ORIGINAL

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION

Softcard Systems, Inc.,

Plaintiff,

v.

Target Corporation and VISA U.S.A. Inc.,

Defendants.

Civil Action File No.

1 03 CV 3585

COMPLAINT FOR
PATENT INFRINGEMENT AND INJUNCTIVE RELIEF

Plaintiff Softcard Systems, Inc. ("Softcard") hereby makes the following allegations in support of its claims for relief:

THE PARTIES

1. Softcard is a Delaware corporation with its principal place of business at 1592 Mars Hill Road, Suite B, Watkinsville, Georgia 30677.

2. Upon information and belief, Target Corporation ("Target") is a Minnesota corporation with its principal place of business at 1000 Nicollet Mall, Minneapolis, Minnesota, 55403. Target's local agent for service of process is C.T. Corporation System, 1201 West Peachtree Street, N.E., Atlanta, Georgia, 30361.

3. Upon information and belief, Visa U.S.A. Inc. ("Visa") is a Delaware corporation with its principal place of business at 900 Metro Center Boulevard, Foster City, California, 94404. Visa's local agent for service of process is C.T. Corporation System, 1201 West Peachtree Street, N.E., Atlanta, Georgia, 30361.

JURISDICTION AND VENUE

4. This Court has subject matter jurisdiction over this controversy under 28 U.S.C. §§ 1331 and 1338(a).

5. Upon information and belief, this action arises out of the transaction of business, commission of tortious injuries, and other activities of Target and Visa within the judicial district of the United States District Court for the Northern District of Georgia and elsewhere. Accordingly, upon information and belief, Target and Visa are subject to personal jurisdiction in Georgia and the judicial district of this Court.

6. Upon information and belief, venue is proper in this judicial district pursuant to 28 U.S.C. § 1391(b) & (c) and § 1400(b).

7. In this action, Softcard seeks damages and injunctive relief against Target and Visa for acts of patent infringement in violation of the Patent Act of the United States, 35 U.S.C. §§ 1, *et seq.*

COUNT ONE
INFRINGEMENT OF THE '038 PATENT

8. U.S. Patent No. 6,012,038 ("the '038 patent"), titled "System and Method for Controlling Distribution of Coupons", was duly and legally issued by the United States Patent and Trademark Office on January 4, 2000. A copy of the '038 patent is attached hereto as Exhibit A.

9. Softcard owns the '038 patent and has the right to sue for infringement thereof.

10. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the '038 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the '038 patent.

COUNT TWO
INFRINGEMENT OF THE '526 PATENT

11. U.S. Patent No. 6,067,526 ("the '526 patent"), titled "System and Method for Distributing Coupons Through a System of Computer Networks", was duly and legally issued by the United States Patent and Trademark Office on May 23, 2000. A copy of the '526 patent is attached hereto as Exhibit B.

12. Softcard owns the '526 patent and has the right to sue for infringement thereof.

13. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the '526 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the '526 patent.

COUNT THREE
INFRINGEMENT OF THE '135 PATENT

14. U.S. Patent No. 5,890,135 ("the '135 patent"), titled "System and Method for Displaying Product Information in a Retail System", was duly and legally issued by the United States Patent and Trademark Office on March 30, 1999. A copy of the '135 patent is attached hereto as Exhibit C.

15. Softcard owns the '135 patent and has the right to sue for infringement thereof.

16. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the '135 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the '135 patent.

PRAYER FOR RELIEF

WHEREFORE, as a direct and proximate result of Target's and Visa's infringement of any and all of the '038, '526, and '135 patents, Softcard has been

and continues to be damaged in its business and property, including, among other ways, the loss of substantial profits.

WHEREFORE, by reason of Target's and Visa's infringing acts, Target and Visa have caused, are causing, and unless enjoined and restrained by this Court, will continue to cause Softcard great and irreparable injury to, among other things, the good will and business reputation of Softcard and its business relations with its customers, and will continue to infringe, contribute to the infringement of, and induce others to infringe the patents-in-suit, all of which cannot be adequately compensated or measured in money. Softcard has no adequate remedy at law for this harm.

WHEREFORE, Target's and Visa's infringement of any and all of the '038, '526, and '135 patents is, has been, and continues to be committed with full knowledge of Softcard's rights under these patents, and in willful, wanton and deliberate disregard thereof.

WHEREFORE, Softcard prays for judgment against Target and Visa as follows:

(a) That Target and Visa, their officers, agents, servants, and employees, and all persons acting in concert with them, and each of them, be preliminarily and

permanently enjoined from infringing, contributing to, and inducing others to infringe U.S. Patent Nos. 6,012,038; 6,067,526; and 5,890,135;

(b) That U.S. Patent Nos. 6,012,038; 6,067,526; and 5,890,135 be adjudged to be infringed;

(c) That Softcard be awarded damages under 35 U.S.C. § 284 adequate to compensate it for patent infringement, which are in no event less than a reasonable royalty, together with interest and costs as fixed by the Court;

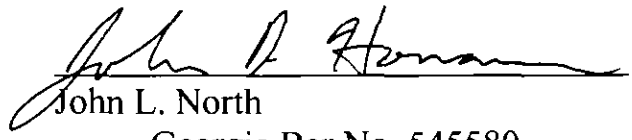
(d) That the damages awarded to Softcard in connection with Target's and Visa's willful patent infringement be trebled pursuant to 35 U.S.C. § 284;

(e) That prejudgment interest be assessed on all damages;

(f) That Softcard be awarded its reasonable attorney's fees and costs of suit under 35 U.S.C. § 285; and

(g) That Softcard be awarded such other relief as the Court may deem just and proper.

DATED: November 25, 2003.



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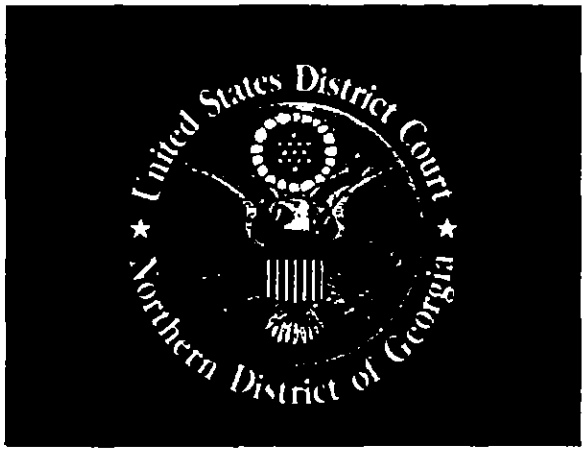

EXHIBIT / ATTACHMENT

A

(To be scanned in place of tab)

US006012038A

United States Patent [19]

Powell

[11] **Patent Number: 6,012,038**

[45] **Date of Patent: *Jan. 4, 2000**

[54] **SYSTEM AND METHOD FOR CONTROLLING DISTRIBUTION OF COUPONS**

[75] Inventor: **Ken R. Powell**, Athens, Ga.

[73] Assignee: **SoftCard Systems, Inc.**, Watkinsville, Ga.

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/100,868**

[22] Filed: **Jun. 22, 1998**

Related U.S. Application Data

[63] Continuation of application No. 08/603,482, Feb. 20, 1996, Pat. No. 5,806,044.

[51] **Int. Cl.**[7] **G06F 17/60**

[52] **U.S. Cl.** **705/14**; 709/200; 709/213; 709/219

[58] **Field of Search** 235/375, 383, 235/385; 364/400; 370/400, 401; 395/200.3, 200.31, 200.43, 200.49, 200.6, 200.79; 705/10, 14, 20, 24, 400; 709/200, 201, 213, 219, 230, 249; 700/90

[56] **References Cited**

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Printout of Decker Drugs Coupon (1 page), Copyright 1995, received via the World Wide Web.

ISO7816-2: 1988(E), Identification cards—Integrated circuit (s) cards with contact—Part 2, International Organization for Standardization (ISO).

ISO/IEC 7816-3: 1989 (E), Identification cards—Integrated circuit(s) cards with contacts—Part 3: International Organization for Standardization (ISO).

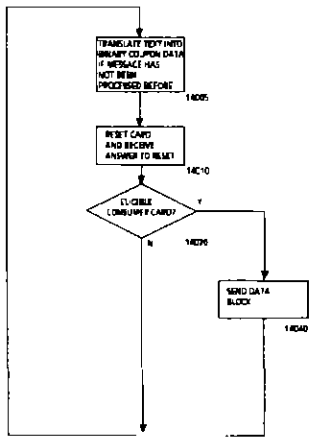
(List continued on next page.)

Primary Examiner—Edward R. Cosimano
Attorney, Agent, or Firm—Jerome D. Jackson

[57] **ABSTRACT**

A system for dispensing and redeeming the electronic discount coupons. The system includes a personal computer (PC) having hardware and software for receiving an electronic coupon from the system of computer networks, translating the received coupon into a binary format, and sending the binary-formatted coupon to a card-writing device. The card-writing device writes the coupon data onto a portable customer card ("smart card") approximately the size of a credit card. Subsequently, the customer goes to the store with the card. Upon completion of shopping, the customer redeems the electronic coupons at the checkout area, by inserting the card into the checkout station. During checkout, the customer is credited with the value of a coupon when UPC data from a bar code reader corresponds to a coupon stored on the card.

39 Claims, 21 Drawing Sheets



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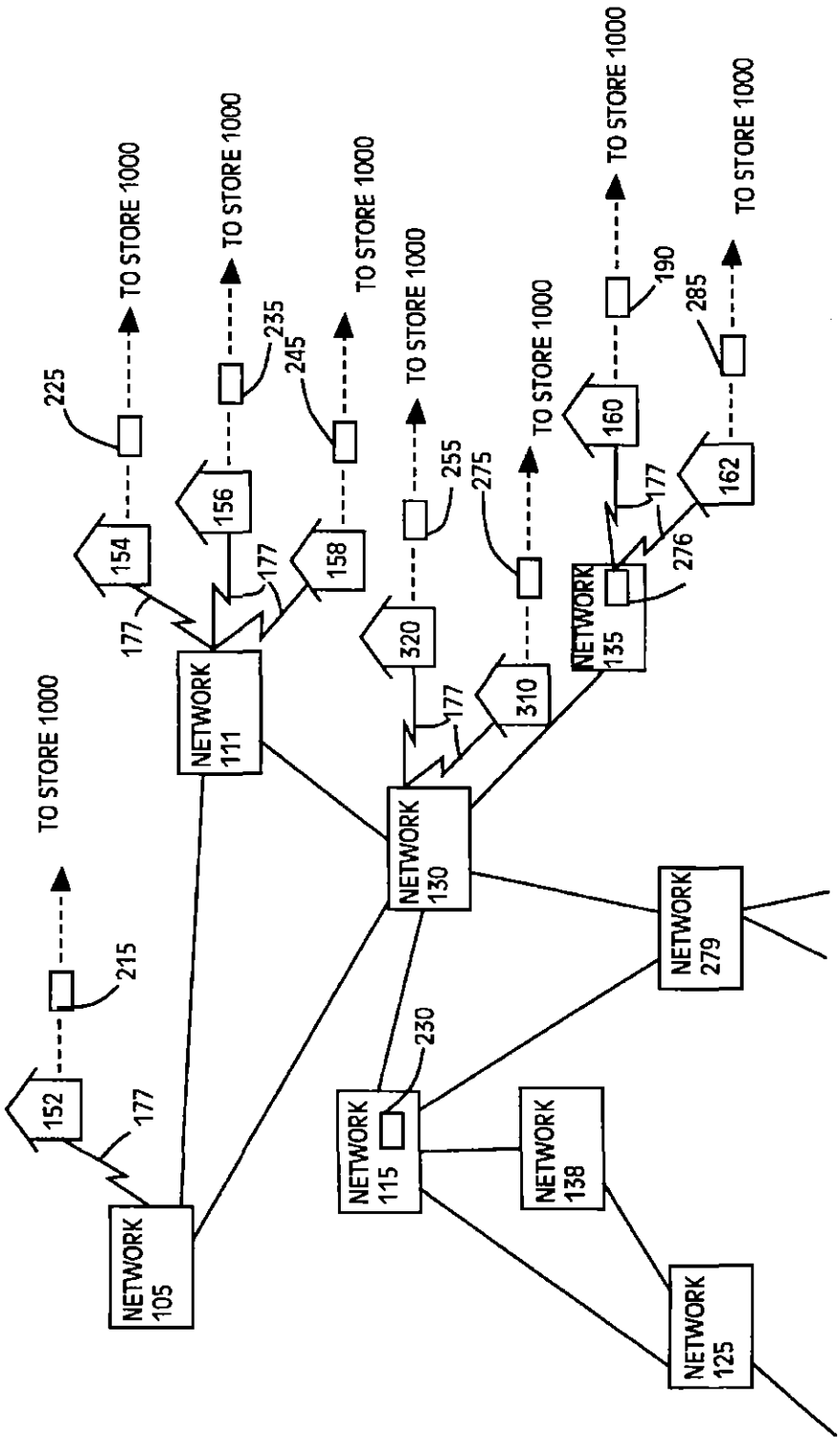
Printout from Dialog: Vizard, Frank, "Radio typecasting. (Radio Data Systems)," Popular Mechanics, v170, n8, p90(2), Aug. 1993.

Fig. 1A


TO STORE 1000
TO STORE 1000
TO STORE 1000
TO STORE 1000
TO STORE 1000
TO STORE 1000
TO STORE 1000
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275
190
285
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154
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158
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162
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276
NETWORK 105
NETWORK 111
NETWORK 115
NETWORK 130
NETWORK 135
NETWORK 138
NETWORK 279
NETWORK 125
230
320
310
TO Fig. 1B

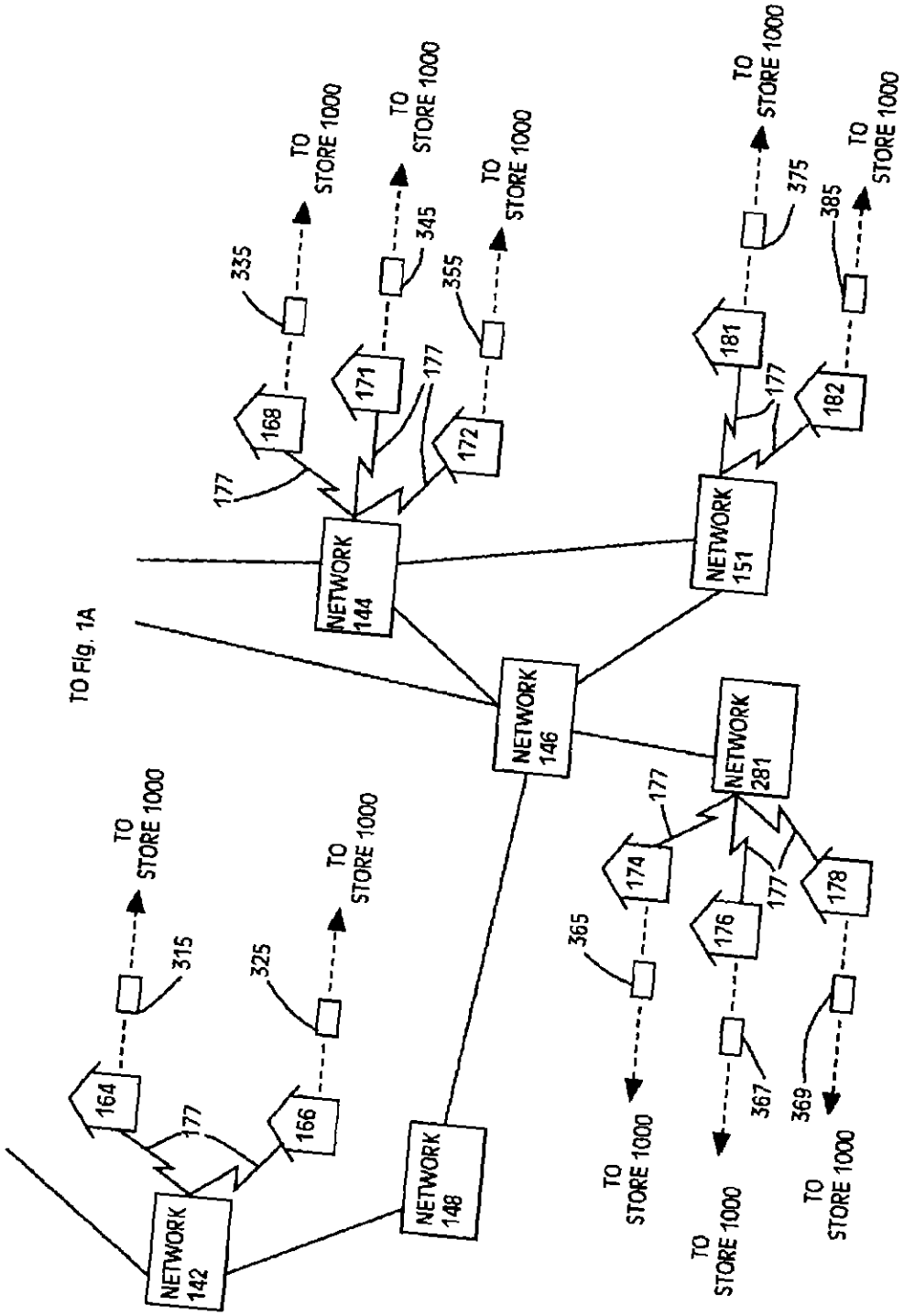
TO Fig. 1A
NETWORK 142
NETWORK 144
NETWORK 146
NETWORK 148
NETWORK 151
NETWORK 281
TO STORE 1000
164
166
168
171
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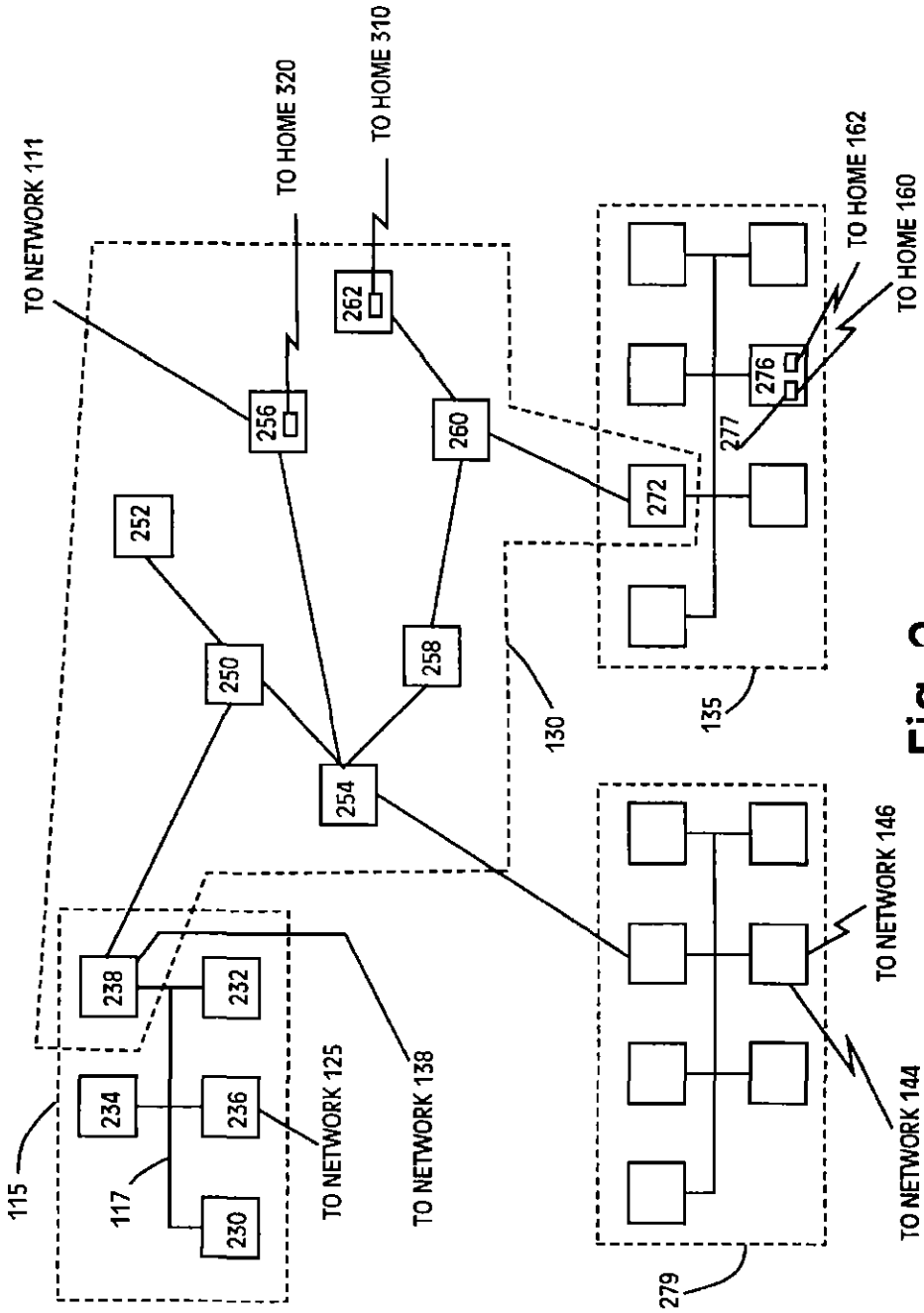
Fig. 1B


