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Method of assigning and displaying promotional messages for electronic price labels

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ABSTRACT

An electronic price label (EPL) (22) stores promotional messages and corresponding promotional indicators in its memory. A controlling computer transmits a promotional indicator to the EPL. The EPL compares the promotional indicator in the message with the promotional indicators stored within the memory, and, if a match is found, displays the associated promotional message.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

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Invention Title: "METHOD OF ASSIGNING AND DISPLAYING PROMOTIONAL MESSAGES FOR ELECTRONIC PRICE LABELS"

The following statement is a full description of this invention, including the best method of performing it known to us:-

(File: 20047.00)

METHOD OF ASSIGNING AND DISPLAYING PROMOTIONAL MESSAGES FOR ELECTRONIC PRICE LABELS

The present invention relates to electronic signage, and more specifically to a method of displaying promotional messages by electronic price labels (EPLs).

EPL systems typically include a plurality of EPLs for each merchandise item in a store. EPLs typically display the price of corresponding merchandise items on store shelves and are typically attached to a rail along the leading edge of the shelves. A store may contain thousands of EPLs to display the prices of the merchandise items. The EPLs are coupled to a central server from where information about the EPLs is typically maintained in an EPL data file. Price information displayed by the EPLs is obtained from the PLU (price look up) file.

During special promotions, EPL systems cannot display the correct price, particularly in the case of promotions such as "buy one, get one free" (BOGO). For example, if the cost of an item is one dollar during a BOGO promotion, the manager of the transaction establishment cannot display a price of fifty cents to imply that each of two purchased items is fifty cents, nor can the manager display a price of one dollar to imply that two purchased items may be purchased for one dollar.

Thus, a promotional message which is printed on a paper shelf talker or bib and which explains the promotion must be placed adjacent the EPL for the item. However, paper shelf talkers must be installed manually, thereby increasing the cost and setup time associated with special promotions.

It is an object of the present invention to overcome, or at least substantially ameliorate one or more of the disadvantages of the prior art.

According to the invention there is provided a method of assigning a selected promotional message to an electronic price label (EPL) associated with an item, including the steps of:

(a) storing the selected promotional message and a corresponding first promotional indicator in a memory within the EPL;

(b) receiving a second promotional indicator from a controlling computer by the EPL;

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(c) comparing the first and second promotional indicators by the EPL;

(d) displaying the selected promotional message by the EPL if the first and second promotional indicators are equal.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram of a transaction management system;

Fig. 2 is a perspective view of an EPL displaying a promotional message;

Fig. 3 is a block diagram of a system for producing a PLU file reader program;

Fig. 4 is a flow diagram illustrating how the PLU file reader is created;

Fig. 5 is a flow diagram illustrating the operation of the PLU file reader program as it is used to obtain promotional indicators from a PLU data file;

Fig. 6 is a flow diagram illustrating a method of displaying promotional messages by an EPL; and

Fig. 7 is a flow diagram illustrating in more detail how an EPL displays a particular promotional message intended for that EPL.

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In Fig. 1, transaction system 10 preferably includes host computer system 12, point-of-service (POS) system 14, and EPL system 16.

POS system 14 preferably includes bar code scanner 18 and terminal 20.

EPL system 16 preferably includes EPLs 22, host EPL computer 24, and EPL storage medium 26.

EPLs 22 are typically attached to shelves and other locations within a store and include a data register 54, a control circuit 53, and a display 56. Data registers 54 contain data, usually the price of an item associated with an EPL on the shelves. Data register 54 may additionally contain a promotional message.

Control circuit 53 controls the internal operation of EPLs 22. Control circuit 53 receives and stores messages from EPL computer 24 and transmits response messages to EPL computer 24. Control circuit 53 also controls the display of price and promotional messages, including blinking.

Display 56 displays price and promotional messages. Display 56 is preferably a liquid crystal display (LCD).

Host EPL computer 24 executes EPL software 30, which maintains the contents of EPL data file 32. EPL software 30 includes application programming interface (API) 33, which has hooks to operating system 52 or POS software 31. For example, a commercially-available API exists for the UNIX, WindowsNT, and OS/2 operating systems of Novell, Microsoft, and IBM, and the UNITY POS software of NCR Corporation. EPL software 30 includes a suit of independent applications 35 which all have hooks to API 33.

Host EPL computer 24 also executes PLU file reader 38, which is compiled to run on operating system 52 and/or on POS software 31, depending on the needs of

the transaction establishment. PLU file reader 38 directly accesses PLU information in PLU data file 44, as an alternative to maintaining a duplicate of PLU data file 44. The PLU information is preferably price information.

PLU file reader 38 is linked to API 33 through inter-process communications and includes PLU file reading routine 43 which works with API 33 to cause POS software 31 or operating system 52 to read PLU data file 44 and transfer PLU information to electronic price label (EPL) software 30. Eliminating the need for a duplicated file also eliminates the possibility of price mismatch occurring between PLU data file 44 and the duplicate file.

Advantageously, none of the other applications 35 have to change if PLU reader 38 is created and placed into system 10. As PLU reader 38 attaches into API 33 via interprocess communications, it isolates independent application programs 35 from the details of PLU maintenance routine 50 and PLU data file 44. PLU reader 38 masks price information in PLU data file 44 into displayable formats for EPL system 16. In many EPL systems, data format 9/9.99 (9 for 9.99) or 99.99 is the maximum price display. As further examples, data format 2/12.40 masks into displayable information 6.20 and data format 10/1.10 masks into displayable information .11.

This method proves advantageous in handling advanced pricing methods. For example, one customer may wish to display price information for a "buy one get one free" item differently from price information for another item. PLU reader 38 performs this change once only, and independent applications do not require modification as a result of this change.

