UNITED STATES DISTRICT COURT FOR
THE EASTERN DISTRICT OF NEW YORK

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07 1474

FILED
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U.S. DISTRICT COURT E.D.N.Y.
★ APR 07 2007 ★
BROOKLYN OFFICE

EON-NET, L.P.

Plaintiff,

v.

DELTA AIR LINES, INC.,

Defendant.

Case No.: _____

COMPLAINT FOR PATENT INFRINGEMENT

DEMAND FOR JURY TRIAL

VITALIANO, J.

GO. M.J.

Plaintiff, Eon-Net, L.P., a limited partnership (hereinafter referred to as "Eon-Net"), demands a jury trial and complains against the defendant as follows:

THE PARTIES

1. Eon-Net is a limited partnership organized and existing under the laws of the British Virgin Islands, with its principal place of business at P.O. Box 116, Road Town, Tortola, British Virgin Islands.

2. Upon information and belief, Delta Air Lines, Inc. (hereinafter referred to as "Defendant" or "Delta") is a business organized and existing under the laws of the State of Georgia, having a place of business at John F. Kennedy International Airport, Terminal 3, Jamaica, New York 11430. Delta traces its roots back to 1924, and presently offers service to more destinations than any other global airline with service to 292 destinations in 46 countries.

JURISDICTION AND VENUE

3. This action arises under the patent laws of the United States of America, Title 35 of the United States Code. This Court has jurisdiction of this action under 28 U.S.C. §§ 1331 and 1338(a).

4. Upon information and belief, Defendant is doing business and committing infringements in this judicial district and is subject to personal jurisdiction in this judicial district.

5. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400(b).

CLAIM FOR PATENT INFRINGEMENT

6. Plaintiff, Eon-Net, repeats and incorporates herein the entirety of the allegations contained in paragraphs 1 through 5 above.

7. On July 11, 2006, U.S. Patent No. 7,075,673 (hereinafter referred to as "the '673 patent") was duly and legally issued to Eon-Net for an invention entitled "Information Processing Methodology." A copy of the '673 patent is attached to this Complaint as Exhibit 1.

8. Eon-Net is the owner of all right, title and interest in and to the '697 patent.

9. On February 27, 2007, U.S. Patent No. 7,184,162 (hereinafter referred to as "the '162 patent") was duly and legally issued to Eon-Net for an invention entitled "Information Processing Methodology." A copy of the '162 patent is attached to this Complaint as Exhibit 2.

10. Eon-Net is the owner of all right, title and interest in and to the '162 patent.

COUNT ONE

11. Plaintiff, Eon-Net, repeats and incorporates herein the entirety of the allegations contained in paragraphs 1 through 10 above.

12. Delta has for a long time past and still is infringing, actively inducing the infringement of and/or contributorily infringing in this judicial district, the '673 patent by, among other things, operating a website at www.delta.com ("the Delta Website") pursuant to a claim of the '673 patent, without permission from Eon-Net, in which information entered by a Delta customer

into an electronic document template displayed on the browser of the customer's computer is extracted according to content instructions and transmitted to an application program operating on Defendant's web server according to customizable transmission format instructions in a manner defined by the claims of the '673 patent. For example, a Delta customer seeking to book a flight can enter information including the city, date and time of the departing flight, and the city, date and time of the return flight into HTML form elements displayed on the web page found at http://www.delta.com/home/index.jsp of the Delta Website. The foregoing information entered into the HTML forms is extracted by the browser and transmitted to an application program running on the Delta web server for processing the customer's booking request in a POST format and using an http protocol required by the application program. A copy of the aforementioned web page is attached hereto as Exhibit 3, and a copy of a portion of the source code viewable on a customer's browser for such web page is attached hereto as Exhibit 4. A claim chart detailing the infringement of a representative claim of the '673 patent is attached hereto as Exhibit 5.

13. Plaintiff, Eon-Net, has been damaged by such infringing activities by the Defendant of the '673 patent and will be irreparably harmed unless such infringing activities are enjoined by this Court.

COUNT TWO

14. Plaintiff, Eon-Net, repeats and incorporates herein the entirety of the allegations contained in paragraphs 1 through 13 above.

15. Delta has for a long time past and still is infringing, actively inducing the infringement of and/or contributorily infringing in this judicial district, the '162 patent by, among other things, operating the Delta Website pursuant to a claim of the '162 patent, without permission from Eon-Net, in which information entered by a customer of Defendant into an electronic document template displayed on the browser of the customer's computer is extracted according to content instructions and transmitted to an application program operating on Defendant's web server

according to customizable transmission format instructions in a manner defined by the claims of the '162 patent. For example, a Delta customer seeking to book a flight can enter information including the city, date and time of the departing flight, and the city, date and time of the return flight into HTML form elements displayed on the web page found at http://www.delta.com/home/index.jsp of the Delta Website. The foregoing information entered into the HTML forms is extracted by the browser and transmitted to an application program running on the Delta web server for processing the customer's booking request in a POST format and using an http protocol required by the application program. A copy of the aforementioned web page is attached hereto as Exhibit 3, and a copy of the source code viewable on a customer's browser for such web page is attached hereto as Exhibit 4. A claim chart detailing the infringement of a representative claim of the '162 patent is attached hereto as Exhibit 6.

16. Plaintiff, Eon-Net, has been damaged by such infringing activities by the Defendant of the '162 patent and will be irreparably harmed unless such infringing activities are enjoined by this Court.

PRAYER FOR RELIEF

WHEREFORE, THE Plaintiff, Eon-Net prays for judgment against the Defendant Delta on all the counts and for the following relief:

A. Declaration that the Plaintiff is the owner of the '673 patent, and that the Plaintiff has the right to sue and to recover for infringement thereof;

B. Declaration that the '673 patent is valid and enforceable;

C. Declaration that the Defendant has infringed, actively induced infringement of, and/or contributorily infringed '673 patent;

D. A preliminary and permanent injunction against the Defendant, each of its officers, agents, servants, employees, and attorneys, all parent and subsidiary corporations, their assigns and successors in interest, and those persons acting in active concert or participation with them, enjoining them from continuing acts of infringement, active

inducement of infringement, and contributory infringement of Eon-Net's '673 patent;

E. An accounting for damages under 35 U.S.C. §284 for infringement of Eon-Net's '673 patent by the Defendant and the award of damages so ascertained to the Plaintiff, Eon-Net, together with interest as provided by law;

F. Declaration that the Plaintiff is the owner of the '162 patent, and that the Plaintiff has the right to sue and to recover for infringement thereof;

G. Declaration that the '162 patent is valid and enforceable;

H. Declaration that the Defendant has infringed, actively induced infringement of, and/or contributorily infringed '162 patent;

I. A preliminary and permanent injunction against the Defendant, each of its officers, agents, servants, employees, and attorneys, all parent and subsidiary corporations, their assigns and successors in interest, and those persons acting in active concert or participation with them, enjoining them from continuing acts of infringement, active inducement of infringement, and contributory infringement of Eon-Net's '162 patent;

J. An accounting for damages under 35 U.S.C. §284 for infringement of Eon-Net's '162 patent by the Defendant and the award of damages so ascertained to the Plaintiff, Eon-Net, together with interest as provided by law;

K. Award of Eon-Net's costs and expenses; and

L. Such other and further relief as this Court may deem proper, just and equitable.

DEMAND FOR JURY TRIAL

The Plaintiff, Eon-Net, demands a trial by jury of all issues properly triable by jury in this action.

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Attorneys for Plaintiff Eon-Net, L.P.

Dated: April 6, 2007
Westfield, NJ

US007075673B2

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

(10) **Patent No.: US 7,075,673 B2**
(45) **Date of Patent: Jul. 11, 2006**

(54) **INFORMATION PROCESSING METHODOLOGY**

(75) Inventors: **Robert Lech**, Jackson, NJ (US); **Mitchell A. Medina**, New York, NY (US); **Catherine B. Ellas**, Plainsboro, NJ (US)

(73) Assignee: **EON-Net L.P.**, Tortola (VG)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 34 days.

(21) Appl. No.: **10/704,484**

(22) Filed: **Nov. 6, 2003**

(65) **Prior Publication Data**

US 2004/0070793 A1 Apr. 15, 2004

Related U.S. Application Data

(60) Continuation of application No. 09/458,162, filed on Dec. 9, 1999, now Pat. No. 6,683,697, which is a continuation of application No. 09/044,159, filed on Mar. 19, 1998, now Pat. No. 6,094,505, which is a continuation of application No. 08/487,150, filed on Jun. 7, 1995, now Pat. No. 5,768,416, which is a division of application No. 08/348,224, filed on Nov. 28, 1994, now Pat. No. 5,625,465, which is a continuation of application No. 08/143,135, filed on Oct. 29, 1993, now Pat. No. 5,369,508, which is a continuation of application No. 07/672,865, filed on Mar. 20, 1991, now Pat. No. 5,258,855.

(51) **Int. Cl.**
H04N 1/40 (2006.01)

(52) **U.S. Cl.** **358/1.15**; 382/175

(58) **Field of Classification Search** 358/1.15; 382/175, 177, 180, 282, 287, 306, 317
See application file for complete search history.

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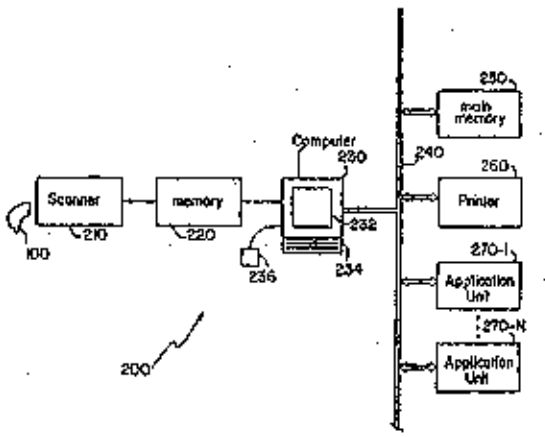
Primary Examiner—Thomas D. Lee
Assistant Examiner—Stephen Brinich
(74) *Attorney, Agent, or Firm*—Foley & Lardner LLP

(57) **ABSTRACT**

An information processing methodology gives rise to an application program interface which includes an automated digitizing unit, such as a scanner, which inputs information from a diversity of hard copy documents and stores information from the hard copy documents into a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which designate portions of the stored document information required by a particular application program. The selected stored document information is then placed into the transmission format required by a particular application program in accordance with transmission format instructions. After the information has been transmission formatted, the information is transmitted to the application program. In one operational mode, the interface interactively prompts the user to identify, on a display, portions of the hard copy documents containing information used in application programs or for storage.

57 Claims, 15 Drawing Sheets



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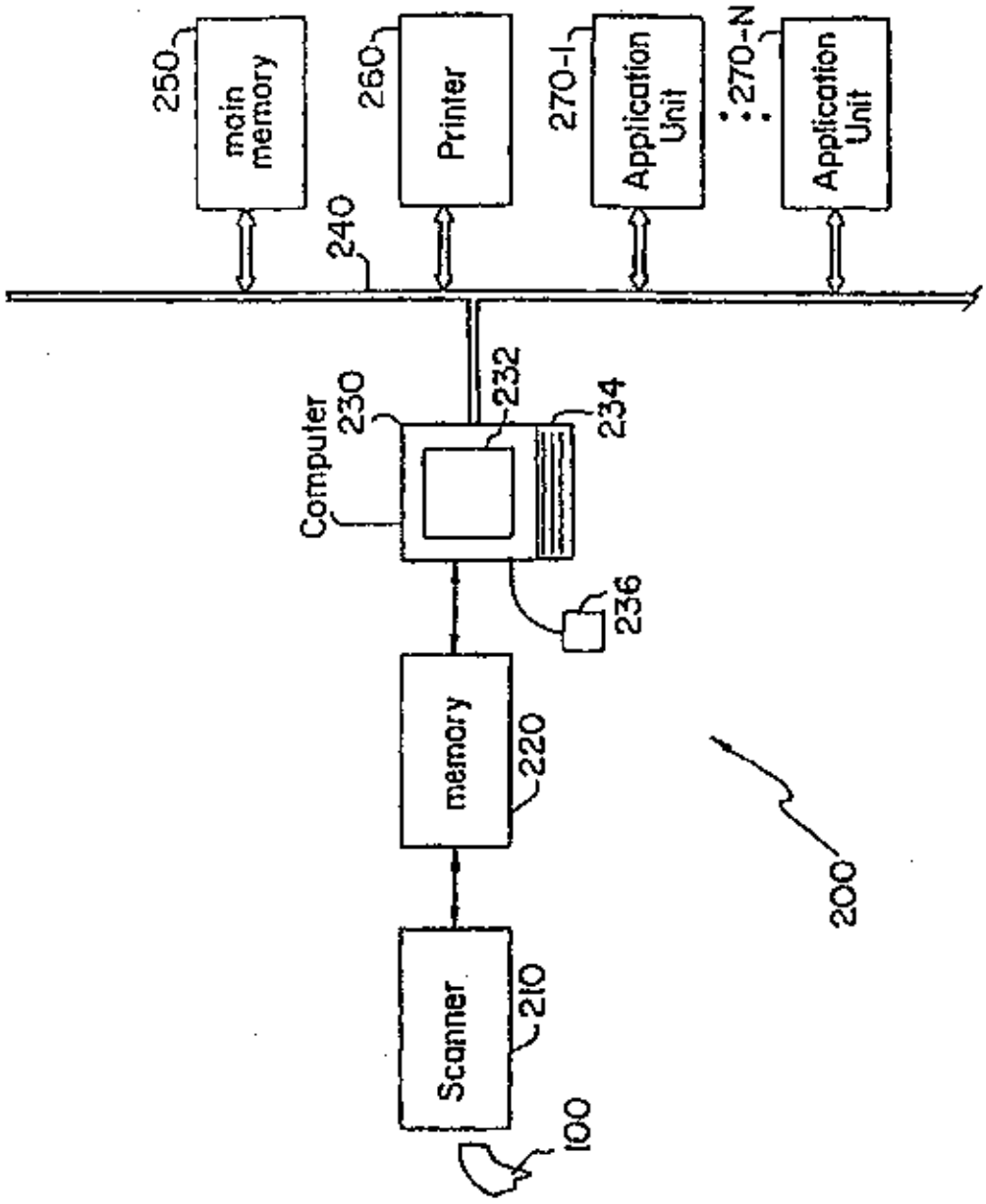
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main memory
260
Printer
270-1
Application Unit
270-N
Application Unit
240
Computer
230
232
234
236
memory
220
200
Scanner
210
100

FIG. 1

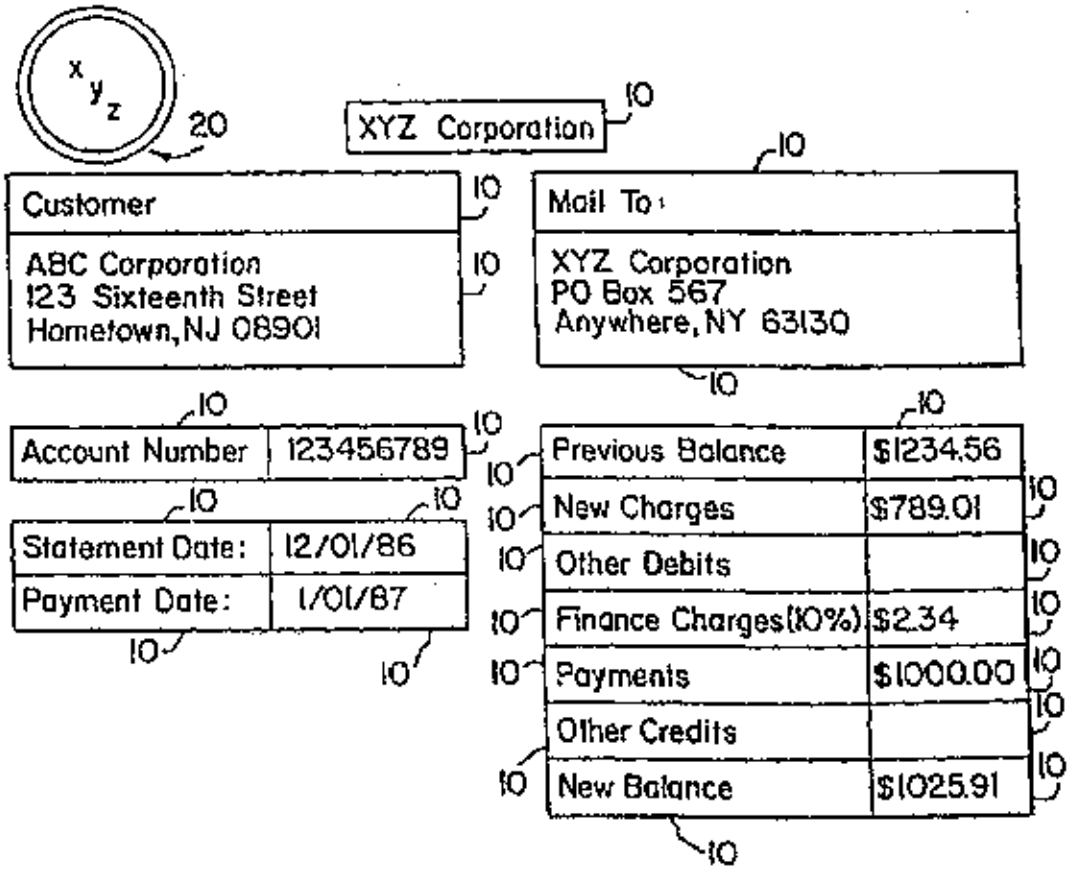

x y z
20
XYZ Corporation
10
Customer
ABC Corporation
123 Sixteenth Street
Hometown, NJ 08901
Mail To:
XYZ Corporation
PO Box 567
Anywhere, NY 63130
Account Number
123456789
Statement Date:
12/01/86
Payment Date:
1/01/87
Previous Balance
$1234.56
New Charges
$789.01
Other Debits
Finance Charges(10%)
$2.34
Payments
$1000.00
Other Credits
New Balance
$1025.91
Winter Sale In Effect Throughout January!
30

FIG. 2

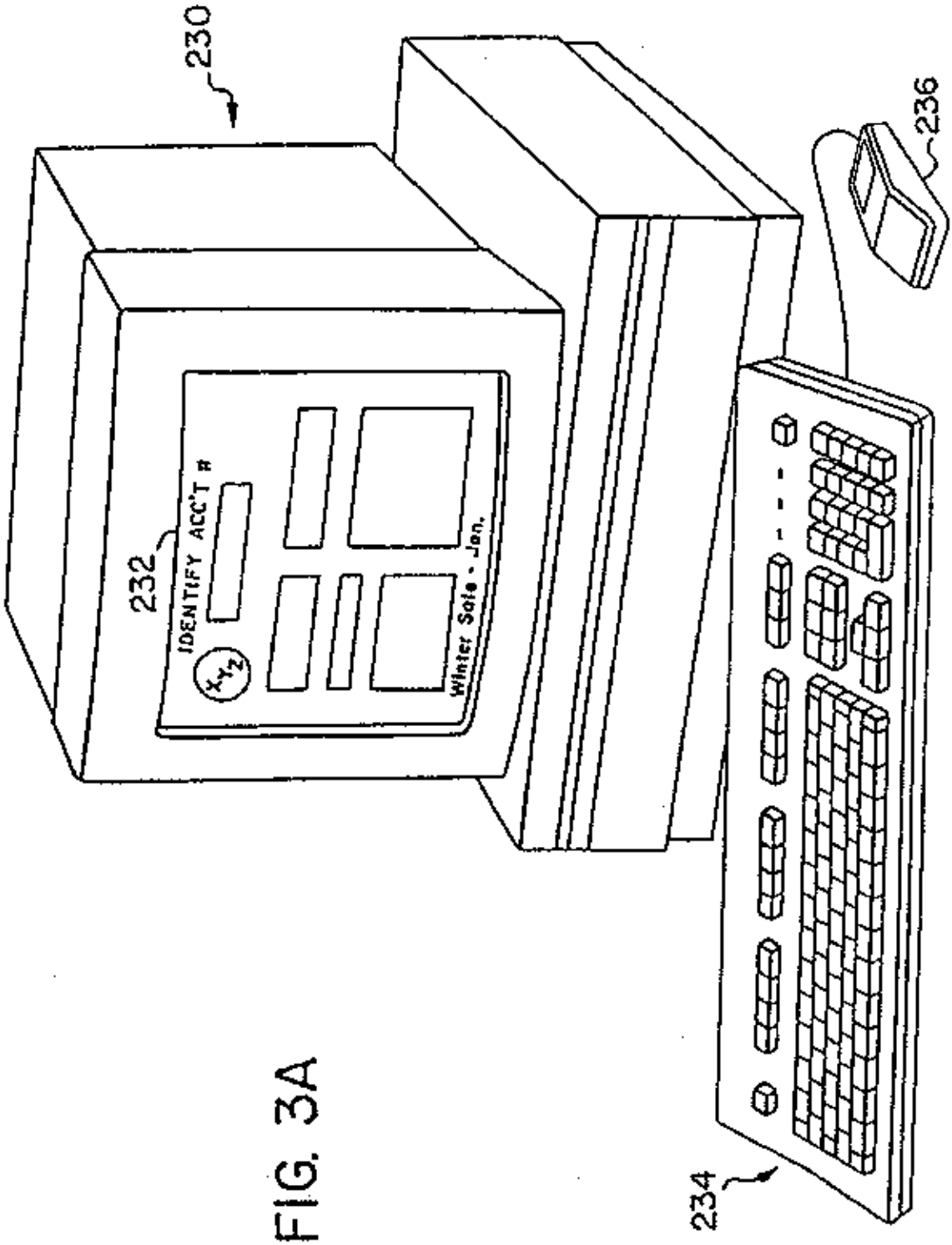


FIG. 3A

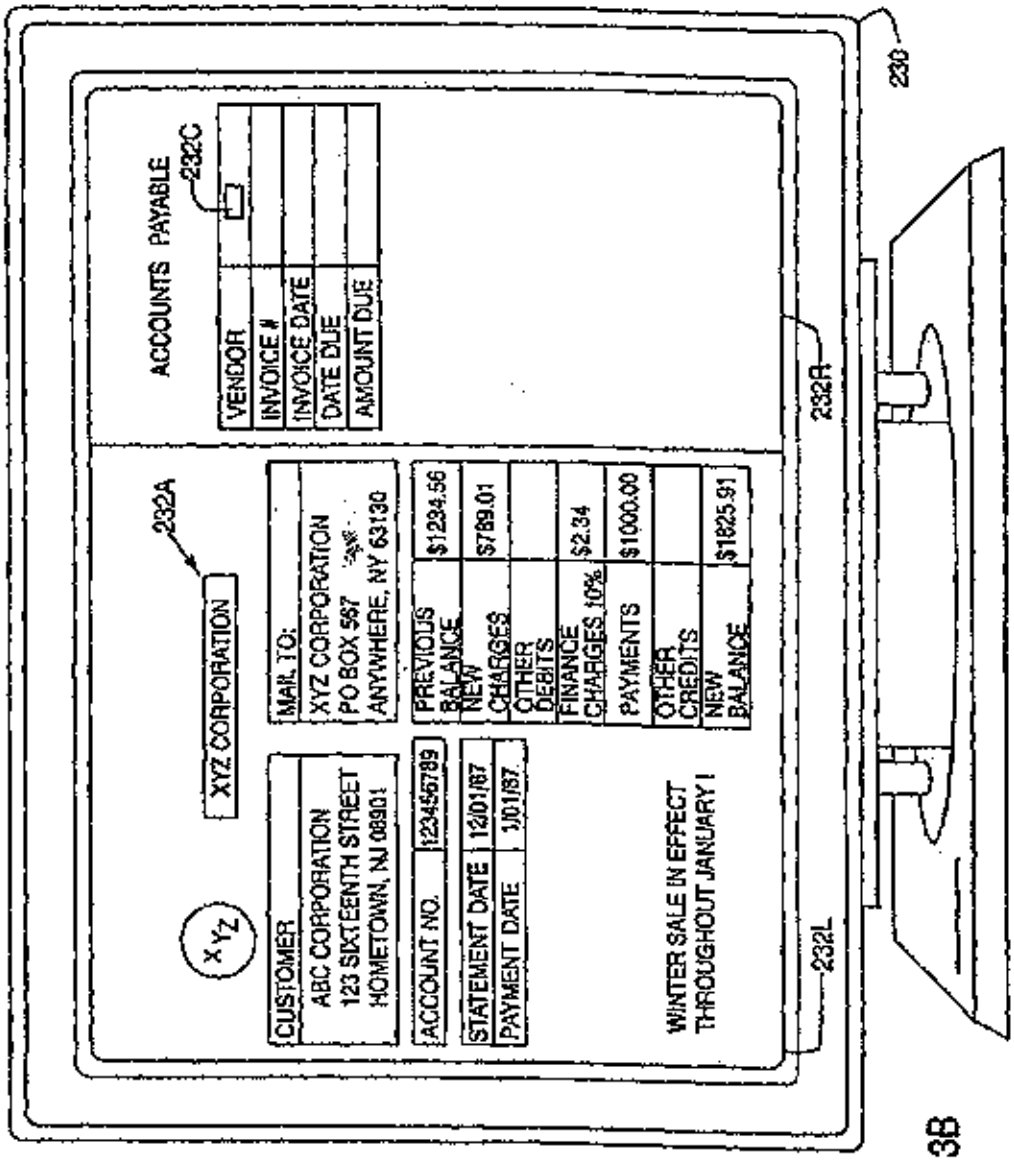

230
232A
232C
232R
232L
XYZ CORPORATION
ACCOUNTS PAYABLE
VENDOR
INVOICE #
INVOICE DATE
DATE DUE
AMOUNT DUE
CUSTOMER
ABC CORPORATION
123 SIXTEENTH STREET
HOMETOWN, NJ 08901
MAIL TO:
XYZ CORPORATION
PO BOX 567
ANYWHERE, NY 63130
ACCOUNT NO. 123456789
STATEMENT DATE 12/01/87
PAYMENT DATE 1/01/87
PREVIOUS BALANCE $1234.56
NEW CHARGES $789.01
OTHER DEBITS
FINANCE CHARGES 10% $2.34
PAYMENTS $1000.00
OTHER CREDITS
NEW BALANCE $1825.91
WINTER SALE IN EFFECT
THROUGHOUT JANUARY!

