 9) in the relational model, and no such concepts are mentioned or employed in Chaturvedi. In particular, the use of the word "relevance" in Chaturvedi is unrelated to the "fuzzy" notion of relevance in the present invention. Like all research on relational systems, Chaturvedi employs no notion of weighted relevance. When it is stated, for example, that "...it [join-value set] is transmitted to the relevant nodes participating in the join

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operation," Chaturvedi simply means that the join-value set is sent to those nodes participating in the join which may contribute any tuples to the result of the join. There is no relevance weighting involved in this operation. If it can be determined that a node participating in the join will not contribute any tuples to the result, then it is not sent the join-value set, otherwise the join-value set is sent to the node. The decision is completely "sharp" and does not involve any "fuzziness." This is hardly surprising since Chaturvedi describes a relational model which is unrelated to information retrieval using fuzzy queries.

With regard to fragment storage, the storage of relation fragments in a Distributed Relational Database System is specified in the allocation schema. In Chaturvedi, Example 4, there are three relation fragments: T1A, T1B, and T2. T1A is the relation fragment defined by the relational algebra expression:

SELECT * FROM T1 WHERE e = 'A'

and T1B is the relation fragment defined by the relational algebra expression:

SELECT * FROM T1 WHERE e = 'B'

The allocation schema simply specifies which nodes contain a copy of each relation fragment. Here, for example, is the allocation schema used by Chaturvedi in this example:

T1A: node A

T1B: node B

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T2: node A

It is merely coincidence that the value of the attribute e coincides with the name of the node.

With regard to the comments on Page 4, the steps in Chaturvedi, page 199, column 1 are concerned with choosing time invariant relation queries. These steps are not concerned with query processing per se. In the present invention a query request can specify one of several levels of service (claim 16). Roughly speaking, the lower levels of service are faster but are less accurate, the higher levels of service are slower but more accurate. This notion of level of service is meaningless for the relational model. In the relational model, all queries have **exactly one correct answer**. There is no concept in the relational model of answers that are better or worse.

In sum, the field of "information retrieval using fuzzy queries" (a term of art) is quite different from the relational model. In the relational model a query is a complete and unambiguous specification of the result. Relevance in the relational model is either TRUE or FALSE. In information retrieval results are returned which may or may not satisfy the intentions behind the query, and which may even be unrelated to the intentions behind the query. The claims have been amended to particularly point out this difference and remove the confusion which has

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apparently been brought about by the use of terms which are similar to those of the cited references.

For the reasons given above, reconsideration and allowance is respectfully requested. The Examiner is encouraged to telephone the undersigned attorney to discuss any matters in furtherance of the prosecution of this application.

Respectfully submitted,

Kenneth P. Baclawski

By _____
Stanley M. Schurgin
Registration No. 20,979
Attorney for Applicant(s)

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
Ten Post Office Square
Boston, Massachusetts 02109

Telephone: (617) 542-2290
Telecopier: (617) 451-0313

Date: 6/7/96

SMS/jet
84277

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES
TEL (617) 542-2290
FAX (617) 451-0313

LB

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SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
08/318,252	10/05/94	BACLAWSKI K	NU360XX

E3M1/0911
WEINGARTEN SCHURGIN GAGNEBIN & HAYES
TEN POST OFFICE SQUARE
BOSTON MA 02109

LEWIS, EXAMINER	
ART UNIT	PAPER NUMBER
2307	5

DATE MAILED: 09/11/96

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents

See attached

Office Action Summary

Application No.	Applicant(s)
08/318,253	BACIANSKI
Examiner	**Group Art Unit**
Cheryl Lewis	2309

☒ Responsive to communication(s) filed on 6/9/96.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-17 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-17 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

1. Claims 1-17 are presented for examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Neches, Patent Number: 5,006,978.

4. - With respect to claims 1, 6-8, 12-14, and 17,

Neches discloses the random selection means for a plurality of home nodes (fig. 1), the home node fragmenting means including a query fragment (figs. 2-2a), the hashing means of the selected home node (figs. 2b-2c), and the query fragments local hash table means (figs. 2-2a) and returning means.

5. - With respect to claim 2,

Neches discloses the means to receive a home node including the query fragment means (figs. 2c-2d).

6. - With respect to claims 3 and 9,

Neches discloses the means to determine a measure of relevance between the accessed data and query (figs. 2h-2j) and the returning step of the object identifier (fig. 2h.

7. - With respect to claims 4 and 10,

Neches discloses the means which essentially comprise the same means as determining a measure or relevance by a cosine measure (fig. 5).

8. - With respect to claims 5 and 11,

Neches discloses the portion hashed query fragment to comprise 5 bits and 32 bits (fig. 11).

9. - With respect to claims 15 and 16,

Neches discloses the means to label and return three query levels (figs. 2-2j).

10. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new grounds of rejection.