EPL storage medium 26 which stores promotional data file 28, and EPL data file 32, are preferably a fixed disk drive.

Host computer system 12 includes PLU storage medium 36, host PLU computer 40, and input device 42.

PLU storage medium 36 stores PLU data file 44. PLU file 44 is preferably the sole location for storing item prices and item information. PLU file 44 also stores promotional indicators associated with promotional messages in EPL promotional data file 28.

Promotional indicators uniquely identify promotional messages, such as "BUY ONE/ GET ONE". EPL 22 may display price separately, or as an integral part of a promotional message. The promotional messages and promotional indicators are arranged as a table in EPL promotional data file 28, such as the one shown below as Table I. The slashes imply blinking or flashing or scrolling between messages. Promotional data may be entered and modified using input device 42 and PLU maintenance routine 50.

Indicator	Promotional Message
00	(No message)
01	/BUY ONE/ GET ONE
02	/BUY TWO/ GET TWO
03	/SPECIAL PURCHASE (blinking)
04	/(Message 01)/ (Message 02)/ (Message 03).

PLU file 44 is available for distribution to POS terminal 20 by host PLU computer 40. Alternatively, provision may be made for bar code scanner 18 to directly access primary PLU file 44 from host PLU computer 40.

Here, terminals 20, 24, and 40 are shown as separate components that are networked together, but they may also be combined in different ways. For example, EPL computer 24 and host PLU computer 40 may be combined to form a single host computer. POS terminal 20 and host PLU computer 40 may be combined to form a POS terminal

which doubles as a host computer for a network of other POS terminals.

Host PLU computer 40 executes POS software 31 and PLU maintenance routine 50. PLU maintenance routine 50 is controlled by POS software 31 and updates PLU file 44, prepares system 12 for a loss of PLU data file 44, and executes PLU data recovery procedures.

Input device 42 is preferably a keyboard.

PLU maintenance routine 50 may send changes in price and promotional indicators in PLU file 44 directly to EPL computer 24 and POS terminal 20 as they are entered in input device 42 (immediate processing) or store price changes and promotional indicator changes within a batch file for later batch updating (batch processing).

During normal operation, EPL computer 24 executes PLU file reader 38 to obtain price and any promotional indicators from PLU data file 44. EPL software 30 obtains promotional messages associated with the promotional indicators from EPL promotional data file 28 and sends the price information and promotional messages to data register 54. Display 56 displays the price and the promotional message in data register 54.

Control circuit 53 controls the internal operation of EPL 22. Control circuit 53 stores received messages from EPL computer 24 and transmits response messages to EPL computer 24. Control circuit 53 also controls the display of price and promotional messages, including blinking.

Upon receiving a message containing promotional data, control circuit 53 stores the promotional data in data register 54. Upon receiving an instruction to display a particular promotional message, control circuit 53 retrieves the promotional message from the register and displays it using display 56.

The register 54 stores promotional data and other data necessary for the proper operation of EPL system 10.

Display 56 displays price and promotional messages. Display 56 is preferably a liquid crystal display (LCD).

Turning now to Fig. 2, EPL 22 is shown in more detail. The promotional message 46 is shown as "/BUY ONE/ GET ONE".

Turning now to Fig. 3, the components that are used to construct PLU file reader 38 include template PLU file reader 60, object code 62, example mappings and translations 64, target routines 66, and make files 68. Template PLU reader 60 is a super set of example mappings and translations 64 and target routines 66. Example mappings and translations 64 and target routines 66 are edited and customized by developers to produce customized mappings and translations 65 and customized target routines 67 (customized template PLU reader 61). PLU file reading routine 43 is an example of a customized target routine. Customized mappings and translations 65 and customized target routines 67 along with object code 62 are fed into make files 68 in order to produce executable code for a PLU file reader 38.

Object code 62 consists of libraries 41 that provide an interface into API 33 and isolate all other EPL applications from API 33, thus allowing the existence of PLU file reader 38. Included in libraries 41 are functions to perform module start up, open PLU data file 44, connect an application to PLU data file 44, close an application's connection to PLU data file 44, close PLU data file 44, and to terminate the application.

Example mappings and translations 64 provide non-displayable information (in code and/or in documentation) and may be edited to customize PLU file reader 38.

Target routines 66 are routines that may be edited and customized to suit the needs of the target transaction establishment.

Make files 68 are files that pass source code (edited template 70) through compiler 72 and then pass object code 71 through linker 74 to produce the target executable.

Turning now to Fig. 4 the method of creating generic PLU file reader 38 begins with START 80.

In step 82, independent applications 35 are isolated from PLU data file 44 through a non-displayable mapping determination and translation process. Example mappings and translations 64 result. This original development effort is provided to customers for future customization.

In steps 84, template 60 is provided. Template 60 is packaged in an installable format that can then be distributed and installed on the target system.

In step 85, customized mappings and translations 65 and customized target routines 67 are determined so that all information for an EPL can be displayed. Connection methods that will be employed for the target system are also determined.

In steps 86-92, customized template 61 is produced by changing template 60 to reflect customized mappings and translations 65. This work is performed by developers who are responsible for the integration of EPL system 16 for a target customer. Integration and customization are directed by the customer. This gives the customer the opportunity to gain a competitive advantage by displaying the information required to better serve its customers.

In step 86, the "open PLU file" section is changed. The "open PLU file" section is a routine that must be completed/ customized to open the PLU data file 44. The "open PLU file" section must be executed before any of the read sections.

In step 87, the "read first" section is changed. The "read first" section is a routine that must be completed/customized to read the first PLU in PLU data file 44.

In step 88, the "read next" section is changed. The "read next" section is a routine that must be completed/customized to read the next PLU in PLU data file 44 sequentially.

In step 90, the "read specific" section is changed. The "read specific" section is a routine that must be completed/customized to read a specific PLU data file record.