FIG. 3B

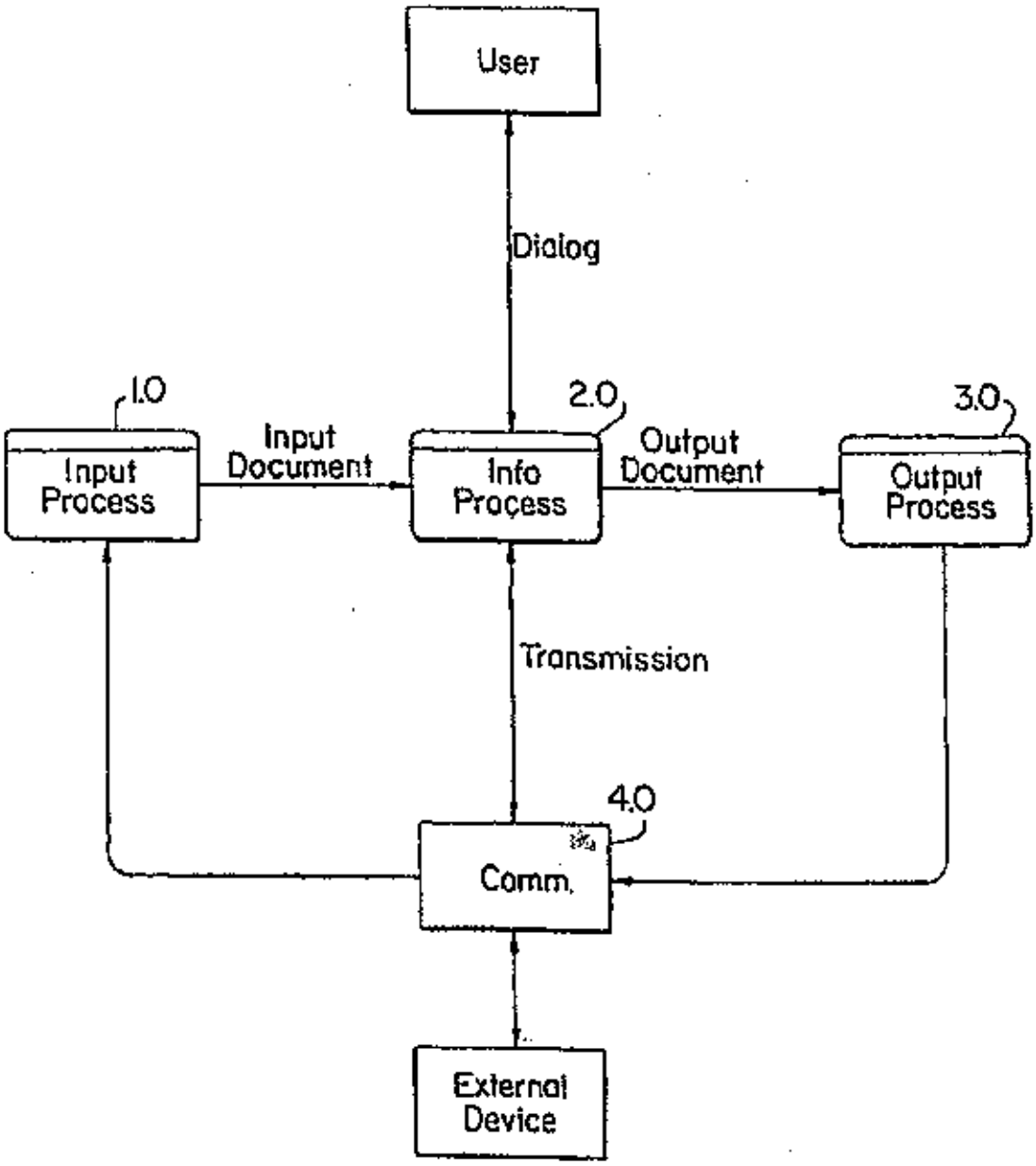

User
Dialog
1.0
Input Process
Input Document
2.0
Info Process
Output Document
3.0
Output Process
Transmission
4.0
Comm.
External Device

FIG. 4

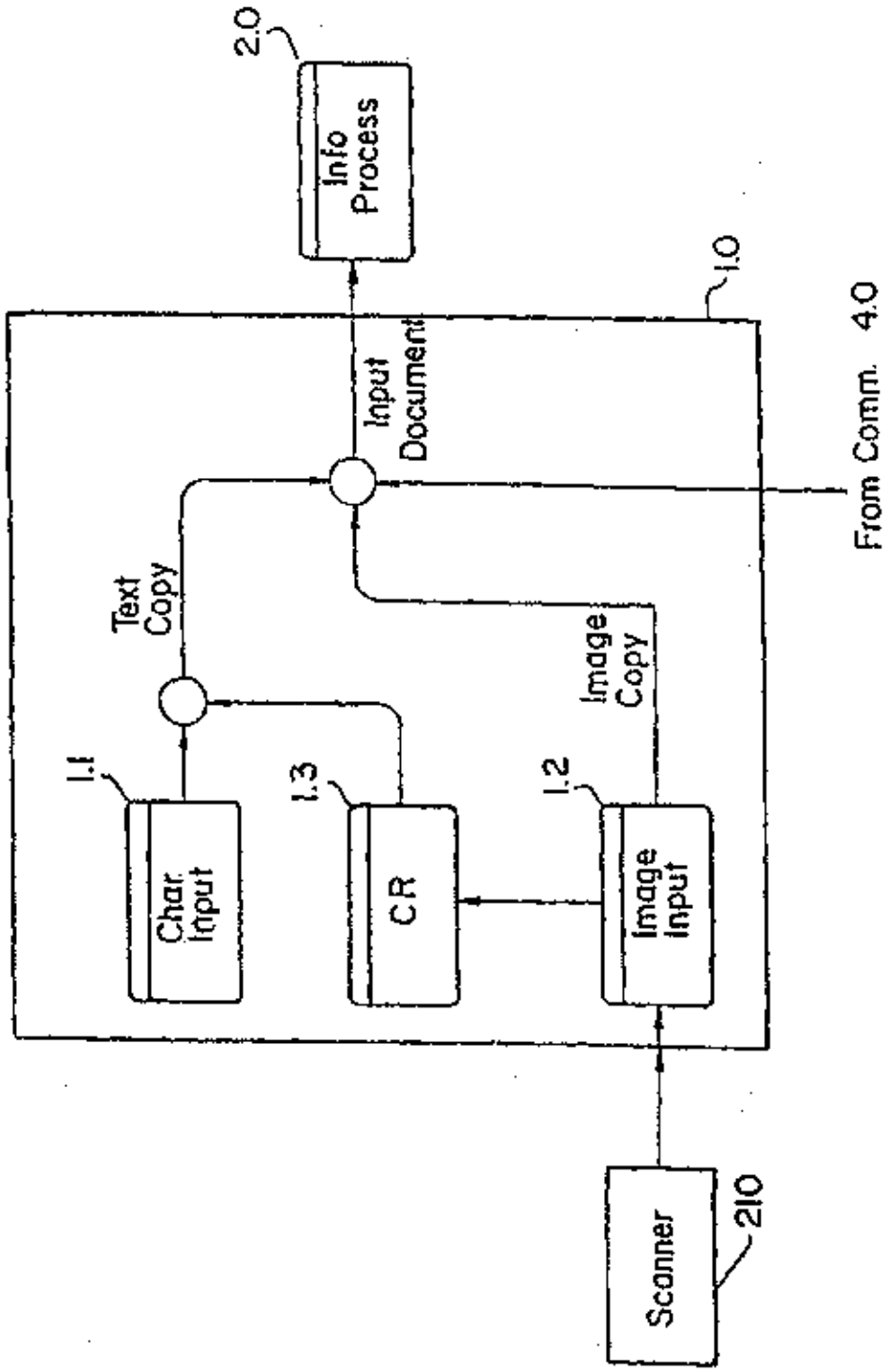

2.0
Info Process
1.0
Input Document
From Comm. 4.0
Text Copy
Image Copy
1.1
Char. Input
1.3
CR
1.2
Image Input
Scanner
210

FIG. 5

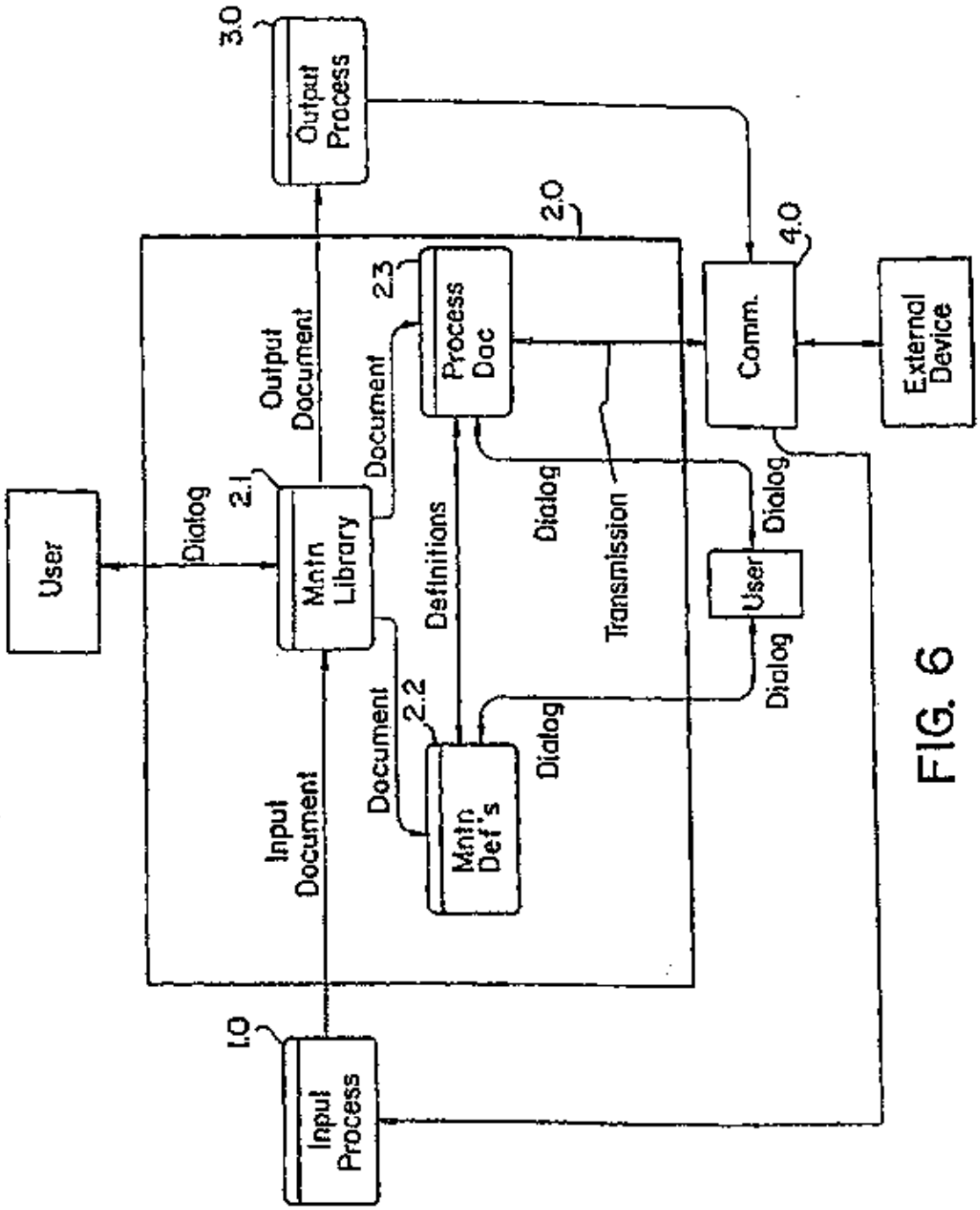

3.0
Output Process
2.0
4.0
2.3
Process Doc
Comm.
External Device
Output Document
Document
Dialog
Dialog
Transmission
Dialog
2.1
User
Dialog
Main Library
Definitions
User
Dialog
Document
2.2
Dialog
Input Document
Main Def's
1.0
Input Process

FIG. 6

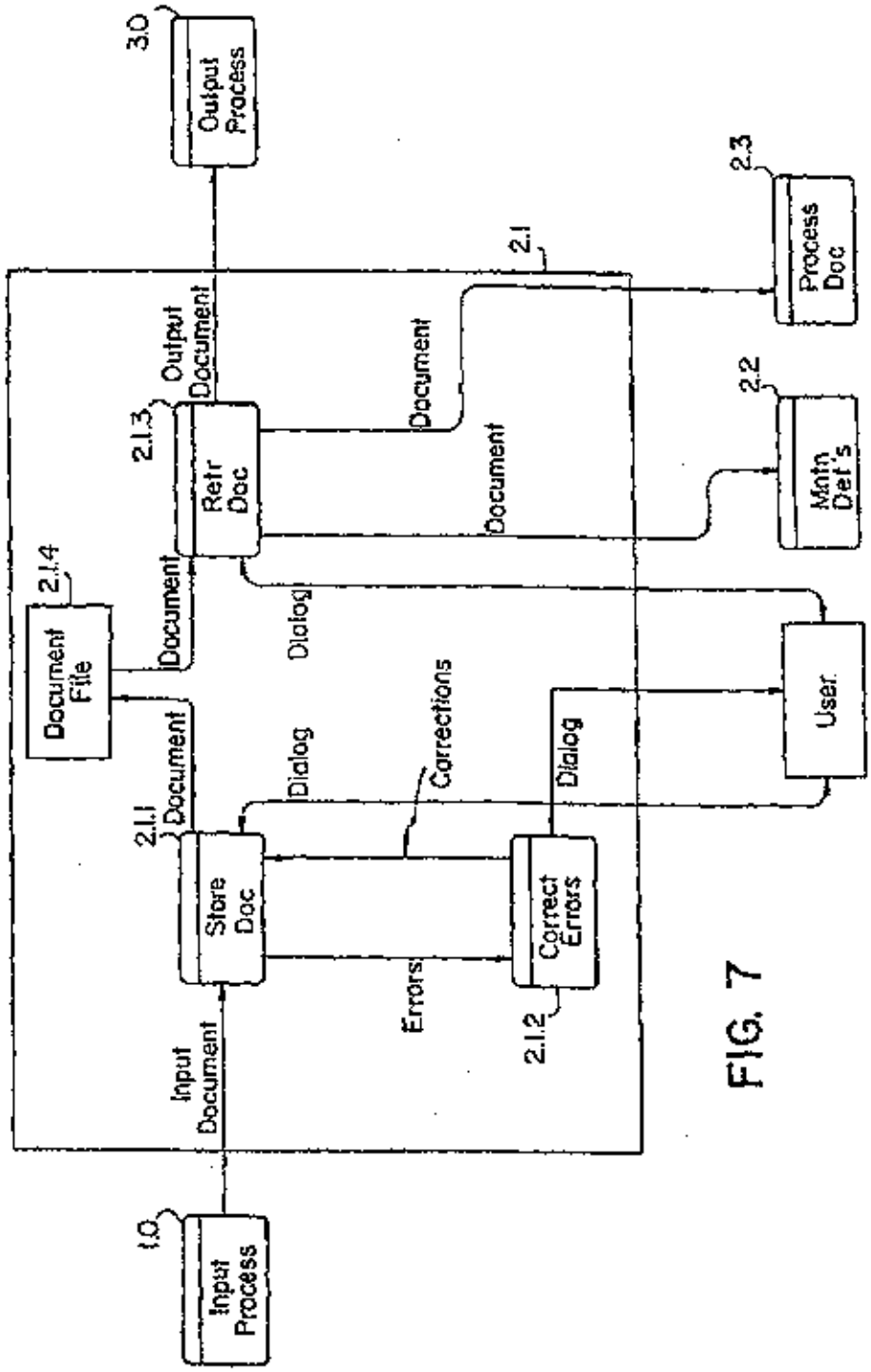

3.0
Output Process
2.3
Process Doc
2.1
Output Document
Document
2.1.3
Retr Doc
2.2
Matn Def's
Document
2.1.4
Document File
Document
Dialog
User
Dialog
Corrections
Dialog
2.1.1
Document
Store Doc
Correct Errors
Errors
2.1.2
Input Document
1.0
Input Process

FIG. 7

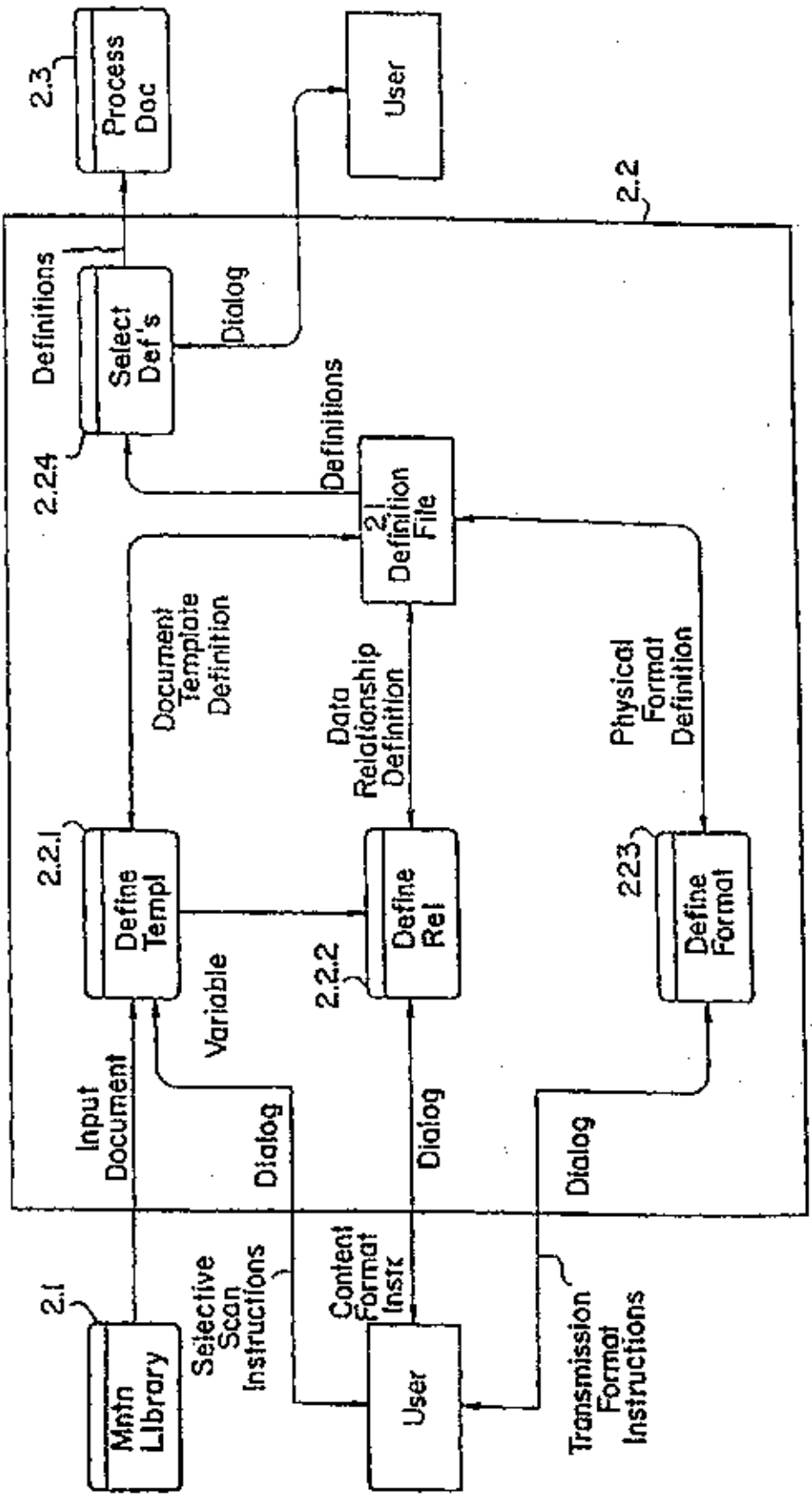

2.3
Process Doc
User
2.2
Definitions
Select Def's
Dialog
2.24
Definitions
2.1 Definition File
Document Template Definition
Data Relationship Definition
Physical Format Definition
2.2.1
Define Templ
2.2.2
Define Rel
223
Define Format
Variable
Input Document
Dialog
Dialog
Dialog
2.1
Main Library
Selective Scan Instructions
Content Format Instr
User
Transmission Format Instructions

FIG. 8

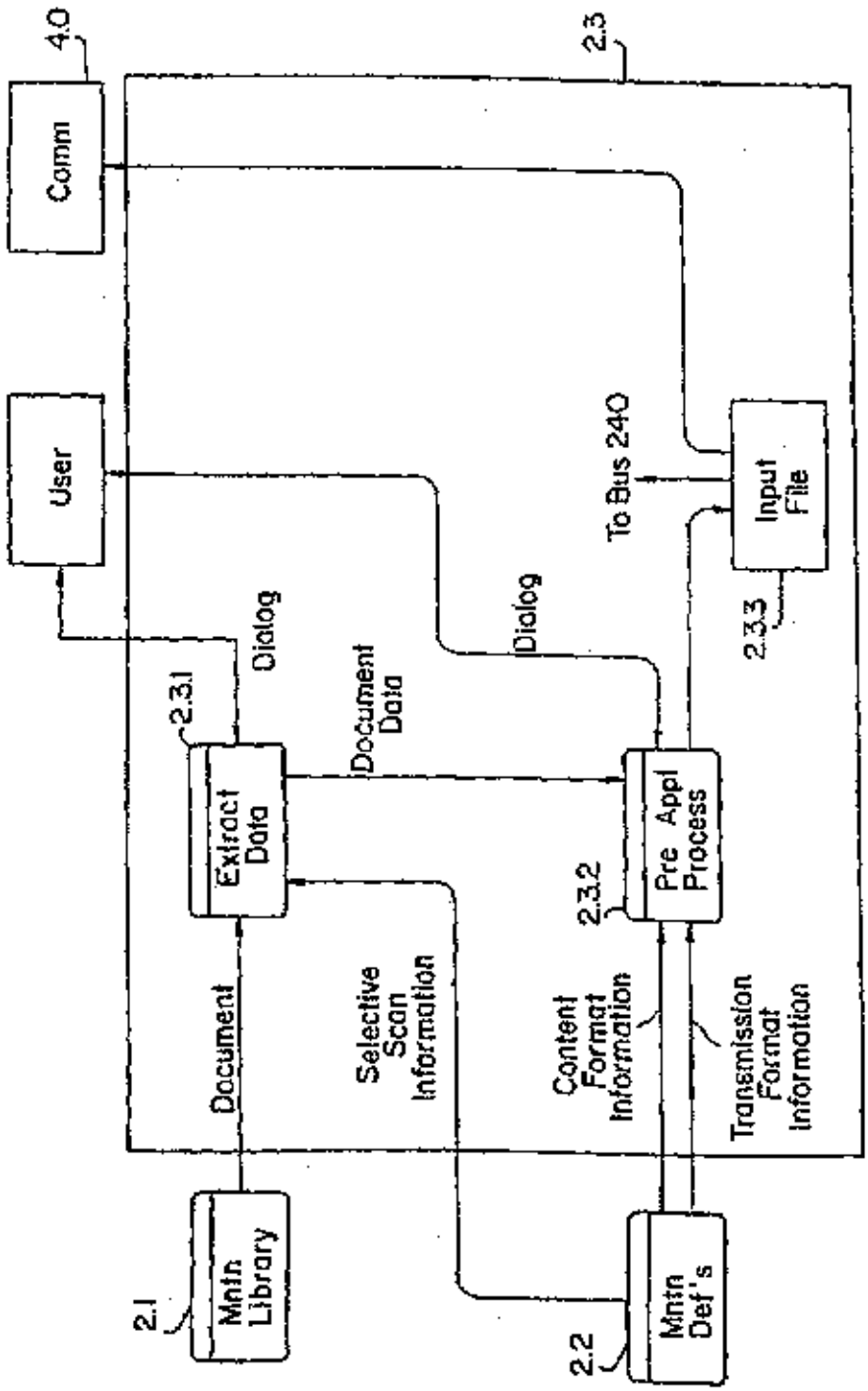

4.0
Comm
2.3
User
To Bus 240
Input File
2.3.3
Dialog
Dialog
2.3.1
Extract Data
Document Data
Pre Appl Process
2.3.2
Document
Selective Scan Information
Content Format Information
Transmission Format Information
2.1
Mntn Library
2.2
Mntn Def's