TO NETWORK 111
TO HOME 320
TO HOME 310
TO HOME 162
TO HOME 160
262
256
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276
277
272
252
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258
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135
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232
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115
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TO NETWORK 125
TO NETWORK 138
TO NETWORK 146
TO NETWORK 144
279

Fig. 2

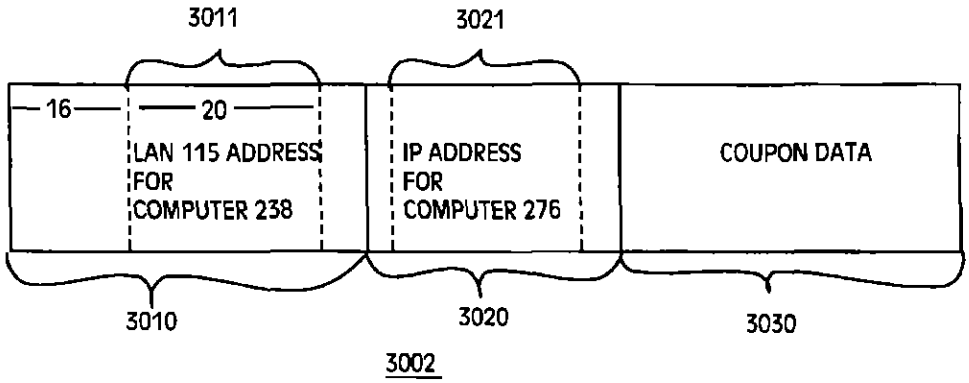

Fig. 3A

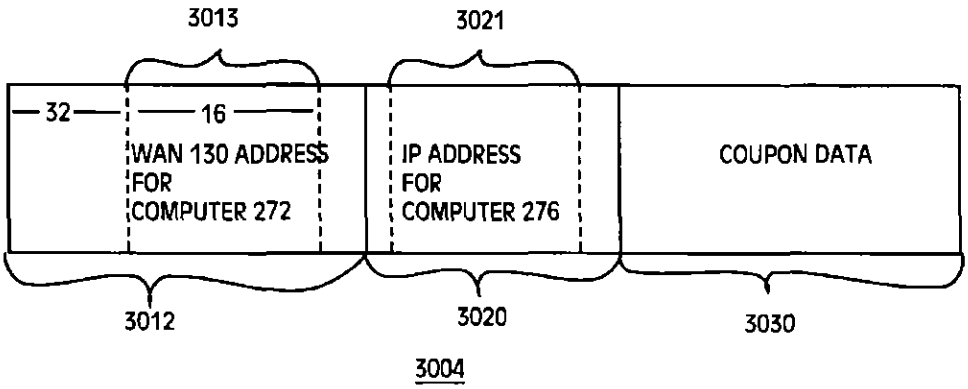

Fig. 3B

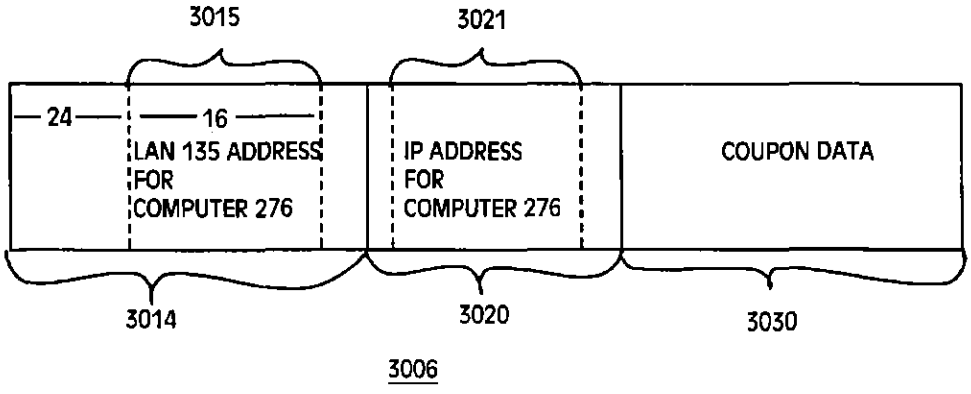

Fig. 3C

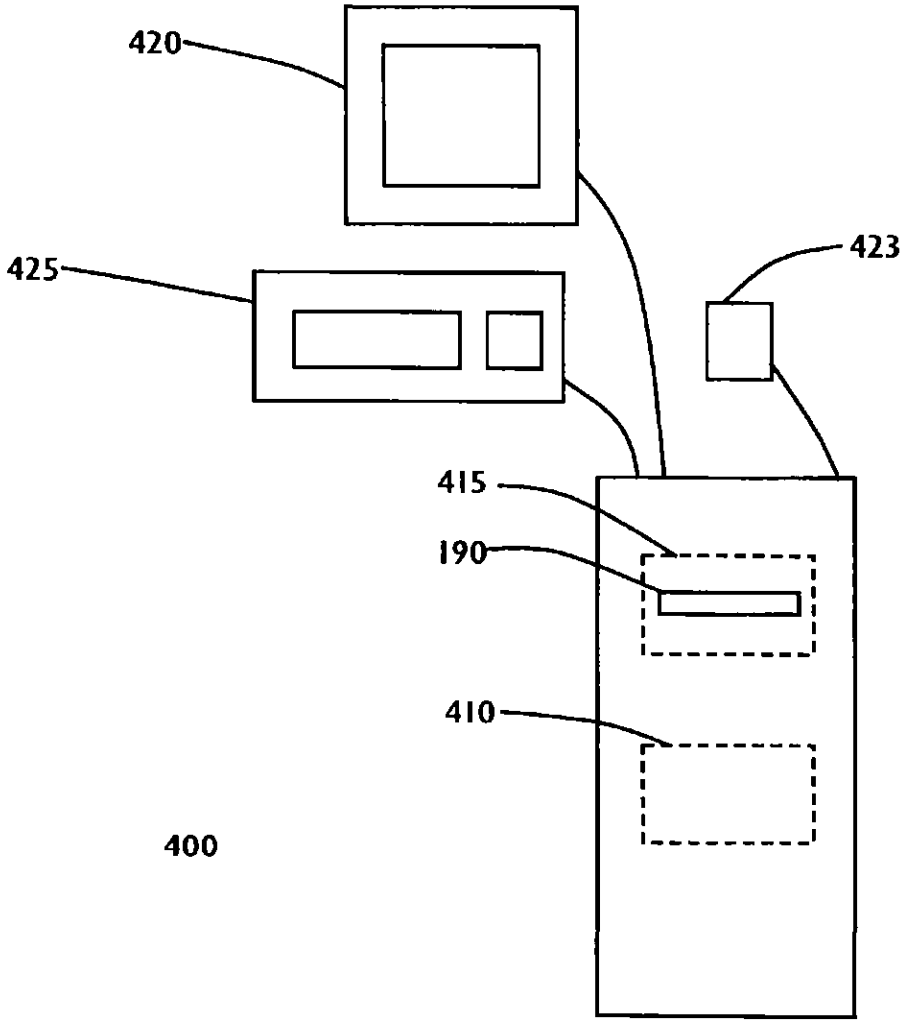

Fig. 4

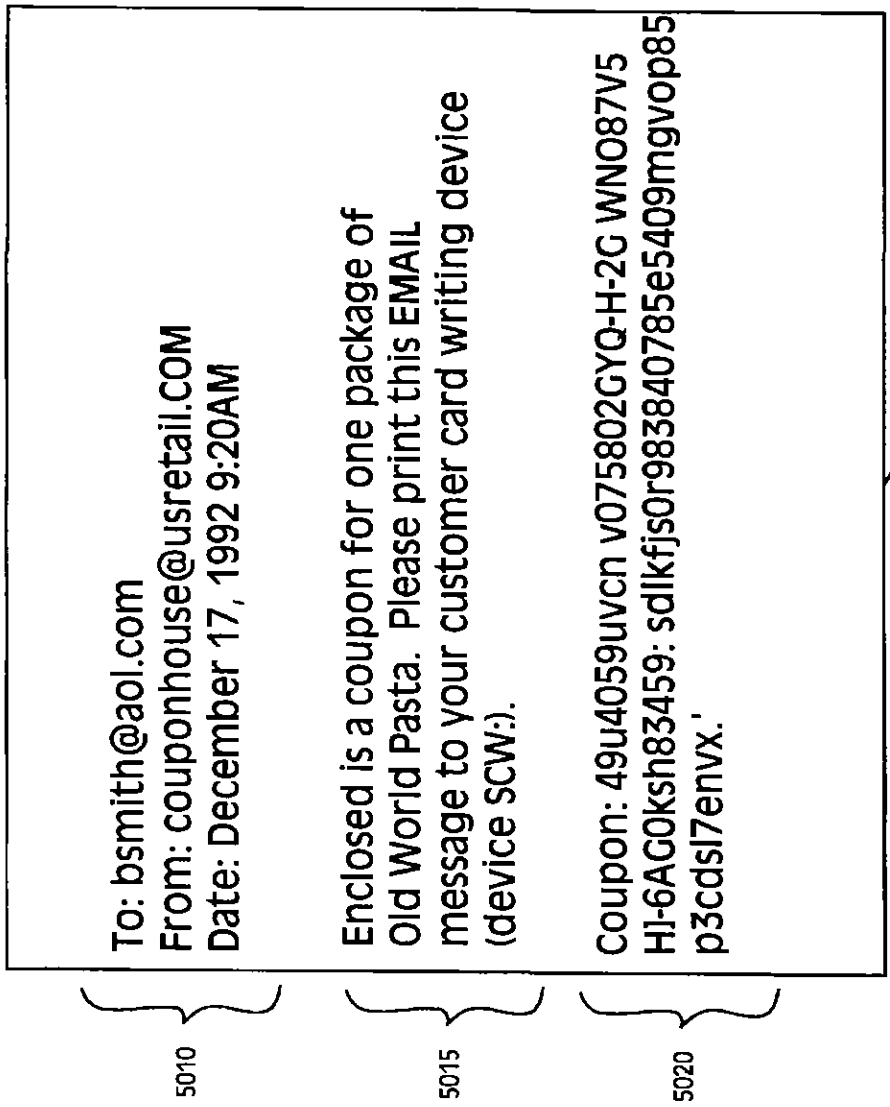
To: bsmith@aol.com
From: couponhouse@usretail.COM
Date: December 17, 1992 9:20AM
Enclosed is a coupon for one package of Old World Pasta. Please print this EMAIL message to your customer card writing device (device SCW:).
Coupon: 49u4059uvcn v075802GYQ-H-2G WNO87V5 HJ-6AG0ksh83459: sdlkfjs0r9838407785e5409mgvop85 p3cdsl7envx.'
5010
5015
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Fig. 5

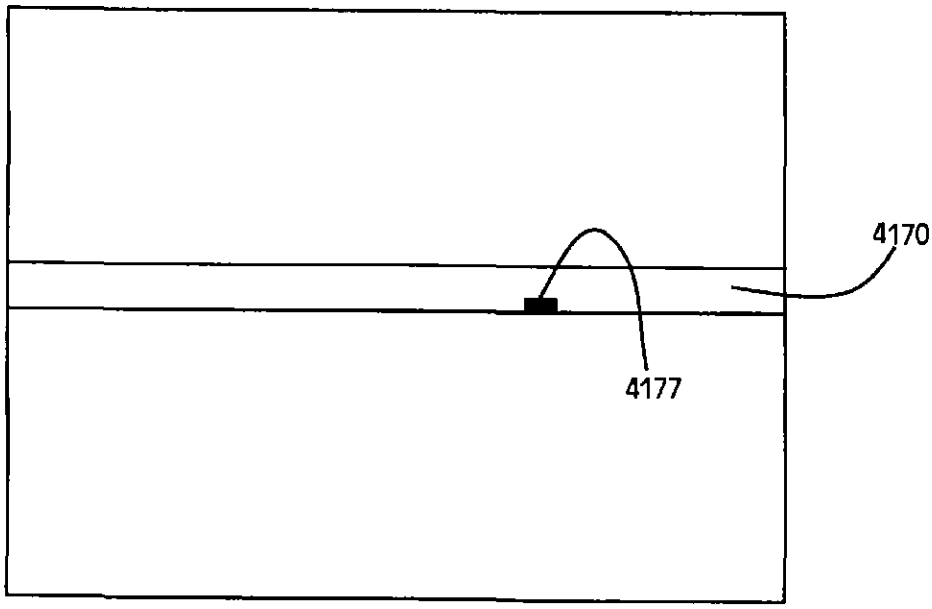

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Fig. 6

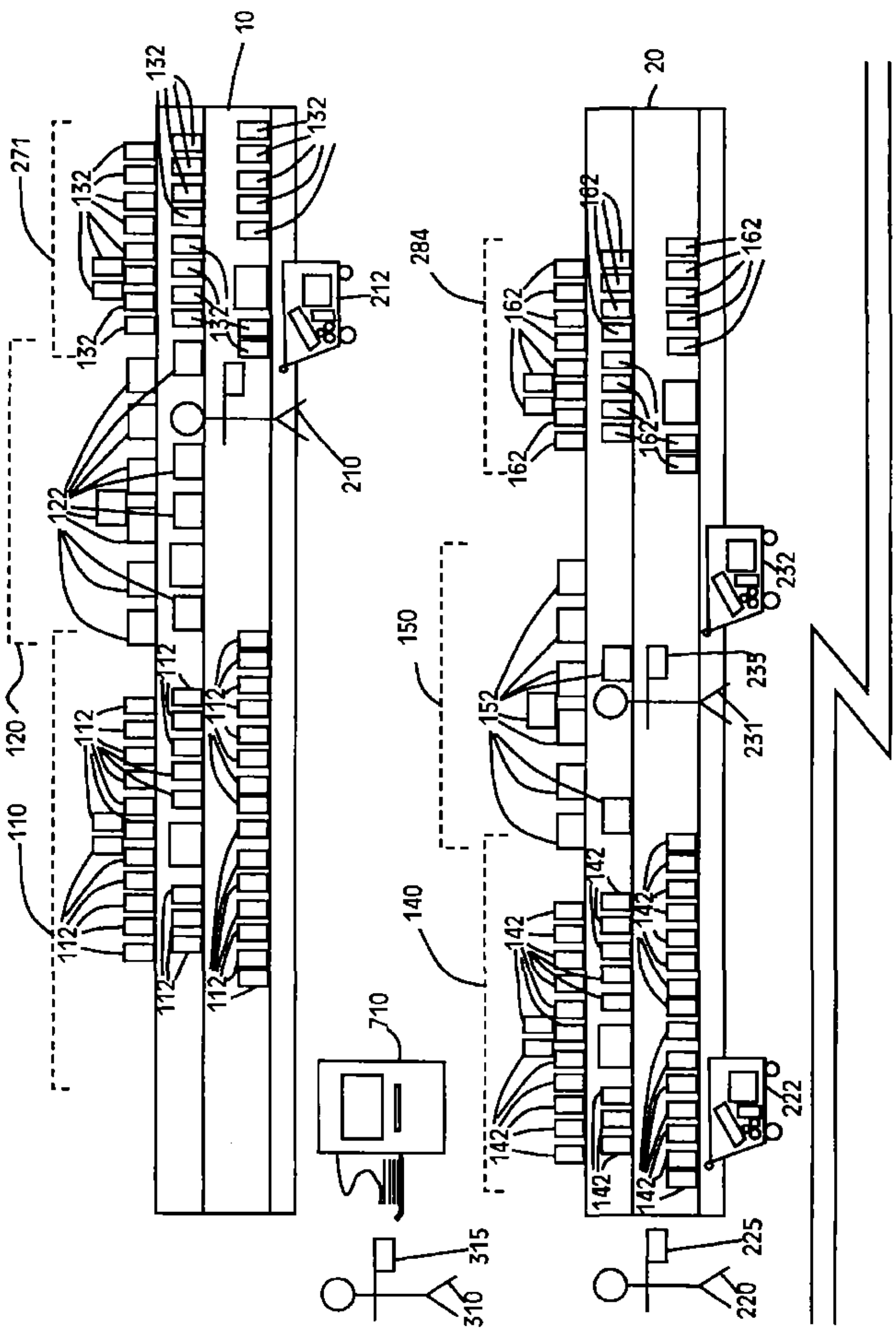
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Fig. 7A

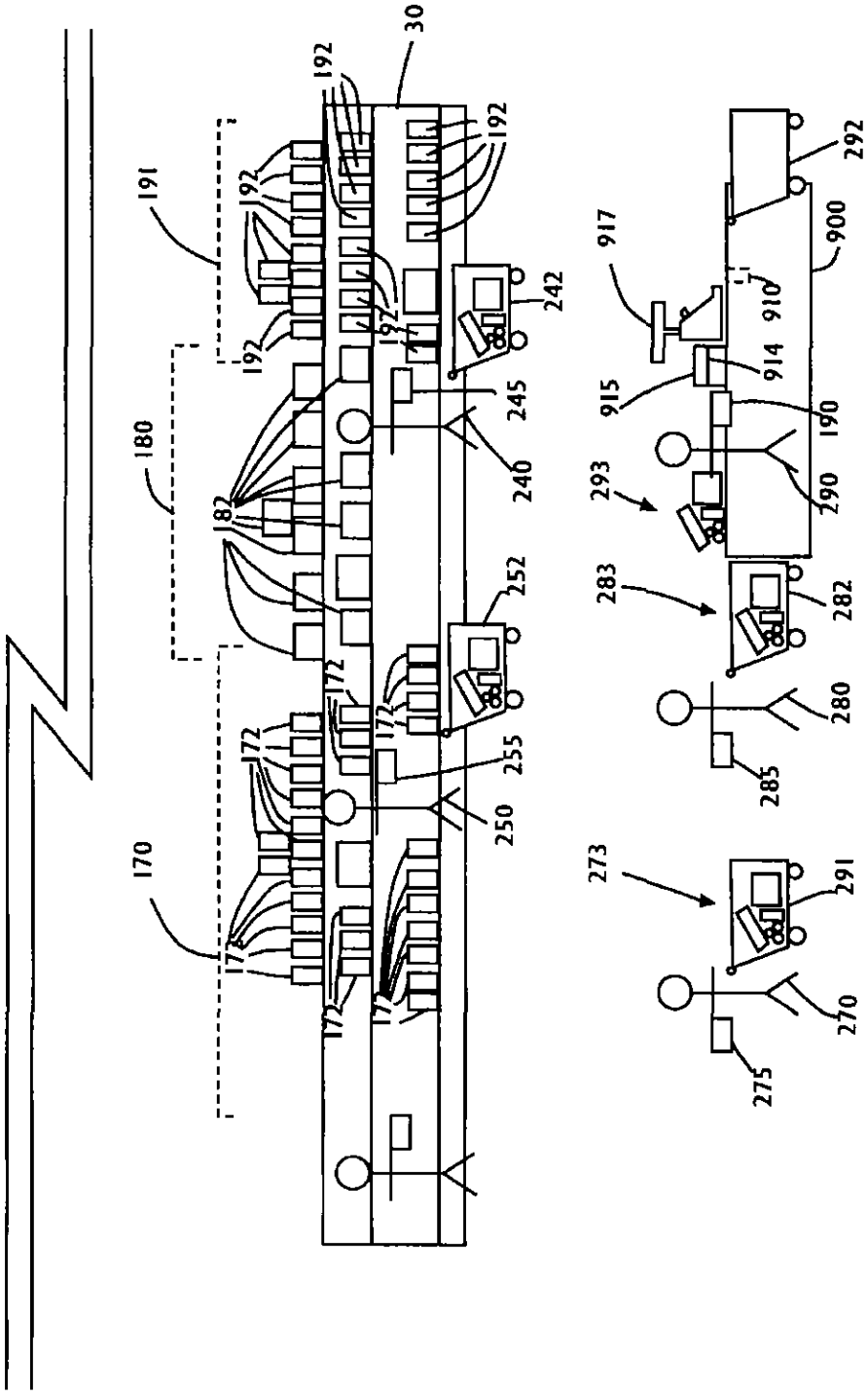
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Fig. 7B