In step 91, the "close PLU file" section is changed. The "close PLU file" section is a routine that must be completed/customized to close the PLU data file 44. The "close PLU file" section must be executed when the calling program no longer wants to read the PLU file 44.

In step 92, customized mapping and translations 65 and customized target routines 67 derived from step 85 are applied to template 60.

In step 94, a new executable (PLU file reader 38) is compiled and linked from object code 62 and template 61 using make files 68, compiler 72, and linker 74.

In step 96, the method ends.

Referring now to Fig. 5, the operation of PLU file reader 38 is illustrated in detail, beginning with START 100.

In step 102, PLU file reader 38 starts up and configures itself.

In step 104, PLU file reader 38 waits for an interprocess communications message from API 33. Interprocess communication services (e.g., "queues" for UNIX, threads or pipes for OS/2) are provided by operating system 52. API 33 calls on operating system 52

to send a request from one of independent applications 35 to PLU file reader 38.

For example, this independent application 35 may be control which requests that PLU file reader 38 obtain price information and any promotional indicators so that EPL software 30 may store them in EPL data file 32.

Independent application program 35 issues a call to API 33, instructing API 33 to perform a "read direct" routine provided by API 33. API 33 calls on operating system 52 to send the interprocess communications message to PLU file reader 38. Preferably, API 33 passes the message to libraries 41 within PLU file reader 38.

If such a message is received, PLU file reader 38 determines whether the interprocess communications message contains an "exit" command in step 105. If it does, PLU file reader 38 terminates in step 116.

If the interprocess communications message does not contain an "exit" command, libraries 41 call a PLU file reading routine 43 within libraries 41 in step 106. PLU file reading routine 43 is customized to the needs of the transaction establishment.

In step 108, PLU file reading routine 43 uses operating system 52 to obtain the price information and any promotional indicators from PLU data file 44.

In step 110, PLU file reading routine 43 masks the price information and promotional indicators from PLU data file 44. For example, if application program 35 is a program which controls promotional messages displayed by EPL 22, masking would include converting the promotional indicators into promotional messages that are displayable by EPL 22.

In step 112, PLU file reading routine 43 ends.

In step 114, libraries 41 call on operating system 52 to return the price information and promotional indicators via interprocess communications to the

requesting application 35 via API 33. PLU file reader 38 returns to a waiting state in step 104.

After PLU file reader 38 sends the price information and promotional indicators to API 33, API 33 passes the price information and promotional indicators to the requesting application 35. Application program 35 can then display the price information and promotional indicators, compare the information, or otherwise examine the information in accordance with the function of application program 35.

Turning now to Fig. 6, a method of displaying promotional messages by EPL 14 begins with START 120.

In step 122, EPL software 30 obtains a promotional indicator and optional price information from PLU data file 44 using PLU file reader 38.

In step 124, EPL software 30 compares the promotional indicator to promotional indicators stored within EPL promotional data file 28 to obtain a promotional message associated with the promotional indicator.

In step 126, EPL computer 16 transmits a message addressed to EPL 22 which contains the promotional message and the price information.

In step 128, control circuit 53 receives and acknowledges the message.

In step 130, control circuit 53 stores the promotional message and price information in data register 54.

In step 132, control circuit 53 causes display 56 to display the promotional message and price information in data register 54.

In step 134, the method ends.

With reference to Fig. 7, a method of instructing EPL 14 to display a particular promotional message begins with START 160.

In step 162, input device 42 records a promotional indicator designated for EPL 22 by the operator. The operator may also enter a price change for the item.

In step 164, EPL computer 24 stores the promotional indicator in the record of EPL 22 in EPL data register 54.

In step 166, EPL computer 24 transmits a message, such as a price update message, addressed to EPL 22 and containing the promotional indicator and a new price, if applicable, in the EPL data register 54.

In step 168, EPL control circuit 53 receives and acknowledges the message.

In step 170, EPL control circuit 53 compares the promotional indicator in the message with promotional indicators stored in data register 54.

In step 172, EPL control circuit 53 causes display 56 to display the promotional message associated with the promotional indicator in the message, as well as new or existing price information.

In step 174, the method ends.

Advantageously, the present method saves an operator from having to enter promotional messages many times, including once each time an EPL requires a promotional message. Since promotional messages are stored within the EPLs, the method of the present invention does not require additional bandwidth to send the messages after they are stored. Use of promotional indicators provides an efficient shorthand method of assigning promotional messages to EPLs.

Although the present invention has been described with particular reference to certain preferred embodiments thereof, variations and modifications of the present invention can be effected within the spirit and scope of the following claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of assigning a selected promotional message to an electronic price label (EPL) associated with an item, including the steps of:

(a) storing the selected promotional message and a corresponding first promotional indicator in a memory within the EPL;

(b) receiving a second promotional indicator from a controlling computer by the EPL;

(c) comparing the first and second promotional indicators by the EPL;

(d) displaying the selected promotional message by the EPL if the first and second promotional indicators are equal.

2. The method as recited in claim 1, in which step (a) comprises: storing a plurality of promotional messages and corresponding promotional indicators, including the selected promotional message and the first promotional indicator.

3. The method as recited in claim 2, further comprising broadcasting information to a plurality of EPLs, which information includes the second promotional indicator.

4. A method according to claim 2 or claim 3, comprising:

in step (a), storing the promotional messages and associated promotional indicators in a promotional data file;

in step (b), storing one of the promotional indicators in an item record within a price file; and

further comprising the step (e) of reading the price file to obtain the one promotional indicator.

5. The method as recited in claim 4, wherein the step (e) of reading the price file comprises the substeps of:

(e-1) executing a price file reading program which reads the price file;

(e-2) providing an application programming interface (API) having hooks into the price file reading program; and

(e-3) causing the price file reading program to read the price file to obtain the one promotional indicator by the API.