11. Any inquiry concerning this communication or earlier communications form the examiner should be directed to Cheryl Lewis whose telephone number is (703) 305-8750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 2300

Notice of References Cited

Application No.	Applicant(s)
08/318,252	Baclawski
Examiner	**Group Art Unit**
Cheryl Lewis	2307

Page 1 of 1

U.S. PATENT DOCUMENTS

*		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
	A	5,309,559	05/03/94	Katz et al.	364	419.19
	B	5,006,998	04/09/91	Neches	364	200
	C					
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* A copy of this reference is not being furnished with this Office action.
(See Manual of Patent Examining Procedure, Section 707.05(a).)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/318,252	10/05/94	BACLAWSKI K	NU360XX

B3M1/0321

WEINGARTEN SCHURGIN GAGNEBIN & HAYES
TEN POST OFFICE SQUARE
BOSTON MA 02109

EXAMINER	
LEWIS,C	
ART UNIT	PAPER NUMBER
2307	

DATE MAILED: 03/21/97 #7

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)

☆U.S.GOVERNMENT PRINTING OFFICE 1996-411-516/40275

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SERIAL	FILING	FIRST NAME APPLICANT	ATTORNEY DOCKET
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TEN POST OFFICE SQUARE
BOSTON, MASSACHUSETTS 02109

EXAMINER	
LEWIS, C	
ART UNIT	PAPER
2307	7

DATE MAILED:

Please find below a communication from the Examiner in charge of this application.

Please, see attached documents.

Commissioner of Patents and Trademarks.

PTOL-90 (REV. 6/84)

Office Action Summary

Application No.	Applicant(s)
08/318,252	Baclawski
Examiner	**Group Art Unit**
Cheryl Lewis	2307

☒ Responsive to communication(s) filed on *Dec 12, 1996*

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-17* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) *3-5, 9-11, and 14-16* is/are allowed.

☒ Claim(s) *1, 2, 6-8, 12, 13, and 17* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Response to Amendment

1. This Office Action is in response to the applicant's communication filed December 12, 1996.

2. Claims 1-17 are presented for examination.

3. Applicant's have amended claims 1, 6, 8, 12, 13, and 17.

4. Claims 3-5, 9-11, and 14-16 are allowed over the prior art of record.

5. Applicant's arguments with respect to 1, 2, 6, 7, 8, 12, 13, and 17 claims have been considered but are deemed to be moot in view of the new grounds of rejection.

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

USC 102 Rejection

7. Claims 1, 2, 6, 7, 8, 12, 13,, and 17 are rejected under 35 USC 102(b) as being unpatentable over Kuechler et al., Patent Number: 4,811,199.

8. With respect to claims 1, 6, 7, 8, 12, 13, and 17,

Kuechler discloses randomly selecting home nodes and query nodes (col. 4, lines 18-34, col. 12, & lines 1-24). Kuechler discloses the means which essentially comprise the same means as hashing and fragmenting (col. 6, lines 24-31 & 51-68, col.7, & lines 1-14). Kuechler discloses the query fragments (fig. 1, item 32, col. 6 & lines 10-13, 24-31, 38-41), transmitting the query fragments (fig. 1, items 10-22), and the plurality of query nodes (col. 16 & lines 20/Salary Range Definitions/Salary Acceptable Array, 37/Job-Id Range Definition/Job-ID Acceptable Array, & 55/Name,

Salary, & Job-Id). Kuechler discloses the hashing table means (col. 13, lines 62-67, col. 14, & lines 1-17 & 47-55). Kuechler discloses returning the query node accessed to items respective hashed query fragment (Abstract, lines 8-15). Kuechler discloses the object identifier means corresponding to the accessed data (col. 8 & line 50, Name, Salary, & Job-Id).

9. - With respect to claim 2,

Kuechler discloses receiving at the home node a query from a user prior to the fragmenting step (col. 9 & lines 34-55).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheryl Lewis whose telephone number is (703) 305-8750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

CL
March 13, 1997

THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 2300

Notice of References Cited

Application No.	Applicant(s)		
08/318,252	Baclawski		
Examiner		Group Art Unit	Page 1 of 1
Cheryl Lewis		2307	

U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A	4,811,199	03/07/89	Kuechler et al.	364	200
B					
C					
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FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
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Q						
R						
S						
T						

NON-PATENT DOCUMENTS

	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)	DATE
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V		
W		
X		

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application	:	Kenneth P. Baclawski
Application No.	:	08/318,252
Filed	:	October 5, 1994
For	:	DISTRIBUTED COMPUTER DATABASE SYSTEM AND METHOD
Examiner	:	C. Lewis
Attorney's Docket	:	NU-360XX

Group Art Unit: 2307

* *

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: BOX NON-FEE AMENDMENT, Assistant Commissioner for Patents, Washington, D.C. 20231 on 5/14/97.