FIG. 9

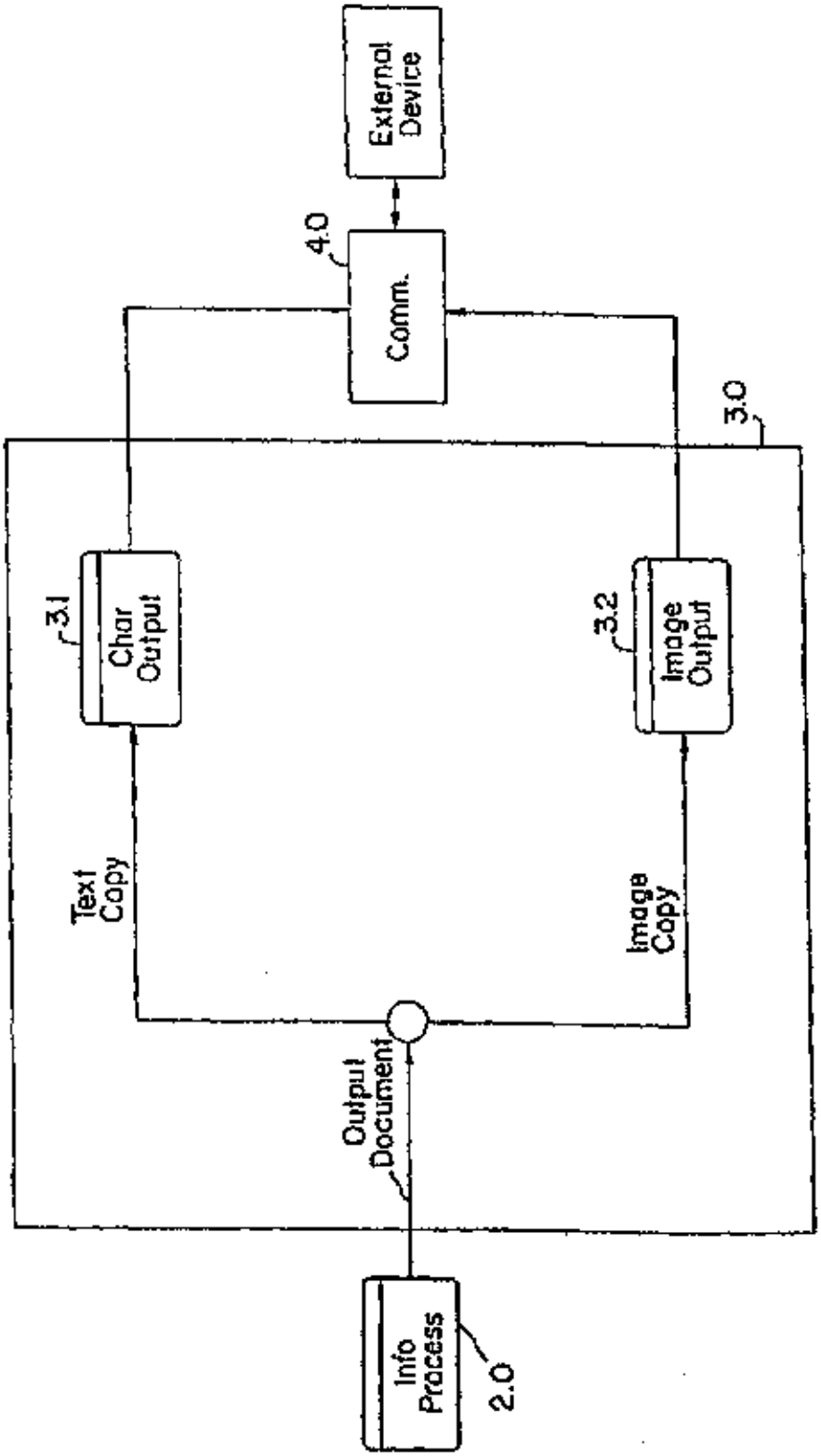

External Device
4.0
Comm.
3.0
3.1
Char Output
3.2
Image Output
Text Copy
Image Copy
Output Document
Info Process
2.0

FIG. 10

FIG. 11

Variable Name	Value
Vendor	XYZ Corporation
Heading 2	2
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

FIG. 12A

Variable Name	Value
Vendor	XYZ Corporation
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
New Balance	$1025.91

FIG. 12B

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG. 12C

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG.13A

```
> 1 > 1 >1 > "XYZ Corporation"
> 2 > 2 > 25 >+ 123456789 >
> 3 > 2 > 1 > D12 / 01 / 86 >
> 4 > 2 > 11 > D12 / 15 / 86 >
> 5 > 2 > 21 > D01 / 01 / 87 >
> 6 > 10 > 25 > $1234.56 >
> 7 > 11 > 25 > $789.01 >
> 8 > 13 > 25 > $2.34 >
> 9 > 14 > 25 > $1000.00 >
> 10 >16 > 25 > $1025.91 >
```

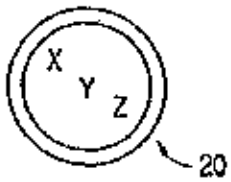
FIG.13B

```
> 1 > 1 >1 > $1234.56 >
> 2 > 2 > 1 > "XYZ Corporation"
> 3 > 3 > 1 > "PO Box 567"
> 4 > 4 > 1 > "Anywhere, NY  63130"
```

FIG.13C

```
/ 1 / 1 /1 / $1234.56 / /
/ 2 / 2 / 1 / *XYZ Corporation*
/ 3 / 3 / 1 / *PO Box 567*
/ 4 / 4 / 1 / *Anywhere, NY  63130*
```

FIG. 14



XYZ Corporation

Customer

ABC Corporation
123 Sixteenth Street
Hometown, NJ 88981

Mail To:

△ XYZ Corporation
PO Box 567
Anywhere, NY 63130 △

Account Number 123456789

Statement Date: ○ 12/01/86 ○

Payment Date: 1/01/87

Previous Balance	$1234.56
New Charges	□ $789.01 □
Other Debits	
Finance Charges (10%)	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

WINTER SALE IN EFFECT THROUGHOUT JANUARY:

30

INFORMATION PROCESSING METHODOLOGY

This application is a continuation of application Ser. No. 09/458,162, filed Dec. 9, 1999 now U.S. Pat. No. 6,683,697 which is a continuation of application Ser. No. 09/044,159, filed Mar. 19, 1998 (now U.S. Pat. No. 6,094,505), which is a continuation of application Ser. No. 08/487,150, filed Jun. 7, 1995 (now U.S. Pat. No. 5,768,416), which is a divisional of Ser. No. 08/348,224, filed Nov. 28, 1994 (now U.S. Pat. No. 5,625,465), which is a continuation of Ser. No. 08/143,135, filed Oct. 29, 1993 (now U.S. Pat. No. 5,369,508), which is a continuation of Ser. No. 07/672,865, filed Mar. 20, 1991 (now U.S. Pat. No. 5,258,855).

BACKGROUND OF THE INVENTION

The invention is directed to a system for efficiently processing information originating from hard copy documents. More specifically, the invention is directed to a hard copy document to application program interface which minimizes the need to manually process hard copy documents.

In the past, information contained on hard copy documents was manually entered into a computer via the input controller of a particular computer. The original document was then filed away for future reference. Automatic input of data was limited to the input of Magnetic Ink Character Recognition (MICR) data and to Optical Character Recognition (OCR) data. This fixed-position data was forwarded directly to a dedicated computer application specifically designed to accommodate the input format. In more recent years typewritten text has been mechanically inputted into a computer via a text file. Examples of this latter type of system are word processors and photo-typesetters.

These conventional systems have limitations which decrease the efficiency of processing information from a hard copy document. For example, the systems discussed above are limited in their application to MICR, OCR, or typewritten data. Parsing and processing data is limited to the particular requirements of the particular computer application which requires the input data. In addition, in these conventional systems, the actual hard copy document must be retained for future reference at great expense.

In a sophisticated computer network, different users may require different portions of the information contained on a hard copy document. For example, if the hard copy document is an invoice returned with payment of a bill, the accounting department may need all of the monetary information contained on the bill while the mailroom may need only customer address information, to update a customer's address. Therefore, there is a need for a system in which specific information from a hard copy document can be selectively distributed to various users.

Another problem with conventional systems is that users, even within the same company, may require that the information extracted from a hard copy document be transmitted to a particular application program in a specific transmission format. For example, one department in a company may use a particular application program which must receive information using a particular character as a delimiter and other departments may require the information in a different format using different delimiters.

Another problem, particularly for small businesses, is that current systems can not efficiently accommodate the inputting of information from a diversity of hard copy documents. A large business which receives many forms in the same

format can afford a system which inputs a high volume of information in that format into memory. For example, it is cost-effective for a bank which processes hundreds of thousands of checks a month to buy a dedicated machine which can read information off of checks having a rigidly defined, or fixed, format. However, as the diversity of forms received by a business increases relative to the number of forms that must be processed, it becomes less cost-effective to design a dedicated machine for processing each type of form format. This problem is particularly significant in small businesses which may, for example, receive fifty invoices a month, all in different, non-fixed, formats. It is frequently not cost-effective for a small business to design dedicated systems for inputting information in each of these various formats. This leaves a small business with no other practical alternative than to manually input the information off of each invoice each month.

SUMMARY OF THE INVENTION

It is an object of the invention, therefore, to provide an application program interface which allows a user to select specific portions of information extracted from a diversity of hard copy documents and allows the user to direct portions of this information to several different users in accordance with the needs of the particular user.

It is also an object of the invention to provide a cost-effective system for inputting hard copy documents which can accommodate hard copy documents in a diversity of formats.

It is another object of the invention to provide an application program interface which allows a user to put information, which is to be transmitted, into a particular transmission format, based upon the needs of the receiver of the information.

It is a further object of the invention to provide an application program interface which will allow the extraction, selection, formatting, routing, and storage of information from a hard copy document in a comprehensive manner such that the hard copy document itself need not be retained.

It is another object of the invention to provide a system which reduces the amount of manual labor required to process information originating from a hard copy document.

A further object of the invention is to reduce the time required to process information originating from a hard copy document so that a higher volume of transactions involving hard copy documents can be processed.

The invention provides an application program interface which inputs a diversity of hard copy documents using an automated digitizing unit and which stores information from the hard copy documents in a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which define portions of the stored document information required by a particular application unit. Selected stored document information is then formatted into the transmission format used by the particular application program based on transmission format instructions. The transmission formatted selected stored document information is then transmitted to the particular application program. The hard copy documents may contain textual information or image information or both.

The interface operates in three different modes.

In a first mode, the interface extracts all of the information from hard copy documents and stores this information in memory. Parsing of various portions of the extracted information is performed in accordance with content instructions.

In a second mode, the user operates interactively with the interface by use of a display and an input device, such as a mouse. In this second mode, a hard copy document is inputted and displayed on the display. The interface then prompts the user to identify the location of various information. For example, the interface can ask the user to identify the location or address information on the hard copy document. In response, the user positions the mouse to identify address information using a cursor. The identified information is then stored as address information in memory. Subsequently, the interface again prompts the user to identify other pieces of information, which are then stored in the appropriate locations in memory. This process proceeds until all of the information which is desired to be extracted off of the hard copy document is stored in memory.

In a third mode of operation, selected portions of information are extracted off of hard copy documents in accordance with predetermined location information which has been specified by the user. For example, the user can define a template which specifies the location of information on hard copy documents. Templates can be formed in conjunction with second mode operation. Alternatively, the user can instruct the interface to search hard copy documents for a particular character or symbol, located on the hard copy documents. The information desired to be extracted off of the hard copy documents is specified relative to the location of this character or symbol.

The interface can also prompt or receive from an applications program or another information processing system, required information, content instructions, and format instructions.

Other objects, features, and advantages of the invention will be apparent from the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in further detail below with reference to the accompanying drawings, in which:

FIG. **1** illustrates hardware for implementing a preferred embodiment of the instant invention;

FIG. **2** illustrates an example of a hard copy document containing information to be processed by the instant invention;

FIGS. **3**A and **3**B are enlarged views of the computer of FIG. **1** used to explain how the invention interactively prompts a user to identify information;

FIG. **4** is an overall data flow diagram for the FIG. **1** preferred embodiment;

FIG. **5** is a detailed input data flow diagram for the FIG. **1** preferred embodiment;

FIG. **6** is a detailed information processing data flow diagram for the FIG. **1** preferred embodiment;

FIG. **7** is a more detailed information processing data flow diagram for the maintain library module of FIG. **6**;

FIG. **8** is a more detailed information processing data flow diagram for the maintain definitions module of FIG. **6**;

FIG. **9** is a more detailed information processing data flow diagram for the process document module of FIG. **6**;

FIG. **10** is a detailed output data flow diagram for the FIG. **1** preferred embodiment;

FIG. **11** lists data corresponding to the hard copy document of FIG. **2**;

FIGS. **12**A, **12**B, and **12**C illustrate examples of data which can be selected from the extracted data of FIG. **11** in accordance with content instructions;

FIGS. **13**A, **13**B, and **13**C illustrate examples of the data of FIGS. **12**A, **12**B, and **12**C formatted in accordance with various transmission format instructions to form input files; and

FIG. **14** illustrates another example of a hard copy document containing information to be processed by the instant invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hardware

The invention provides an interface between information originating from a hard copy document and a computer application unit which uses the information. The computer application unit can be a particular computer application program or a device which is controlled in accordance with instructions or information from the hard copy document. The invention also allows storing a copy of the hard copy document in a memory and retrieving the copy of the hard copy document. By providing a comprehensive and integrated system which can accommodate almost all of the possible uses of information contained on a hard copy document, the instant invention allows for a paperless office.

The invention includes hardware and software necessary to extract, retrieve, and process information from the hard copy document. A copy of the actual image of the hard copy document is stored in memory. Textual information extracted from the hard copy document is also stored in memory. Textual information is information, such as alphanumeric characters, which is recognized on the hard copy document and which is stored in a form which corresponds to the particular recognized character. For example, the extracted characters can be stored in the ASCII format in an electronic memory.

The user can have all of the information extracted from the hard copy document and stored in memory. Alternatively, the interface can interactively prompt the user to identify specific pieces of information for storage. The interface can also extract specific pieces of information using a predefined template. The interface can also prompt or receive from another information processing system or an applications program desired information, content instructions, and format instructions.

The instant invention also provides for parsing information extracted from the hard copy document and for directing this parsed information to specific users or application programs as an input file.

The invention also permits the user to define the transmission format of the input file for a particular computer application unit.

FIG. **1** illustrates hardware for implementing a preferred embodiment of a hard copy document to application program interface according to the instant invention. The interface **200** processes information extracted off of hard copy document **100** and provides information to application units **270** in a form required by each particular application unit. The interface extracts information off of a hard copy document **100** utilizing a scanner **210**. The scanner **210** can be any type of scanner which extracts information off of hard copy documents, for example, an Optical Reader.

The scanned information is stored in a scanner memory **220** or in main memory **250**, as will be described in greater detail below. If main memory **250** or another memory is, available to store the scanned information, then scanner memory **220** can be omitted.

The information from scanner memory **220** or main memory **250** is transmitted to computer **230**. In the preferred embodiment, computer **230** includes a display **232**, a keyboard **234**, and a mouse **236**. The display **232** displays an image of the hard copy document itself and/or information necessary to process the information extracted off of the hard copy document.

The computer **230** is used to select portions of the stored document information contained in memory in accordance with content instructions which define portions of the stored document information required by an application unit. These content instructions may be provided by the application program. Alternatively, the content instructions can be inputted via an input device such as a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

The computer **230** is also used to format selected stored document information into the transmission format used by an application unit based on transmission format instructions. The transmission format instructions may be provided by the application program. Alternatively, the transmission format instructions can be inputted via a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

Thus, the computer **230** is used to generate an input file for a particular application unit. The computer **230** is connected to scanner memory **220**, main, or permanent, memory **250**, a printer **260**, and application units **270**, via a bus **240**. Although FIG. **1** illustrates use of a bus to connect components together, it is understood that any routing or connecting link, implemented in hardware or software or both, can be employed instead of, or in addition to, a bus. Instructions to or in the computer **230** control the main memory **250**, the printer **260**, the application units **270**, and the bus **240**. Instructions to or in computer **230** can also control exchanges of information with scanner memory **220**.

When the computer **230** generates an input file for a particular document, the computer **230** can send this input file directly to an application unit or can store this input file in the main memory **250** until required by an application unit. The main memory **250** may also optionally store a copy of the image information for the hard copy document and the textual information for the hard copy document. Thus, the image information and textual information from the hard copy document can be retrieved and printed out on printer **260**. In addition, image and textual information stored in scanner memory **220** or in main memory **250** can be used to form additional input files at the time of input or at a later time, based on content instructions and transmission format instructions. Thus, the invention can, at the discretion of the user, eliminate the need to retain copies of hard copy documents, permitting a paperless office.

The application units **270** include particular application programs and devices which are controlled in accordance with information contained on hard copy document **100**.

FIG. **2** illustrates an example of a hard copy document **100** which contains information to be processed by the instant invention. The document illustrated in FIG. **2** is a bill from XYZ Corporation to customer ABC Corporation. FIG. **2** is only an example of a type of document that can be processed by the instant invention.

In a first operational mode, the scanner **210** stores all of the information extracted off of hard copy document **100** in the scanner memory **220** or, alternatively, in main memory **250**. The extracted information is stored in two forms. The actual image of the hard copy document **100** is stored as image information in the scanner memory **220**. In addition, the scanner memory **220** stores textual information recognized on the hard copy document **100** by, for example, employing standard character recognition software. In the preferred embodiment, the textual information is stored in ASCII format. The scanner memory **220** can be, for example, an electronic, magnetic, or optical memory.

FIG. **3A** illustrates an enlarged view of the computer **230** of FIG. **1**. This view will be used to describe a second mode of operation. In this second mode of operation, the hard copy document **100** is scanned and a copy of the document **100** is displayed on display **232** of computer **230**, based on the contents of information temporarily stored in scanner memory **220**. After the document is displayed on display **232**, the computer **230** interactively prompts the user to identify the location of specific pieces of information on the hard copy document. In the FIG. **3A** illustration, this prompt message is indicated as the message beginning with the arrow.

For example, the prompt message can ask the user to identify the location of account number information on the hard copy document. The user then uses an input device, such as keyboard **234** or mouse **236** or a touch screen, notepad, voice recognition device, or other input device to position a cursor on the display to identify the location of the information requested by the prompt message. For example, the cursor could be used to define a block (which could be highlighted) containing the requested information, followed by a mouse "enter" click. In this example, the user would move the mouse to identify the location of the account number information contained on the hard copy document **100**. The computer **230** then stores the information which has been identified by the user as account number information in the appropriate address or subfile or as the appropriate variable or parameter in memory. The computer then prompts the user to identify the location of other information on the hard copy document, such as, statement date information. The process proceeds until all of the desired information has been stored into the appropriate locations in memory.

FIG. **3B** illustrates a variation of the second mode for interactively prompting the user for information. In FIG. **3B**, the display is split into two portions. A left-hand portion **232L** displays the image of the hard copy document and a right-hand portion **232R** displays the required application program information. For example, in FIG. **3B**, portion **232R** displays a spreadsheet used by an application program. While observing the split display, the user can input instructions to associate specific pieces of information on the hard copy document (for example, the vendor name indicated by the mouse arrow **232A**) with particular sublites in memory (for example, the vendor field next to which the cursor **232C** appears), using a mouse or other input device(s) or both. The split display also allows the user to generate content format instructions while observing the information required for a particular application program on the right-hand portion.

These second modes of operation are efficient for small businesses which receive a small number of a wide variety of invoices, since the user does not necessarily have to store all of the information that appears on the hard copy document. A further advantage is that data input is quicker, easier, and more accurate than with previous keyboard methodology. In addition, by specifying the location on the hard copy document of information, the user may optionally create a template, to be described in further detail below, for each different type of invoice. This template is stored for future use when another hard copy document in the same format is received.

More specifically, instructions from computer **230** can direct the scanner **210** and scanner memory **220**, and/or main memory **250**, to scan and/or store only specific portions of hard copy document **100**. After the interactive prompts required to obtain information for a desired application program, the unused information stored in scanner memory **220** or **250** can be erased. Further, scanning of a second identical document can be limited to only those portions of the document which contain needed information.

More specifically, in FIG. **2**, the lines **10** drawn around certain portions of the document represent the areas which the user has previously identified as the portions of a document to be extracted by the scanner **210** and stored in scanner memory **220** and/or main memory **250**. Since the logo **20** and the message **30** have not been identified as an area to be scanned and stored, these areas are not scanned and stored in subsequent documents. Since the user has previously associated each of the areas **10** with a specific subfile of information, e.g., the account number, the scanned information is stored in memory locations corresponding to that subfile.

Data Processing

FIGS. **4–10** illustrate the flow of data in the FIG. **1** preferred embodiment. FIG. **4** illustrates the overall data flow for the FIG. **1** preferred embodiment. The preferred embodiment includes an input process module **1.0**, an information processing module **2.0**, and an output processing module **3.0**. The information processing module **2.0** is equipped to receive instructions from and transmit information to a user. The information processing module **2.0** can also transmit to and receive information from a remote external device through communication interface **4.0**. Input process module **1.0** and output processing module **3.0** can also access communication interface **4.0**. A module is implemented in hardware, software, or a combination of hardware and software. The specific implementation for a particular business application depends upon a variety of factors, for example, the relative costs of hardware and software implemented systems, the frequency with which a user will want to expand or modify the system, and the like.

FIG. **5** is a more detailed diagram of the input process module **1.0** of FIG. **4**. The input process module **1.0** includes a character input module **1.1**, an image input module **1.2**, and, in the preferred embodiment, a character recognition device **1.3**. The character input module inputs textual information, such as alphanumeric characters, from an input device such as keyboard **234**. The image input module **1.2** inputs image information, for example, a digitized image of the actual appearance of hard copy document **100**. Textual information can include textual input from an input device such as keyboard **234** and textual information extracted from the document by character recognition device **1.3**. Both types of information comprise an input document which is transmitted to information processing module **2.0**. In the FIG. **1** preferred embodiment, the processing performed by input process module **1.0** occurs in scanner memory **220**, computer **230**, and main memory **250**.

FIG. **6** illustrates information processing data flow for the FIG. **1** preferred embodiment, that is, FIG. **6** illustrates data flow in the information processing module **2.0**.

The information processing module **2.0** includes a maintain library module **2.1**, to be described in further detail below in conjunction with FIG. **7**, a maintain definitions module **2.2**, to be described in further detail below in conjunction with FIG. **8**, and a process document module **2.3** to be described in further detail below in conjunction with FIG. **9**.

The information processing module **2.0** is the module which coordinates and drives the entire system. In the preferred embodiment, the information processing module **2.0** is implemented primarily by computer **230**.

FIG. **7** illustrates information processing data flow in the maintain library module **2.1**. The maintain library module **2.1** maintains a library of image information, for example, a digitized image representing the actual appearance of the hard copy document, and textual information of the hard copy documents for reference during processing. This library can be incorporated within scanner memory **220**, main memory **250**, or another independent memory, for example, a RAM disk. The maintain library module **2.1** includes a store document module **2.1.1**, a correct errors module **2.1.2**, a retrieve document module **2.1.3**, and a document file **2.1.4**. These modules operate collectively to store, retrieve, and correct document information.