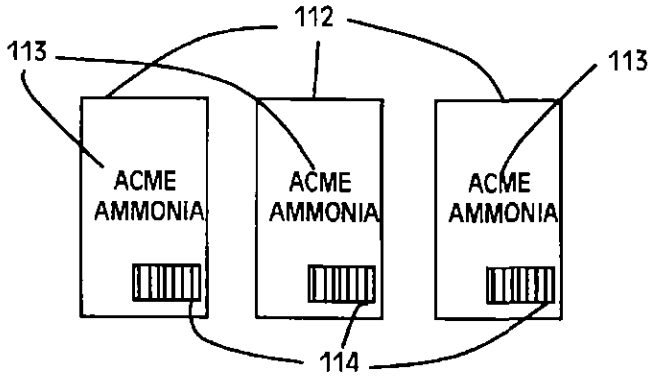


Fig. 8A

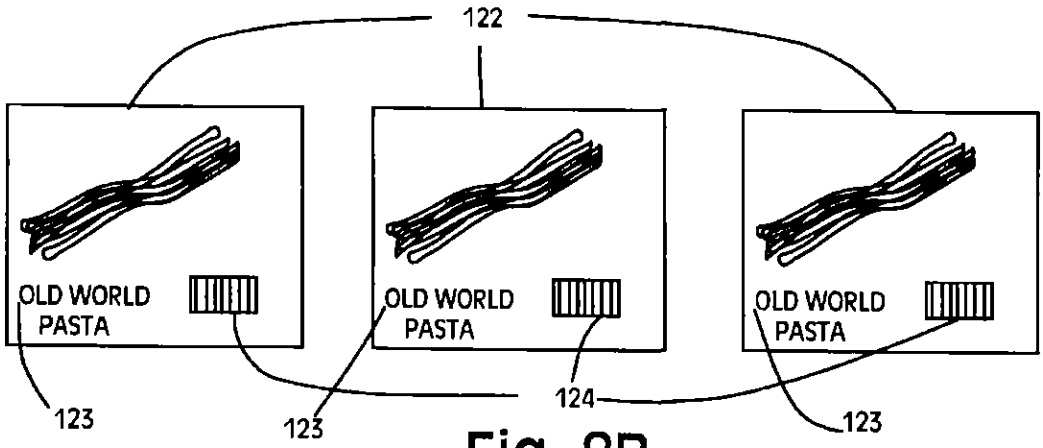


Fig. 8B

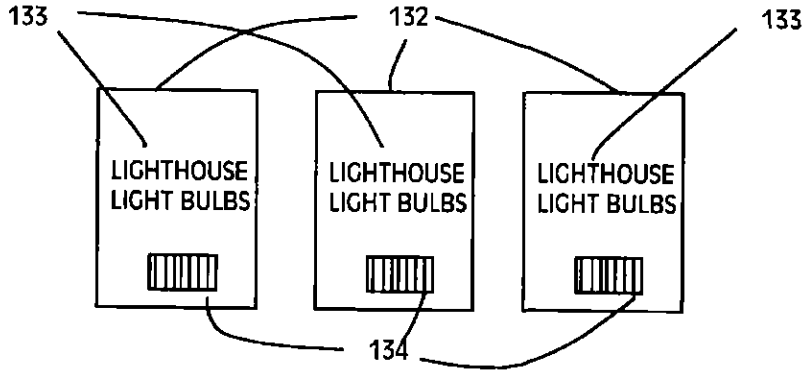


Fig. 8C

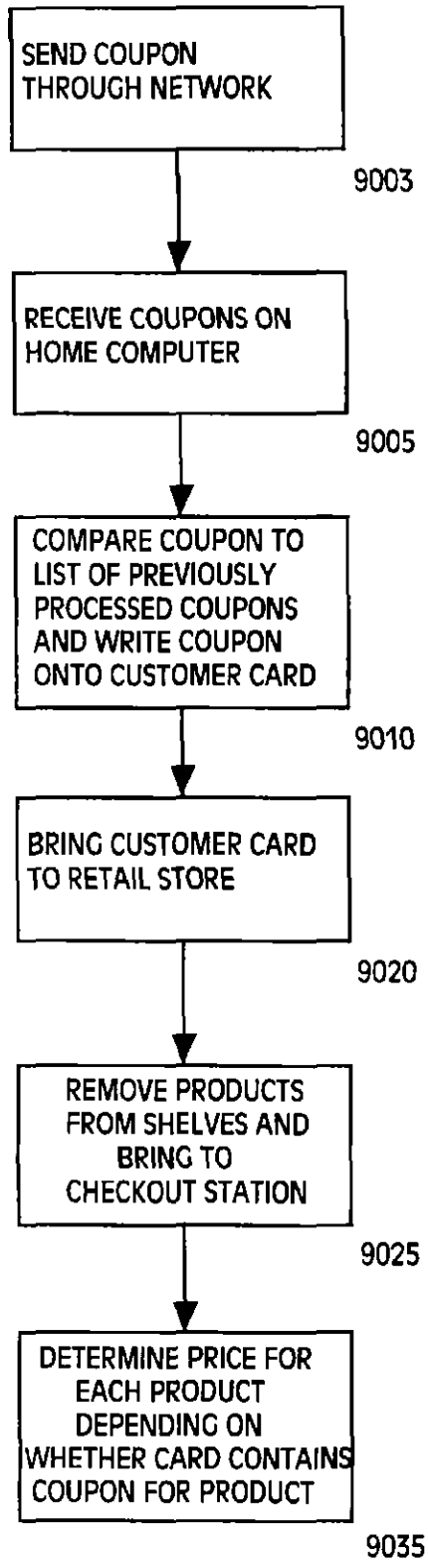

SEND COUPON THROUGH NETWORK
9003
RECEIVE COUPONS ON HOME COMPUTER
9005
COMPARE COUPON TO LIST OF PREVIOUSLY PROCESSED COUPONS AND WRITE COUPON ONTO CUSTOMER CARD
9010
BRING CUSTOMER CARD TO RETAIL STORE
9020
REMOVE PRODUCTS FROM SHELVES AND BRING TO CHECKOUT STATION
9025
DETERMINE PRICE FOR EACH PRODUCT DEPENDING ON WHETHER CARD CONTAINS COUPON FOR PRODUCT
9035

Fig. 9

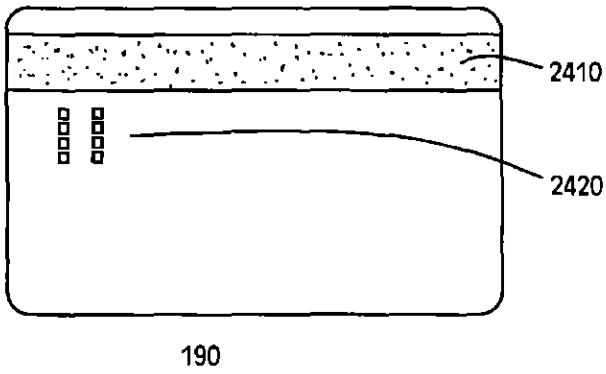


Fig. 10A

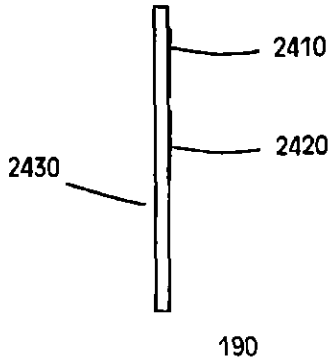


Fig. 10B

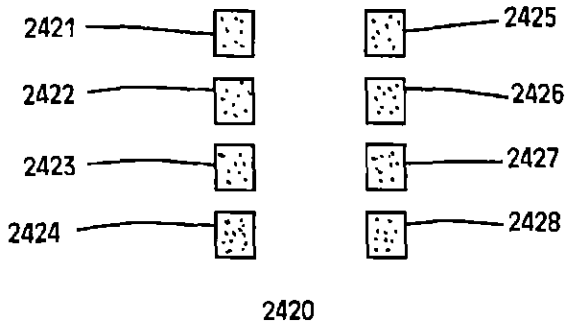
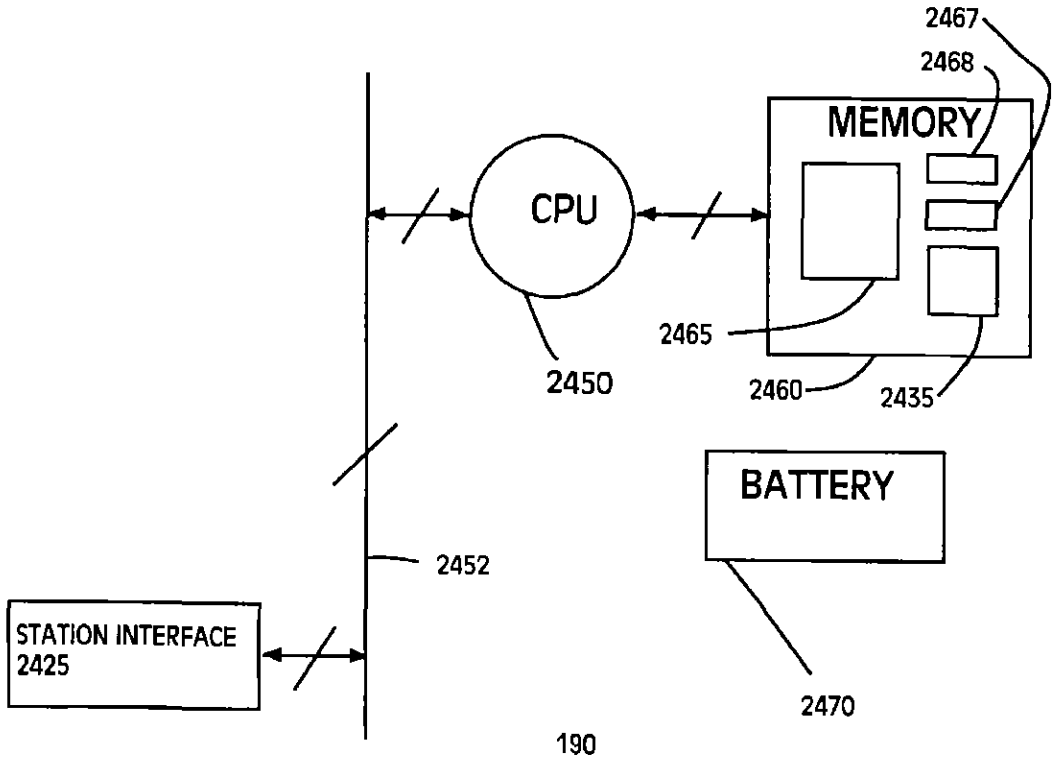


Fig. 10C


2467
2468
MEMORY
CPU
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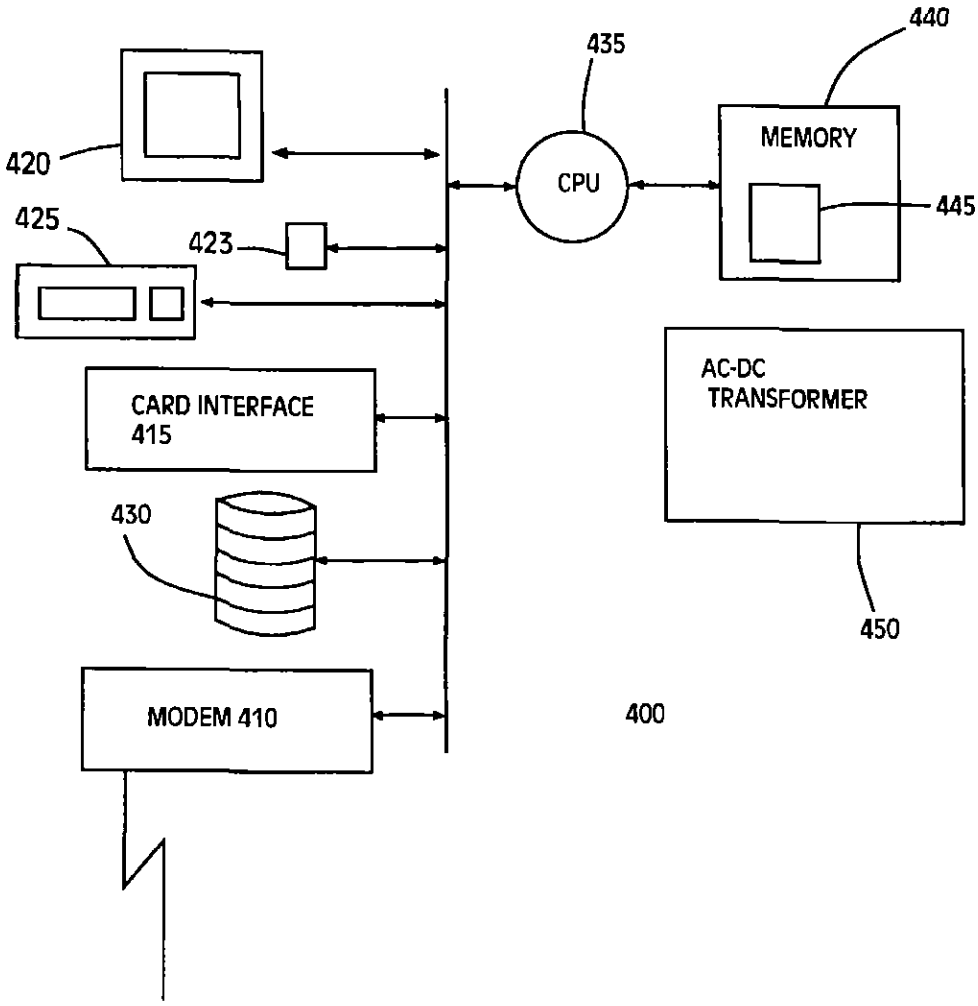
2435
BATTERY
2452
STATION INTERFACE
2425
2470
190

Fig. 11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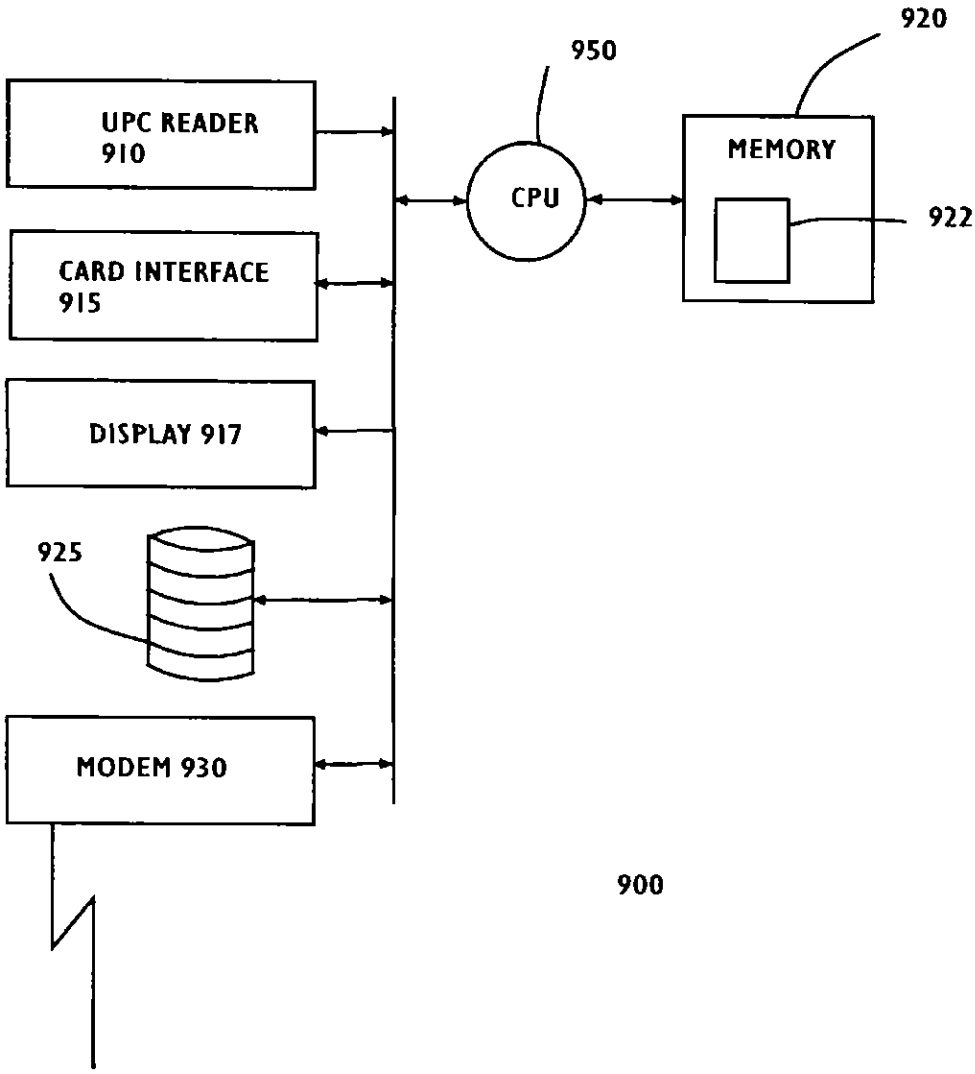
425
423
CARD INTERFACE
415
AC-DC
TRANSFORMER
430
450
MODEM 410
400

Fig. 12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950
UPC READER
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CPU
MEMORY
922
CARD INTERFACE
915
DISPLAY 917
925
MODEM 930
900

Fig. 13

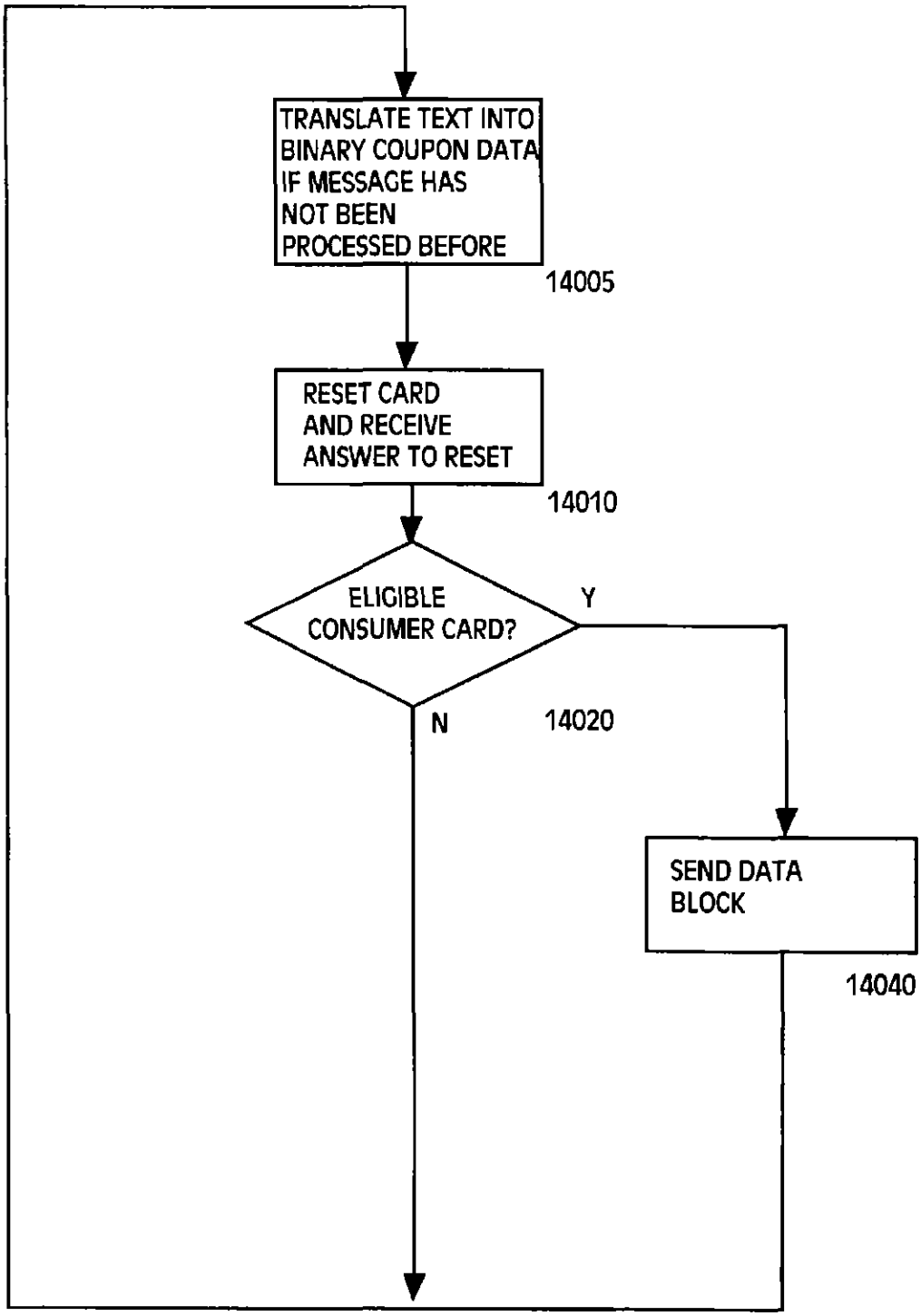
TRANSLATE TEXT INTO BINARY COUPON DATA IF MESSAGE HAS NOT BEEN PROCESSED BEFORE
14005
RESET CARD AND RECEIVE ANSWER TO RESET
14010
ELIGIBLE CONSUMER CARD?
Y
N
14020
SEND DATA BLOCK
14040