6. The method as recited in claim 5, wherein the step (e-3) comprises the substeps of:

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(e-3-A) sending a call for the one promotional indicator to the API by an application program which manages displaying of the promotional messages;

(e-3-B) sending a request message for the one promotional indicator to the price file reading program by the API;

(e-3-C) instructing control software to obtain the one promotional indicator from the price file by the price file reading program;

(e-3-D) sending the one promotional indicator to the API by the price file reading program; and

(e-3-E) sending the one promotional indicator to the application program by the API.

7. A method of assigning a selected promotional message to an electronic price label substantially as herein described with reference to any one of the embodiments of the invention shown in the accompanying drawings.

DATED this 27th Day of August 1997

NCR CORPORATION

Attorney: JOHN B. REDFERN

Fellow Institute of Patent Attorneys of Australia

of SHELSTON WATERS

FIG. 1

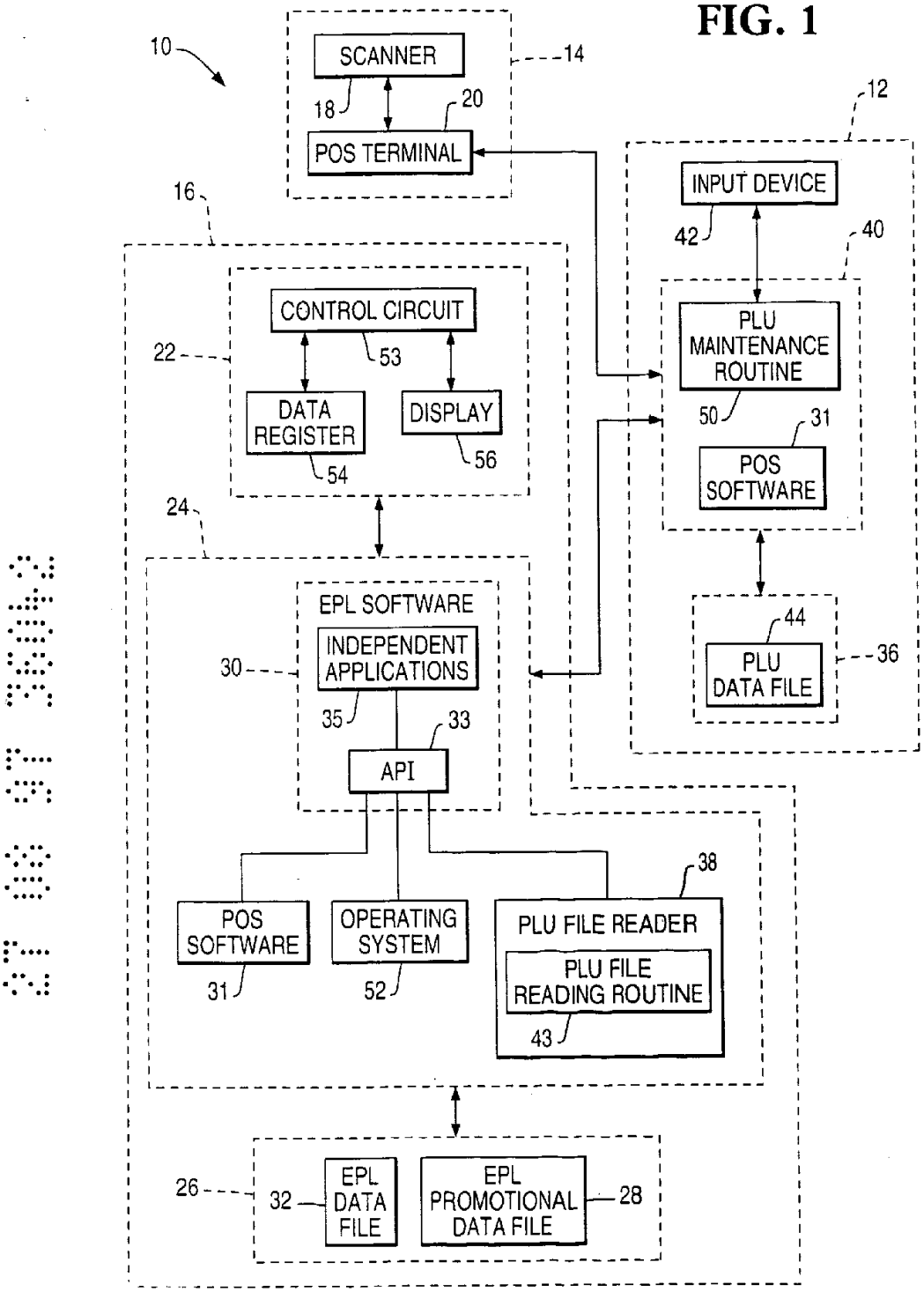

10
SCANNER
18
20
14
POS TERMINAL
12
INPUT DEVICE
42
40
16
CONTROL CIRCUIT
53
22
PLU MAINTENANCE ROUTINE
50
31
DATA REGISTER
54
DISPLAY
56
POS SOFTWARE
24
EPL SOFTWARE
44
INDEPENDENT APPLICATIONS
30
35
33
PLU DATA FILE
36
API
38
POS SOFTWARE
31
OPERATING SYSTEM
52
PLU FILE READER
PLU FILE READING ROUTINE
43
26
32
EPL DATA FILE
EPL PROMOTIONAL DATA FILE
28