The store document module **2.1.1**, prior to routing the document to the document file **2.1.4**, may provide information on recognition errors which may have occurred while inputting the document. For example, the store document module **2.1.1** identifies that a character contained on hard copy document **100** was not recognized. The store document module **2.1.1** also optionally causes a copy of the document and its parsing to be displayed on the display **232** for confirmation by the user. The user may utilize this opportunity to identify any errors in the displayed document and, in conjunction with the correct errors module **2.1.2**, to revise the document's parsing, if necessary, prior to storage of the document in memory. The module **2.1.1** also provides a facility for the user to name a particular hard copy document for cataloging, storage, and retrieval purposes. After the document is named, the store document module **2.1.1** stores copies of the document in the document file **2.1.4**.

The correct errors module **2.1.2** processes instructions from the user to correct errors identified by thee store document module **2.1.1** and errors that have been spotted by the user during the confirmation process.

The retrieve document module **2.1.3** permits the user to retrieve a copy of a document previously stored in the document file **2.1.4**. As described above, long-term storage is provided by main memory **250**, if necessary.

FIG. **8** illustrates a more detailed information processing data flow diagram for the maintain definitions module **2.2** of FIG. **6**. The maintain definitions module **2.2** allows the user to define system and document parameters and maintains the definitions of these system and document parameters. The maintain definitions module **2.2** includes a define template module **2.2.1** which allows the user to specify the location of information on the document. This information provided by the user defines a template which is used to extract information off the document and to associate the extracted information with a particular variable or subfile. These templates are illustrated by boxes **10** in the FIG. **2** example of a hard copy document. The maintain definitions module **2.2** can also access templates previously defined by the user and stored in main memory **250**. Templates can also be provided as part of software packages developed by program developers.

The maintain definitions module **2.2** also includes a define relationships module **2.2.2**. The define relationships module **2.2.2** allows the user to define data relationships, or logical relationships, between pieces of information extracted from the hard copy documents. These pieces of information are

then used to generate an input file for a selected computer application unit. The user defines these relationships by content instructions. Alternatively, content instructions to define relationships can be provided by application software. If the user provides these content instructions, the content instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. Examples of content instructions, data, and logical relationships will be described in further detail in conjunction with FIGS. **11** and **12A**, **12B**, and **12C**.

The maintain definitions module **2.2** also includes a define format module **2.2.3**. The define format module **2.2.3** allows the user to define transmission formats for an input file which is then transmitted to a selected computer application unit. Selection of the transmission format of the input file is accomplished by the user through use of transmission format instructions. Alternatively, the applications software itself can generate its own transmission format instructions. When the user must specify transmission format instructions, the transmission format instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. A further description of various transmission formats will be provided below in conjunction with FIGS. **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

A select definitions module **2.2.4** is also included in the maintain definitions module **2.2**. The select definitions module **2.2.4** allows the user to store and select a set of definitions to be used for processing the document. The definitions identify pieces of information on the document by, for example, absolute location, variable location, or relative location, or by proximity to key words and/or symbols. These definitions are described in further detail below by way of an illustrative example.

FIG. **9** illustrates a more detailed information processing data flow diagram for the process document module **2.3**. The process document module **2.3** processes the document after the document has been stored in the system. The process document module **2.3** gathers the appropriate information which has been stored, and creates input file(s) **2.3.3** for the selected application unit. The process document module **2.3** then transmits the input file(s) via bus **240** and/or communication interface **4.0** to an application unit **270**, an output device such as printer **260**, or to main memory **250**.

The process document module **2.3** includes an extract data module **2.3.1**. This module extracts data off of the document in accordance with the user's instructions, for example, the user-defined template, or through the interactive mode.

The process document module **2.3** also includes a preapplication process module **2.3.2** which gathers and associates information extracted from the document in accordance with content instructions. This module prompts the user for any additional information required to satisfy the relationships defined by the content instructions. The preapplication process module **2.3.2** also places the selected information into the transmission format defined by the transmission format instructions.

The preapplication process module **2.3.2** also generates the input file **2.3.3** for the selected application in accordance with the appropriate instructions. The input file **2.3.3** is then transmitted to bus **240** and/or communication interface **4.0** for transmission to a particular application unit **270**.

FIG. **10** illustrates a detailed output data flow diagram for output module **3.0**. Output module **3.0** outputs a textual and/or image copy of the document. In the FIG. **1** preferred embodiment, output module **3.0** is implemented by printer **260**, associated software, and associated interface circuitry.

Operation

Examples of operation of a preferred embodiment will now be described.

The user enters the system by providing instructions to the information processing module **2.0**. The user then instructs the information processing module **2.0** to conduct maintain library processing, maintain definitions processing, or process document processing.

If the user selects maintain library processing, the user then provides instructions to maintain or modify the document library through the maintain library module **2.1**. For example, the user can direct the inputting and storage of a hard copy document **100** or can retrieve and output a document. The user requests inputting of a document through the store document module **2.1.1**. The system then prompts the user to specify a storage location for the inputted document. The document is then read-in by the input process module **1.0**. A textual copy and/or an image copy are stored into the document file **2.1.4**. Errors which have occurred during inputting are identified and corrected by the correct errors module **2.1.2** and the user. The corrections are reflected in the document information stored in document file **2.1.4**.

The retrieve document module **2.1.3** is used to retrieve and output a document. The system prompts the user to specify the storage location of a document and the type of document copy, for example, a textual or an image copy, to be outputted. The document is then outputted by the output process module **3.0**.

If the user initially selected maintain definitions processing, the user would instruct the system to maintain and/or modify parameter definitions through the maintain definitions module **2.2**. For example, the user can define and maintain a document template for extracting selected portions of information off of the hard copy document. The user can use the template to extract selected portions of information off of the hard copy document when the document is originally inputted, or alternatively, the user can use the template to identify selected portions of information for extraction off of an image copy of the document. In creating the template, the user identifies pieces of information on the document to be extracted and assigns a variable name, or subfile, to each piece of data.

The location of data to be extracted can be defined in a number of ways other than by use of a template. For example, the user can designate the absolute location of information on the document with respect to a grid overlaid on the document, e.g., always on line **3**, starting in column **1**. The user can also identify information by specifying the relative location of information to be extracted, e.g., always two lines below the piece of data named "salutation", starting in column **3**. The user can also specify the location of information to be extracted by variable location specification. For example, if the hard copy document is a letter, the module would conduct a key word search for the term "Dear Sir:". Wherever this term "Dear Sir:" is located, this piece of data would be associated with the variable specified by the user, for example, the variable "salutation." In addition, a defined set of conventional symbols can be used to signify certain recurring data items for the convenience of users of the instant invention. For example, a "@" symbol can be used to delineate the vendor name as follows: "@XYZ Corporation@". Other examples of the use of symbols to delineate information will be described with reference to FIG. **14**.

The maintains definition module **2.2** is also used to maintain data relationships in accordance with content instructions and to maintain input file formats in accordance with transmission format instructions. Relationships are defined and maintained between pieces of data, specified by, for example, the names of variables, through the define relationships module **2.2.2**. The names of pieces of data on the document are retrieved by, for example, the define template module **2.2.1**, and are passed to the define relationships module **2.2.2**. The user may then provide any additional pieces of data needed to generate an input file for a particular application program or unit, such as an input file line number. The user, the applications software, and/or instructions previously stored in memory then establishes the contents of the input file by defining relationships between pieces of data using content instructions. Specific examples of content instructions will be discussed below in conjunction with FIGS. **11**, **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

The user and/or the applications software defines and maintains the transmission format of the input file to be used by a particular application program or unit through the define format module **2.2.3** in accordance with transmission format instructions. This is accomplished by defining the parameters to be used by the preapplication process module **2.3.2** in generating an input file. Parameters which would typically be required to generate an input file would include the character type, e.g., text or pixel; delimiters used between pieces of data, e.g., a slash or a semicolon; end of line characters, e.g., a carriage return or a line feed; and end of file characters. Examples of transmission formats will be described in further detail below in conjunction with FIGS. **11**, **12A**, **12B**, **12C**, **13A**, **13B**, and **13C**.

If the user initially selected process document processing, the interface will then proceed to process the document through use of the process document module **2.3**. For example, the user can extract specific portions of data from an image copy of a document, can generate an input file for transmission to an application program, or can directly process information interactively with an application program.

If the user desires to extract specific portions of data from an image copy of a hard copy document which has already been stored in memory, is the user uses the extract data module **2.3.1** to identify a document to be processed. The document is then retrieved by the retrieve document module **2.1.3** and passed to the extract data module **2.3.1**. The user can also select parameter definitions through the select definitions module **2.2.4**.

The selected document template or parameter definition is passed to the extract data module **2.3.1**. The extract data module **2.3.1** extracts pieces of data from the image copy of the document, as defined by the document template definition or the parameter definitions or both. This document data is then passed to preapplication process module **2.3.2**.

The interface generates input file(s) **2.3.3** by use of the preapplication process module **2.3.2**. The selected data relationship definition, as defined by the content instructions, and the selected record format definitions, as defined by the transmission format instructions, are passed to the preapplication process module **2.3.2**. The preapplication process module **2.3.2** assembles the input file in accordance with the content instructions. The preapplication process module **2.3.2** also prompts the user for any additional pieces of data which need to be provided by the user. The input file is converted to the desired transmission format in accordance with the transmission format instructions. This physically formatted data is then stored in the input file **2.3.3**.

The user can also use an application program to process information by loading the particular application program into the computer **230** rather than by sending the input file to a remote application unit **270**.

An illustrative example of the processing described above will now be described.

The user inputs instructions via keyboard **234** or another input device which indicate that the user desires to input and store a document. The computer **230** then prompts the user for the name of the document. In this example, the user desires to input the document of FIG. **2** and therefore names the document "XYZ Corp. Bill 12/01/86." The computer then prompts the user to feed the hard copy document **100** into the scanner **210**. The image of the hard copy document is displayed on display **232**. The computer then prompts the user to identify the account number on the document. By use of the mouse **236** or other input device to position a cursor on the display, the user indicates the location of the account number. The account number is then read-in to a subfile named "Account Number." This process proceeds until all of the desired information has been read-in and stored.

In this particular example, no errors were encountered while inputting the document. The user then directs that the document be stored for future reference in a document file.

Some time later, the user desires to retrieve and output the document and to generate input files based on information from the document. The computer **230** prompts the user for the name of the document and the type of output. The user responds with "XYZ Corp. Bill 12/01/86" for a printed textual copy. The document is then retrieved from the document file and passed to the printer **260** for printing.

In order to generate an input file for a specific application program, the user selects the option to define a document template for use when each month's XYZ Corporation bill arrives. Accordingly, the user instructs the system to display a copy of an XYZ Corporation bill on the display **232**. The user then identifies pieces of data by absolute locations. That is, the user assigns specific names to information located at specific portions of the document. In this example, the user would input the following information:

Vendor-text, line **1**, one line, column **1**, 80 characters;

Account number-numeric, line **6**, one line, column **25**, 9 characters;

Statement date-date, line **9**, one line, column **25**, 8 characters;

Payment date-date, line **11**, one line, column **25**, 8 characters;

Previous balance-currency, line **7**, one line, column **75**, 9 characters;

New charges-currency, line **8**, one line, column **75**, 9 characters;

Other debits-currency, line **10**, one line, column **75**, 9 characters;

Finance charges-currency, line **12**, one line, column **75**, 9 characters;

Payments-currency, line **13**, one line, column **75**, 9 characters;

Other credits-currency, line **14**, one line, column **75**, 9 characters;

New balance-currency, line **15**, one line, column **75**, 9 characters.

The user also identifies data with variable locations. In this particular example, a variable location is specified as follows:

Heading 2—line, value="Mail To:"

The identification of Heading 2 as line information means that the system will search for occurrences of the character string "Mail To:" and assign the line number which contains this character string to Heading 2.

The user also identifies data by relative locations. In this example, the user identifies the following relative location:

Mail To-text, Heading 2+1, 3 lines, column 60, 25 characters per line.

The instructions above instruct the system to assign the textual information beginning on one line after Heading 2 and continuing for 3 lines, in column 60, to the Mail To subfile.

As an alternative to inputting the actual line, column, and character numbers, the user can identify desired portions of the document by blocking, or highlighting, the desired portions using the mouse or other input device. In this case, the computer converts the highlighted portions into corresponding line, column, and character numbers.

FIG. 11 lists data corresponding to the hard copy document of FIG. 2 and the associated variable or subfile names.

Next, the user desires to define data relationships in accordance with content instructions. Examples of the type of contents which can be specified by a user are illustrated in FIGS. 12A, 12B, and 12C.

In this particular example, three separate departments of ABC Corporation require information from the XYZ Corporation bill. The first department requires vendor, account number, statement date, payment date, previous balance, new charges, debits, finance charges, payments, and new balance information. The second and third departments require mail to information and previous balance information. Each of these departments have their own application program which utilizes this information.

The user employs content instructions to designate how pieces of information, which have been extracted off of hard copy document 100, are directed to particular departments, that is, particular application programs. FIG. 12A illustrates the contents of the information to be transmitted to the first department. FIG. 12B illustrates the information to be transmitted to the second department. FIG. 12C illustrates the information to be transmitted to the third department. The content instructions, therefore, parse the information shown in FIG. 11 to various application programs, as shown by FIGS. 12A, 12B, and 12C. Content instructions can also be used to identify additional pieces of data which are required for the input files of the particular application programs. In this particular example, the specific application programs from the three departments all require numeric record number information, numeric horizontal position information, numeric vertical position information, and date received information. The horizontal and vertical position information is used by the application program to specify the location of the received information on a spreadsheet application program, in this example. The user may know in advance the content format required by each application program, that is, in this example, the location and type of information specified on the spreadsheet. The user may also employ the split display mode described with reference to FIG. 3B to generate content format instructions.

Using the content instructions, the user establishes the following contents for the input file corresponding to FIG. 12A:

Record number, horizontal position, vertical position, vendor;

Record number, horizontal position, vertical position, account number;

Record number, horizontal position, vertical position, statement date;

Record number, horizontal position, vertical position, date received;

Record number, horizontal position, vertical position, payment date;

Record number, horizontal position, vertical position, previous balance;

Record number, horizontal position, vertical position, new charges;

Record number, horizontal position, vertical position, finance charges;

Record number, horizontal position, vertical position, payments;

Record number, horizontal position, vertical position, new balance.

Next, transmission format instructions are employed to define the transmission format of the input file for a specific application program or unit. FIG. 13A illustrates the transmission input file corresponding to FIG. 12A. FIG. 13B illustrates the transmission input file corresponding to FIG. 12B. FIG. 13C illustrates the transmission input file corresponding to FIG. 12C. A comparison of FIGS. 12B and 12C reveals that FIGS. 12B and 12C have the same contents. However, the information illustrated in FIG. 12B is being sent to a different application program than the information in FIG. 12C. These application programs require different transmission input formats, as illustrated in FIGS. 13B and 13C. More specifically, the application program that receives the input file illustrated in FIG. 13B uses the greater than sign as a delimiter whereas the application program which receives the transmission input file shown in FIG. 13C uses a back-slash as the delimiter.

After the contents and the transmission format for the input file have been defined, and any additional information has been inputted, the input file is assembled and transmitted to the particular application program.

FIG. 14 illustrates another example of a hard copy document containing information to be processed by the instant invention. The hard copy document illustrated in FIG. 14 is first scanned and information from the hard copy document is stored into a memory. The interface 200 then identifies portions of the hard copy document corresponding to various variables by recognizing a defined set of symbols. In the FIG. 14 example, triangles delineate the mailing address, circles delineate the statement date, and squares delineate the new charges. Information from these portions of the hard copy document is stored in the corresponding memory locations or subfiles for each variable. The same set of symbols can be used to identify the same information from one document to the next. Thus, even if the physical formats of documents are not fixed from one document to the next, a diversity of hard copy documents can be processed without manually inputting data by recognition of the defined symbols.

Examples of readily available application programs are Quicken and Lotus 1,2,3 both of which are widely utilized in the business community. Quicken, for example is an easy-to-utilize program for writing checks and preparing business records. Payee, amount and address information may readily be transmitted from scanner memory 220 and/or main memory 250 to the Quicken application program for check writing functions and ledger keeping purposes. Lotus is a well known spreadsheet program which may process data input into specified cells once this data is placed in conventional Lotus format.

Thus, the instant invention provides an integrated and comprehensive system for handling information from a hard copy document, thus permitting a paperless office. In addition, the invention permits data, extracted off of a hard copy document, to be easily manipulated into various logical and transmission formats required by a particular application unit. The invention also provides a low cost system for inputting information from a wide variety of hard copy documents into a memory.

The foregoing description has been set forth merely to illustrate preferred embodiments of the invention and is not intended to be limiting. Modifications are possible without departing from the scope of the invention.

For example, letters, checks, forms, pictures, reports, music scores, film, and other types of hard copy documents can be processed by the invention for accounts payable/receivable accounting, inventory control, record keeping, budgeting, data base management, music transcription, forms processing, computerized art, survey and questionnaire processing, statistical data analysis, correspondence processing and other applications.

Other automated digitizing units can be used in addition to or as an alternative to use of the scanner **210** as an input unit. Any electrical, magnetic, or optical device which extracts information off of a hard copy document, thereby eliminating the need to manually input significant amounts of information from the hard copy document is suitable for use as an automated digitizing unit. In addition, information can be input by user responses and digital and analog signals generated from various devices, and from computer files from other computer systems. Suitable hardware for inputting data includes a keyboard, a light pen, a mouse, a touch screen, a laser scanner, a microphone, a tablet, a disk drive, a magnetic tape drive, and a modem.

The interface **200** can also output information in forms other than a hard copy of textual or image information. For example, the interface **200** can output system responses, computer files, and digital and analog signals for transmission to other computer systems or to control systems. Suitable hardware for outputting information includes a disk drive, a magnetic tape drive, a cathode ray tube, a plasma screen, a printer, a plotter, a fiber developer, an amplifier, and a modem.

Since modifications of the described embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the scope of the invention should be limited solely with respect to the appended claims and equivalents.

What is claimed is:

1. A system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer in which said template automatically generates content instructions to extract data and to transmit said data to at least one field in at least one of said plurality of application programs according to customizable transmission format instructions which are dependent upon and compatible with said at least one application program, operating on said other computer, that is receiving said transmitted data.

2. The system as recited in claim **1** in which said system is a distributed computing system.

3. The system as recited in claim **1** wherein said content instructions automatically parse said data to said at least one field in said application program.

4. The system as recited in claim **1** wherein said content instructions are automatically generated using a mouse function.

5. The system as recited in claim **1** wherein said content instructions are automatically generated using speech recognition.

6. The system as recited in claim **1** wherein said content instructions are automatically generated interactively with said user.

7. The system as recited in claim **1** wherein said extracted data comprises billing information.

8. The system as recited in claim **1** wherein said extracted data comprises financial information.

9. The system as recited in claim **1** wherein said extracted data comprises personal information.

10. The system as recited in claim **1** wherein said extracted data comprises customer information.

11. A method of doing business utilizing a computer system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer comprising the steps of:

displaying an image of the electronic document on the first computer;

utilizing the image of the electronic document of said first computer as said template;

utilizing said template to automatically generate content instructions;

extracting data corresponding to said information from the image of the electronic document utilizing said content instructions;

transmitting said extracted data to at least one field in said at least one of said plurality of application programs on said other computer;

said transmitting being done in accordance with customizable transmission format instructions which are transmission format instructions customizable to be dependent upon and compatible with said at least one of said plurality of application programs operating on said other computer that is receiving said transmitted data.

12. The method as recited in claim **11** further comprising the step of executing the application program on said other computer.

13. The method as recited in claim **11** wherein said extracted data comprises billing information.

14. The method as recited in claim **11** wherein said extracted data comprises financial information.

15. The method as recited in claim **11** wherein said extracted data comprises personal information.

16. The method as recited in claim **11** wherein said extracted data comprises customer information.

17. An interface of a computer system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer, said interface for inputting and transmitting information comprising:

means for displaying an image of the electronic document on the first computer;

means for utilizing the image of the electronic document of said first computer as said template;

means, utilizing said template, to automatically generate content instructions;

means for extracting data corresponding to said information from the image of the electronic document utilizing said content instructions;

means for transmitting said extracted data to at least one field in said at least one of said plurality of application programs on an other computer, different from said first computer and in accordance with customizable transmission format instructions which are transmission format instructions customizable to be compatible with said at least one of said plurality of application programs, operating on said other computer, that is receiving said transmitted data.

18. The interface as recited in claim 17 wherein said content instructions are automatically generated interactively with said user.

19. The interface as recited in claim 17 wherein said content instructions are automatically generated using speech recognition.

20. The interface as recited in claim 17 wherein said content instructions are automatically generated using a mouse function.

21. The interface as recited in claim 17 wherein said extracted data comprises billing information.

22. The interface as recited in claim 17 wherein said extracted data comprises financial information.

23. The interface as recited in claim 17 wherein said extracted data comprises personal information.

24. The interface as recited in claim 17 wherein said extracted data comprises customer information.

25. A method utilizing a computer system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer, said method comprising the steps of:

displaying an image of the electronic document on the first computer;

utilizing the image of the electronic document of said first computer as the template;

utilizing said, template to automatically generate content instructions;

extracting data corresponding to said information from the image of the electronic document utilizing said content instructions;

transmitting said extracted data to at least one field in said at least one of said plurality of application programs operable on said other computer;

said transmitting being done in accordance with customizable transmission format instructions which are transmission format instructions customizable to be dependent upon and compatible with said at least one of said plurality of application programs, operating on said other computer that is receiving said transmitted data.

26. The method as recited in claim 25 further comprising the step of executing the application program on said other computer.

27. The method as recited in claim 25 wherein said extracted data comprises billing information.

28. The method as recited in claim 25 wherein said extracted data comprises financial information.

29. The method as recited in claim 25 wherein said extracted data comprises personal information.

30. The method as recited in claim 25 wherein said extracted data comprises customer information.

31. An application program interface for use in data processing in a computer system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer, said interface comprising:

utilities for enabling automatic generation of content instructions using the electronic document template, said content instructions designating data portions of said electronic document template required by at least one of said plurality of application programs;

utilities for enabling formatting of said data portions used by said at least one of said plurality of application programs based on customizable transmission format instructions which are transmission format instructions customizable to be dependent upon and compatible with said at least one of said plurality of application programs; and

utilities for automatically enabling transmission of formatted selected data portions to said at least one of said plurality of application programs, operating on said other computer that is receiving said transmitted data.

32. The application program interface as recited in claim 31, wherein said content instructions automatically parse said data to said at least one field in said application program.

33. The application program interface as recited in claim 31, wherein said content instructions are automatically generated using a mouse function.

34. The application program interface as recited in claim 31, wherein said content instructions are automatically generated using speech recognition.

35. The application program interface as recited in claim 31, wherein said content instructions are automatically generated interactively with said user.

36. The application program interface as recited in claim 31, further comprising utilities for enabling storage of said content instructions.

37. The application program interface as recited in claim 31, wherein said interface operates in a distributed computing system.

38. The application program interface as recited in claim 31, further comprising utilities for enabling definition of said electronic document template for associating portions of said electronic document template with specific variables.

39. The application program as recited in claim 31 wherein said designated data comprises billing information.

40. The application program as recited in claim 31 wherein said designated data comprises financial information.

41. The application program as recited in claim 31 wherein said designated data comprises personal information.

42. The application program as recited in claim 31 wherein said designated data comprises customer information.

43. A method of processing information utilizing a computer system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer, said method comprising the steps of:

displaying an image of an electronic document on the first computer for inputting information into at least one of said plurality of application programs stored on an other computer according to transmission format instructions;

processing the information by automatically generating content instructions to parse at least a portion of the image to at least one field of information required by said at least one of said plurality of application programs; and

transferring said at least one field of information to said at least one of said plurality of application programs utilizing customizable transmission format instructions which are transmission format instructions customizable to be dependent upon and compatible with said at least one of said application programs, operating on said other computer that is receiving said transmitted data.

44. The method as recited in claim 43 wherein said information comprises billing information.

45. The method as recited in claim 43 wherein said information comprises financial information.

46. The method as recited in claim 43 wherein said information comprises personal information.

47. The method as recited in claim 43 wherein said information comprises customer information.

48. An information processing system configurable to input information from a first computer into a plurality of application programs operable on another computer in which a template document transmitted by said first computer to said other computer includes content instructions to automatically extract data and to transmit said data to at least one field in at least one of said plurality of application programs according to customizable transmission format instructions which are transmission format instructions dependent upon and customizable to be compatible with said at least one of said plurality of applications programs, operating on said other computer that is receiving said transmitted data.

49. The information processing system as recited in claim 48 in which said system is a distributed computing system.

50. The information processing system as recited in claim 48 wherein said content instructions automatically parse said data to said at least one field in said application program.

51. The information processing system as recited in claim 48 wherein said content instructions are automatically generated using a mouse function.

52. The information processing system as recited in claim 48 wherein said content instructions are automatically generated using speech recognition.