FIG. 14

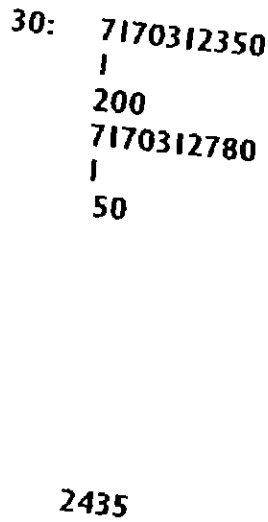

Fig. 15A

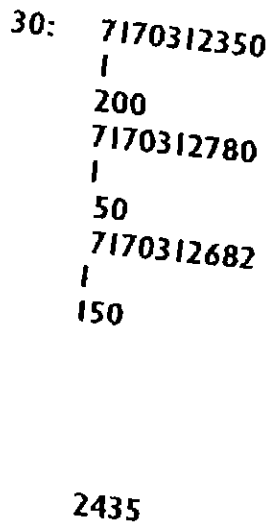

Fig. 15B

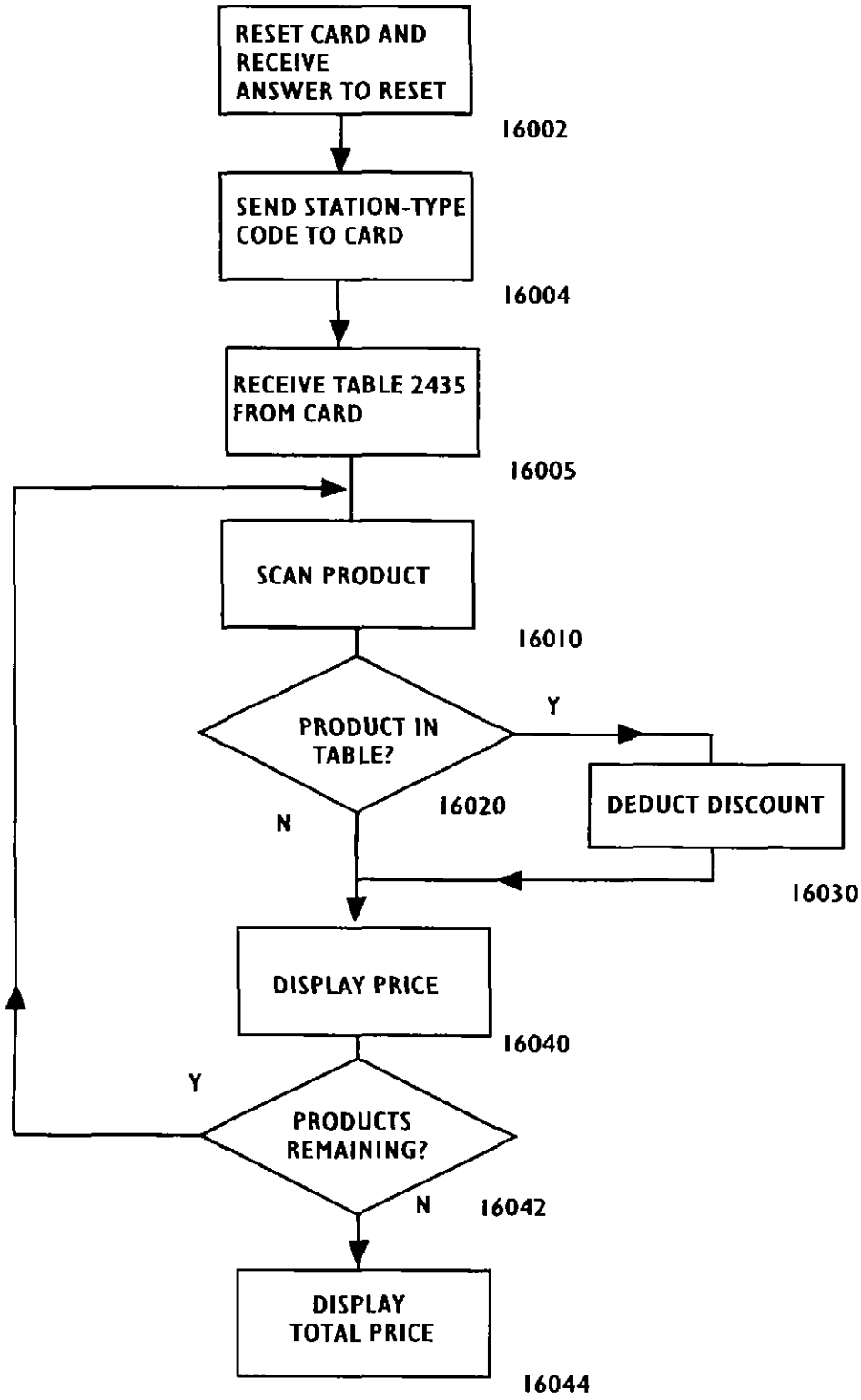
RESET CARD AND RECEIVE ANSWER TO RESET
16002
SEND STATION-TYPE CODE TO CARD
16004
RECEIVE TABLE 2435 FROM CARD
16005
SCAN PRODUCT
16010
PRODUCT IN TABLE?
Y
N
16020
DEDUCT DISCOUNT
16030
DISPLAY PRICE
16040
PRODUCTS REMAINING?
Y
N
16042
DISPLAY TOTAL PRICE
16044

FIG. 16

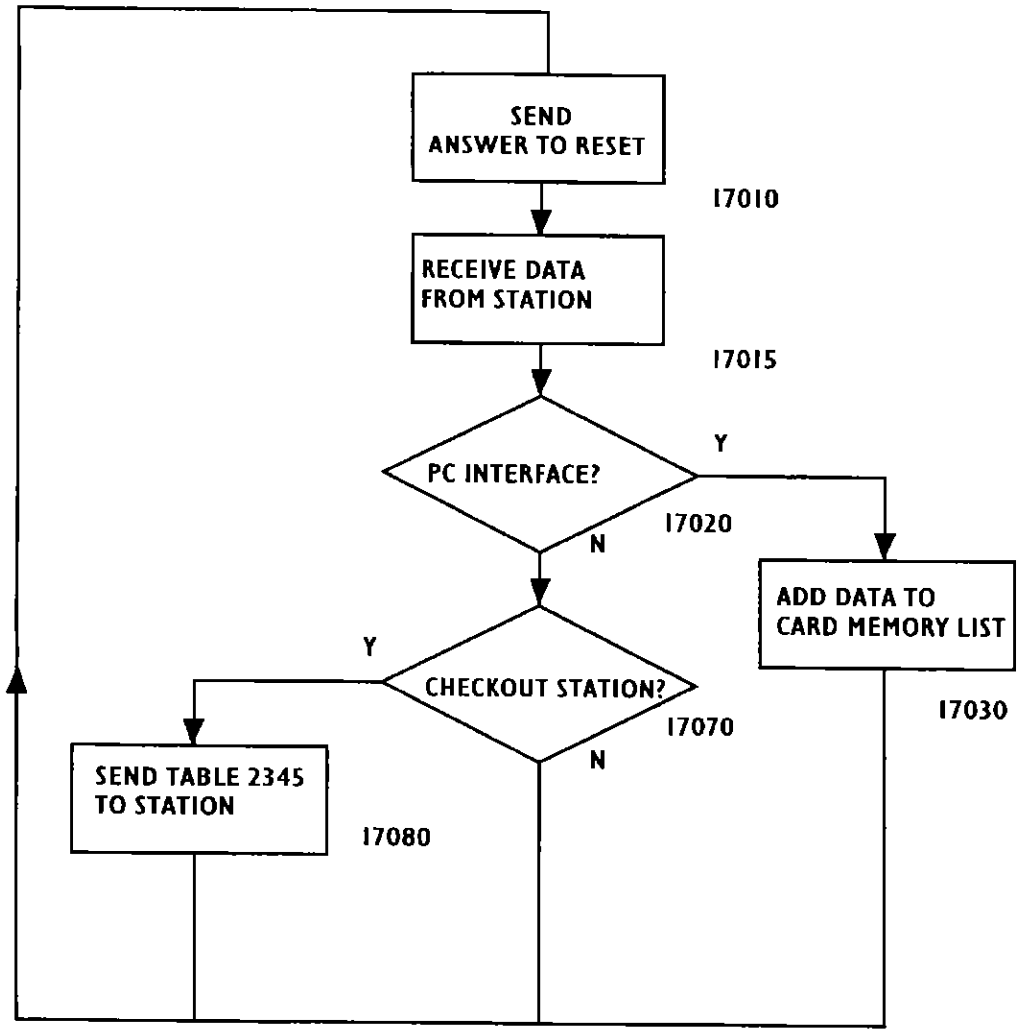
SEND ANSWER TO RESET
17010
RECEIVE DATA FROM STATION
17015
PC INTERFACE?
Y
17020
N
ADD DATA TO CARD MEMORY LIST
17030
CHECKOUT STATION?
Y
17070
N
SEND TABLE 2345 TO STATION
17080

FIG. 17

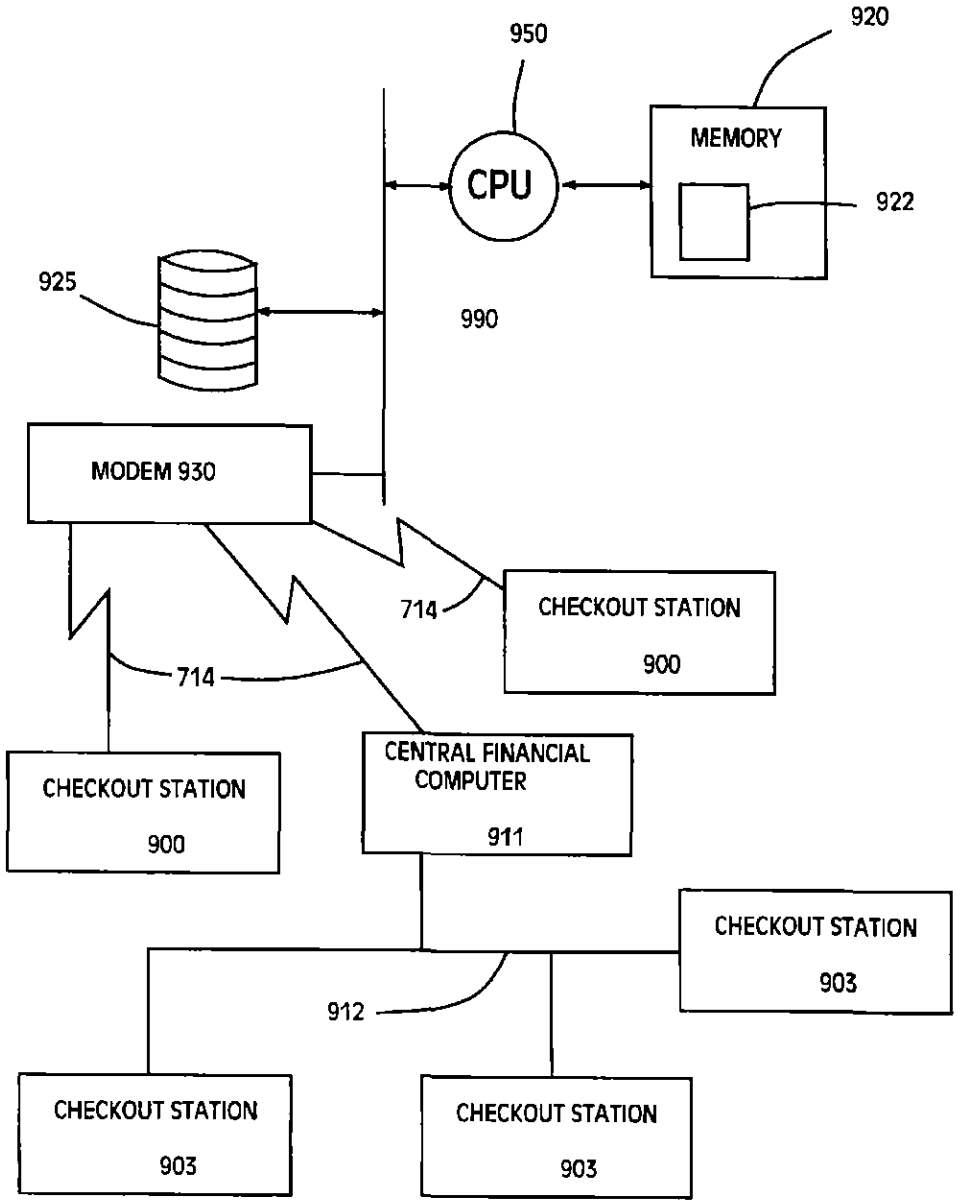
950
920
MEMORY
CPU
922
925
990
MODEM 930
714
CHECKOUT STATION
900
714
CENTRAL FINANCIAL
COMPUTER
911
CHECKOUT STATION
900
CHECKOUT STATION
903
912
CHECKOUT STATION
903
CHECKOUT STATION
903

Fig. 18

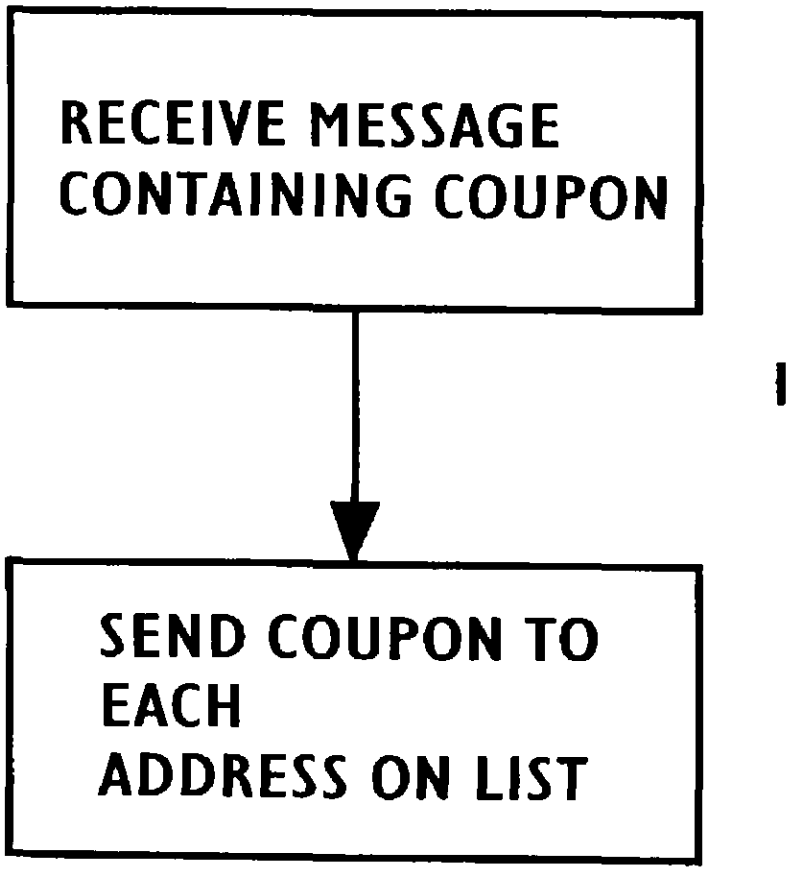
RECEIVE MESSAGE CONTAINING COUPON
1
SEND COUPON TO EACH ADDRESS ON LIST
2

FIG. 19

SYSTEM AND METHOD FOR CONTROLLING DISTRIBUTION OF COUPONS

This Application is a continuation of application Ser. No. 08/603,482 of KEN R. POWELL filed Feb. 20, 1996 for SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS, now U.S. Pat. No. 5,806,044 issued Sep. 8, 1998, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a retail system and, more particularly, to a system and method for distributing discount coupons through a system of computer networks.

2. Description of Related Art

Discount coupons are a popular means to stimulate sales of products such as grocery store items. In 1992, approximately 310 billion coupons were distributed and 7.7 billion coupons were redeemed, saving customers $4 billion. It has been estimated that in-store couponing coupled with advertising increases sales by 544%.

A typical marketing scheme involves placing coupons in a newspaper, by printing the coupons in the newspaper or by inserting coupon inserts into the newspaper, and allowing customers to bring the printed coupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associated with this scheme. To alleviate this overhead, another marketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a newspaper, and capitalizing on the fact that 66% of buyer decisions are made at the time of product purchase. Both the in-store scheme and the newspaper scheme, however, are susceptible to fraud by an unscrupulous retailer that requests reimbursement payments by presenting unredeemed coupons to the clearing house. Other schemes include delivering coupons to customers through the mail, distributing coupons in or on the product package, and distributing coupons at checkout. All of these schemes have an overhead cost of handling the coupons and of sending the redeemed coupons to a clearing house to enable product manufacturers to reimburse retailers for the reduction in proceeds resulting from coupon redemptions.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, in a system including a computer network, a plurality of customers, and a computer that sends a coupon signal in a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, a coupon processing system comprises a receiver that receives the coupon signal sent in the first signal; a determiner that determines whether a coupon, corresponding to the coupon signal, has been previously processed; and a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.

According to another aspect of the present invention, in a system including a computer network, and a plurality of customers, a method comprises the steps, performed for a customer in the plurality of customers, of sending a first signal on the computer network, the first signal including a respective destination signal corresponding to the customer, and a coupon signal; receiving the coupon signal; after the receiving step, determining whether a coupon, corresponding to the coupon signal, has been previously processed; and conditionally processing the coupon, if the coupon has not been previously processed.

BRIEF DESCRIPTION OF THE DRAWINGS

According to yet another aspect of the present invention, there is a coupon system for a system including a computer network, and a plurality of customers. The coupon system comprises means for sending a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, and a coupon signal; means for receiving the coupon signal; means for determining whether a coupon, corresponding to the received coupon signal, has been previously processed; and means for conditionally processing the coupon, if the coupon has not been previously processed.

According to yet another aspect of the present invention, there is a coupon system including a communication system, a plurality of customers, and a computer that sends a coupon signal in a first signal in the communication system. The coupon system comprises a receiver that receives the coupon signal sent in the first signal; a determiner that uses a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.

According to yet another aspect of the present invention, there is a method in a system including a communication system, and a plurality of customers. The method comprises the steps, performed for a customer in the plurality of customers, of sending a first signal in the communication system, the first signal including a coupon signal; receiving the coupon signal; after the receiving step, using a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and conditionally processing the coupon, if the coupon has not been previously processed.

FIGS. **1A** and **1B** are a schematic diagram of a system of computer networks, in accordance with a first preferred embodiment of the present invention.

FIG. **2** is a diagram emphasizing a part of the system shown in FIGS. **1A** and **1B**.

FIGS. **3A**, **3B**, and **3C** are diagrams showing a discount coupon sent through a system of computer networks from computer **230** to Home **160**.

FIG. **4** is a diagram of a personal computer inside Home **160**.

FIG. **5** is the display of the personal computer showing an electronic coupon received through the system of computer networks into home **160**.

FIG. **6** is a side view of the card-writing device in the personal computer for writing coupons onto portable cards in home **160**.

FIGS. **7A** and **7B** are a schematic diagram of a retail store in the preferred system.

FIGS. **8A**, **8B**, and **8C** are enlarged views of some products shown in FIGS. **7A** and **7B**.