FIG. 2

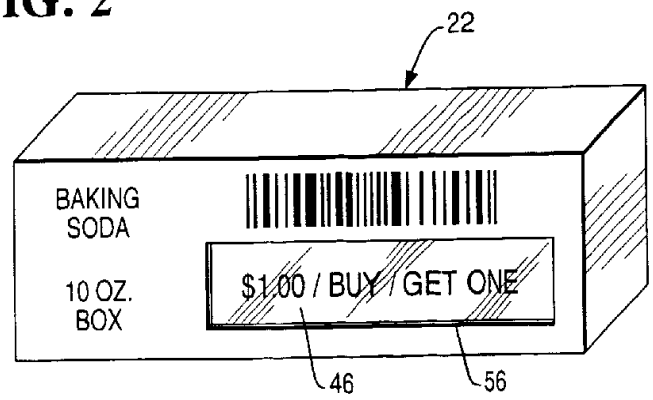

22
BAKING SODA
10 OZ. BOX
$1.00 / BUY / GET ONE
46
56

FIG. 3

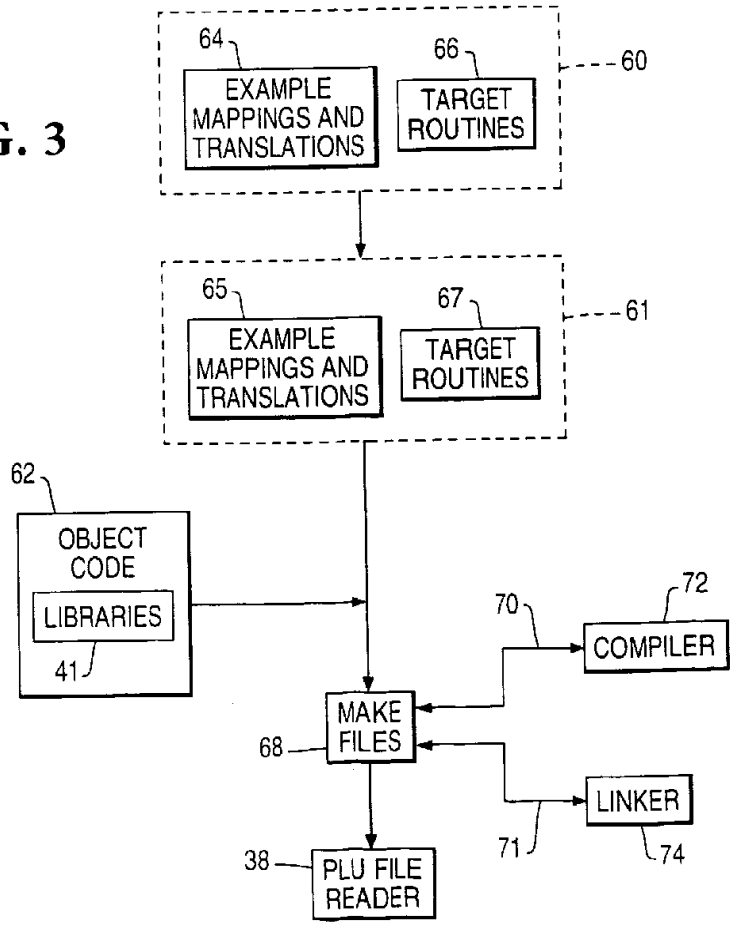

64
EXAMPLE MAPPINGS AND TRANSLATIONS
66
TARGET ROUTINES
60
65
EXAMPLE MAPPINGS AND TRANSLATIONS
67
TARGET ROUTINES
61
62
OBJECT CODE
LIBRARIES
41
70
72
COMPILER
MAKE FILES
68
LINKER
71
74
38
PLU FILE READER