53. The information processing system as recited in claim 48 wherein said content instructions are automatically generated interactively with said user.

54. The method as recited in claim 48 wherein said extracted data comprises billing information.

55. The information processing system as recited in claim 48 wherein said extracted data comprises financial information.

56. The information processing system as recited in claim 48 wherein said extracted data comprises personal information.

57. The information processing system as recited in claim 48 wherein said extracted data comprises customer information.

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(54) **INFORMATION PROCESSING METHODOLOGY**

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See application file for complete search history.

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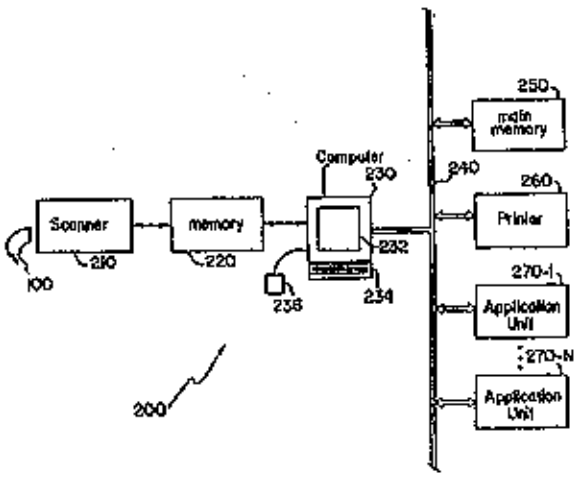
(57) **ABSTRACT**

An information processing methodology gives rise to an application program interface which includes an automated digitizing unit, such as a scanner, which inputs information from a diversity of hard copy documents and stores information from the hard copy documents into a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which designate portions of the stored document information required by a particular application program. The selected stored document information is then placed into the transmission format required by a particular application program in accordance with transmission format instructions. After the information has been transmission formatted, the information is transmitted to the application program. In one operational mode, the interface interactively prompts the user to identify, on a display, portions of the hard copy documents containing information used in application programs or for storage.

56 Claims, 15 Drawing Sheets



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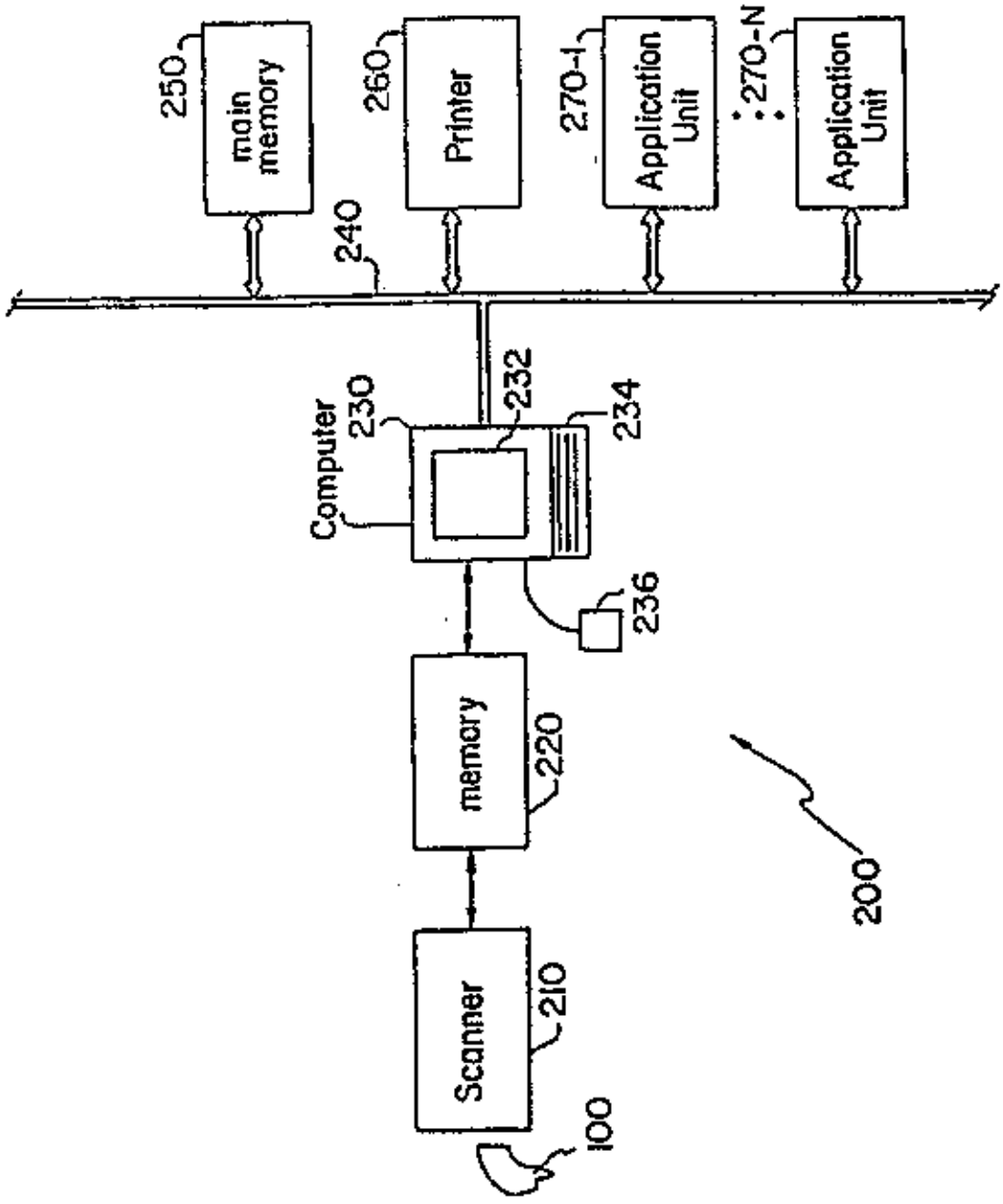
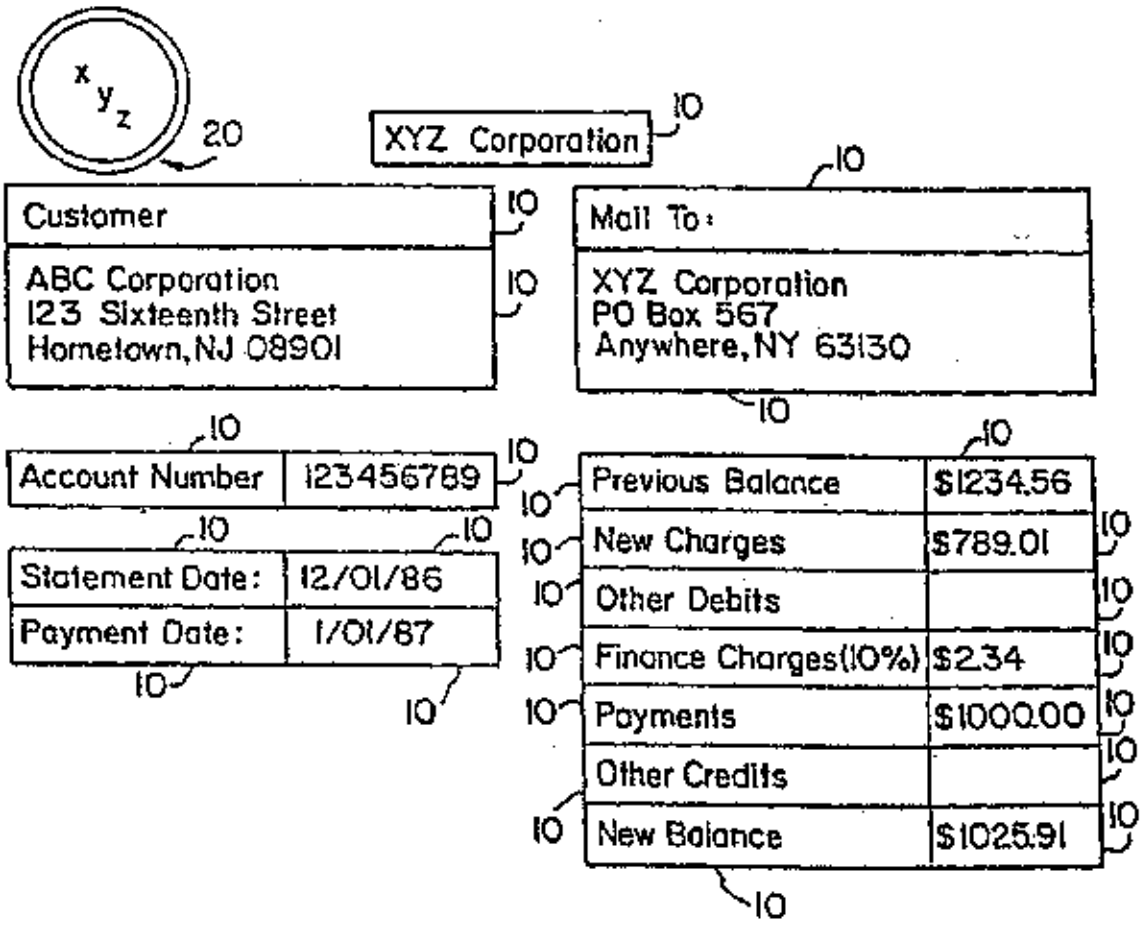

250
main memory
260
Printer
270-1
Application Unit
270-N
Application Unit
240
232
234
230
Computer
236
memory
220
200
Scanner
210
100

FIG. 1



Winter Sale In Effect Throughout January!

30

FIG. 2

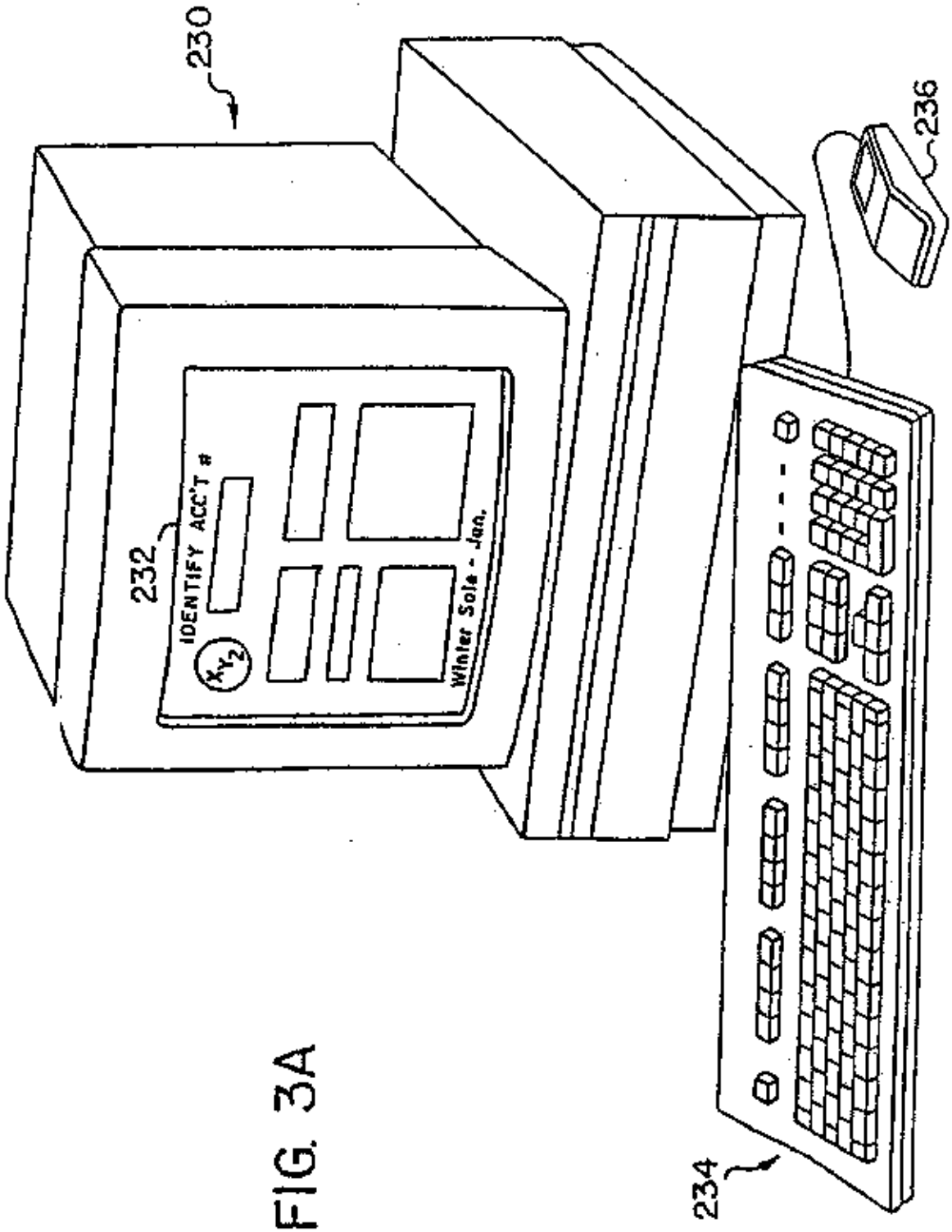


FIG. 3A

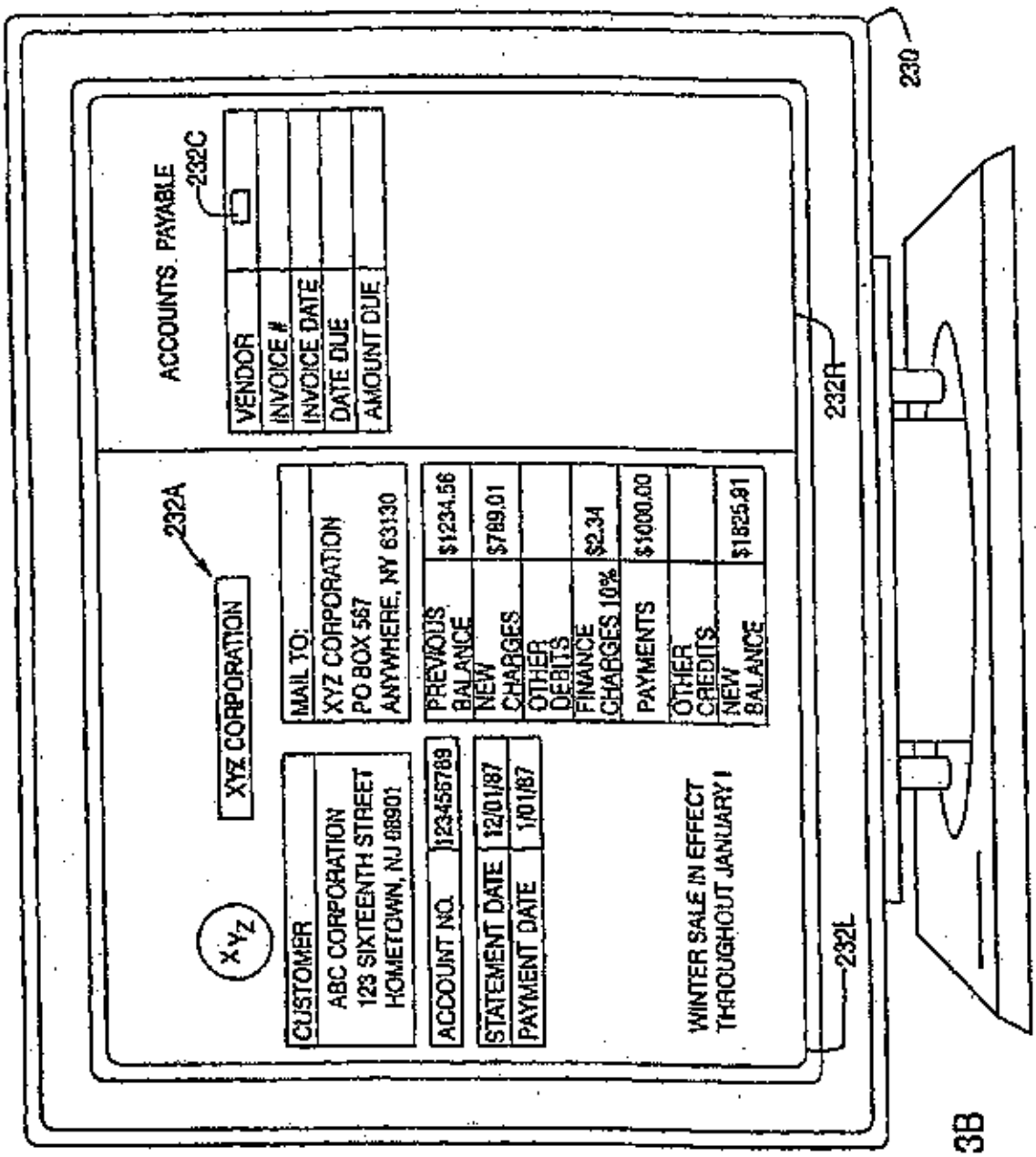

230
232R
232L
232A
232C
XYZ CORPORATION
ACCOUNTS PAYABLE
VENDOR
INVOICE #
INVOICE DATE
DATE DUE
AMOUNT DUE
MAIL TO:
XYZ CORPORATION
PO BOX 567
ANYWHERE, NY 63130
CUSTOMER
ABC CORPORATION
123 SIXTEENTH STREET
HOMETOWN, NJ 08901
ACCOUNT NO. 123455789
STATEMENT DATE 12/01/87
PAYMENT DATE 1/01/87
PREVIOUS BALANCE $1234.56
NEW CHARGES $789.01
OTHER DEBITS
FINANCE CHARGES 10% $2.34
PAYMENTS $1000.00
OTHER CREDITS
NEW BALANCE $1825.91
WINTER SALE IN EFFECT
THROUGHOUT JANUARY!

FIG. 3B

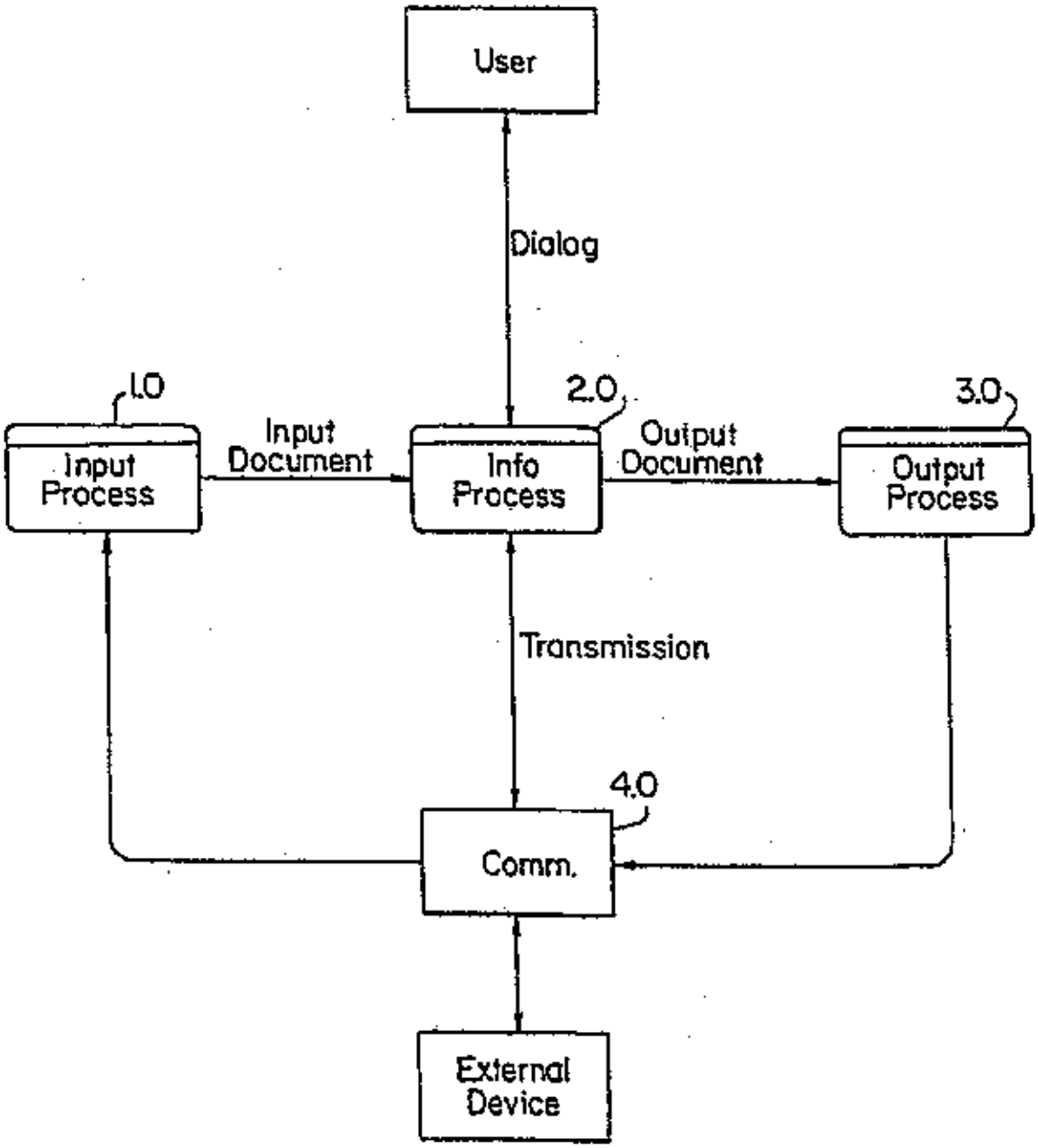

User
Dialog
1.0
Input Process
Input Document
2.0
Info Process
Output Document
3.0
Output Process
Transmission
4.0
Comm.
External Device

FIG. 4

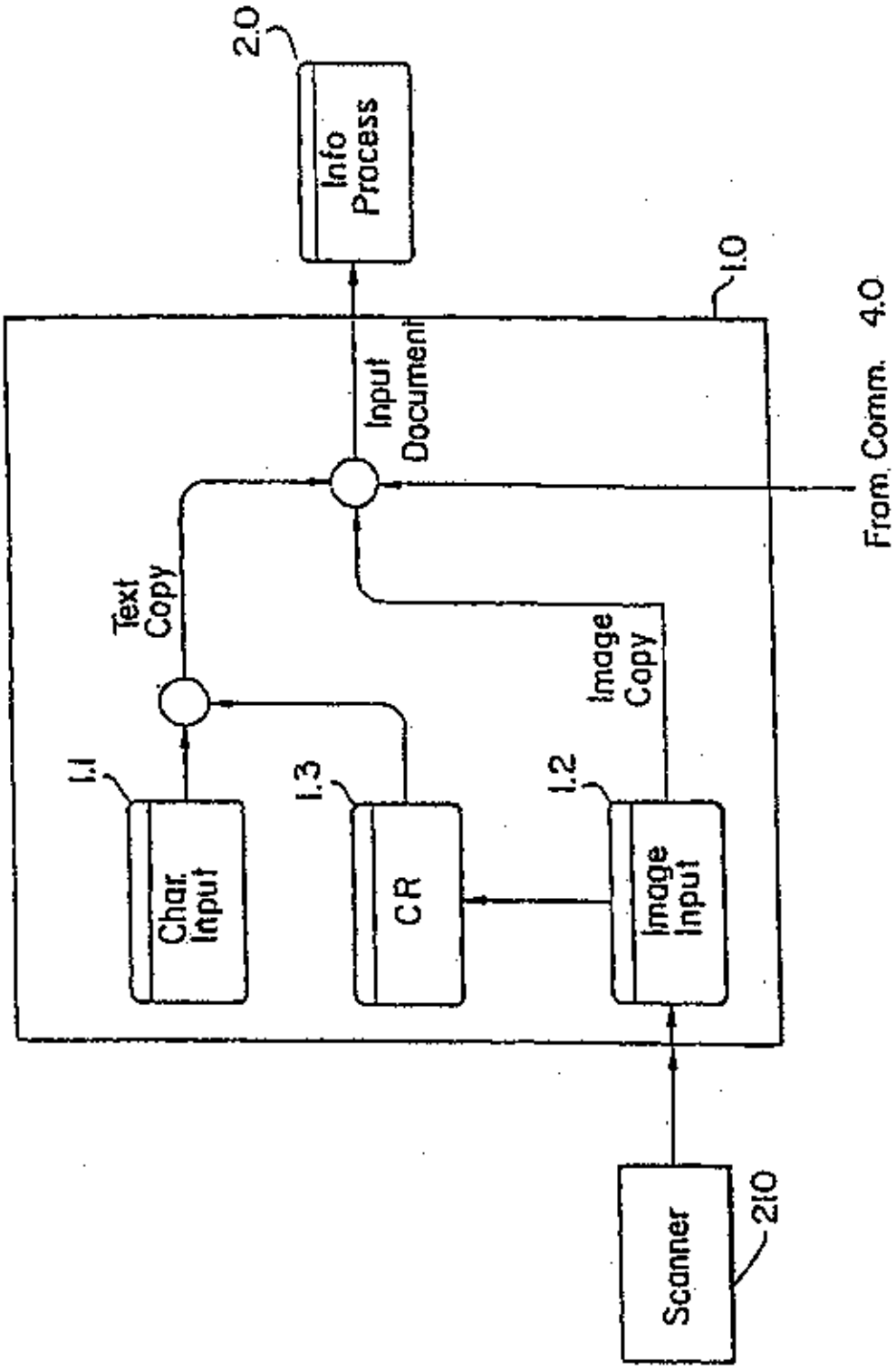

2.0
Info Process
1.0
Input Document
From Comm. 4.0
Text Copy
Image Copy
1.1
Char. Input
1.3
CR
1.2
Image Input
Scanner
210