FIG. **9** is a flow chart of a processing performed in the preferred system.

FIG. **10A** is a plan view of one of the customer cards in the preferred system.

FIG. **10B** is a side view of the card shown in FIG. **10A**.

FIG. **10C** is an enlarged, partial view of the card shown in FIG. **10A**.

FIG. **11** is a block diagram of the customer card.

FIG. **12** is a block diagram of the personal computer shown in FIG.**4**.

FIG. **13** is a block diagram of the check-out station shown in FIG. **7B**.

FIG. **14** is a flow chart of a step of the processing shown in FIG. **9**.

FIGS. **15A** and **15B** are diagrams of some memory contents of a customer card at different points in time.

FIG. **16** is a flow chart of another step of the processing shown in FIG. **9**.

FIG. **17** is a flow chart of the processings of step **9010** and of step **9035** of FIG. **9**.

FIG. **18** is a block diagram of a system including a clearing house and multiple check-out stations.

FIG. **19** is a flow chart of a possible processing in the preferred system.

The accompanying drawings which are incorporated in and which constitute a part of this specification, illustrate embodiments of the invention and, together with the description, explain the principles of the invention, and additional advantages thereof. Throughout the drawings, corresponding parts are labeled with corresponding reference numbers.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1A** and **1B** show a system of computer networks for distributing coupons in accordance with a first preferred embodiment of the present invention. Computer networks **105**, **111**, **115**, **130**, **135**, **138**, **125**, **279**, **142**, **148**, **144**, **146**, **281**, and **151** are interconnected. Each computer network includes a plurality of computers. Each of homes **152**, **154**, **156**, **158**, **160**, **162**, **164**, **166**, **168**, **171**, **172**, **174**, **176**, **178**, **181**, **182**, **310**, and **320** is coupled to one of the computers networks via a respective telephone signal path **177**.

The system includes portable customer cards **215**, **225**, **235**, **245**, **255**, **275**, **285**, **190**, **315**, **325**, **335**, **345**, **355**, **365**, **367**, **369**, **375**, and **385**. Each customer card is a portable customer card, approximately the size of a credit card. Each card contains a random access memory for storing electronic coupons.

A computer **230** within network **115** stores electronic coupons and distributes the stored coupons to the homes. As represented schematically in FIGS. **1A** and **1B**, a customer carries her respective card from her home to a store. A computer in each home receives a coupon from computer **230**, via one or more of the computer networks, and stores the received coupon onto one of the cards. For example, a computer in home **160** receives a coupon signal from computer **230** via networks **115**, **130**, and **135** and stores the received coupon onto card **190**.

FIG. **2** shows a section of the preferred system, emphasizing a path between computer **230** and home **160**. Network **115** is a local area network (LAN), network **130** is a wide area network (WAN), network **135** is an LAN, and network **279** in a LAN.

Network **115** includes a plurality of first computers, computers **234**, **238**, **230**, **236**, and **232**. Each of these first computers has a respective network address uniquely identifying the computer on network **115**. The first computers

can communicate with each other by sending data packets in a certain format. Each network-**115**-packet has a field containing the destination address of the packet. Each network-**115**-packet is in a format conforming to the communication protocol of network **115**, meaning, for example, that the packet has a destination address field offset a certain number of bits from the start of the packet, and that the destination address field has a certain number of bits. Computer **230** includes circuitry (hardware and software) for sending a data packet through transmission cable **117**. The circuitry includes software for constructing a packet, having the packet format of network **115**, containing a discount coupon identifying a product.

Network **130** includes a second plurality of computers, computers **254**, **250**, **252**, **258**, **256**, **262**, **260**, and **272**. Computer **230** sends this product-identification signal to home **160** via computer **238**, as described in more detail below. Each of these second computers has a respective second network address uniquely identifying the computer on network **130**. The second computers communicate with each other by sending a packet in the format for network **130**.

The data packet from computer **230** includes a destination address field allowing computer **238** to recognize that the data packet is to be received by computer **238**. Computer **238** has an address on both LAN **115** and WAN **130**, meaning that computer **238** has circuitry for recognizing an its own address in a network-**115**-formatted packet sent over network **115**, and has circuitry for recognizing an its own address in a network-**130**-formatted packet sent over network **130**. Thus, computer **238** acts to route packets between networks **115** and **130**. In other words, computer **238** includes circuitry, responsive to an address on network **115**, for receiving a packet in the format of network **115**, containing an electronic coupon identifying a certain product, and for sending a second packet in the format of network **130**, the second packet containing a signal identifying the certain product. When computer **238** receives a packet destined for computer **276**, computer **238** constructs a packet addressed to computer **272**, using the protocol for network **130**.

Computer **272** has an address on both WAN **130** and LAN **135** and, therefore, computer **272** acts to route packets between networks **130** and **135**. When computer **272** receives the packet, computer **272** constructs a packet addressed to computer **276**, using the protocol of network **135**.

More specifically, computer **230** constructs an "IP" packet addressed to computer **276**, using the Internet Protocol (IP). Computer **230** then imbeds this IP packet within a network-**115**-formatted packet addressed to computer **238**, using the protocol of network **115**. When computer **238** receives the packet, computer **238** reads the IP address, determines that the IP packet should be sent over network **130**, and imbeds the IP packet within an network-**130**-formatted packet addressed to computer **272**, using the protocol of network **130**.

When computer **272** receives the packet, computer **272** reads the IP address, determines that the IP address corresponds to computer **276**, and imbeds the IP packet in a packet addressed to computer **276**, using the protocol of network **135**.

FIG. **3A** shows data packet **3002** in the format of network **115**, sent by computer **230** through cable **117**. Header field **3010** includes a 20 bit destination address field **3011** identifying computer **238** on network **115**. Destination address

field **3011** is 16-bits removed from the beginning of the data package **3002**. Header **3010** contains other fields, including a 20-bit field containing the address of the sender of packet **3002**, and a field containing data correction bits. Field **3020** includes an Internet Protocol (IP) address field **3021** identifying computer **276**. Field **3030** includes electronic coupon information in ASCII (American Standard Code for Information Interchange) text form.

Computer **238**, which resides on both LAN **115** and WAN **130**, includes circuitry to translate packet **3002** received from computer **230**, into packet **3004** shown in FIG. **3B**. Packet **3004** includes header field **3012**. Header **3012** includes a 16 bit destination address field **3013** identifying computer **272** on WAN **130**. Address field **3013** is 32-bits removed from the start of packet **3004**. Header **3012** has other fields, including a field identifying the sender of packet **3004**, and a field containing data correction bits.

Computer **238** determines that the packet should be sent to computer **272** on network **130** by reading a routing table. The routing table has an entry for network **135**. The entry for network **135** identifies network **130** and computer **272** as the path to be used when computer **238** is sending a packet to a computer on network **135**. Thus, computer **238** constructs packet **3004** in response to IP address field **3021** in packet **3002**.

As shown in FIG. **2**, computer **238** sends a packet to computer **272**, via computers **250**, **254**, **258**, and **260**.

In other words, each packet is essentially a type of signal having a network address of a certain length and having a certain number of digits. A signal on one network may include a first network address O1 digits removed from the start of the signal. A signal another network may include a second network address is O2 digits removed from the start of the signal, wherein O1 is not equal to O2, and the first network address includes N1 digits and the second network includes N2 digits, wherein N1 is not equal to N2.

Computer **272**, which resides on both WAN **130** and LAN **135**, includes circuitry to translate packet **3004** received from computer **238**, into packet **3006** shown in FIG. **3C**. Packet **3006** includes header field **3014**. Header **3014** includes an address field **3015** identifying computer **276** on LAN **135**. Header **3014** includes a 16 bit destination address field **3015** identifying computer **276** on LAN **135**. Address field **3015** is 24-bits removed from the start of packet **3006**. Header **3014** has other fields, including a field identifying the sender of packet **3006**, and a field containing data correction bits.

Thus, the preferred system may be conceptualized as computers sending packets containing electronic coupons. The preferred system may also be conceptualized as programs, running on the computers, that send electronic mail (Email) messages to each other. Each Email message includes one or more of the packets described above. The programs include a coupon server (not shown), running on computer **230**, for constructing the Email message and sending the Email message to a customer, and Mail Transfer Agents and a User Agent (not shown) that route the Email messages between each other and ultimately store an Email message into an electronic mail box for the recipient of the message. An electronic mailbox is a memory area readable by the owner of the mail box. For example, FIG. **2** shows mail box **277** readable by personal computer **400** in home **160**.

FIG. **4** shows a personal computer **400** within home **160**. Computer **400** includes a modem **410**, a CRT display **420**, a keyboard **425**, a mouse **423**, and a coupon-writing device **415**. To receive an electronic coupon, the user establishes a telephone connection between computer **400** and computer **276** through modem **410**. Subsequently, the user logs onto computer **276** and invokes a program to read Email stored in mailbox **277**.

FIG. **5** shows CRT display **420** after the mail-reading program reads a coupon message from mailbox **277**. As shown in FIG. **5**, coupon data **3030** includes the ASCII text of an electronic mail (Email) message. Message field **5010** identifies the sender and receiver of the message, "couponhouse@usretail.com" being the Email address of the coupon server on node **230** and "bsmith@aol.com" being the Email address of the customer residing in home **160**. Message field **5015** is user readable text identifying the coupon. Message field **5020** is electronic coupon information encoded in text format. The user sends coupon data **3030** to device **415** by issuing a print command and specifying device "SCW:", which is a name designating card-writing device **415**. A driver program for device **415** receives the text data and translates the data into a certain binary format, described below, and sends the binary data to device **415**. Device **415** couples to a customer card **190** and sends data to card **190**.

FIG. **6** shows a side view of card-writing device **415**, including interface slot **4170**. Interface slot **4170** has a width sufficient to accommodate the width of one of the customer cards **190**. When a card **190** is in interface slot **4170**, conductive contact **4177** inside interface slot **4170** touches contact **2427** (described below) on the customer card. Interface slot **4170** has other contacts (not shown) for touching the other card contacts **2420** (described below).

FIGS. **7A** and **7B** show grocery store **1000**. FIGS. **7A** and FIG. **7B** are each a partial view of store **1000**. Customers **210**, **220**, **231**, **240**, **250**, **270**, **280**, and **290**, shop in the store. Before shopping in the store, each of these customers obtained a customer card. For example, customer **231** obtained customer card **235** from a bank, by completing an application for the bank. The application contained questions to collect demographic data, including birth date, income level, past buying patterns, geographic location, size of family, level of education, and job-related data. The bank subsequently wrote customer identification data for customer **231** onto customer card **235**, and issued customer card **235** to customer **231**, and sent the customer's demographic data to a clearinghouse which then stored the demographic data on disk. Each of customers **210**, **220**, **240**, **250**, **270**, **280**, and **290** obtains a respective customer card in a similar manner. In other words, for each customer the preferred method writes demographic data for the customer onto a disk in the market research center, and writes personal identification data for the customer onto a respective card for the customer.

After redemption data, including customer identification data from a plurality of cards, is compiled and sent to a market research center, as described below, the customer identification data is used to access the corresponding demographic data, thereby providing the manufacturer with valuable marketing data on coupon program effectiveness and customer demographics.

Store **1000** includes shelves **10**, **20**, and **30**, defining aisles between the shelves. The supermarket has a plurality of product areas, each corresponding to a respective product. Product Area **110** has Acme brand ammonia. Product Area **120** has Old World brand pasta. Product Area **271** has Lighthouse brand light bulbs.

More specifically, Product Area **110** has bottles of ammonia **112** grouped together on multiple shelves. Bottles of

ammonia **112** are contiguously grouped, meaning that no other product is between any two bottles of ammonia **112**.

FIG. **8**A shows an enlarged view of some of the bottles of ammonia **112**. Each bottle of ammonia has a common Universal Product Code (UPC) label **114**, which is a group of parallel lines that encodes a number that uniquely identifies acme ammonia. In other words, label **114** is different than labels of units of other products. Each bottle of ammonia **112** also has a common character label **113**. Character label **113** is "ACME AMMONIA." Label **113** is different than labels of units of other products.

Product Area **120** has boxes of pasta **122** grouped together on multiple shelves. Boxes of pasta **122** are contiguously grouped, meaning that no other product is between any two boxes of pasta **122**.

FIG. **8**B shows an enlarged view of some of the boxes of pasta **122**. Each box of pasta **122** has a common Universal Product Code (UPC) label **124**, which is a group of parallel lines that encodes a number that uniquely identifies Old World pasta. In other words, label **124** is different than labels of units of other products. Each box of pasta **122** also has a common character label **123**. Character label **123** is "OLD WORLD PASTA." Label **123** is different than labels of units of other products.

Product Area **271** has boxes of light bulbs **132** grouped together on multiple shelves. Boxes of light bulbs **132** are contiguously grouped, meaning that no other product is between two boxes of light bulbs **132**.

FIG. **8**C shows an enlarged view of some of the boxes of light bulbs **132**. Each box of light bulbs **132** has a common Universal Product Code (UPC) label **134**, which is a group of parallel lines that encodes a number that uniquely identifies Lighthouse light bulbs. In other words, label **134** is different than labels of other products. Each box **132** also has a common character label **133**. Character label **133** is "LIGHTHOUSE LIGHT BULBS." Label **133** is different than labels of other products.

Similarly, other product area in the store each have a set of respective products contiguously grouped together and a corresponding product station adjacent to the products. The respective units of a certain product have a common label, different than labels on units of other products, that uniquely identifies the certain product. Product area **140** has bottles of ketchup **142** contiguously grouped together. Product area **284** has loaves of bread **162** contiguously grouped together. Product area **170** has cartons of milk **172** contiguously grouped together. Product area **180** has packages of bacon **182**. Product area of **191** has packages of butter **192** contiguously grouped together.

Product area **150** has boxes of cereal **152** contiguously grouped together.

FIG. **9** shows a processing performed in the preferred system. Computer **230** sends an electronic coupon, in the form of an E-mail message, through computer networks **115**, **130**, and **135**. (Step **9003**). A customer, such as customer **290**, receives the electronic coupon, through modem **410**, onto her home computer (step **9005**). The coupon is compared to a list of previously processed coupons and written onto her customer card **190** using writing device **415** (step **9010**). The customer then brings her respective customer card to a store **1000**. (step **9020**).

At store **1000**, the customer removes products from shelves **10**, **20**, and **30** and brings the products to checkout station **900** (step **9025**). In other words, while shopping in store **1000**, each of customers **210**, **220**, **231**, **240**, **250**, **270**, **280**, and **290** carries his or her respective customer card. Customer **290** carries card **190**, customer **220** carries card **225**, customer **231** carries card **235**, customer **240** carries card **245**, customer **250** carries card **255**, customer **270** carries card **275**, customer **280** carries card **285**, and customer **290** carries card **190**. Each customer tows a shopping cart to hold selected products. Customer **210** tows cart **212**, customer **220** tows cart **222**, customer **231** tow cart **232**, customer **240** tows cart **242**, customer **250** tows cart **252**, customer **270** tows cart **291**, customer **280** tows cart **282**, and customer **290** tows cart **292**. The customer then removes a product from the shelf and places the removed product into her cart. The customer thus shops throughout the store.

Checkout station **900** then scans the products and determines a price for each product depending on whether the customer card contains coupons for the scanned product (step **9035**). More specifically, the customer redeems the electronic coupons at the checkout area, by inserting her customer card into checkout station **915**. For example, a customer such as customer **240** in FIG. **7**B completes the purchase of her selected products **243** by transferring products **243** from her cart **242** to counter **900**, and by inserting card **245** into checkout station **915**. Subsequently, a checkout clerk (not shown) scans each selected product past UPC bar code reader **910**. Bar code reader **910** is an optical detector. In other words, bar code reader **910** detects an electromagnetic signal. A processor coupled to station **915** and reader **910** determines whether the most recently scanned product is on a discount list stored in card **245**. If the most recently scanned product is identified in this discount list, a price for the product is determined using the discount data corresponding to the product, and the resulting price is displayed on display **917**. Checkout counter **900** scans and processes each product **243** in a similar manner.

Similarly customer **280** in FIG. **7**B follows the procedure of FIG. **9** by transferring products **283** from her cart **282** to counter **900**, and by inserting card **285** into checkout station **915**; and the checkout clerk (not shown) scans each selected product **283** past UPC bar code reader **910**. Customer **270** follows the procedure of FIG. **9** by transferring products **273** from her cart **291** to counter **900**, and by inserting card **275** into checkout station **915**; and the checkout clerk (not shown) scans each selected product **273** past UPC bar code reader **910**.

Because of the large number of electronic coupons that may be available to a customer, a customer such as customer **310** may wish to insert their card into display station **710**, to review what coupons are currently stored on the card. Station **710** may also present the viewer with additional information about the products identified by the coupons on the card. Station **710** is described in detail in application of KEN R. POWELL for SYSTEM AND METHOD FOR DISPLAYING PRODUCT INFORMATION IN A RETAIL SYSTEM Ser. No. 08/603,483, filed on Feb. 20, 1996, now U.S. Pat. No. 5,890,135 issued Mar. 30, 1999 the contents of which is herein incorporated by reference.

Step **9005** includes a step of reading an electronic mail (Email) message. An Email message from computer **230**, for the user of PC **400** in home **160**, resides in an electronic mailbox **277**, which is a memory area on computer **276**. The user of PC **400** dials into computer **276** using a telephone line, submits appropriate user identification including a password, and then invokes a program that reads the Email message from the memory of computer **276** into the memory of PC **400**.

The user then executes the driver for device **415**, by printing the Email message to device "SCW:". The driver

translates the textual coupon shown in FIG. **5** into a binary format, described below. Thus, the driver program and device **415** are essentially responsive to the coupon data stored in packet **3004**, which was constructed by routing computer **238**.

To prevent an unscrupulous user from repeatedly writing a single Email coupon onto a customer card, which would be contrary to the intent of the coupon issuer, the driver maintains a list of Email coupons already processed, including the time and date of the Email as shown in field **5010** of FIG. **5**. Before writing an electronic coupon to a customer card, the driver compares the corresponding Email message to the list to verify that an identical coupon has not been processed.

Further, to prevent a user from changing the date and time field of a previously-printed Email message and reprinting the modified message to thwart this protection mechanism, each Email message from the coupon server on node **230** contains the encoded date and time in field **5020**. Thus, the driver both verifies that an Email message with the date and time has not been previously processed, and verifies that the unencoded date and time in area **5010** matches the encoded date and time in field **5020**.

There are two preferred methods for getting the Email address for PC **400** to the coupon server on node **230**, to allow the server to send a coupon to PC **400**. The first preferred method is to program the coupon server using data collected from sources off of the Internet. The second preferred method is to allow the user of PC **400** to send her Email address, through the computer networks, to node **230**.

To implement this second method, it is presently preferred that the Email address for the user of PC **400** be sent by a web browser for the World Wide Web (WWW). With one scheme, a user sends an Email message requesting a coupon for a specific product, by invoking the browser to select Hypertext in a document advertising the product. Selection of the Hypertext invokes a "Form" in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on node **230**. The message contains the Email address given by the user and data identifying the product corresponding to the selected hypertext. Upon receiving the message, the coupon server sends an Email message to the user's address.

An alternate scheme is to have the user of PC **400** join a club, by invoking the browser to select Hypertext in a document advertising the club. The club is essentially a mailing list for certain types of coupons. Selection of the hypertext invokes a Form in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on node **230**. The message contains the Email address given by the user and data identifying the club corresponding to the selected hypertext. Upon receiving the message, the coupon server adds the Email address to the list for the club identified in the message. Subsequently, some event causes the coupon server to send a coupon to each address in the list. (FIG. **19**).

One such event would be receipt, by the coupon server, of an Email message from a coupon issuer. (FIG. **19** step 1) The coupon issuer may be a distributor of the product corresponding to the coupon. The coupon server, in this case, acts as "mail exploder," and essentially echoes the single Email message from the coupon issuer to each member of the list. (FIG. **19** step 2)

FIG. **10**A shows a plan view of customer card **190**, and FIG. **10**B shows a side view of card **190**. Card **190** is 8.5 cm by 5.4 cm, the length and width of a typical financial credit card. Card **190** is slightly thicker than a typical financial credit card. Card **190** includes a magnetic stripe **2410**, interface contacts **2420** for communication with the product stations and the checkout station, and embossed area **2430** for displaying the card owner's name. Magnetic stripe **2410** allows a conventional credit card stripe reader to read basic data from the card. Magnetic stripe **2410** is not necessary to the operation of the preferred embodiment of the invention, described in more detail below.