FIG. 4

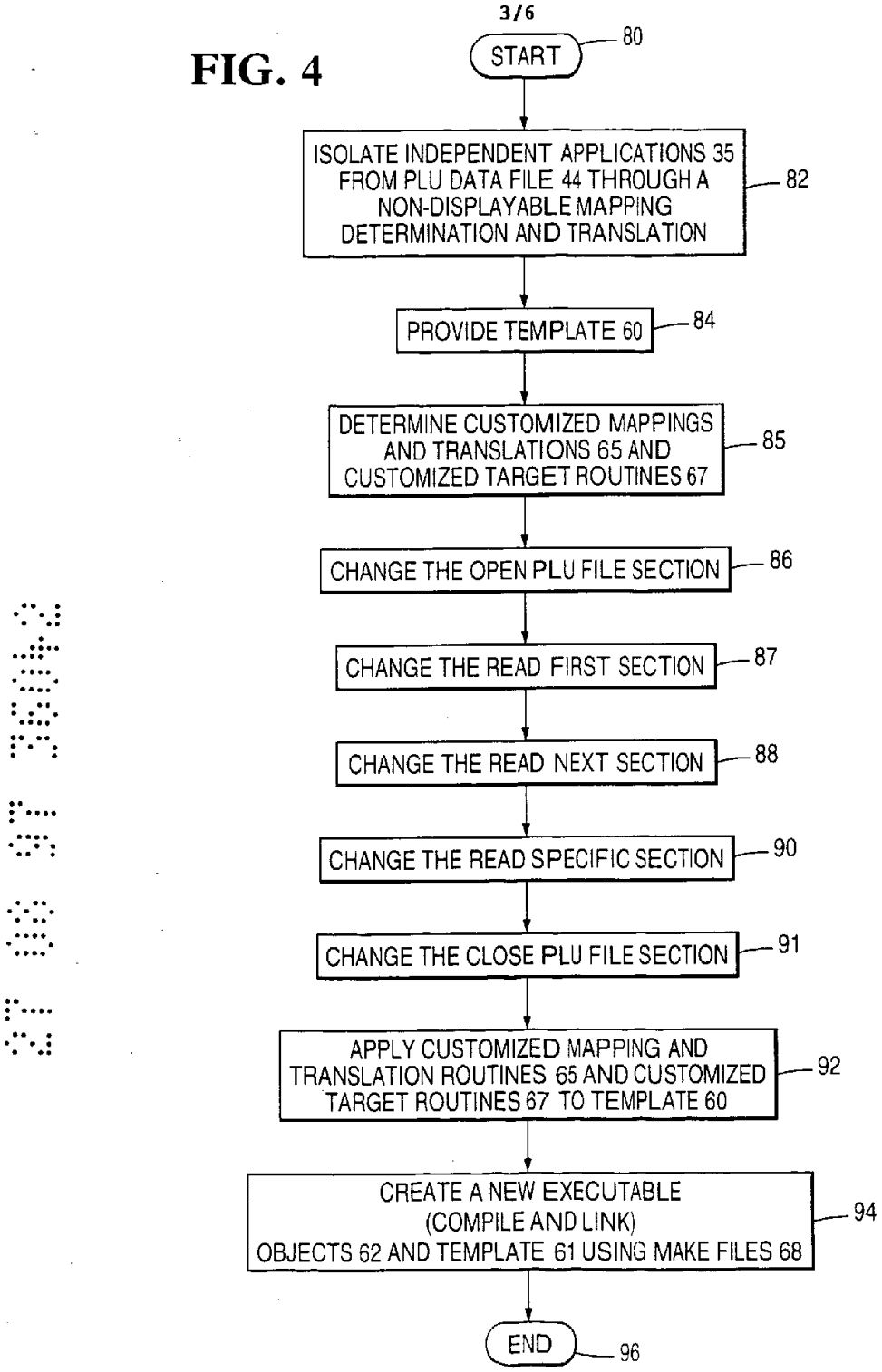

START
80
ISOLATE INDEPENDENT APPLICATIONS 35 FROM PLU DATA FILE 44 THROUGH A NON-DISPLAYABLE MAPPING DETERMINATION AND TRANSLATION
82
PROVIDE TEMPLATE 60
84
DETERMINE CUSTOMIZED MAPPINGS AND TRANSLATIONS 65 AND CUSTOMIZED TARGET ROUTINES 67
85
CHANGE THE OPEN PLU FILE SECTION
86
CHANGE THE READ FIRST SECTION
87
CHANGE THE READ NEXT SECTION
88
CHANGE THE READ SPECIFIC SECTION
90
CHANGE THE CLOSE PLU FILE SECTION
91
APPLY CUSTOMIZED MAPPING AND TRANSLATION ROUTINES 65 AND CUSTOMIZED TARGET ROUTINES 67 TO TEMPLATE 60
92
CREATE A NEW EXECUTABLE (COMPILE AND LINK) OBJECTS 62 AND TEMPLATE 61 USING MAKE FILES 68
94
END
96