FIG. 5

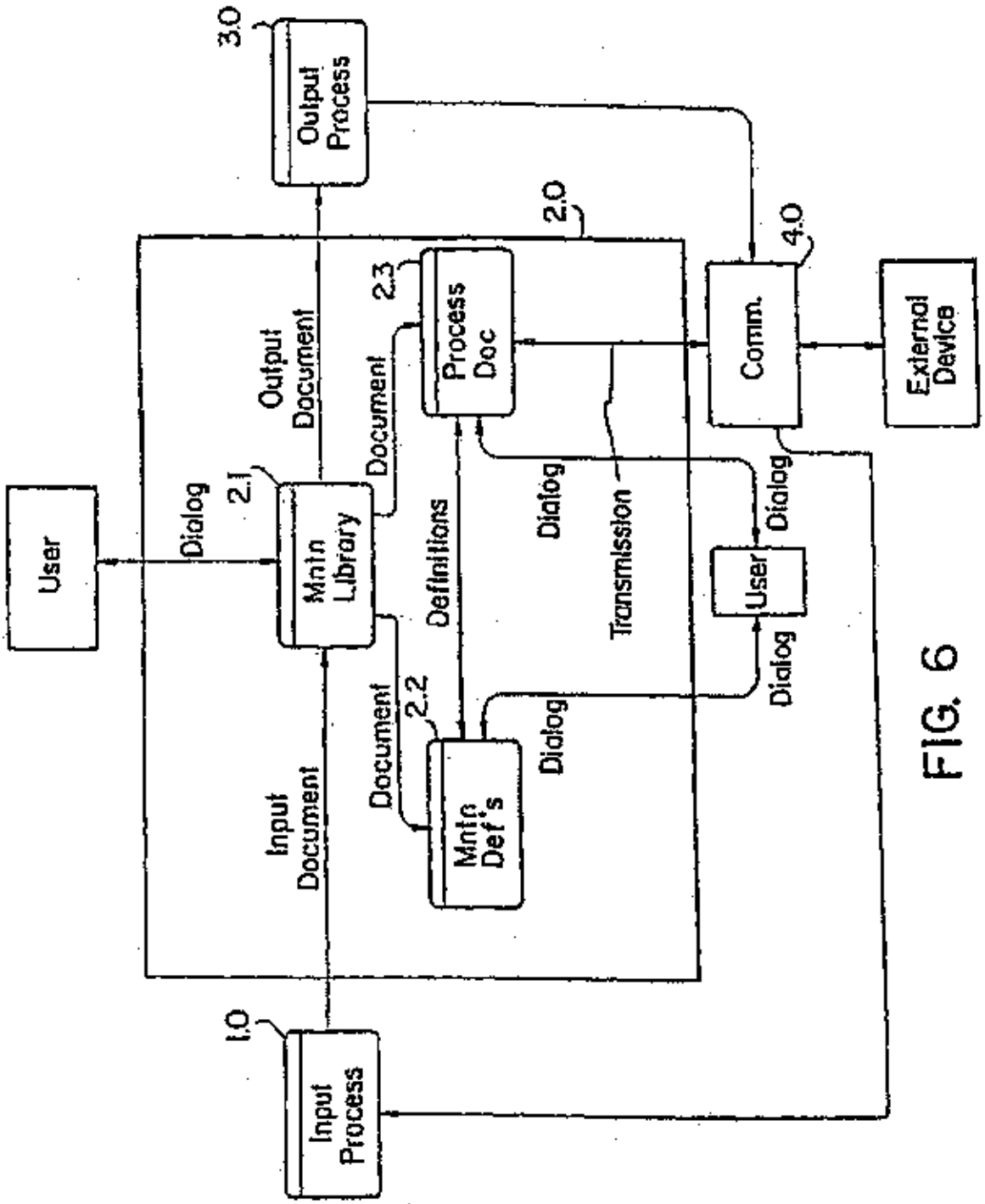

3.0
Output Process
2.0
4.0
2.3
Process Doc
Comm.
External Device
Output Document
Document
Dialog
2.1
Mntn Library
Definitions
Dialog
Transmission
Dialog
User
User
Dialog
Document
2.2
Mntn Def's
Dialog
Input Document
1.0
Input Process

FIG. 6

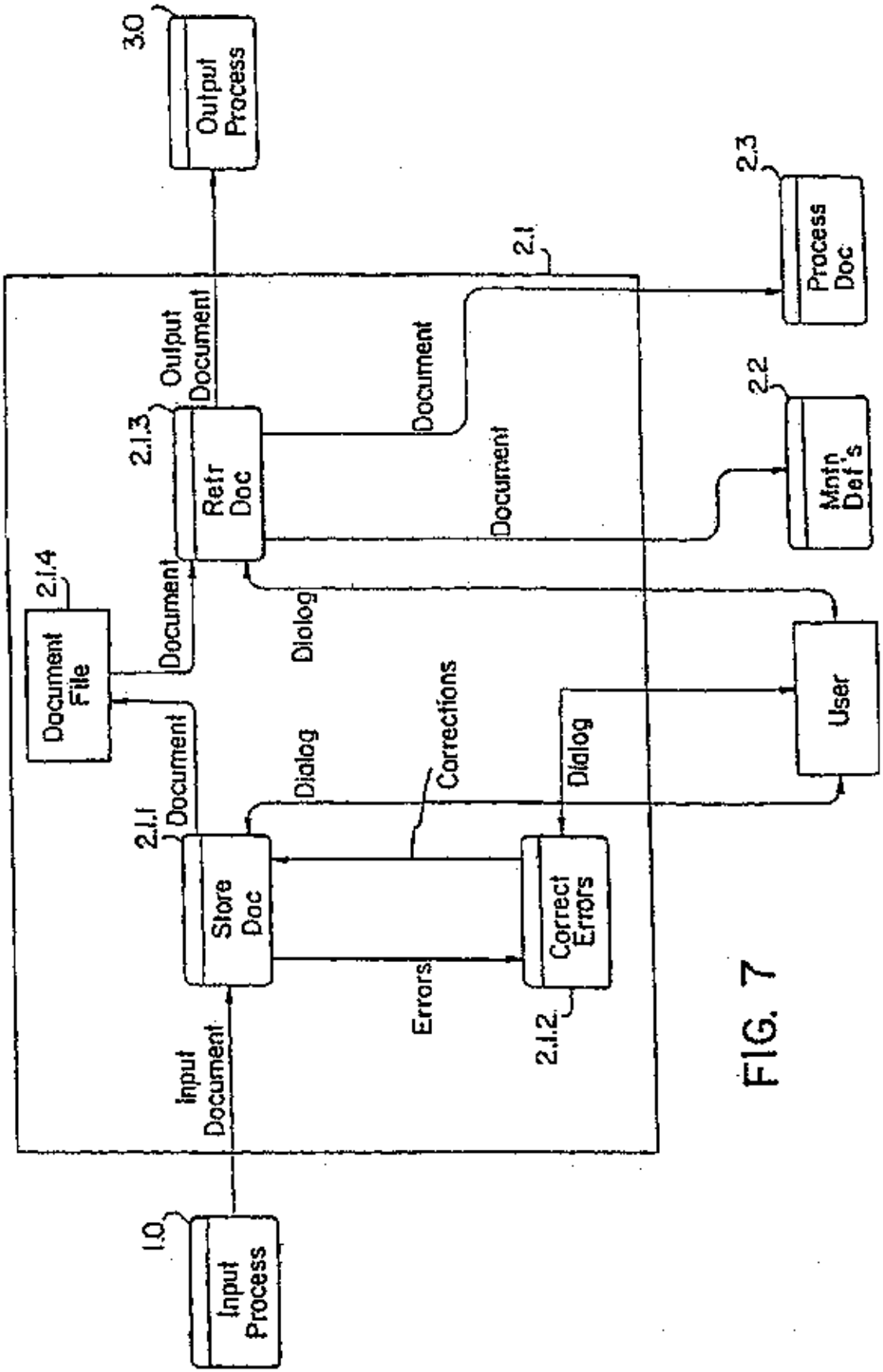

3.0
Output Process
2.3
Process Doc
2.1
Output Document
Document
2.1.3
Refr Doc
2.2
Mntn Def's
Document
2.1.4
Document File
Document
Dialog
User
Dialog
Corrections
Dialog
Document
2.1.1
Store Doc
Correct Errors
Errors
2.1.2
Input Document
1.0
Input Process

FIG. 7

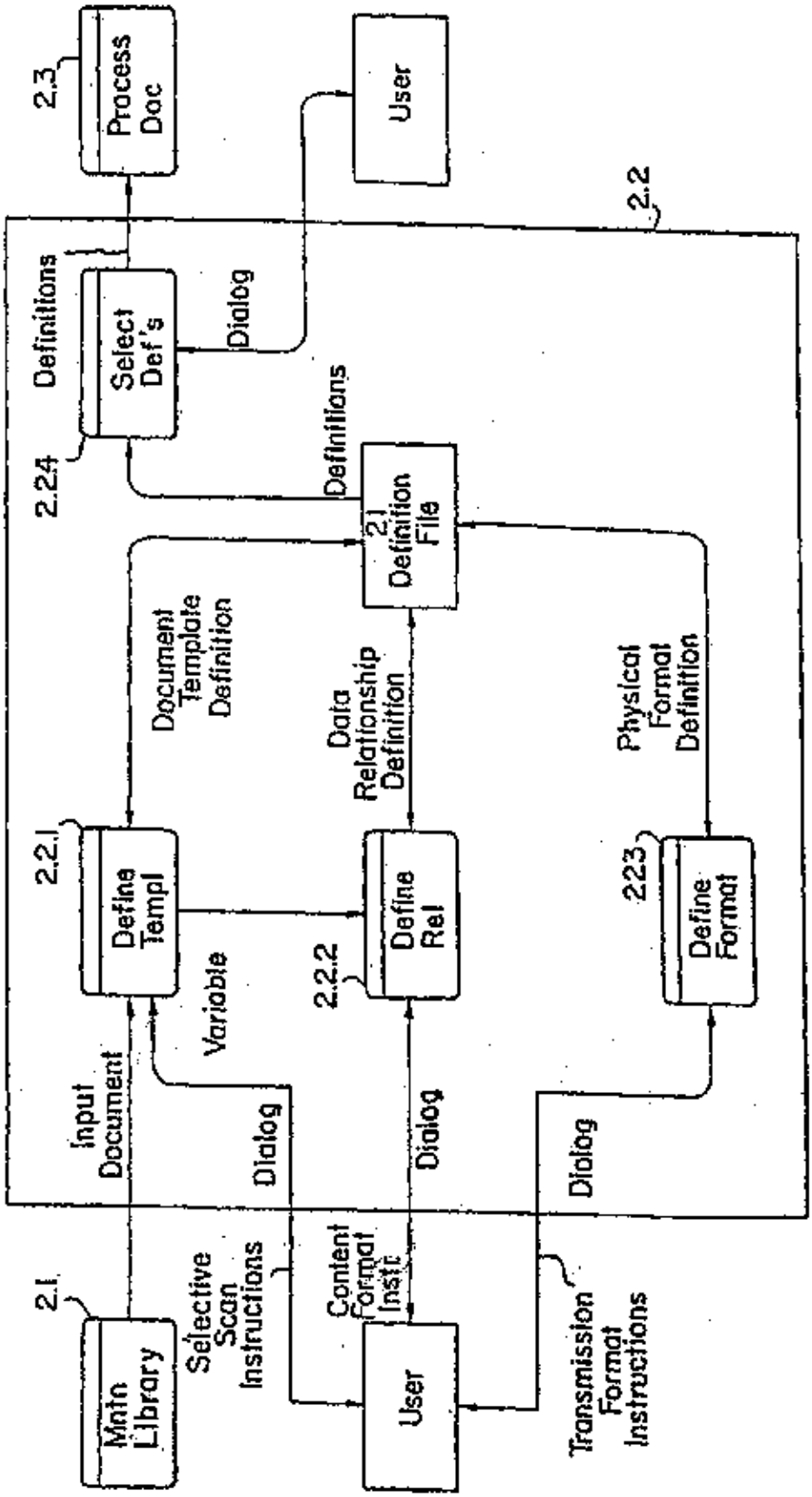

2.3
Process Doc
User
2.2
Definitions
Select Def's
Dialog
2.24
Definitions
2.1 Definition File
Document Template Definition
Data Relationship Definition
Physical Format Definition
2.2.1
Define Templ
2.2.2
Define Rel
223
Define Format
Variable
Input Document
Dialog
Dialog
Dialog
2.1
Main Library
Selective Scan Instructions
Content Format Instr.
User
Transmission Format Instructions

FIG. 8

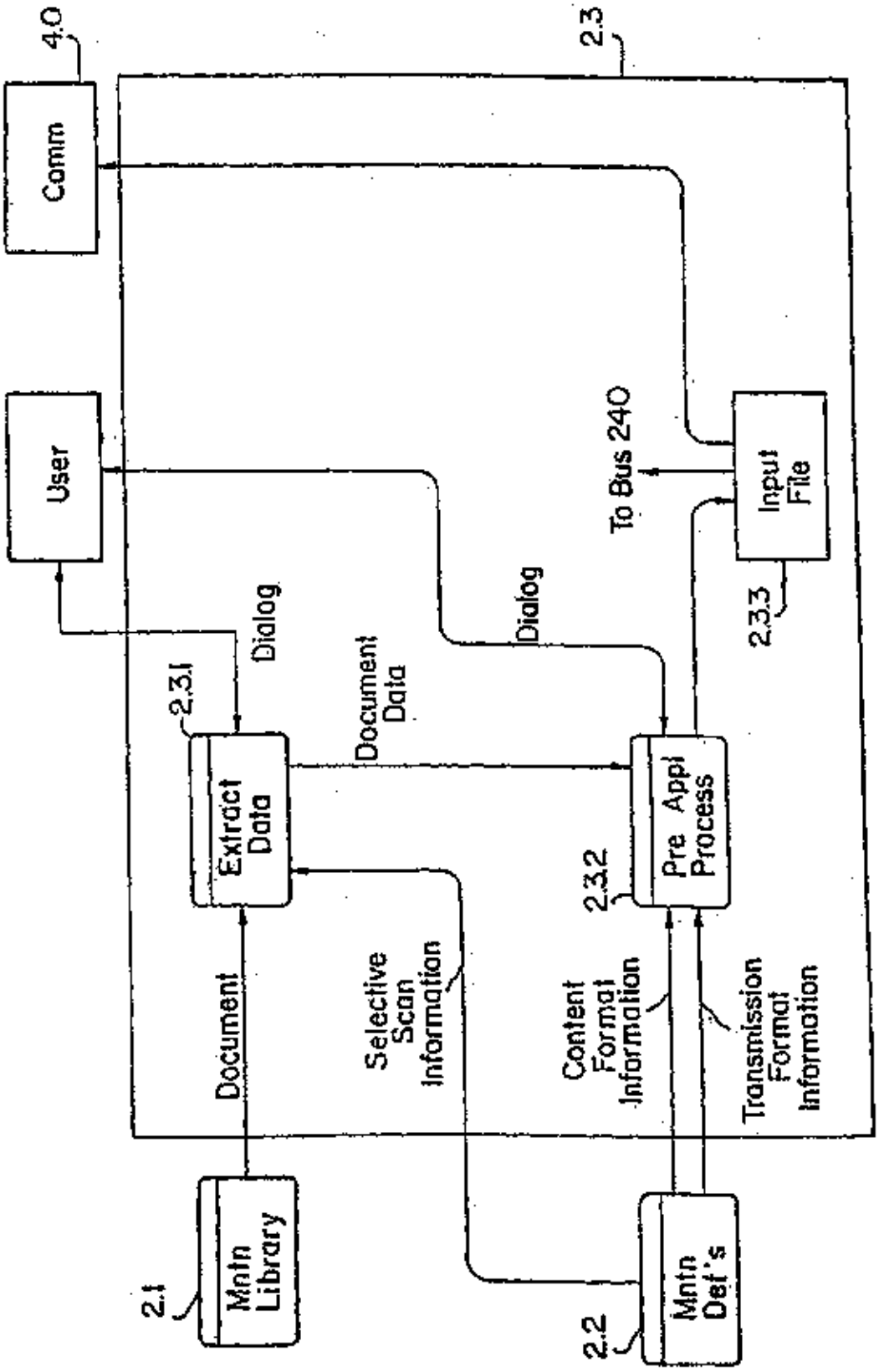

4.0
Comm
2.3
User
To Bus 240
Input File
2.3.3
Dialog
Dialog
2.3.1
Extract Data
Document Data
Pre Appl Process
2.3.2
Document
Selective Scan Information
Content Format Information
Transmission Format Information
2.1
Mntn Library
2.2
Mntn Def's

FIG. 9

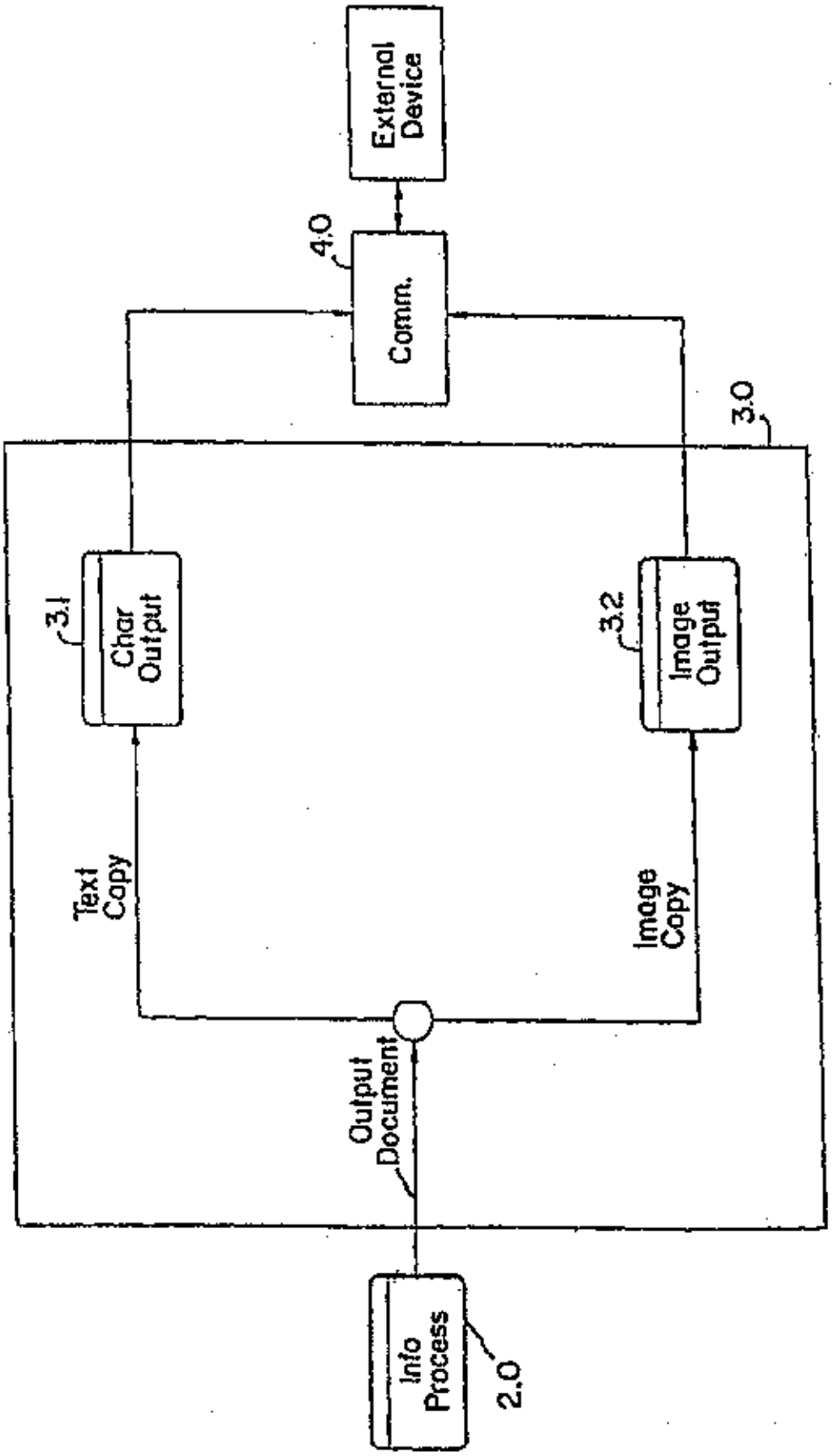

External Device
4.0
Comm.
3.0
3.1
Char Output
3.2
Image Output
Text Copy
Image Copy
Output Document
Info Process
2.0

FIG. 10

FIG. 11

Variable Name	Value
Vendor	XYZ Corporation
Heading 2	2
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

FIG. 12A

Variable Name	Value
Vendor	XYZ Corporation
Account Number	123456789
Statement Date	12/01/86
Payment Date	1/01/87
Previous Balance	$1234.56
New Charges	$789.01
Debits	
Finance Charges	$2.34
Payments	$1000.00
New Balance	$1025.91

FIG. 12B

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG. 12C

Variable Name	Value
Mail To	XYZ Corporation PO Box 567 Anywhere, NY 63130
Previous Balance	$1234.56

FIG.13A

```
> 1 > 1 >1 > "XYZ Corporation"
> 2 > 2 > 25 >+ 123456789 >
> 3 > 2 > 1 > D12 / 01 / 86 >
> 4 > 2 > 11 > D12 / 15 / 86 >
> 5 > 2 > 21 > D01 / 01 / 87 >
> 6 > 10 > 25 > $1234.56 >
> 7 > 11 > 25 > $789.01 >
> 8 > 13 > 25 > $2.34 >
> 9 > 14 > 25 > $1000.00 >
> 10 >16 > 25 > $1025.91 >
```

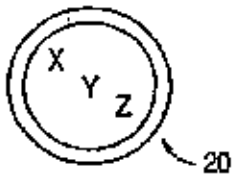
FIG.13B

```
> 1 > 1 >1 > $1234.56 >
> 2 > 2 > 1 > "XYZ Corporation"
> 3 > 3 > 1 > "PO Box 567"
> 4 > 4 > 1 > "Anywhere, NY  63130"
```

FIG.13C

```
/ 1 / 1 /1 / $1234.56 / /
/ 2 / 2 / 1 / *XYZ Corporation*
/ 3 / 3 / 1 / *PO Box 567*
/ 4 / 4 / 1 / *Anywhere, NY  63130*
```

FIG. 14



XYZ Corporation

Customer

ABC Corporation
123 Sixteenth Street
Hometown, NJ 88981

Mail To:

△ XYZ Corporation
PO Box 567
Anywhere, NY 63130 △

Account Number 123456789

Statement Date: ○ 12/01/86 ○

Payment Date: 1/01/87

Previous Balance	$1234.56
New Charges	□ $789.01 □
Other Debits	
Finance Charges (10%)	$2.34
Payments	$1000.00
Other Credits	
New Balance	$1025.91

WINTER SALE IN EFFECT THROUGHOUT JANUARY:

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INFORMATION PROCESSING METHODOLOGY

This application is a continuation of application Ser. No. 10/704,484, filed Nov. 6, 2003, which is a continuation of application Ser. No. 09/458,162, filed Dec. 9, 1999, which is a continuation of application Ser. No. 09/044,159, filed Mar. 19, 1998 (now U.S. Pat. No. 6,094,505), which is a continuation of application Ser. No. 08/487,150, filed Jun. 7, 1995 (now U.S. Pat. No. 5,768,416), which is a divisional of Ser. No. 08/348,224, filed Nov. 28, 1994 (now U.S. Pat. No. 5,625,465), which is a continuation of Ser. No. 08/143,135, filed Oct. 29, 1993 (now U.S. Pat. No. 5,369,508), which is a continuation of Ser. No. 07/672,865, filed Mar. 20, 1991 (now U.S. Pat. No. 5,258,855).

BACKGROUND OF THE INVENTION

The invention is directed to a system for efficiently processing information originating from hard copy documents. More specifically, the invention is directed to a hard copy document to application program interface which minimizes the need to manually process hard copy documents.