FIG. **10**C shows interface contacts **2420** in more detail. Interface contacts **2420** are configured in accordance with ISO7816-2: 1988(E), Identification cards—Integrated circuit(s) cards with contact—Part 2: Dimensions and locations of the contacts, promulgated by the International Organization for Standardization (ISO), and available from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, N.Y. 10036. According to ISO 7816-2, contact **2421** is assigned to VCC (supply voltage), contact **2422** is assigned to RST (reset signal), contact **2423** is assigned to CLK (clock signal), contact **2424** is reserved for future use, contact **2425** is assigned to GND (ground), contact **2426** is assigned to VPP (program and voltage), contact **2427** is assigned to I/O (data input/output), and contact **2428** is reserved for future use. Card **190** communicates with the product stations and the checkout stations through contact **2427** using a half duplex scheme, meaning that contact **2427** is for communicating data signals either to or from the card.

FIG. **11** is a block diagram of customer card **190**, including central processing unit **2450**, memory **2460**, and battery **2470** for supplying power to interface **2425**, processor **2450**, and memory **2460**. Memory **2460** is a random access, addressable device. Station interface **2425** includes a serial to parallel converter for transferring data signals between contact **2427** and CPU **2450** over parallel bus **2452**. Memory **2460** stores a program **2465** executed by processor **2450**, customer identification data **2467**, and authorization data **2468**. Customer identification data **2467** includes a sequence of digits that uniquely identifies the holder of the card. Customer identification data **2467** includes the card holder's social security number. For example, identification data **2467** in customer card **235** uniquely identifies customer **231**. Authorization data **2468** also includes date data indicating an expiration date for the card. Authorization data **2468** also contains a field identifying that the card is a customer card.

Memory **2460** also stores electronic coupons in coupon list **2435**. When a customer inserts a customer card into device **415**, processor **2450** receives an identification code for the product from interface **415** and adds the code to the list **2435**.

Each of customer cards **215**, **225**, **235**, **245**, **255**, **275**, **285**, **315**, **325**, **335**, **345**, **355**, **365**, **367**, **369**, **375**, and **385** has the same hardware structure as customer card **190**.

FIG. **12** shows a block diagram PC **400**, including central processing unit **435**, memory **440**, and AC-DC transformer **450**. Memory **440** is a random access, addressable device. Memory **440** stores driver program **445** for sending coupons to card-writing device **415**. CPU **435** executes driver **445**.

FIG. **13** is a block diagram of checkout counter **900** shown in FIG. **7**B. Disk **925** provides long term storage. CPU **950** executes instructions in random access, addressable memory **920**. Checkout counter **900** also includes UPC reader **910** for reading bar codes on products, and checkout station **915** for communicating with a customer card. Since station **915** is in store **1000** and card-writing device **415** is

in home **160**, which is a separate building from store **1000**, station **915** is spatially removed from card-writing device **415**.

CPU **950** and program **922** act to detect a product scanned by UPC reader **910**, determine a reference price for the product, search for the product's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card memory. CPU **950** then displays the price of the product on display **917**. In other words, CPU **950** and program **922** act to receive a purchase signal identifying a product, to receive to receive a card signal, and to determine a price for the product depending on whether the product identified by the card signal corresponds to the product identified by the purchase signal.

CPU **950** writes coupon redemption data onto disk **925**. Periodically, CPU **950** sends the redemption data to an electronic clearing house through modem **930**.

FIG. **14** shows the processing of step **9010** of FIG. **9** in more detail. CPU **435** executes device driver program **445** in memory **440** to perform the processing shown in FIG. **14**. When a person prints text to device "SCW:", device driver program **445** receives the text and verifies that identical text has not been processed before, by comparing the text received with a list of previous Email messages received. Program **445** also compares the time and date in field **5010** of the text with the encoded time and date in field **5020** of the text, to verify that the text is an authentic Email message from the coupon server on computer **230**. If the Email message is an authentic message that has not been processed before, program **445** then translates the text in field **5020** into binary coupon data. (step **14005**).

Subsequently, program **445** sends a reset command to card interface **415**, causing interface **415** to reset the card by applying a clock signal to card contact **2423**. (The card then answers the reset by sending an answer-to-reset data block, including identification data **2467** and authorization data **2468**, through card contact **2427**. Authorization data **2468** contains a card-type code indicating a customer card.) Program **445** then receives the answer-to-reset data block from card interface **415** (step **14010**).

The communication protocol between interface **415** and a customer card is described in more detail in ISO/IEC 7816-3: 1989 (E), Identification cards—Integrated circuit(s) cards with contacts—Part 3: Electronic signals and transmission protocols; and ISO/IEC 7816-3: 1989/Amd.1: 1992 (E), Part 3: Electronic signals and transmission protocols, AMENDMENT 1: Protocol type technique=1, synchronous half duplex block transmission protocol. Both of these standards are promulgated by the International Organization for Standardization (ISO) and distributed by the American National Standards Institute (ANSI).

CPU **435** analyzes the authorization data in the received answer-to-reset block to determine whether the card is a customer card that is eligible to receive electronic coupons from interface **415** (step **14020**). CPU **435** determines that the card is a customer card if the received authorization data contains a card-type code indicating a customer card. If the card is a customer card, meaning that the authorization data is authorization data **2468**, CPU **435** determines if the card is eligible to receive electronic coupons if authorization data **2468** contains certain codes, and the date and time in Email field **5010** is not later than the date data in authorization data **2468**. If the card is an eligible customer card, CPU **435** sends to the customer card a block containing a station-type code, indicating a PC interface, and the binary coupon data (step **14040**). The binary coupon data includes an identification code for the product received from PC **400** (Old World Pasta **122**) and the discount currently being offered for that product. If the card is not an eligible customer card (step **14020**), there is no further processing.

FIG. **15**A shows some the contents list **2435**, starting at location **30** memory **2460**, of customer card **190**, before CPU **435** of PC **400** executes step **14040**. An electronic coupon is represented by three rows in list **2435**: a 10 digit UPC product code in the first row, discount format data in the second row ("1" signifying cents, "2" signifying percentage), and discount quantity data in the third row. In FIG. **15**A, the customer card is storing two electronic coupons. After CPU **435** executes step **14040** (thereby sending another electronic coupon to the customer card), CPU **2450** in customer card **190** receives the data and adds the data to list **2435**, resulting in three electronic coupons in list **2435** as shown in FIG. **15**B.

In list **2435** in FIGS. **15**A and **15**B, the memory field having the product code 7170312350 corresponds to the UPC code on boxes of Lighthouse Light Bulbs **134**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **200**, signifying that the discount being offered for Lighthouse Light Bulbs **134** is $2.00. The memory field having the product code 7170312780 corresponds to the UPC code on ammonia bottles **112**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **50**, signifying that the discount being offered for ammonia bottles **112** is 50 cents. In list **2435** in FIG. **15**B, the memory field having the product code 7170312682 corresponds to the UPC code on boxes of Old World Pasta **124**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **150**, signifying that the discount being offered for Old World Pasta **124** is $1.50.

FIG. **16** shows aspects of the processing of step **9035** of FIG. **9**. The processing of FIG. **16** is processing performed by CPU **950** and program **922** in checkout counter **900**, when a customer checks out of store **1000**. When a customer, such as customer **290**, inserts customer card **190** into interface slot **914**, a switch (not shown) in interface slot **914** alerts CPU **950** that a card has been inserted into the slot. When a customer card is in interface slot **914**, conductive contacts (not shown) inside interface slot **914** touch each card contact **2420**. Subsequently, CPU **950** causes card interface **925** to reset the card by applying a clock signal to card contact **2423**. (If the card is a customer card, the card then answers the reset by sending a block of data, including identification data **2467** and authorization data **2468**, through card contact **2427**.) CPU **950** then receives the answer-to-reset from the card (step **16002**). CPU **950** then sends a data block containing a station-type code indicating a checkout station (step **16004**). CPU **950** then receives the contents of table **2435** in memory **2460** of the customer card, and temporarily stores these table contents in memory **920** of the checkout station (step **16005**). During step **16005**, CPU **950** also causes customer card **190** to remove all entries from list **2435**, so that the electronic coupons in the list cannot be redeemed again. When the checkout clerk (not shown) moves a product past UPC reader **910**, UPC reader **910** detects the UPC code on the product and sends the UPC

code to CPU **750** (step **16010**). CPU **950** searches the received table contents to determine whether the product scanned is identified in the table (step **16020**). If the product is not in the received table, CPU **950** displays the price (step **16040**). If the product is in the received table, CPU **950** subtracts the discount, as determined by the discount data stored in the received table, from a product reference price read from disk **925** (step **16030**), and displays the resulting price of the product on display **917** (step **16040**). If there are products remaining (step **16042**), processing proceeds to step **16010**. If there are no products remaining, processing proceeds to step **16044** for display of the total price.

Product data, customer identification data **2467**, authorization data **2468**, and the data in list **2435** are each a type of signal.

In other words, the preferred retail system **1000** includes product areas **110**, **120**, **271**, **140**, **284**, **170**, **180**, and **191**; a plurality of customer cards each having a memory, and a checkout counter **900** having checkout station **915** acting as a communication device. A method of operating system **1000** comprises the steps of writing a first signal into memory **2460** of a card in the plurality of cards, in response to a person inserting the card into the interface slot of a PC card interface, the first signal identifying a product; reading the first signal from memory **2460**, in response to a person inserting the card into the interface slot of the checkout station; receiving another signal, from UPC reader **910**, identifying a product; and determining a price for the product depending on whether the product identified by the first signal, read in the reading step, corresponds to the product identified by the other signal.

In summary, after UPC barcode reader **910** scans a product, processor **950** determines eligibility for a discount. If a product qualifies, processor **950** displays the discounted price on display **917**.

FIG. **17** shows aspects of the processing of steps **9010** and **9035** of FIG. **9**. The processing of FIG. **17** processing is performed by one of the customer cards, such as customer card **190**, in the preferred retail system. After the card is reset through contacts **2420**, the customer card sends an "answer to reset" data block in accordance with the ISO standard ISO/ICE 7816-3: 1989(E), cited above. The customer card sends identification data **2467** and authorization data **2468** in the answer-to-reset data block (step **17010**). If the station then sends a block of data to the customer card, the customer card then receives the block of data through contact **2427** (step **17015**). If the block contains a station-type code indicating a PC card interface (step **17020**), the customer card then adds product coupon information, from a certain location in the block, to the list **2345** (step **17030**).

If the customer card is not eligible, the PC interface will not send a block of data, step **17015** therefore does not execute, and processing ceases until the customer card is reinserted into an interface slot, at which time the station will reset the card and processing will restart at step **17010**.

Alternatively, if the block contains a station-type code indicating a Checkout station (step **17070**), the customer card then sends list **2345** to the display station (step **17080**). In other words, CPU **2450** reads list **2435** from memory **2460**, in response to a customer inserting card **190** into checkout station **915**, and sends a signal corresponding to the list **2345** to the checkout station (step **17080**). If the block does not contain a station-type code indicating a Checkout station, there is no additional processing.

FIG. **18** shows a block diagram of a preferred retail system including a clearinghouse **990**, and a plurality of checkout stations **900**. Periodically, checkout counter **900** sends redemption data to an electronic clearing house. The redemption data sent to the clearing house includes the identification of the store, identification of the coupons redeemed and of respective quantities of coupon redemptions. Periodically, checkout counter **900** sends redemption data to a market research center. The redemption data sent to the research center includes the identification of the store and of the customers who presented electronic coupons for redemption. The checkout stations send the redemption data blocks, over telephone signal paths **714**.

Checkout stations **903** are located within a single company. Checkout stations **903** are similar to checkout stations **900**, described above, except that checkout stations **903** have circuitry for communicating over network **912**. Checkout stations **903** send transaction data blocks to central financial computer **911** located within the company. Central financial computer **911** periodically sends the compiled transaction data to clearing house **990**, over telephone signal paths **714**.

Thus, the preferred systems provides a convenient and stimulating shopping environment. The systems allow the user to receive electronic coupons at home and then bring the received coupons to a retail store.

Other applications of electronic coupons are the subject of copending application of KEN R. POWELL for RETAIL SYSTEM, Ser. No. 08/468,816, filed on Jun. 6, 1995, the contents of which is herein incorporated by reference; and of application of KEN R. POWELL for DEVICE AND METHOD OF PROGRAMMING A RETAIL SYSTEM, Ser. No. 08/468,820, filed on Jun. 6, 1995, now U.S. Pat. No. 5,727,153 issued Mar. 10, 1998 for RETAIL STORE HAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is herein incorporated by reference.

Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or the scope of Applicants' general inventive concept. The invention is defined in the following claims.

What is claimed is:

1. A system comprising:

a plurality of portable cards;

a first computer network including a first plurality of computers, each having a respective first network address, the plurality of first computers including a first computer having means for sending a first signal including a first network address, an inter-network address corresponding to a computer on another network, and a signal corresponding to a product;

a second computer network including a second plurality of computers, each having a respective second network address;

means, responsive to the inter-network address from the first signal, for sending a second signal including a second network address and the signal corresponding to the product; and

means, responsive to the signal corresponding to the product from the second signal, for sending a card signal, to a portable card in the plurality of cards; and

means, spatially removed from the previous means, for reading the card signal from the portable card.

2. In a system including a computer network, a plurality of customers, and a computer that sends a coupon signal in a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, a coupon processing system comprising:

a receiver that receives the coupon signal sent in the first signal;

a determiner that determines whether a coupon, corresponding to the coupon signal, has been previously processed; and

a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.

3. The coupon processing system of claim 2 wherein the respective destination signal includes an inter-network address.

4. The coupon processing system of claim 2 wherein the respective destination signal includes an electronic mail address.

5. The coupon processing system of claim 2 wherein the transmitter includes

a card interface that transmits the coupon to a card in a plurality of portable cards.

6. The coupon processing system of claim 5 further including

a processor, spatially removed from the transmitter, that receives a transmitted coupon from the card.

7. The coupon processing system of claim 2 further including

a second receiver that receives a purchase signal corresponding to a product; and

a determiner that determines whether a transmitted coupon corresponds to the purchase signal.

8. The coupon processing system of claim 7 further including

an electromagnetic detector for generating the purchase signal.

9. In a system including a computer network, and a plurality of customers, a method comprising the steps, performed for a customer in the plurality of customers, of:

sending a first signal on the computer network, the first signal including a respective destination signal corresponding to the customer, and a coupon signal;

receiving the coupon signal;

after the receiving step, determining whether a coupon, corresponding to the coupon signal, has been previously processed; and

conditionally processing the coupon, if the coupon has not been previously processed.

10. The method of claim 9 wherein the sending step includes sending the first signal wherein the respective destination signal includes an inter-network address.

11. The method of claim 9 wherein the sending step includes sending the first signal wherein the respective destination signal includes an electronic mail address.

12. The method of claim 9 further including the steps of

receiving a purchase signal corresponding to a product; and

determining whether a coupon, processed by the processing step, corresponds to the purchase signal.

13. The method of claim 9 further including the steps of

generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

receiving the purchase signal; and

determining whether a coupon, processed by the processing step, corresponds to the purchase signal.

14. The method of claim 9 wherein the sending step includes

sending an inter-network address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between two computers.

15. The method of claim 9 wherein the system further includes a plurality of portable cards and the method further includes

sending the coupon to a card in the plurality of portable cards;

subsequently, moving the card; and

receiving the coupon from the card.

16. The method of claim 15 wherein the system further includes a plurality of portable cards and the processing step includes

sending the coupon to a card in the plurality of portable cards.

17. The method of claim 15 wherein the system further includes a plurality of portable cards and the method further includes the steps, performed after the determining step, of:

sending the coupon to a card in the plurality of portable cards;

subsequently, moving the card; and

receiving the coupon from the card.

18. A coupon system for a system including a computer network, and a plurality of customers, the coupon system comprising:

means for sending a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, and a coupon signal;

means for receiving the coupon signal;

means for determining whether a coupon, corresponding to the received coupon signal, has been previously processed; and

means for conditionally processing the coupon, if the coupon has not been previously processed.

19. The coupon system of claim 18 wherein the respective destination signal includes an inter-network address.

20. The coupon system of claim 18 wherein the respective destination signal includes an electronic mail address.

21. The coupon system of claim 18 wherein the system further includes a plurality of portable cards and the means for conditionally processing includes a card interface.

22. The coupon system of claim 18 further including

a receiver that receives a purchase signal corresponding to a product; and

a determiner that determines whether a coupon, processed by the processing means, corresponds to the purchase signal.

23. The coupon system of claim 18 wherein the destination signal includes

sending an inter-network address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between two computers.

24. In a system including a communication system, a plurality of customers, and a computer that sends a coupon

EXHIBIT / ATTACHMENT

B

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signal in a first signal in the communication system, a coupon system comprising:

a receiver that receives the coupon signal sent in the first signal;

a determiner that uses a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and

a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.

25. The coupon system of claim **24** wherein the first signal includes a destination signal corresponding to a customer in the plurality of customers.

26. The coupon system of claim **24** wherein the first signal includes an electronic mail address.

27. The coupon system of claim **24** wherein the transmitter includes

a card interface that transmits the coupon to a card in a plurality of portable cards.

28. The coupon system of claim **27** further including a processor, spatially removed from the transmitter, that receives a transmitted coupon from the card.

29. The coupon system of claim **24** further including

a second receiver that receives a purchase signal corresponding to a product; and

a determiner that determines whether a transmitted coupon corresponds to the purchase signal.

30. The coupon system of claim **29** further including

an electromagnetic detector for generating the purchase signal.

31. In a system including a communication system, and a plurality of customers, a method comprising the steps, performed for a customer in the plurality of customers, of:

sending a first signal in the communication system, the first signal including a coupon signal;

receiving the coupon signal;

after the receiving step, using a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and

conditionally processing the coupon, if the coupon has not been previously processed.

32. The method of claim **31** wherein the sending step includes sending a destination signal corresponding to a customer in the plurality of customers.

33. The method of claim **31** wherein the sending step includes sending an electronic mail address.

34. The method of claim **31** further including the steps of

receiving a purchase signal corresponding to a product; and

determining whether a coupon, processed by the processing step, corresponds to the purchase signal.

35. The method of claim **31** further including the steps of

generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

receiving the purchase signal; and

determining whether a coupon, processed by the processing step, corresponds to the purchase signal.

36. The method of claim **31** wherein the sending step includes

sending an inter-network address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between two computers.

37. The method of claim **31** wherein the system further includes a plurality of portable cards and the method further includes

sending the coupon to a card in the plurality of portable cards;

subsequently, moving the card; and

receiving the coupon from the card.

38. The method of claim **37** wherein the system further includes a plurality of portable cards and the processing step includes

sending the coupon to a card in the plurality of portable cards.

39. The method of claim **37** wherein the system further includes a plurality of portable cards and the method further includes the steps, performed after the determining step, of:

sending the coupon to a card in the plurality of portable cards;

subsequently, moving the card; and

receiving the coupon from the card.

* * * * *

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United States Patent [19]

Powell

[11] Patent Number: 6,067,526

[45] Date of Patent: *May 23, 2000

[54] **SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS**

[75] Inventor: **Ken R. Powell**, Athens, Ga.

[73] Assignee: **Softcard Systems, Inc.**, Watkinsville, Ga.

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/245,419**

[22] Filed: **Feb. 5, 1999**

Related U.S. Application Data

[63] Continuation of application No. 09/100,868, Jun. 22, 1998, which is a continuation of application No. 08/603,482, Feb. 20, 1996, Pat. No. 5,806,044.

[51] **Int. Cl.**[7] **G06F 17/60**

[52] **U.S. Cl.** **705/14**; 370/389; 370/392; 709/238

[58] **Field of Search** 370/351, 389, 370/392, 466; 395/200.6, 200.68; 705/14; 709/230, 238

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Primary Examiner—Edward R. Cosimano
Attorney, Agent, or Firm—Jerome D. Jackson

[57] **ABSTRACT**

A system for dispensing and redeeming the electronic discount coupons. The system includes a personal computer (PC) having hardware and software for receiving an electronic coupon from the system of computer networks, translating the received coupon into a binary format, and sending the binary-formatted coupon to a card-writing device. The card-writing device writes the coupon data onto a portable customer card ("smart card") approximately the size of a credit card. Subsequently, the customer goes to the store with the card. Upon completion of shopping, the customer redeems the electronic coupons at the checkout area, by inserting the card into the checkout station. During checkout, the customer is credited with the value of a coupon when UPC data from a bar code reader corresponds to a coupon stored on the card.