FIG. 5

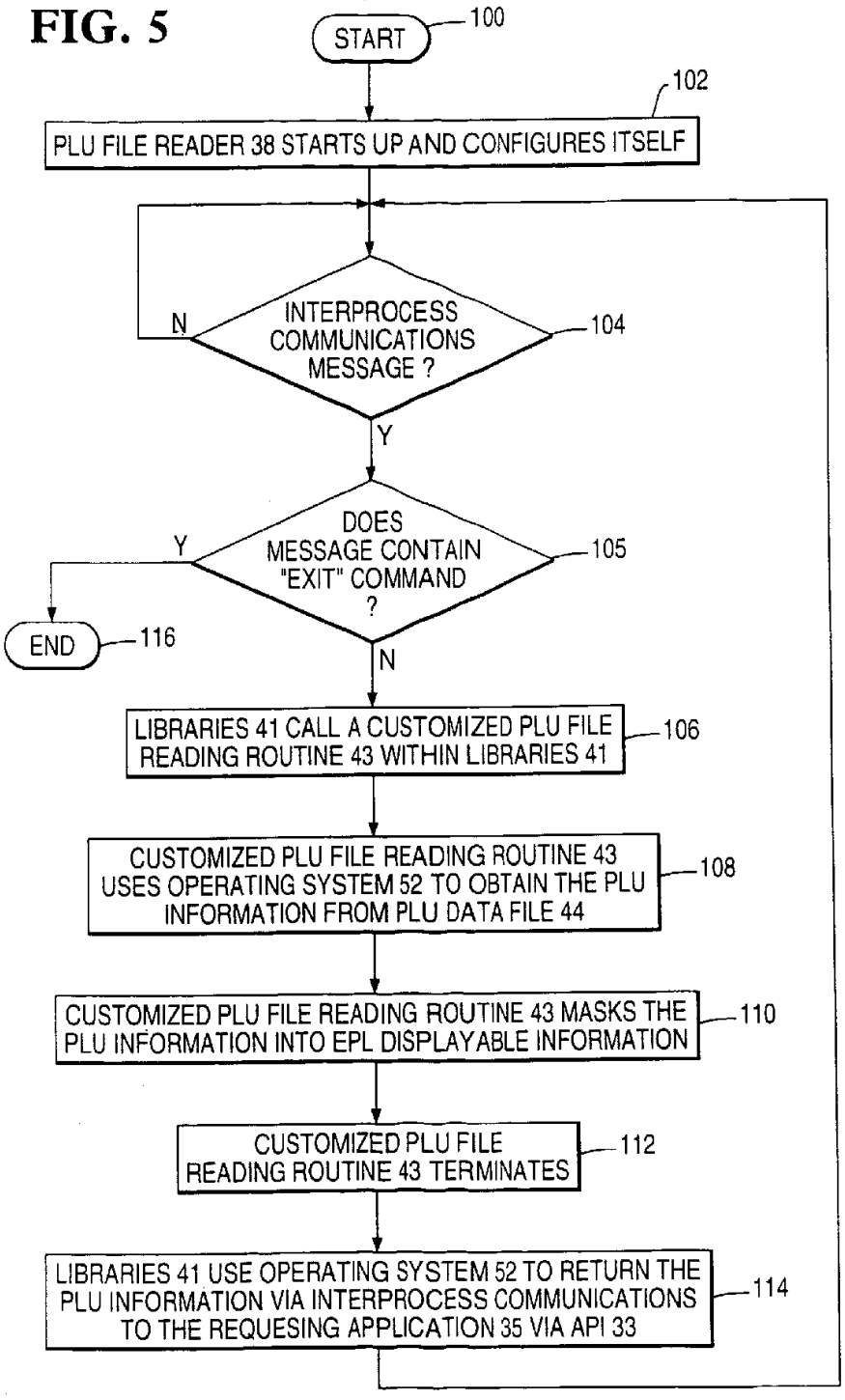

START
100
PLU FILE READER 38 STARTS UP AND CONFIGURES ITSELF
102
INTERPROCESS COMMUNICATIONS MESSAGE ?
104
N
Y
DOES MESSAGE CONTAIN "EXIT" COMMAND ?
105
Y
N
END
116
LIBRARIES 41 CALL A CUSTOMIZED PLU FILE READING ROUTINE 43 WITHIN LIBRARIES 41
106
CUSTOMIZED PLU FILE READING ROUTINE 43 USES OPERATING SYSTEM 52 TO OBTAIN THE PLU INFORMATION FROM PLU DATA FILE 44
108
CUSTOMIZED PLU FILE READING ROUTINE 43 MASKS THE PLU INFORMATION INTO EPL DISPLAYABLE INFORMATION
110
CUSTOMIZED PLU FILE READING ROUTINE 43 TERMINATES
112
LIBRARIES 41 USE OPERATING SYSTEM 52 TO RETURN THE PLU INFORMATION VIA INTERPROCESS COMMUNICATIONS TO THE REQUESING APPLICATION 35 VIA API 33
114

FIG. 6

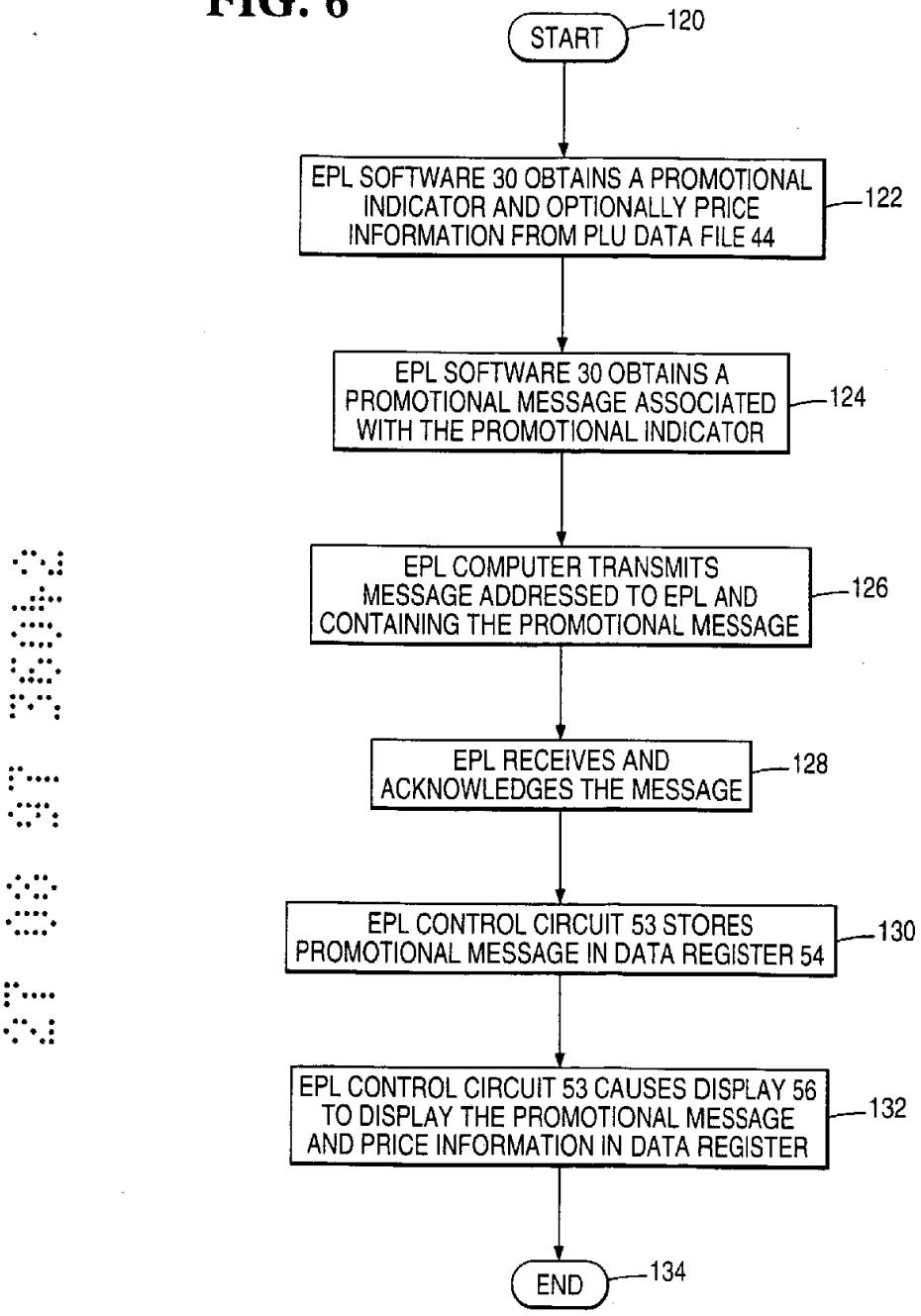
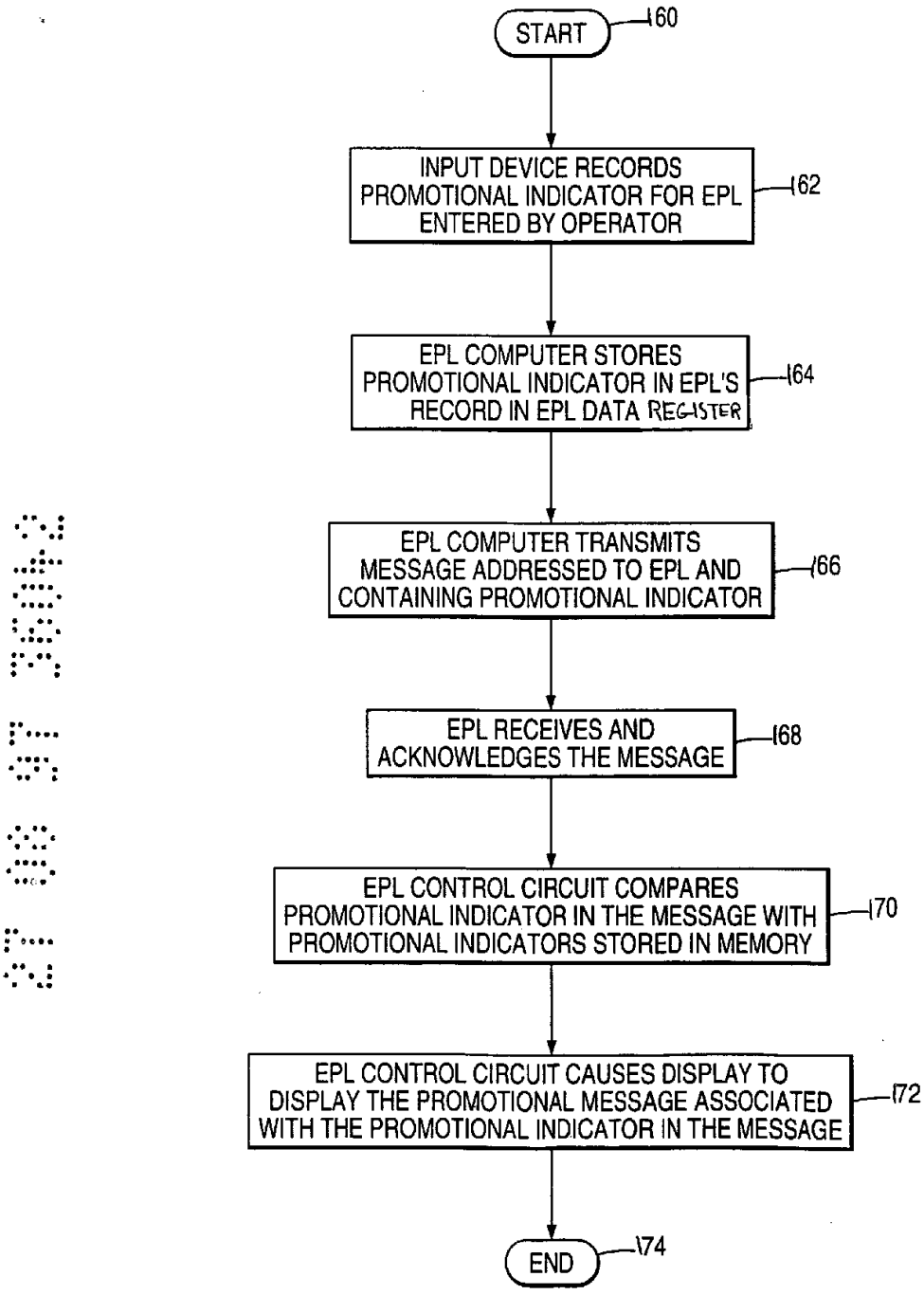