In the past, information contained on hard copy documents was manually entered into a computer via the input controller of a particular computer. The original document was then filed away for future reference. Automatic input of data was limited to the input of Magnetic Ink Character Recognition (MICR) data and to Optical Character Recognition (OCR) data. This fixed-position data was forwarded directly to a dedicated computer application specifically designed to accommodate the input format. In more recent years, typewritten text has been mechanically inputted into a computer via a text file. Examples of this latter type of system are word processors and photo-typesetters.

These conventional systems have limitations which decrease the efficiency of processing information from a hard copy document. For example, the systems discussed above are limited in their application to MICR, OCR, or typewritten data. Parsing and processing data is limited to the particular requirements of the particular computer application which requires the input data. In addition, in these conventional systems, the actual hard copy document must be retained for future reference at great expense.

In a sophisticated computer network, different users may require different portions of the information contained on a hard copy document. For example, if the hard copy document is an invoice returned with payment of a bill, the accounting department may need all of the monetary information contained on the bill while the mailroom may need only customer address information, to update a customer's address. Therefore, there is a need for a system in which specific information from a hard copy document can be selectively distributed to various users.

Another problem with conventional systems is that users, even within the same company, may require that the information extracted from a hard copy document be transmitted to a particular application program in a specific transmission format. For example, one department in a company may use a particular application program which must receive information using a particular character as a delimiter and other departments may require the information in a different format using different delimiters.

Another problem, particularly for small businesses, is that current systems can not efficiently accommodate the inputting of information from a diversity of hard copy documents.

A large business which receives many forms in the same format can afford a system which inputs a high volume of information in that format into memory. For example, it is cost-effective for a bank which processes hundreds of thousands of checks a month to buy a dedicated machine which can read information off of checks having a rigidly defined, or fixed, format. However, as the diversity of forms received by a business increases relative to the number of forms that must be processed, it becomes less cost-effective to design a dedicated machine for processing each type of form format. This problem is particularly significant in small businesses which may, for example, receive fifty invoices a month, all in different, non-fixed, formats. It is frequently not cost-effective for a small business to design dedicated systems for inputting information in each of these various formats. This leaves a small business with no other practical alternative than to manually input the information off of each invoice each month.

SUMMARY OF THE INVENTION

It is an object of the invention, therefore, to provide an application program interface which allows a user to select specific portions of information extracted from a diversity of hard copy documents and allows the user to direct portions of this information to several different users in accordance with the needs of the particular user.

It is also an object of the invention to provide a cost-effective system for inputting hard copy documents which can accommodate hard copy documents in a diversity of formats.

It is another object of the invention to provide an application program interface which allows a user to put information, which is to be transmitted, into a particular transmission format, based upon the needs of the receiver of the information.

It is a further object of the invention to provide an application program interface which will allow the extraction, selection, formatting, routing, and storage of information from a hard copy document in a comprehensive manner such that the hard copy document itself need not be retained.

It is another object of the invention to provide a system which reduces the amount of manual labor required to process information originating from a hard copy document.

A further object of the invention is to reduce the time required to process information originating from a hard copy document so that a higher volume of transactions involving hard copy documents can be processed.

The invention provides an application program interface which inputs a diversity of hard copy documents using an automated digitizing unit and which stores information from the hard copy documents in a memory as stored document information. Portions of the stored document information are selected in accordance with content instructions which define portions of the stored document information required by a particular application unit. Selected stored document information is then formatted into the transmission format used by the particular application program based on transmission format instructions. The transmission formatted selected stored document information is then transmitted to the particular application program. The hard copy documents may contain textual information or image information or both.

The interface operates in three different modes.

In a first mode, the interface extracts all of the information from hard copy documents and stores this information in

memory. Parsing of various portions of the extracted information is performed in accordance with content instructions.

In a second mode, the user operates interactively with the interface by use of a display and an input device, such as a mouse. In this second mode, a hard copy document is inputted and displayed on the display. The interface then prompts the user to identify the location of various information. For example, the interface can ask the user to identify the location of address information on the hard copy document. In response, the user positions the mouse to identify address information using a cursor. The identified information is then stored as address information in memory. Subsequently, the interface again prompts the user to identify other pieces of information, which are then stored in the appropriate locations in memory. This process proceeds until all of the information which is desired to be extracted off of the hard copy document is stored in memory.

In a third mode of operation, selected portions of information are extracted off of hard copy documents in accordance with predetermined location information which has been specified by the user. For example, the user can define a template which specifies the location of information on hard copy documents. Templates can be formed in conjunction with second mode operation. Alternatively, the user can instruct the interface to search hard copy documents for a particular character or symbol, located on the hard copy documents. The information desired to be extracted off of the hard copy documents is specified relative to the location of this character or symbol.

The interface can also prompt or receive from an applications program or another information processing system, required information, content instructions, and format instructions.

Other objects, features, and advantages of the invention will be apparent from the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in further detail below with reference to the accompanying drawings, in which:

FIG. **1** illustrates hardware for implementing a preferred embodiment of the instant invention;

FIG. **2** illustrates an example of a hard copy document containing information to be processed by the instant invention;

FIGS. **3**A and **3**B are enlarged views of the computer of FIG. **1** used to explain how the invention interactively prompts a user to identify information;

FIG. **4** is an overall data flow diagram for the FIG. **1** preferred embodiment;

FIG. **5** is a detailed input data flow diagram for the FIG. **1** preferred embodiment;

FIG. **6** is a detailed information processing data flow diagram for the FIG. **1** preferred embodiment;

FIG. **7** is a more detailed information processing data flow diagram for the maintain library module of FIG. **6**;

FIG. **8** is a more detailed information processing data flow diagram for the maintain definitions module of FIG. **6**;

FIG. **9** is a more detailed information processing data flow diagram for the process document module of FIG. **6**;

FIG. **10** is a detailed output data flow diagram for the FIG. **1** preferred embodiment;

FIG. **11** lists data corresponding to the hard copy document of FIG. **2**;

FIGS. **12**A, **12**B, and **12**C illustrate examples of data which can be selected from the extracted data of FIG. **11** in accordance with content instructions;

FIGS. **13**A, **13**B, and **13**C illustrate examples of the data of FIGS. **12**A, **12**B, and **12**C formatted in accordance with various transmission format instructions to form input files; and

FIG. **14** illustrates another example of a hard copy document containing information to be processed by the instant invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hardware

The invention provides an interface between information originating from a hard copy document and a computer application unit which uses the information. The computer application unit can be a particular computer application program or a device which is controlled in accordance with instructions or information from the hard copy document. The invention also allows storing a copy of the hard copy document in a memory and retrieving the copy of the hard copy document. By providing a comprehensive and integrated system which can accommodate almost all of the possible uses of information contained on a hard copy document, the instant invention allows for a paperless office.

The invention includes hardware and software necessary to extract, retrieve, and process information from the hard copy document. A copy of the actual image of the hard copy document is stored in memory. Textual information extracted from the hard copy document is also stored in memory. Textual information is information, such as alphanumeric characters, which is recognized on the hard copy document and which is stored in a form which corresponds to the particular recognized character. For example, the extracted characters can be stored in the ASCII format in an electronic memory.

The user can have all of the information extracted from the hard copy document and stored in memory. Alternatively, the interface can interactively prompt the user to identify specific pieces of information for storage. The interface can also extract specific pieces of information using a predefined template. The interface can also prompt or receive from another information processing system or an applications program desired information, content instructions, and format instructions.

The instant invention also provides for parsing information extracted from the hard copy document and for directing this parsed information to specific users or application programs as an input file.

The invention also permits the user to define the transmission format of the input file for a particular computer application unit.

FIG. **1** illustrates hardware for implementing a preferred embodiment of a hard copy document to application program interface according to the instant invention. The interface **200** processes information extracted off of hard copy document **100** and provides information to application units **270** in a form required by each particular application unit. The interface extracts information off of a hard copy document **100** utilizing a scanner **210**. The scanner **210** can be any type of scanner which extracts information off of hard copy documents, for example, an Optical Reader.

The scanned information is stored in a scanner memory **220** or in main memory **250**, as will be described in greater

detail below. If main memory **250** or another memory is available to store the scanned information, then scanner memory **220** can be omitted.

The information from scanner memory **220** or main memory **250** is transmitted to computer **230**. In the preferred embodiment, computer **230** includes a display **232**, a keyboard **234**, and a mouse **236**. The display **232** displays an image of the hard copy document itself and/or information necessary to process the information extracted off of the hard copy document.

The computer **230** is used to select portions of the stored document information contained in memory in accordance with content instructions which define portions of the stored document information required by an application unit. These content instructions may be provided by the application program. Alternatively, the content instructions can be inputted via an input device such as a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

The computer **230** is also used to format selected stored document information into the transmission format used by an application unit based on transmission format instructions. The transmission format instructions may be provided by the application program. Alternatively, the transmission format instructions can be inputted via a keyboard, a touch screen, a mouse, a notepad, a voice recognition device, or the like.

Thus, the computer **230** is used to generate an input file for a particular application unit. The computer **230** is connected to scanner memory **220**, main, or permanent, memory **250**, a printer **260**, and application units **270**, via bus **240**. Although FIG. **1** illustrates use of a bus to connect components together, it is understood that any routing or connecting link, implemented in hardware or software or both, can be employed instead of, or in addition to, a bus. Instructions to or in the computer **230** control the main memory **250**, the printer **260**, the application units **270**, and the bus **240**. Instructions to or in computer **230** can also control exchanges of information with scanner memory **220**.

When the computer **230** generates an input file for a particular document, the computer **230** can send this input file directly to an application unit or can store this input file in the main memory **250** until required by an application unit. The main memory **250** may also optionally store a copy of the image information for the hard copy document and the textual information for the hard copy document. Thus, the image information and textual information from the hard copy document can be retrieved and printed out on printer **260**. In addition, image and textual information stored in scanner memory **220** or in main memory **250** can be used to form additional input files at the time of input or at a later time, based on content instructions and transmission format instructions. Thus, the invention can, at the discretion of the user, eliminate the need to retain copies of hard copy documents, permitting a paperless office.

The application units **270** include particular application programs and devices which are controlled in accordance with information contained on hard copy document **100**.

FIG. **2** illustrates an example of a hard copy document **100** which contains information to be processed by the instant invention. The document illustrated in FIG. **2** is a bill from XYZ Corporation to customer ABC Corporation. FIG. **2** is only an example of a type of document that can be processed by the instant invention.

In a first operational mode, the scanner **210** stores all of the information extracted off of hard copy document **100** in the scanner memory **220** or, alternatively, in main memory **250**. The extracted information is stored in two forms. The actual image of the hard copy document **100** is stored as image information in the scanner memory **220**. In addition, the scanner memory **220** stores textual information recognized on the hard copy document **100** by, for example, employing standard character recognition software. In the preferred embodiment, the textual information is stored in ASCII format. The scanner memory **220** can be, for example, an electronic, magnetic, or optical memory.

FIG. **3A** illustrates an enlarged view of the computer **230** of FIG. **1**. This view will be used to describe a second mode of operation. In this second mode of operation, the hard copy document **100** is scanned and a copy of the document **100** is displayed on display **232** of computer **230**, based on the contents of information temporarily stored in scanner memory **220**. After the document is displayed on display **232**, the computer **230** interactively prompts the user to identify the location of specific pieces of information on the hard copy document. In the FIG. **3A** illustration, this prompt message is indicated as the message beginning with the arrow.

For example, the prompt message can ask the user to identify the location of account number information on the hard copy document. The user then uses an input device, such as keyboard **234** or mouse **236** or a touch screen, notepad, voice recognition device, or other input device to position a cursor on the display to identify the location of the information requested by the prompt message. For example, the cursor could be used to define a block (which could be highlighted) containing the requested information, followed by a mouse "enter" click. In this example, the user would move the mouse to identify the location of the account number information contained on the hard copy document **100**. The computer **230** then stores the information which has been identified by the user as account number information in the appropriate address or subfile or as the appropriate variable or parameter in memory. The computer then prompts the user to identify the location of other information on the hard copy document, such as, statement date information. The process proceeds until all of the desired information has been stored into the appropriate locations in memory.

FIG. **3B** illustrates a variation of the second mode for interactively prompting the user for information. In FIG. **3B**, the display is split into two portions. A left-hand portion **232L** displays the image of the hard copy document and a right-hand portion **232R** displays the required application program information. For example, in FIG. **3B**, portion **232R** displays a spreadsheet used by an application program. While observing the split display, the user can input instructions to associate specific pieces of information on the hard copy document (for example, the vendor name indicated by the mouse arrow **232A**) with particular subfiles in memory (for example, the vendor field next to which the cursor **232C** appears), using a mouse or other input device(s) or both. The split display also allows the user to generate content format instructions while observing the information required for a particular application program on the right-hand portion.

These second modes of operation are efficient for small businesses which receive a small number of a wide variety of invoices, since the user does not necessarily have to store all of the information that appears on the hard copy document. A further advantage is that data input is quicker, easier, and more accurate than with previous keyboard methodology. In addition, by specifying the location on the hard copy document of information, the user may optionally create a template, to be described in further detail below, for each

different type of invoice. This template is stored for future use when another hard copy document in the same format is received.

More specifically, instructions from computer **230** can direct the scanner **210** and scanner memory **220**, and/or main memory **250**, to scan and/or store only specific portions of hard copy document **100**. After the interactive prompts required to obtain information for a desired application program, the unused information stored in scanner memory **220** or **250** can be erased. Further, scanning of a second identical document can be limited to only those portions of the document which contain needed information.

More specifically, in FIG. **2**, the lines **10** drawn around certain portions of the document represent the areas which the user has previously identified as the portions of a document to be extracted by the scanner **210** and stored in scanner memory **220** and/or main memory **250**. Since the logo **20** and the message **30** have not been identified as an area to be scanned and stored, these areas are not scanned and stored in subsequent documents. Since the user has previously associated each of the areas **10** with a specific subfile of information, e.g., the account number, the scanned information is stored in memory locations corresponding to that subfile.

Data Processing

FIGS. **4**–**10** illustrate the flow of data in the FIG. **1** preferred embodiment. FIG. **4** illustrates the overall data flow for the FIG. **1** preferred embodiment. The preferred embodiment includes an input process module **1.0**, an information processing module **2.0**, and an output processing module **3.0**. The information processing module **2.0** is equipped to receive instructions from and transmit information to a user. The information processing module **2.0** can also transmit to and receive information from a remote external device through communication interface **4.0**. Input process module **1.0** and output processing module **3.0** can also access communication interface **4.0**. A module is implemented in hardware, software, or a combination of hardware and software. The specific implementation for a particular business application depends upon a variety of factors, for example, the relative costs of hardware and software implemented systems, the frequency with which a user will want to expand or modify the system, and the like.

FIG. **5** is a more detailed diagram of the input process module **1.0** of FIG. **4**. The input process module **1.0** includes a character input module **1.1**, an image input module **1.2**, and, in the preferred embodiment, a character recognition device **1.3**. The character input module inputs textual information, such as alphanumeric characters, from an input device such as keyboard **234**. The image input module **1.2** inputs image information, for example, a digitized image of the actual appearance of hard copy document **100**. Textual information can include textual input from an input device such as keyboard **234** and textual information extracted from the document by character recognition device **1.3**. Both types of information comprise an input document which is transmitted to information processing module **2.0**. In the FIG. **1** preferred embodiment, the processing performed by input process module **1.0** occurs in scanner memory **220**, computer **230**, and main memory **250**.

FIG. **6** illustrates information processing data flow for the FIG. **1** preferred embodiment, that is, FIG. **6** illustrates data flow in the information processing module **2.0**.

The information processing module **2.0** includes a maintain library module **2.1**, to be described in further detail below in conjunction with FIG. **7**, a maintain definitions module **2.2**, to be described in further detail below in conjunction with FIG. **8**, and a process document module **2.3** to be described in further detail below in conjunction with FIG. **9**.

The information processing module **2.0** is the module which coordinates and drives the entire system. In the preferred embodiment, the information processing module **2.0** is implemented primarily by computer **230**.

FIG. **7** illustrates information processing data flow in the maintain library module **2.1**. The maintain library module **2.1** maintains a library of image information, for example, a digitized image representing the actual appearance of the hard copy document, and textual information of the hard copy documents for reference during processing. This library can be incorporated within scanner memory **220**, main memory **250**, or another independent memory, for example, a RAM disk. The maintain library module **2.1** includes a store document module **2.1.1**, a correct errors module **2.1.2**, a retrieve document module **2.1.3**, and a document file **2.1.4**. These modules operate collectively to store, retrieve, and correct document information.

The store document module **2.1.1**, prior to routing the document to the document file **2.1.4**, may provide information on recognition errors which may have occurred while inputting the document. For example, the store document module **2.1.1** identifies that a character contained on hard copy document **100** was not recognized. The store document module **2.1.1** also optionally causes a copy of the document and its parsing to be displayed on the display **232** for confirmation by the user. The user may utilize this opportunity to identify any errors in the displayed document and, in conjunction with the correct errors module **2.1.2**, to revise the document's parsing, if necessary, prior to storage of the document in memory. The module **2.1.1** also provides a facility for the user to name a particular hard copy document for cataloging, storage, and retrieval purposes. After the document is named, the store document module **2.1.1** stores copies of the document in the document file **2.1.4**.

The correct errors module **2.1.2** processes instructions from the user to correct errors identified by the store document module **2.1.1** and errors that have been spotted by the user during the confirmation process.

The retrieve document module **2.1.3** permits the user to retrieve a copy of a document previously stored in the document file **2.1.4**. As described above, long-term storage is provided by main memory **250**, if necessary.

FIG. **8** illustrates a more detailed information processing data flow diagram for the maintain definitions module **2.2** of FIG. **6**. The maintain definitions module **2.2** allows the user to define system and document parameters and maintains the definitions of these system and document parameters. The maintain definitions module **2.2** includes a define template module **2.2.1** which allows the user to specify the location of information on the document. This information provided by the user defines a template which is used to extract information off the document and to associate the extracted information with a particular variable or subfile. These templates are illustrated by boxes **10** in the FIG. **2** example of a hard copy document. The maintain definitions module **2.2** can also access templates previously defined by the user and stored in main memory **250**. Templates can also be provided as part of software packages developed by program developers.

The maintain definitions module **2.2** also includes a define relationships module **2.2.2**. The define relationships module **2.2.2** allows the user to define data relationships, or logical

relationships, between pieces of information extracted from the hard copy document. These pieces of information are then used to generate an input file for a selected computer application unit. The user defines these relationships by content instructions. Alternatively, content instructions to define relationships can be provided by application software. If the user provides these content instructions, the content instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. Examples of content instructions, data, and logical relationships will be described in further detail in conjunction with FIGS. **11** and **12**A, **12**B, and **12**C.

The maintain definitions module **2.2** also includes a define format module **2.2.3**. The define format module **2.2.3** allows the user to define transmission formats for an input file which is then transmitted to a selected computer application unit. Selection of the transmission format of the input file is accomplished by the user through use of transmission format instructions. Alternatively, the applications software itself can generate its own transmission format instructions. When the user must specify transmission format instructions, the transmission format instructions are inputted via keyboard **234** or via another input device such as a notepad, a voice recognition device, or the like. A further description of various transmission formats will be provided below in conjunction with FIGS. **12**A, **12**B, **12**C, **13**A, **13**B, and **13**C.

A select definitions module **2.2.4** is also included in the maintain definitions module **2.2**. The select definitions module **2.2.4** allows the user to store and select a set of definitions to be used for processing the document. The definitions identify pieces of information on the document by, for example, absolute location, variable location, or relative location, or by proximity to key words and/or symbols. These definitions are described in further detail below by way of an illustrative example.

FIG. **9** illustrates a more detailed information processing data flow diagram for the process document module **2.3**. The process document module **2.3** processes the document after the document has been stored in the system. The process document module **2.3** gathers the appropriate information which has been stored, and creates input file(s) **2.3.3** for the selected application unit. The process document module **2.3** then transmits the input file(s) via bus **240** and/or communication interface **4.0** to an application unit **270**, an output device such as printer **260**, or to main memory **250**.

The process document module **2.3** includes an extract data module **2.3.1**. This module extracts data off of the document in accordance with the user's instructions, for example, the user-defined template, or through the interactive mode.

The process document module **2.3** also includes a preapplication process module **2.3.2** which gathers and associates information extracted from the document in accordance with content instructions. This module prompts the user for any additional information required to satisfy the relationships defined by the content instructions. The preapplication process module **2.3.2** also places the selected information into the transmission format defined by the transmission format instructions.

The preapplication process module **2.3.2** also generates the input file **2.3.3** for the selected application in accordance with the appropriate instructions. The input file **2.3.3** is then transmitted to bus **240** and/or communication interface **4.0** for transmission to a particular application unit **270**.

FIG. **10** illustrates a detailed output data flow diagram for output module **3.0**. Output module **3.0** outputs a textual and/or image copy of the document. In the FIG. **1** preferred embodiment, output module **3.0** is implemented by printer **260**, associated software, and associated interface circuitry.

Operation

Examples of operation of a preferred embodiment will now be described.

The user enters the system by providing instructions to the information processing module **2.0**. The user then instructs the information processing module **2.0** to conduct maintain library processing, maintain definitions processing, or process document processing.

If the user selects maintain library processing, the user then provides instructions to maintain or modify the document library through the maintain library module **2.1**. For example, the user can direct the inputting and storage of a hard copy document **100** or can retrieve and output a document. The user requests inputting of a document through the store document module **2.1.1**. The system then prompts the user to specify a storage location for the inputted document. The document is then read-in by the input process module **1.0**. A textual copy and/or an image copy are stored into the document file **2.1.4**. Errors which have occurred during inputting are identified and corrected by the correct errors module **2.1.2** and the user. The corrections are reflected in the document information stored in document file **2.1.4**.

The retrieve document module **2.1.3** is used to retrieve and output a document. The system prompts the user to specify the storage location of a document and the type of document copy, for example, a textual or an image copy, to be outputted. The document is then outputted by the output process module **3.0**.

If the user initially selected maintain definitions processing, the user would instruct the system to maintain and/or modify parameter definitions through the maintain definitions module **2.2**. For example, the user can define and maintain a document template for extracting selected portions of information off of the hard copy document. The user can use the template to extract selected portions of information off of the hard copy document when the document is originally inputted, or alternatively, the user can use the template to identify selected portions of information for extraction off of an image copy of the document. In creating the template, the user identifies pieces of information on the document to be extracted and assigns a variable name, or subfile, to each piece of data.

The location of data to be extracted can be defined in a number of ways other than by use of a template. For example, the user can designate the absolute location of information on the document with respect to a grid overlaid on the document, e.g., always on line 3, starting in column 1. The user can also identify information by specifying the relative location of information to be extracted, e.g., always two lines below the piece of data named "salutation", starting in column 3. The user can also specify the location of information to be extracted by variable location specification. For example, if the hard copy document is a letter, the module would conduct a key word search for the term "Dear Sir:". Wherever this term "Dear Sir:" is located, this piece of data would be associated with the variable specified by the user, for example, the variable "salutation." In addition, a defined set of conventional symbols can be used to signify certain recurring data items for the convenience of users of the instant invention. For example, a "@" symbol can be used to delineate the vendor name as follows:

"@XYZ Corporation@". Other examples of the use of symbols to delineate information will be described with reference to FIG. 14.

The maintains definition module 2.2 is also used to maintain data relationships in accordance with content instructions and to maintain input file formats in accordance with transmission format instructions. Relationships are defined and maintained between pieces of data, specified by, for example, the names of variables, through the define relationships module 2.2.2. The names of pieces of data on the document are retrieved by, for example, the define template module 2.2.1, and are passed to the define relationships module 2.2.2. The user may then provide any additional pieces of data needed to generate an input file for a particular application program or unit, such as an input file line number. The user, the applications software, and/or instructions previously stored in memory then establishes the contents of the input file by defining relationships between pieces of data using content instructions. Specific examples of content instructions will be discussed below in conjunction with FIGS. 11, 12A, 12B, 12C, 13A, 13B, and 13C.

The user and/or the applications software defines and maintains the transmission format of the input file to be used by a particular application program or unit through the define format module 2.2.3 in accordance with transmission format instructions. This is accomplished by defining the parameters to be used by the preapplication process module 2.3.2 in generating an input file. Parameters which would typically be required to generate an input file would include the character type, e.g., text or pixel; delimiters used between pieces of data, e.g., a slash or a semicolon; end of line characters, e.g., a carriage return or a line feed; and end of file characters. Examples of transmission formats will be described in further detail below in conjunction with FIGS. 11, 12A, 12B, 12C, 13A, 13B and 13C.

If the user initially selected process document processing, the interface will then proceed to process the document through use of the process document module 2.3. For example, the user can extract specific portions of data from an image copy of a document, can generate an input file for transmission to an application program, or can directly process information interactively with an application program.