51 Claims, 21 Drawing Sheets

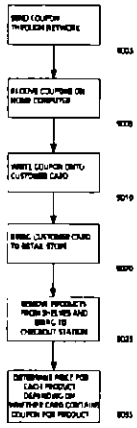

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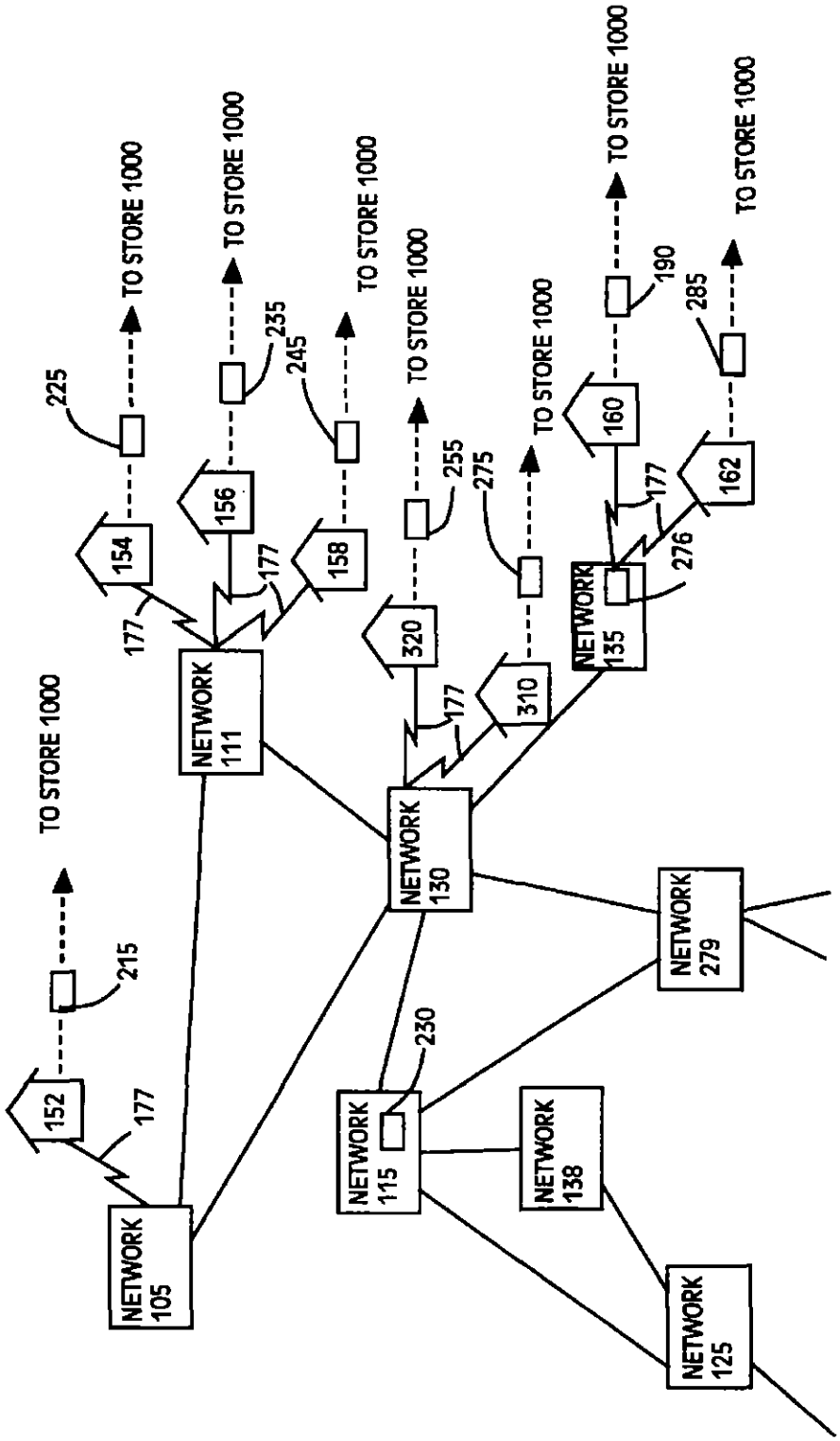
Fig. 1A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NETWORK 130
NETWORK 135
NETWORK 138
NETWORK 279
152
154
156
158
160
162
177
276
310
320
TO Fig. 1B

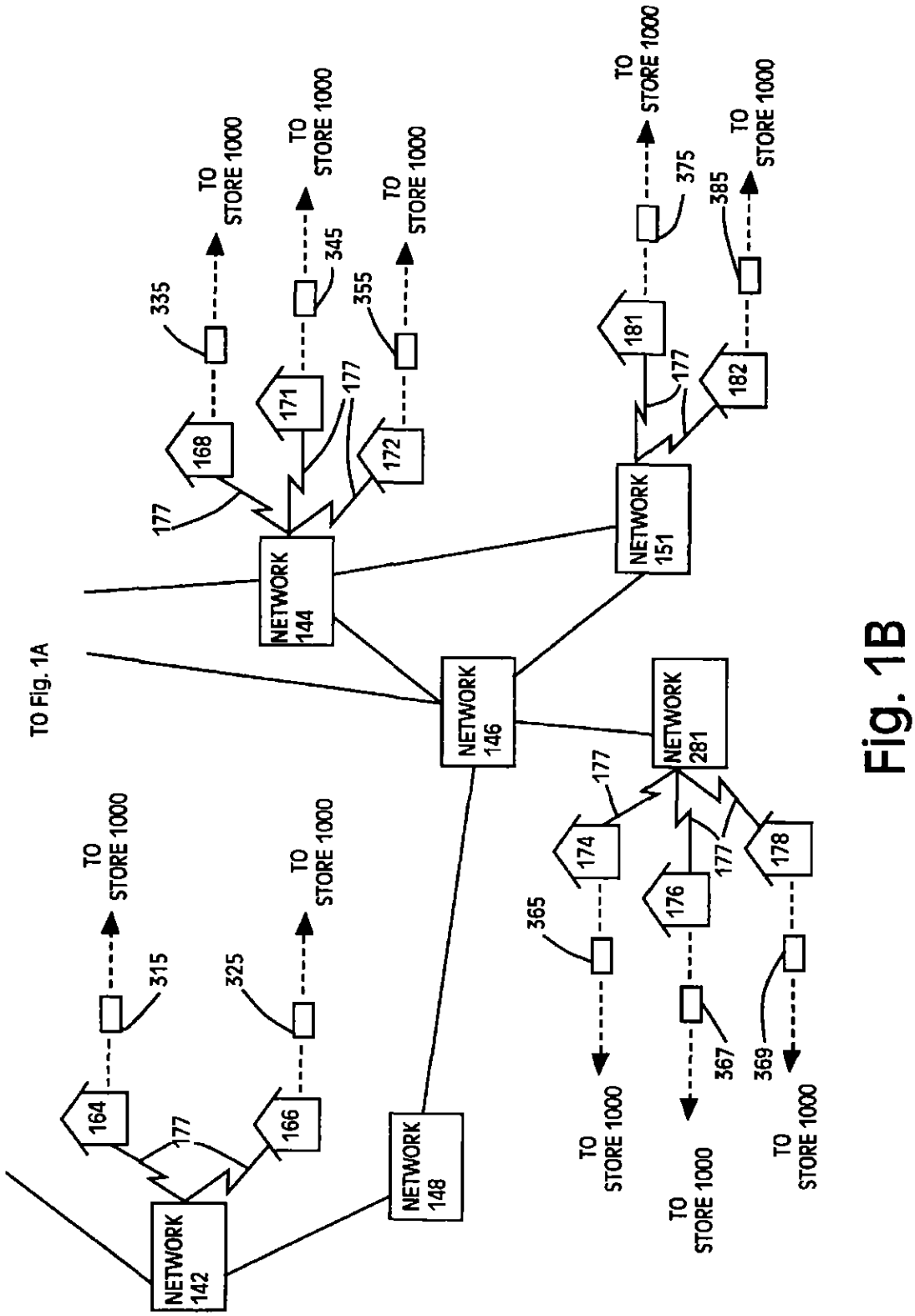

TO Fig. 1A
NETWORK 142
NETWORK 144
NETWORK 146
NETWORK 148
NETWORK 151
NETWORK 281
164
166
168
171
172
174
176
178
181
182
177
315
325
335
345
355
365
367
369
375
385
TO STORE 1000

Fig. 1B

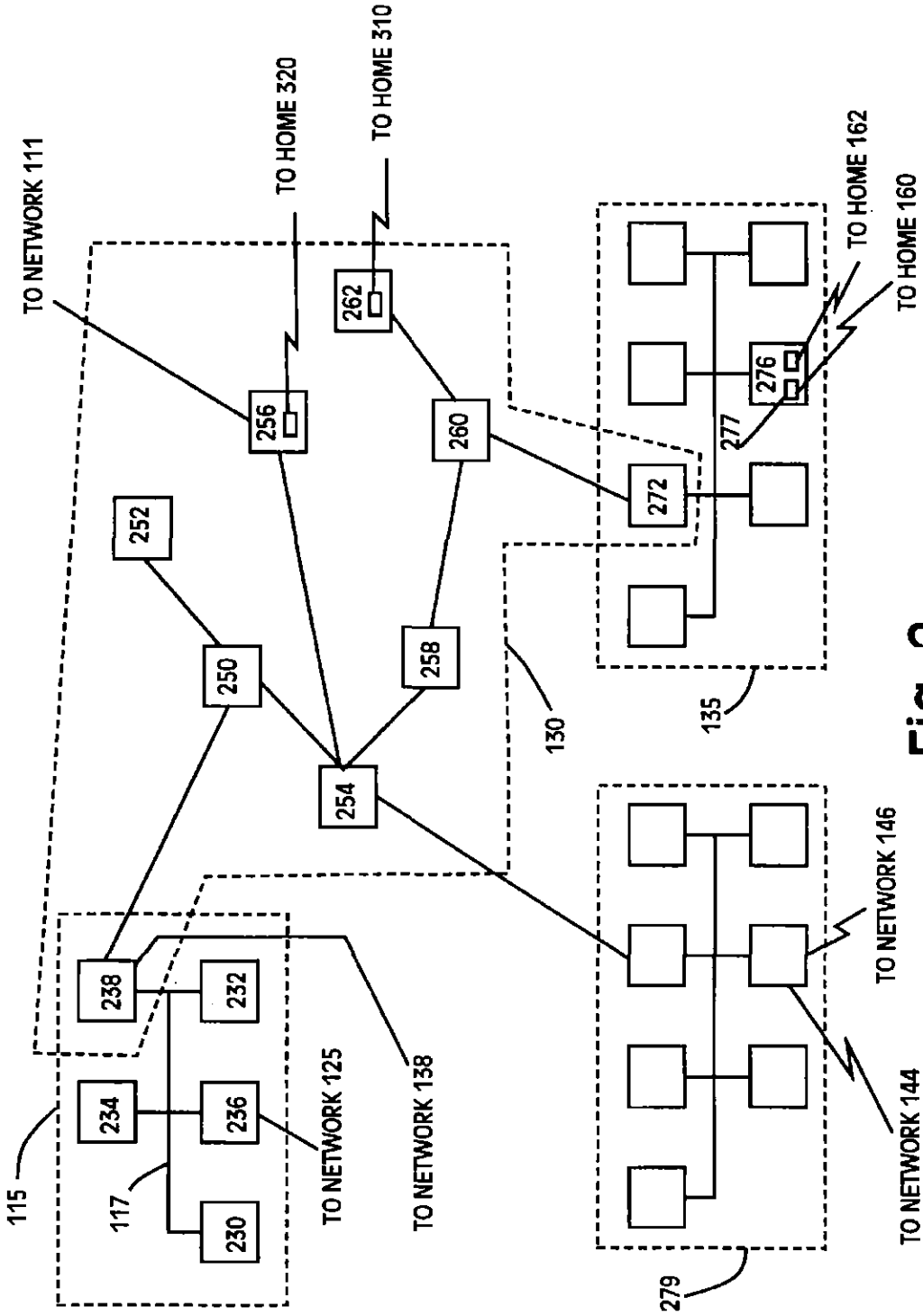

TO NETWORK 111
TO HOME 320
TO HOME 310
TO HOME 162
TO HOME 160
262
256
260
276
277
272
252
250
258
254
130
135
238
232
234
236
230
115
117
TO NETWORK 125
TO NETWORK 138
TO NETWORK 146
TO NETWORK 144
279