By _____
Stanley M. Schurgin
Registration No. 20,979
Attorney for Applicant

* *

AMENDMENT

BOX NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated March 21, 1997, reconsideration is respectfully requested in view of the following remarks:

REMARKS

Claims 1-17 are pending in this application. Applicant is pleased to acknowledge allowance of claims 3-5, 9-11 and 14-16. Claims 1, 2, 6-8, 12, 13 and 17 have been rejected in view of Kuechler. However, the present invention as claimed is patentably distinct from Kuechler.

As described at various points throughout columns 1-20, Kuechler employs a single node system for storing and manipulating information. At column 20, lines 60-68 and column 21, lines 1-30 Kuechler discusses a distributed version of the disclosed method. However, even in this distributed version Kuechler only describes employing the same node as the home node. Hence, Kuechler makes no distinction between a home node and a query node as recited in each of the independent claims of the present invention.

In addition to failing to distinguish home nodes from query nodes, Kuechler broadcasts the same query to every processing node (column 21, lines 9-10). Hence, the query is not fragmented as recited in the claims of the present invention. Further, the information elements (i.e., records) are distributed by storing whole records on the processing nodes, and these information elements are also not fragmented. The location of an information element is determined by its record number, not by any information contained in the record. By contrast, the present invention

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FAX (617) 451-0313

describes a fundamentally distributed technique, and both queries and objects are fragmented. In the present invention query fragments are processed only on the node for which the query fragment is relevant, query fragments are not broadcast to all the nodes, objects are fragmented, and the information content of an object fragment is used to determine on which node it is to be stored. Further, objects are not stored on a single node. Because objects are fragmented and because these fragments are stored independently, objects are distributed over many nodes. These distinguishing features are recited in the claims and hence distinguish the present invention from Kuechler.

The Kuechler concept of a query is the one used by the relational model. Such a query is unambiguous in the sense that every record either satisfies the query or it does not. There is no "fuzziness." The Kuechler query processing technique does introduce additional records that may or may not satisfy the query, but this is done for the sake of improving performance, not because there is any fuzziness in the query. A final filtering step (Fig.1 item 32) removes the spurious records. By contrast, the present invention employs an intrinsically "fuzzy" notion of query. Objects satisfy the query to a greater or lessor degree. Higher levels of service in the present invention are designed to improve the estimates of the degrees by which objects satisfy the query

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GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

rather than to eliminate spurious objects. Such higher levels of service are optional, whereas the final filtering step of Kuechler is mandatory. Furthermore, the distribution of processing effort for the higher levels of service in the present invention are very different from the distribution of processing effort for the final filtering step in Kuechler. Kuechler assigns compact symbols or codes (Abstract, line 7 and column 8, lines 6-7) to ranges of attribute values. These codes are assigned unique codes. They are very different from hash values, which are computed, not assigned, and which are not unique. Finally, Kuechler does not use any hashing techniques. The topological maps of Kuechler are stored using some form of bit map (column 17, lines 51-61) rather than using a hash table.

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GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

Application No.: 08/318,252
Filed: October 5, 1994
Group Art Unit: 2307

For the reasons stated above it is submitted that claims 1, 2, 6-8, 12, 13 and 17 are allowable, and reconsideration and allowance are respectfully requested. The Examiner is invited to telephone the undersigned attorney to discuss any matters which would expedite allowance of present application.

Respectfully submitted,

KENNETH P. BACLAWSKI

By _____
Stanley M. Schurgin
Registration No. 20,979
Attorney for Applicant

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
Ten Post Office Square
Boston, Massachusetts 02109

Telephone: (617) 542-2290
Telecopier: (617) 451-0313

Date: 5/14/97

SMS/rec
101555

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES LLP
TEL (617) 542-2290
FAX (617) 451-0313

Notice of Allowability

Application No.	Applicant(s)
08/318,252	Baclawski
Examiner	**Group Art Unit**
Cheryl Lewis	2307

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course.

☒ This communication is responsive to *communication filed on May 19, 1997*.

☒ The allowed claim(s) is/are *1-17*.

☐ The drawings filed on _____ are acceptable.

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE **THREE MONTHS** FROM THE "DATE MAILED" of this Office action. Failure to timely comply will result in ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

☐ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.

☒ Applicant MUST submit NEW FORMAL DRAWINGS

☒ because the originally filed drawings were declared by applicant to be informal.

☐ including changes required by the Notice of Draftsperson's Patent Drawing Review, PTO-948, attached hereto or to Paper No. _____.

☐ including changes required by the proposed drawing correction filed on _____, which has been approved by the examiner.

☐ including changes required by the attached Examiner's Amendment/Comment.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the reverse side of the drawings. The drawings should be filed as a separate paper with a transmittal lettter addressed to the Official Draftsperson.

☐ Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any response to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE/SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

☐ Interview Summary, PTO-413

☐ Examiner's Amendment/Comment

☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

☐ Examiner's Statement of Reasons for Allowance

THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 2300