If the user desires to extract specific portions of data from an image copy of a hard copy document which has already been stored in memory, the user uses the extract data module 2.3.1 to identify a document to be processed. The document is then retrieved by the retrieve document module 2.1.3 and passed to the extract data module 2.3.1. The user can also select parameter definitions through the select definitions module 2.2.4.

The selected document template or parameter definition is passed to the extract data module 2.3.1. The extract data module 2.3.1 extracts pieces of data from the image copy of the document, as defined by the document template definition or the parameter definitions or both. This document data is then passed to preapplication process module 2.3.2.

The interface generates input file(s) 2.3.3 by use of the preapplication process module 2.3.2. The selected data relationship definition, as defined by the content instructions, and the selected record format definitions, as defined by the transmission format instructions, are passed to the preapplication process module 2.3.2. The preapplication process module 2.3.2 assembles the input file in accordance with the content instructions. The preapplication process module 2.3.2 also prompts the user for any additional pieces of data which need to be provided by the user. The input file is converted to the desired transmission format in accordance with the transmission format instructions. This physically formatted data is then stored in the input file 2.3.3.

The user can also use an application program to process information by loading the particular application program into the computer 230 rather than by sending the input file to a remote application unit 270.

An illustrative example of the processing described above will now be described.

The user inputs instructions via keyboard 234 or another input device which indicate that the user desires to input and store a document. The computer 230 then prompts the user for the name of the document. In this example, the user desires to input the document of FIG. 2 and therefore names the document "XYZ Corp. Bill Dec. 1, 1986." The computer then prompts the user to feed the hard copy document 100 into the scanner 210. The image of the hard copy document is displayed on display 232. The computer then prompts the user to identify the account number on the document. By use of the mouse 236 or other input device to position a cursor on the display, the user indicates the location of the account number. The account number is then read-in to a subfile named "Account Number." This process proceeds until all of the desired information has been read-in and stored.

In this particular example, no errors were encountered while inputting the document. The user then directs that the document be stored for future reference in a document file.

Some time later, the user desires to retrieve and output the document and to generate input files based on information from the document. The computer 230 prompts the user for the name of the document and the type of output. The user responds with "XYZ Corp. Bill Dec. 01, 1986 " for a printed textual copy. The document is then retrieved from the document file and passed to the printer 260 for printing.

In order to generate an input file for a specific application program, the user selects the option to define a document template for use when each month's XYZ Corporation bill arrives. Accordingly, the user instructs the system to display a copy of an XYZ Corporation bill on the display 232. The user then identifies pieces of data by absolute locations. That is, the user assigns specific names to information located at specific portions of the document. In this example, the user would input the following information:

Vendor-text, line 1, one line, column 1, 80 characters;

Account number-numeric, line 6, one line, column 25, 9 characters;

Statement date-date, line 9, one line, column 25, 8, characters;

Payment date-date, line 11, one line, column 25, 8 characters;

Previous balance-currency, line 7, one line, column 75, 9 characters;

New charges-currency, line 8, one line, column 75, 9 characters;

Other debits-currency, line 10, one line, column 75, 9 characters;

Finance charges-currency, line 12, one line, column 75, 9 characters;

Payments-currency, line 13, one line, column 75, 9 characters;

Other credits-currency, line 14, one line, column 75, 9 characters;

New balance-currency, line 15, one line, column 75, 9 characters.

The user also identifies data with variable locations. In this particular example, a variable location is specified as follows:

Heading 2-line, value="Mail To:"

The identification of Heading 2 as line information means that the system will search for occurrences of the character string "Mail To:" and assign the line number which contains this character string to Heading 2.

The user also identifies data by relative locations. In this example, the user identifies the following relative location:

Mail To-text, Heading 2+1, 3 lines, column 60, 25 characters per line.

The instructions above instruct the system to assign the textual information beginning on one line after Heading 2 and continuing for 3 lines, in column 60, to the Mail To subfile.

As an alternative to inputting the actual line, column, and character numbers, the user can identify desired portions of the document by blocking, or highlighting, the desired portions using the mouse or other input device. In this case, the computer converts the highlighted portions into corresponding line, column, and character numbers.

FIG. 11 lists data corresponding to the hard copy document of FIG. 2 and the associated variable or subfile names.

Next, the user desires to define data relationships in accordance with content instructions. Examples of the type of contents which can be specified by a user are illustrated in FIGS. 12A, 12B, and 12C.

In this particular example, three separate departments of ABC Corporation require information from the XYZ Corporation bill. The first department requires vendor, account number, statement date, payment date, previous balance, new charges, debits, finance charges, payments, and new balance information. The second and third departments require mail to information and previous balance information. Each of these departments have their own application program which utilizes this information.

The user employs content instructions to designate how pieces of information, which have been extracted off of hard copy document 100, are directed to particular departments, that is, particular application programs. FIG. 12A illustrates the contents of the information to be transmitted to the first department. FIG. 12B illustrates the information to be transmitted to the second department. FIG. 12C illustrates the information to be transmitted to the third department. The content instructions, therefore, parse the information shown in FIG. 11 to various application programs, as shown by FIGS. 12A, 12B, and 12C. Content instructions can also be used to identify additional pieces of data which are required for the input files of the particular application programs. In this particular example, the specific application programs from the three departments all require numeric record number information, numeric horizontal position information, numeric vertical position information, and date received information. The horizontal and vertical position information is used by the application program to specify the location of the received information on a spreadsheet application program, in this example. The user may know in advance the content format required by each application program, that is, in this example, the location and type of information specified on the spreadsheet. The user may also employ the split display mode described with reference to FIG. 3B to generate content format instructions.

Using the content instructions, the user establishes the following contents for the input file corresponding to FIG. 12A:

Record number, horizontal position, vertical position, vendor;

Record number, horizontal position, vertical position, account number;

Record number, horizontal position, vertical position, statement date;

Record number, horizontal position, vertical position, date received;

Record number, horizontal position, vertical position, payment date;

Record number, horizontal position, vertical position, previous balance;

Record number, horizontal position, vertical position, new charges;

Record number, horizontal position, vertical position, finance charges;

Record number, horizontal position, vertical position, payments;

Record number, horizontal position, vertical position, new balance.

Next, transmission format instructions are employed to define the transmission format of the input file for a specific application program or unit. FIG. 13A illustrates the transmission input file corresponding to FIG. 12A. FIG. 13B illustrates the transmission input file corresponding to FIG. 12B. FIG. 13C illustrates the transmission input file corresponding to FIG. 12C. A comparison of FIGS. 12B and 12C reveals that FIGS. 12B and 12C have the same contents. However, the information illustrated in FIG. 12B is being sent to a different application program than the information in FIG. 12C. These application programs require different transmission input formats, as illustrated in FIG. 13B and 13C. More specifically, the application program that receives the input file illustrated in FIG. 13B uses the greater than sign as a delimiter whereas the application program which receives the transmission input file shown in FIG. 13C uses a back-slash as the delimiter.

After the contents and the transmission format for the input file have been, defined, and any additional information has been inputted, the input file is assembled and transmitted to the particular application program.

FIG. 14 illustrates another example of a hard copy document containing information to be processed by the instant invention. The hard copy document illustrated in FIG. 14 is first scanned and information from the hard copy document is stored into a memory. The interface 200 then identifies portions of the hard copy document corresponding to various variables by recognizing a defined set of symbols. In the FIG. 14 example, triangles delineate the mailing address, circles delineate the statement date, and squares delineate the new charges. Information from these portions of the hard copy document is stored in the corresponding memory locations or subfiles for each variable. The same set of symbols can be used to identify the same information from one document to the next. Thus, even if the physical formats of documents are not fixed from one document to the next, a diversity of hard copy documents can be processed without manually inputting data by recognition of the defined symbols.

Examples of readily available application programs are Quicken and Lotus 1,2,3 both of which are widely utilized in the business community. Quicken, for example is an easy-to-utilize program for writing checks and preparing business records. Payee, amount and address information

may readily be transmitted from scanner memory 220 and/or main memory 250 to the Quicken application program for check writing functions and ledger keeping purposes. Lotus is a well known spreadsheet program which may process data input into specified cells once this data is placed in conventional Lotus format.

Thus, the instant invention provides an integrated and comprehensive system for handling information from a hard copy document, thus permitting a paperless office. In addition, the invention permits data, extracted off of a hard copy document, to be easily manipulated into various logical and transmission formats required by a particular application unit. The invention also provides a low cost system for inputting information from a wide variety of hard copy documents into a memory.

The foregoing description has been set forth merely to illustrate preferred embodiments of the invention and is not intended to be limiting. Modifications are possible without departing from the scope of the invention.

For example, letters, checks, forms, pictures, reports, music scores, film, and other types of hard copy documents can be processed by the invention for accounts payable/receivable accounting, inventory control, record keeping, budgeting, data base management, music transcription, forms processing, computerized art, survey and questionnaire processing, statistical data analysis, correspondence processing and other applications.

Other automated digitizing units can be used in addition to or as an alternative to use of the scanner **210** as an input unit. Any electrical, magnetic, or optical device which extracts information off of a hard copy document, thereby eliminating the need to manually input significant amounts of information from the hard copy document is suitable for use as an automated digitizing unit. In addition, information can be input by user responses and digital and analog signals generated from various devices, and from computer files from other computer systems. Suitable hardware for inputting data includes a keyboard, a light pen, a mouse, a touch screen, a laser scanner, a microphone, a tablet, a disk drive, a magnetic tape drive, and a modem.

The interface **200** can also output information in forms other than a hard copy of textual or image information. For example, the interface **200** can output system responses, computer files, and digital and analog signals for transmission to other computer systems or to control systems. Suitable hardware for outputting information includes a disk drive, a magnetic tape drive, a cathode ray tube, a plasma screen, a printer, a plotter, a film developer, an amplifier, and a modem.

Since modifications of the described embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the scope of the invention should be limited solely with respect to the appended claims and equivalents.

What is claimed is:

1. A method of doing business utilizing a computer system configurable to automatically extract information according to content instructions from an electronic document template file displayed on a first computer to a plurality of application programs running on at least one other computer and transmit said information according to customizable transmission format instructions to at least one field requiring said transmitted information in at least one application program running on said at least one other computer to enable a commercial transaction between a buyer and a seller.

2. The method as recited in claim **1** wherein the transaction involves a physical good.

3. The method as recited in claim **1** wherein the transaction involves a service.

4. The method as recited in claim **1** wherein the transaction involves copyrighted material.

5. The method as recited in claim **1** in which said first computer and at least on other computer are part of a distributed computing system.

6. The method as recited in claim **1** wherein said automatic extracting step automatically parses said information to said at least one field in said application program.

7. The method as recited in claim **1** wherein content instructions are automatically generated during said automatically extracting step.

8. The method as recited in claim **7** wherein said content instructions are automatically generated using a mouse function.

9. The method as recited in claim **7**, wherein said content instructions are automatically generated using speech recognition.

10. The method as recited in claim **7** wherein said content instructions are automatically generated based on interaction by the user with at least one of said first and at least one other computer.

11. The method as recited in claim **1** wherein said extracted information comprises billing information.

12. The method as recited in claim **1** wherein said extracted information comprises financial information.

13. The method as recited in claim **1** wherein said extracted information comprises personal information.

14. The method as recited in claim **1** wherein said extracted information comprises customer information.

15. A method of doing business utilizing a computer system configurable to automatically extract information according to content instructions from an electronic document template file displayed on a first computer to a plurality of application programs running on at least one other computer and to transmit said information according to format instructions to at least one field requiring said transmitted information in at least one application program running on at least one other computer to enable a commercial transaction between a buyer and a seller.

16. The method as recited in claim **15** wherein the transaction involves a physical good.

17. The method as recited in claim **15** wherein the transaction involves a service.

18. The method as recited in claim **15** wherein the transaction involves copyrighted material.

19. The method as recited in claim **15** in which said first computer and at least one other computer are part of a distributed computing system.

20. The method as recited in claim **15** wherein said automatic extracting step automatically parses said information to said at least one field in said application program.

21. The method as recited in claim **15** wherein content instructions are automatically generated during said automatically extracting step.

22. The method as recited in claim **21** wherein said content instructions are automatically generated using a mouse function.

23. The method as recited in claim **21**, wherein said content instructions are automatically generated using speech recognition.

24. The method as recited in claim **21** wherein said content instructions are automatically generated based on interaction by the user with at least one of said first and at least one other computer.

25. The method as recited in claim 15 wherein said extracted information comprises billing information.

26. The method as recited in claim 15 wherein said extracted information comprises financial information.

27. The method as recited in claim 15 wherein said extracted information comprises personal information.

28. The method as recited in claim 15 wherein said extracted information comprises customer information.

29. A method of doing business by automatically extracting information from an electronic document template file displayed on a first computer and transmitting said information to at least one of a plurality of application programs running on at least one other second computer according to customizable transmission format instructions, said at least one other application program requiring said transmitted information to enable a commercial transaction between a buyer and a seller.

30. The method as recited in claim 29 wherein the transaction involves a physical good.

31. The method as recited in claim 29 wherein the transaction involves a service.

32. The method as recited in claim 29 wherein the transaction involves copyrighted material.

33. The method as recited in claim 29 in which said first computer and at least one other computer are part of a distributed computing system.

34. The method as recited in claim 29 wherein said automatic extracting step automatically parses said information to said at least one field in said application program.

35. The method as recited in claim 29 wherein content instructions are automatically generated during said automatically extracting step.

36. The method as recited in claim 35 wherein said content instructions are automatically generated using a mouse function.

37. The method as recited in claim 35, wherein said content instructions are automatically generated using speech recognition.

38. The method as recited in claim 35 wherein said content instructions are automatically generated based on interaction by the user with at least one of said first and at least one other computer.

39. The method as recited in claim 29 wherein said extracted information comprises billing information.

40. The method as recited in claim 29 wherein said extracted information comprises financial information.

41. The method as recited in claim 29 wherein said extracted information comprises personal information.

42. The method as recited in claim 29 wherein said extracted information comprises customer information.

43. A method of doing business by extracting information from a file displayed on a first computer, said file configurable to transmit information to a plurality of application programs running on at least one other computer and transmitting said information according to format instructions to at least one application program on said at least one other computer to enable a commercial transaction between a buyer and a seller.

44. The method as recited in claim 43 wherein the transaction involves a physical good.

45. The method as recited in claim 43 wherein the transaction involves a service.

46. The method as recited in claim 43 wherein the transaction involves copyrighted material.

47. The method as recited in claim 43 in which said first computer and at least one other computer are part of a distributed computing system.

48. The method as recited in claim 43 wherein said automatic extracting step automatically parses said information to said at least one field in said application program.

49. The method as recited in claim 43 wherein content instructions are automatically generated during said automatically extracting step.

50. The method as recited in claim 49 wherein said content instructions are automatically generated using a mouse function.

51. The method as recited in claim 49, wherein said content instructions are automatically generated using speech recognition.

52. The method as recited in claim 49 wherein said content instructions are automatically generated based on interaction by the user with at least one of said first and at least one other computer.

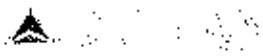
53. The method as recited in claim 43 wherein said extracted information comprises billing information.

54. The method as recited in claim 43 wherein said extracted information comprises financial information.

55. The method as recited in claim 43 wherein said extracted information comprises personal information.

56. The method as recited in claim 43 wherein said extracted information comprises customer information.

* * * * *



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Flight number From To

OR

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Flight notifications

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```
<div class="[illegible]">
<h3 style="[illegible]">Book flights online &... earn 500 bonus miles</h3>
```

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        onClick="[illegible]" />
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       </div>

      <div style="[illegible]">
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        <input type="[illegible]" id="[illegible]" name="[illegible]" value="" tabindex="[illegible]" />
        <a href="#" onFocus="[illegible]" onClick="[illegible]"><img class="[illegible]" src="[illegible]
      </div>
      <div style="[illegible]">
        <label for="[illegible]">To</label>
        <input type="[illegible]" id="[illegible]" name="[illegible]" value="" tabindex="[illegible]" />
        <a href="#" onFocus="[illegible]" onClick="[illegible]"><img class="[illegible]" src="[illegible]
      </div>

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        <option VALUE="[illegible]">Feb
        <option VALUE="[illegible]">Mar
        <option VALUE="[illegible]" SELECTED>Apr
        <option VALUE="May">May
        <option VALUE="[illegible]">Jun
        <option VALUE="[illegible]">Jul
        <option VALUE="[illegible]">Aug
        <option VALUE="[illegible]">Sep
        <option VALUE="[illegible]">Oct
        <option VALUE="[illegible]">Nov
        <option VALUE="[illegible]">Dec

        </select>
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        <option VALUE="[illegible]">02
        <option VALUE="[illegible]">03
        <option VALUE="[illegible]">04
        <option VALUE="[illegible]">05
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        <option VALUE="[illegible]">07
        <option VALUE="[illegible]">08
        <option VALUE="[illegible]">09
        <option VALUE="[illegible]">10
        <option VALUE="11">11
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        <option VALUE="[illegible]">13
        <option VALUE="[illegible]">14
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<option VALUE="24">24
<option VALUE="25">25
<option VALUE="26">26
<option VALUE="27">27
<option VALUE="28">28
<option VALUE="29">29
<option VALUE="30">30
<option VALUE="31">31

</select>
                    <a href="#" onFocus="blur()" onClick="openCalendar('RetCal','departureforoptions[2]',document.forms[0].departureforoptions[2].selectedIndex,'departureforoptions[1]',document.forms[0].departureforoptions[1].selectedIndex);return false;">
</div>
<div style="display:inline;">
  <label for="departureforoptions[3]">Time</label>
  <select style="display:inline;" id="departureforoptions[3]" name="departureforoptions[3]" tabindex="6">
        <option VALUE="ALL" SELECTED>anytime
    <option VALUE="AM">morning
    <option VALUE="NN">noon
    <option VALUE="PM">afternoon
    <option VALUE="EV">evening
    <option VALUE="01A">1am
    <option VALUE="02A">2am
    <option VALUE="03A">3am
    <option VALUE="04A">4am
    <option VALUE="05A">5am
    <option VALUE="06A">6am
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    <option VALUE="09A">9am
    <option VALUE="10A">10am
    <option VALUE="11A">11am
    <option VALUE="12N">12pm
    <option VALUE="01P">1pm
    <option VALUE="02P">2pm
    <option VALUE="03P">3pm
    <option VALUE="04P">4pm
    <option VALUE="05P">5pm
    <option VALUE="06P">6pm
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    <option VALUE="08P">8pm
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    <option VALUE="10P">10pm
    <option VALUE="11P">11pm
    <option VALUE="12M">12am

  </select>
</div>
<div style="display:inline;" id="returnDate">
  <label for="returnMonth">Return</label>
  <select id="returnMonth" name="departureforoptions[4]" tabindex="7">
        <option VALUE="Jan">Jan
    <option VALUE="Feb">Feb
    <option VALUE="Mar">Mar
    <option VALUE="Apr" SELECTED>Apr
    <option VALUE="May">May
    <option VALUE="Jun">Jun
    <option VALUE="Jul">Jul
    <option VALUE="Aug">Aug
    <option VALUE="Sep">Sep
    <option VALUE="Oct">Oct
    <option VALUE="Nov">Nov
    <option VALUE="Dec">Dec

  </select>
  <select style="display:inline;" id="returnDay" name="departureforoptions[5]" tabindex="8">
        <option VALUE="01">01
    <option VALUE="02">02
    <option VALUE="03">03
    <option VALUE="04">04
    <option VALUE="05">05
    <option VALUE="06">06
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    <option VALUE="11">11
    <option VALUE="12">12
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    <option VALUE="14">14
    <option VALUE="15">15
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    <option VALUE="26">26
    <option VALUE="27">27
    <option VALUE="28">28
    <option VALUE="29">29
    <option VALUE="30">30
    <option VALUE="31">31

  </select>
                    <a href="#" onFocus="blur()" onClick="openCalendar('RetCal','departureforoptions[4]',document.forms[0].departureforoptions[4].selectedIndex,'departureforoptions[5]',document.forms[0].departureforoptions[5].selectedIndex);return false;">
```

```
          </div>
          <div style="..." id="...">
            <label for="...">Time</label>
            <select style="..." id="..." name="..." tabindex="1">
                  <option VALUE="A" SELECTED>anytime
              <option VALUE="AM">morning
              <option VALUE="P">noon
              <option VALUE="1P">afternoon
              <option VALUE="2P">evening
              <option VALUE="1A">1am
              <option VALUE="2A">2am
              <option VALUE="3A">3am
              <option VALUE="4A">4am
              <option VALUE="5A">5am
              <option VALUE="6A">6am
              <option VALUE="7A">7am
              <option VALUE="8A">8am
              <option VALUE="9A">9am
              <option VALUE="10A">10am
              <option VALUE="11A">11am
              <option VALUE="12P">12pm
              <option VALUE="1P">1pm
              <option VALUE="2P">2pm
              <option VALUE="3P">3pm
              <option VALUE="4P">4pm
              <option VALUE="5P">5pm
              <option VALUE="6P">6pm
              <option VALUE="7P">7pm
              <option VALUE="8P">8pm
              <option VALUE="9P">9pm
              <option VALUE="10P">10pm
              <option VALUE="11P">11pm
              <option VALUE="12A">12am

            </select>
          </div>

          <div>
            <input type="..." style="..." class="..." id="..." name="..." value="..." tabindex="..."><...>
          </div>

          <div style="...">
            <label for="...">Passengers</label>
                              <select style="..." id="..." name="..." tabindex="...">
                  <option VALUE="1" SELECTED>1
              <option VALUE="2">2
              <option VALUE="3">3
              <option VALUE="4">4
              <option VALUE="5">5
              <option VALUE="6">6
              <option VALUE="7">7

                              </select>
          </div>


          <div style="...">
            <label for="..."><a href="#" onClick="...">Cabin</a></label>
                              <select style="..." id="..." name="..." onChange="...">
              <option value="..."     selected >Coach (Lowest fares)
              <option value="..."     >Coach (Discounted)
              <option value="..."     >Coach (Flexible)
              <option value="..."     >First/Business
                              </select>
          </div>


          <div style="...">
            <input type="checkbox" style="..." class="..." id="..." name="..." value="...">
              tabindex="..." />
            <label for="..." class="..."><a href="#" onClick="...
          </div>
          <div style="...">


            <input type="image" style="..." src="..." alt="..." title="..." ta
          </div>
          </fieldset>
        </form>
        </div>
      </div>
```

```
      <script language="..." src="..." type="..."></script>
      <script language="..." src="..."></script>
      <script language="..." src="..." type="..."></script>
```

Claim Chart for Claim 1 of the 7,075,673 Patent

A system configurable to input information from an electronic document template displayed on a display of a first computer into a plurality of application programs operable on another computer in which said template automatically generates content instructions to extract data and to transmit said data to at least one field in at least one of said plurality of application programs according to customizable transmission format instructions which are dependent upon and compatible with said at least one application program, operating on said other computer, that is receiving said transmitted data.	The http://www.delta.com/ website ("Website") includes technology for displaying in a browser a web page that contains fields for receiving information input therein. For example, the Website uploads to the browser HTML code that causes the browser to display on a customer's computer the HTML document found at http://www.delta.com/home/index.jsp that contains a form into which a customer seeking to book a flight on Delta can enter information, i.e., city, date and time of departing flight, that will be transmitted to an application program running on a web server associated with the Website. To process the entered information, the browser interprets code contained in the HTML form to automatically generate computer-executable instructions (content instructions) that identify and extract the information entered into the HTML document that is required by the application program running on the web server. The system also defines the format and protocol, i.e., POST and http for the aforementioned web page, used to transmit the extracted information required by the particular application program (customizable transmission format instructions).

Claim Chart for Claim 1 of the 7,184,162 Patent

A method of doing business utilizing a computer system configurable to automatically extract information according to content instructions from an electronic document template file displayed on a first computer to a plurality of application programs running on at least one other computer and transmit said information according to customizable transmission format instructions to at least one field requiring said transmitted information in at least one application program running on said at least one other computer to enable a commercial transaction between a buyer and a seller.	The http://www.delta.com/ website ("Website") includes technology for displaying in a browser a web page that contains fields for receiving information input therein. For example, the Website uploads to the browser HTML code that causes the browser to display on a customer's computer the HTML document found at http://www.delta.com/home/index.jsp that contains a form into which a customer seeking to book a flight on Delta can enter information, i.e., city, date and time of departing flight, that will be transmitted to an application program running on a web server associated with the Website. To process the entered information, the browser interprets code contained in the HTML form to automatically generate computer-executable instructions (content instructions) that identify and extract the information entered into the HTML document that is required by the application program running on the web server. The system also defines the format and protocol, i.e., POST and http for the aforementioned web page, used to transmit the extracted information required by the particular application program (customizable transmission format instructions) thereby enabling a commercial transaction between the customer and Delta.