START
120
EPL SOFTWARE 30 OBTAINS A PROMOTIONAL INDICATOR AND OPTIONALLY PRICE INFORMATION FROM PLU DATA FILE 44
122
EPL SOFTWARE 30 OBTAINS A PROMOTIONAL MESSAGE ASSOCIATED WITH THE PROMOTIONAL INDICATOR
124
EPL COMPUTER TRANSMITS MESSAGE ADDRESSED TO EPL AND CONTAINING THE PROMOTIONAL MESSAGE
126
EPL RECEIVES AND ACKNOWLEDGES THE MESSAGE
128
EPL CONTROL CIRCUIT 53 STORES PROMOTIONAL MESSAGE IN DATA REGISTER 54
130
EPL CONTROL CIRCUIT 53 CAUSES DISPLAY 56 TO DISPLAY THE PROMOTIONAL MESSAGE AND PRICE INFORMATION IN DATA REGISTER
132
END
134

FIG. 7


START
160
INPUT DEVICE RECORDS PROMOTIONAL INDICATOR FOR EPL ENTERED BY OPERATOR
162
EPL COMPUTER STORES PROMOTIONAL INDICATOR IN EPL'S RECORD IN EPL DATA REGISTER
164
EPL COMPUTER TRANSMITS MESSAGE ADDRESSED TO EPL AND CONTAINING PROMOTIONAL INDICATOR
166
EPL RECEIVES AND ACKNOWLEDGES THE MESSAGE
168
EPL CONTROL CIRCUIT COMPARES PROMOTIONAL INDICATOR IN THE MESSAGE WITH PROMOTIONAL INDICATORS STORED IN MEMORY
170
EPL CONTROL CIRCUIT CAUSES DISPLAY TO DISPLAY THE PROMOTIONAL MESSAGE ASSOCIATED WITH THE PROMOTIONAL INDICATOR IN THE MESSAGE
172
END
174