Fig. 2

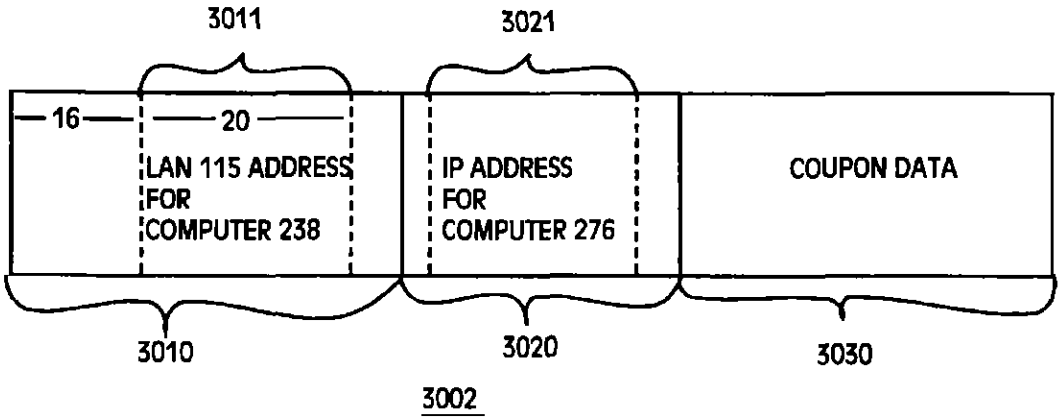


Fig. 3A

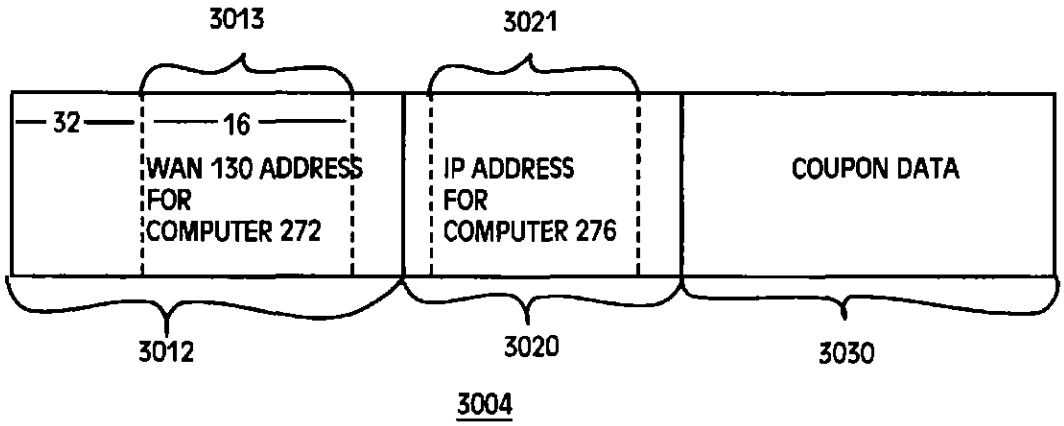


Fig. 3B

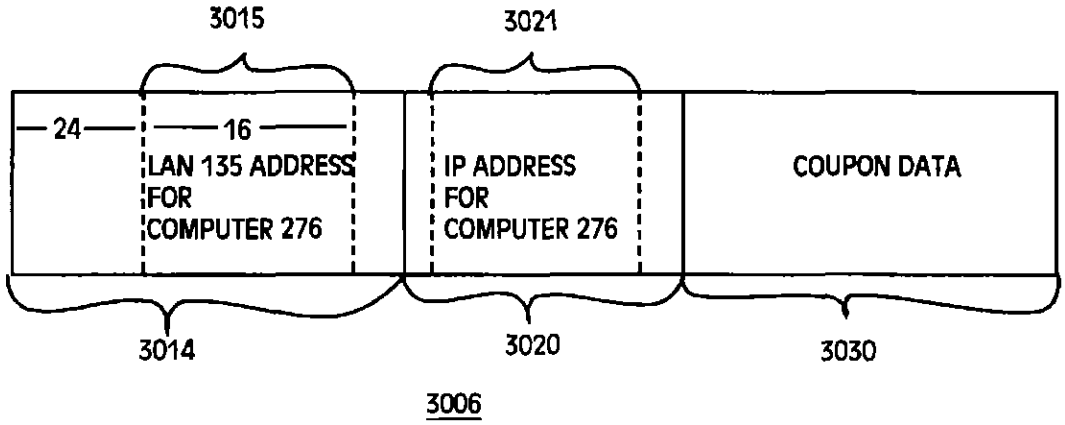


Fig. 3C

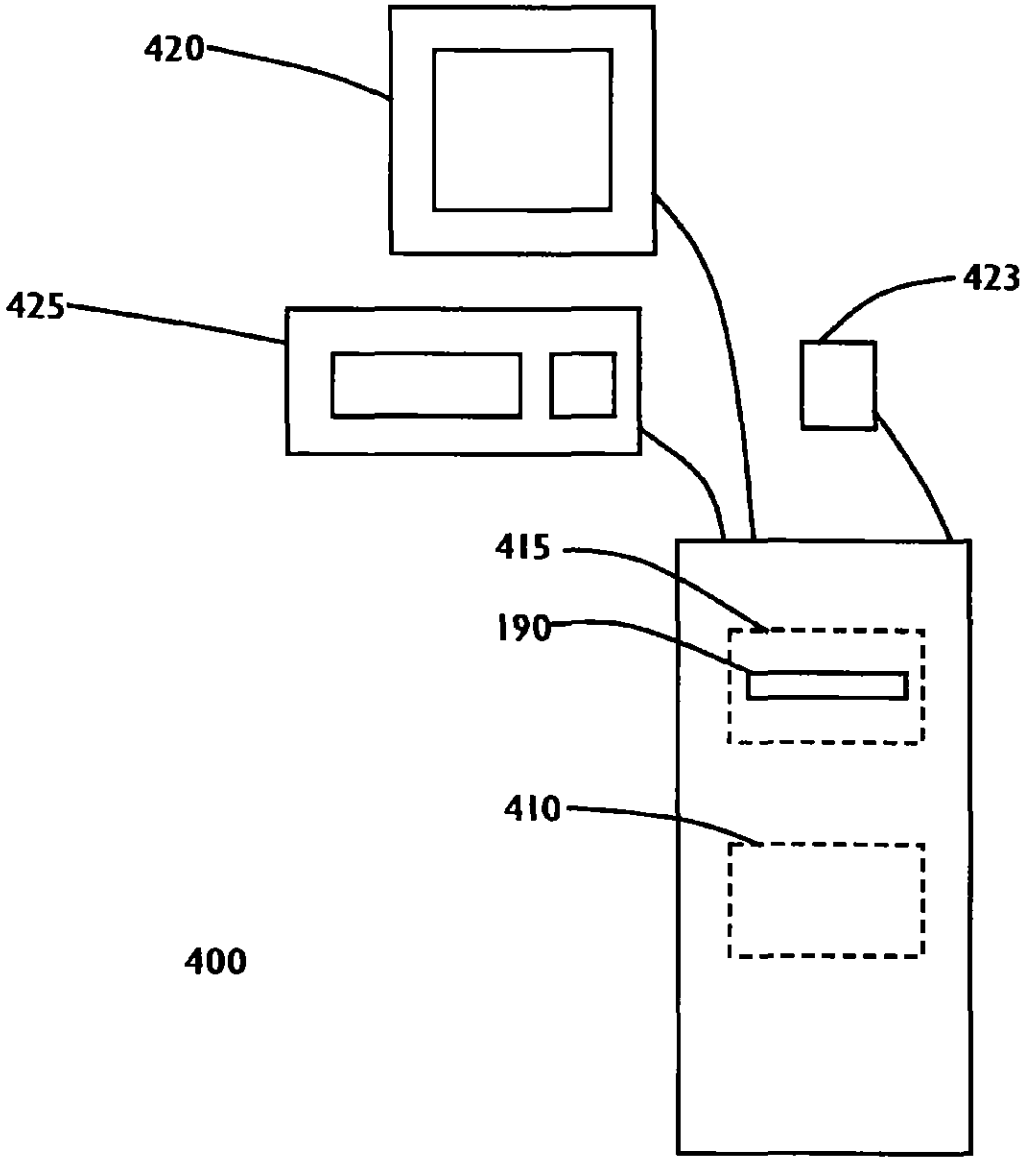


Fig. 4

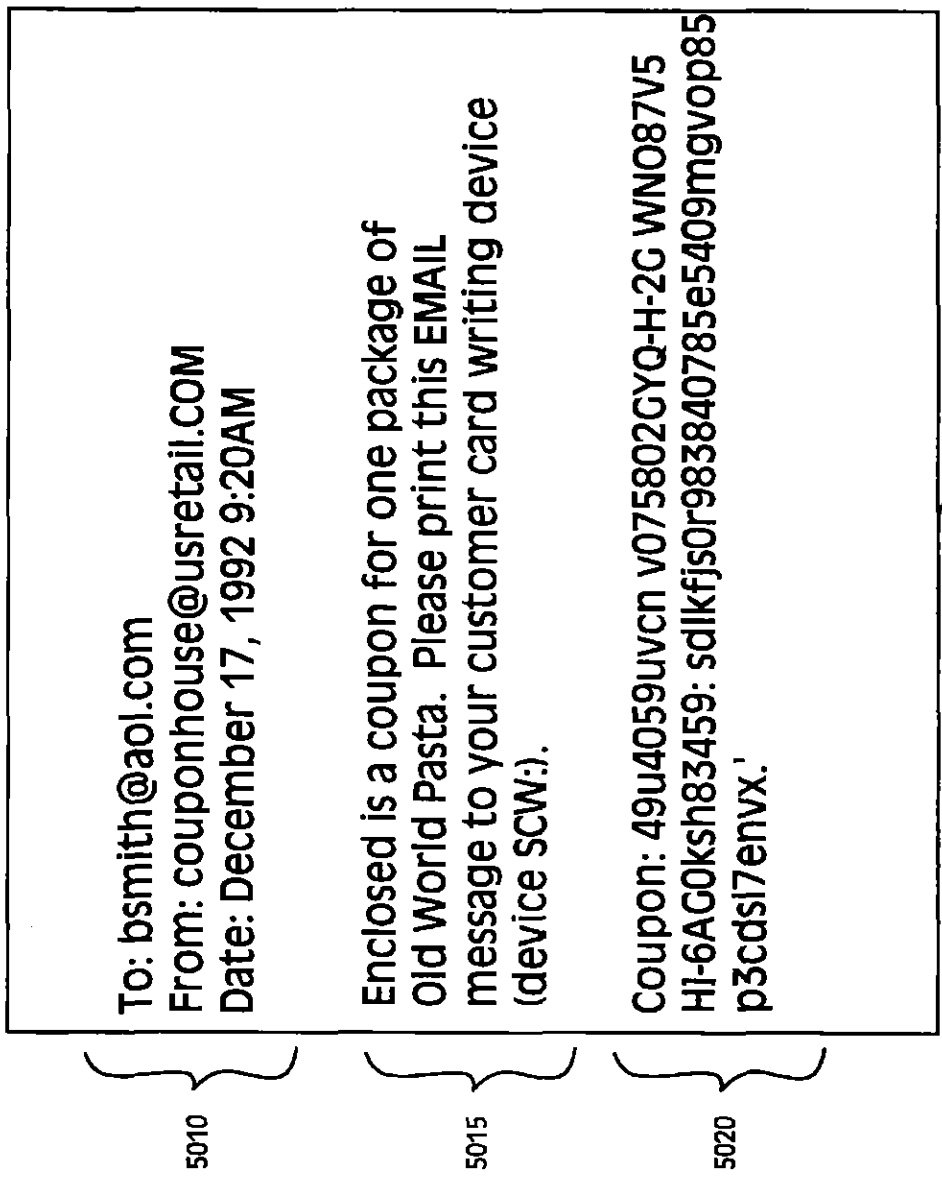
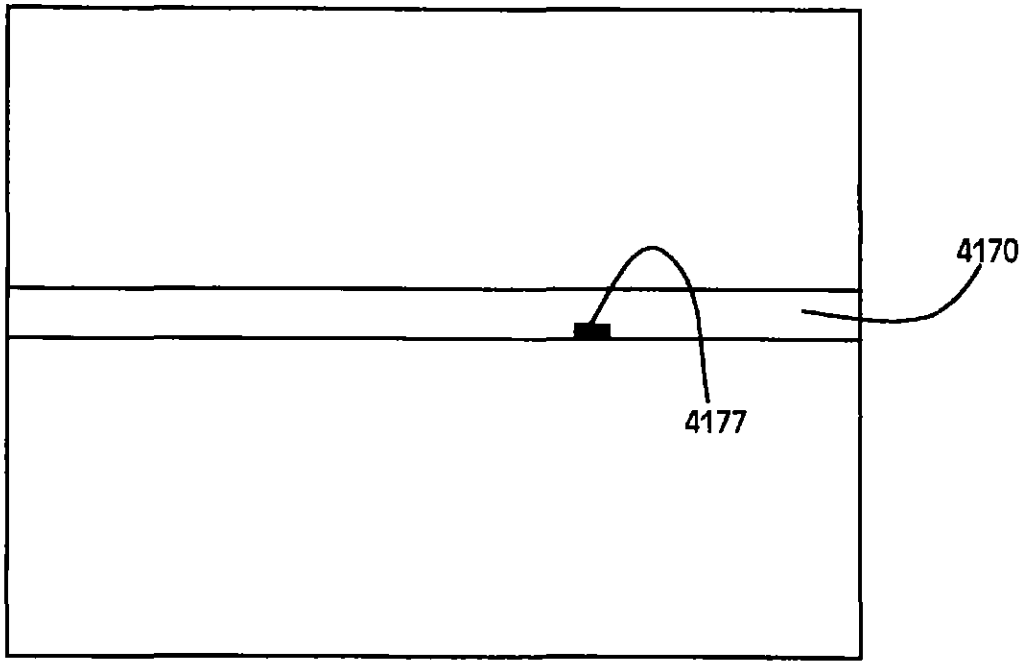

To: bsmith@aol.com
From: couponhouse@usretail.COM
Date: December 17, 1992 9:20AM
Enclosed is a coupon for one package of Old World Pasta. Please print this EMAIL message to your customer card writing device (device SCW:).
Coupon: 49u4059uvcn v075802GYQ-H-2G WN087V5 HI-6AG0ksh83459: sdlkfjs0r9838407785e5409mgvop85 p3cdsl7envx.'
5010
5015
5020
420

Fig. 5



415

Fig. 6

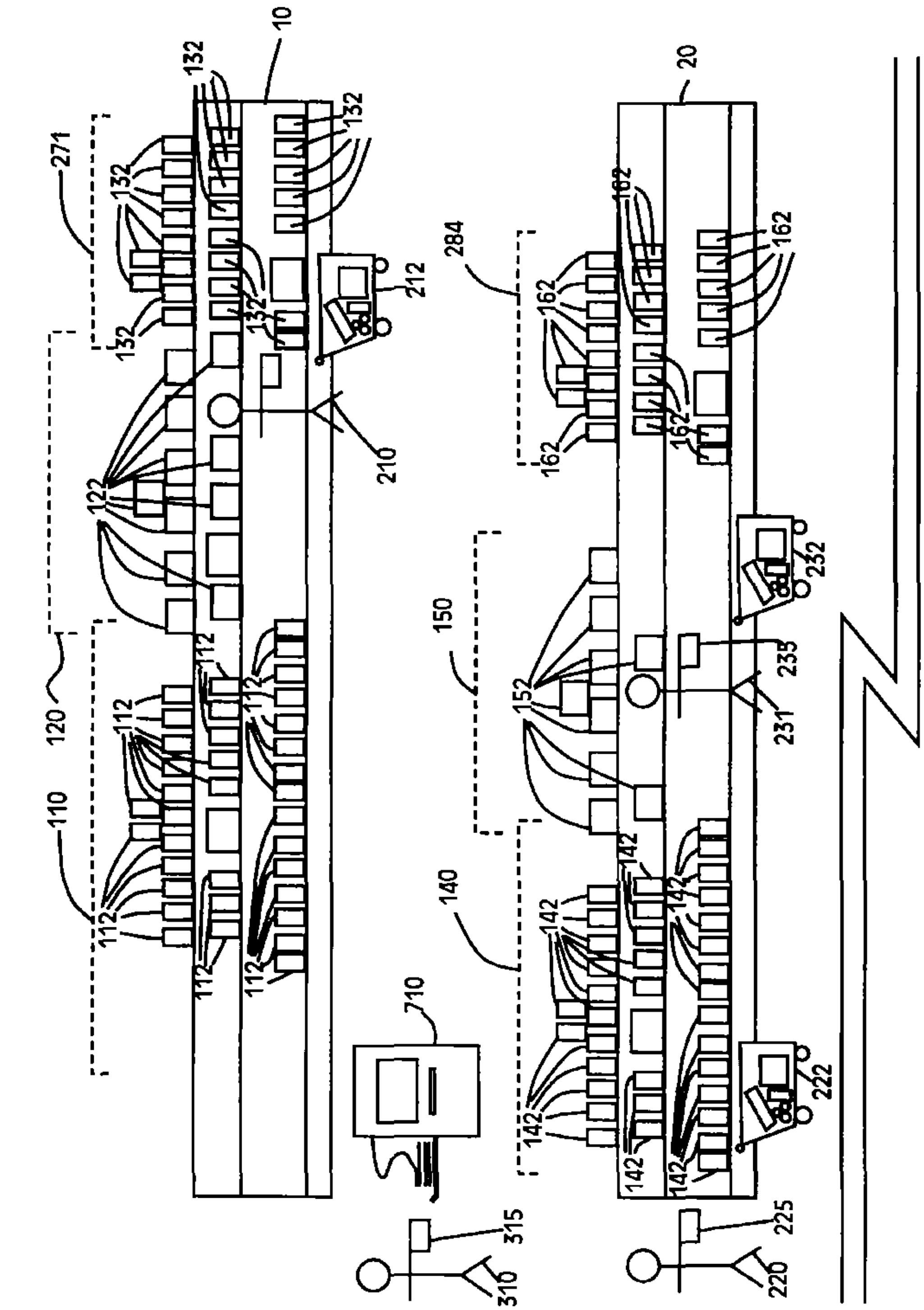

10
20
110
112
120
122
132
140
142
150
152
162
210
212
220
222
225
231
232
235
271
284
310
315
710

Fig. 7A

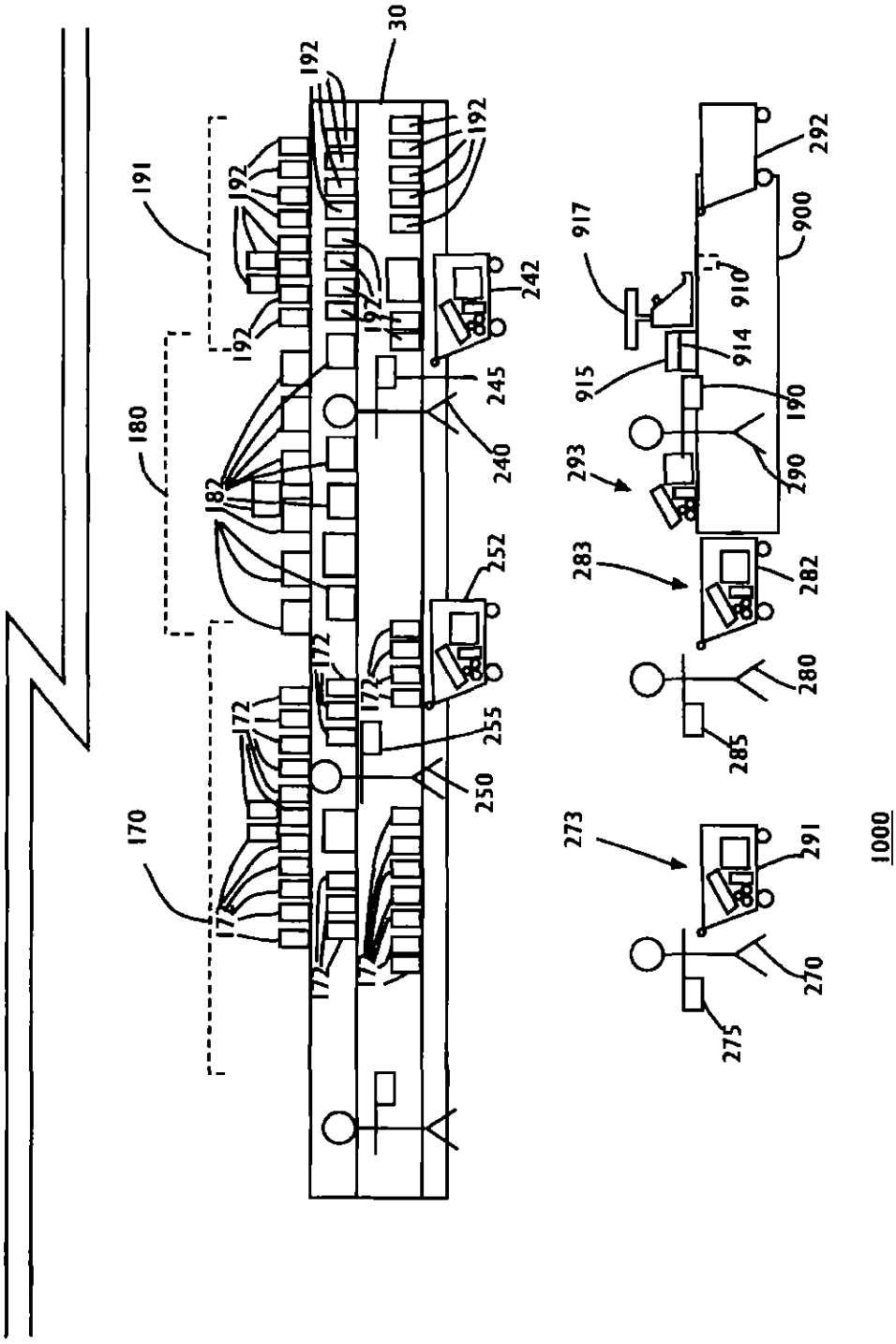

30
192
191
180
182
242
245
240
252
255
250
172
170
292
900
917
910
914
915
190
293
290
283
282
280
285
273
291
270
275
1000

Fig. 7B

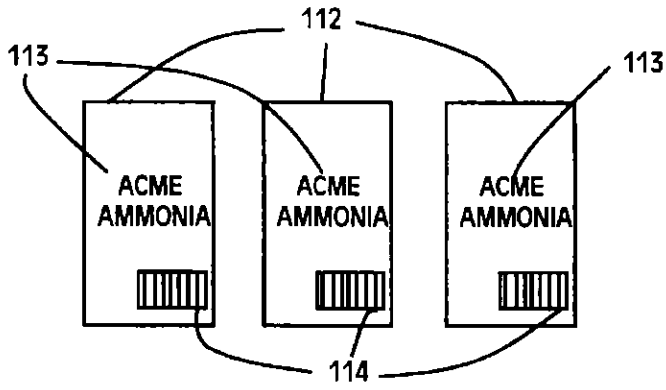


Fig. 8A

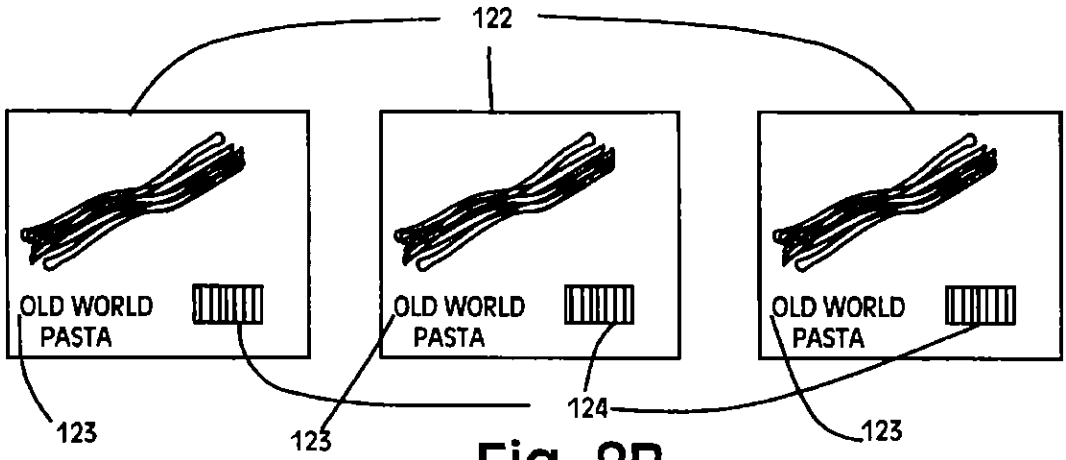


Fig. 8B

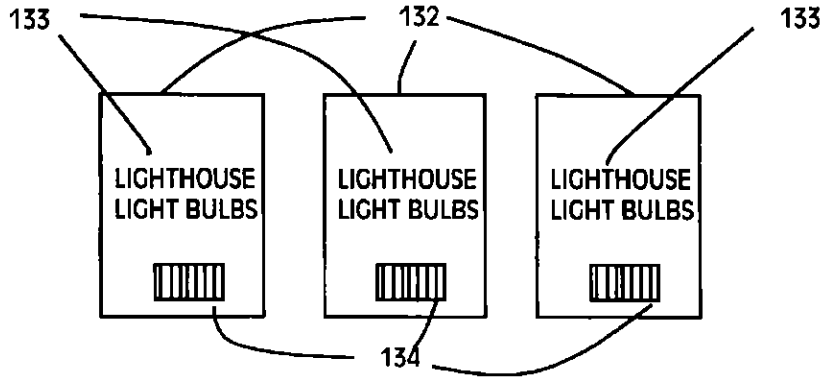


Fig. 8C

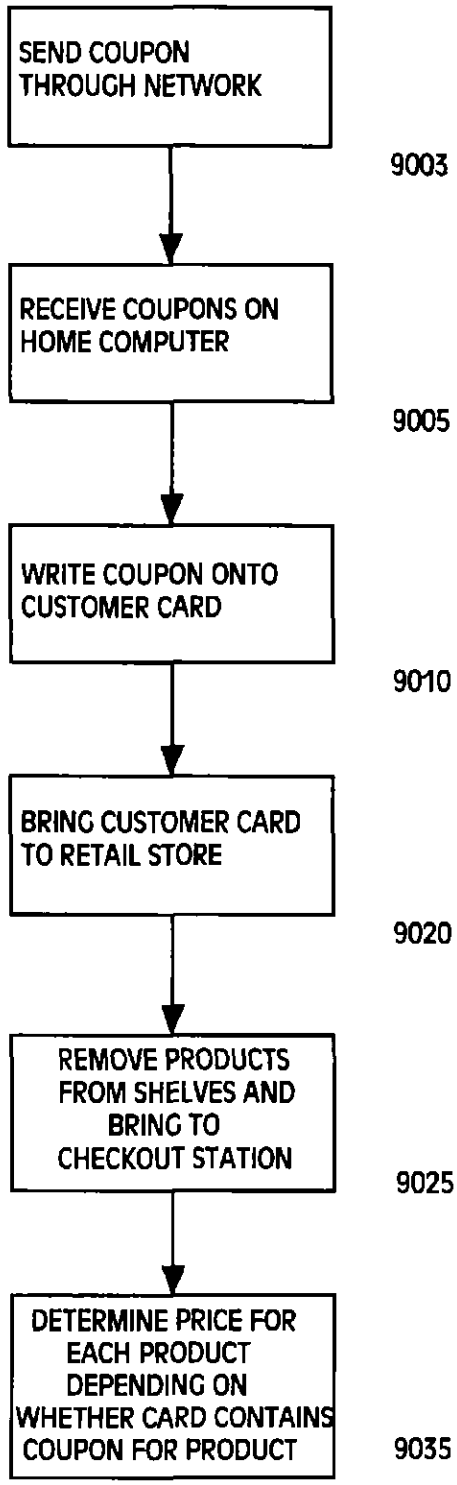

SEND COUPON THROUGH NETWORK
9003
RECEIVE COUPONS ON HOME COMPUTER
9005
WRITE COUPON ONTO CUSTOMER CARD
9010
BRING CUSTOMER CARD TO RETAIL STORE
9020
REMOVE PRODUCTS FROM SHELVES AND BRING TO CHECKOUT STATION
9025
DETERMINE PRICE FOR EACH PRODUCT DEPENDING ON WHETHER CARD CONTAINS COUPON FOR PRODUCT
9035

Fig. 9

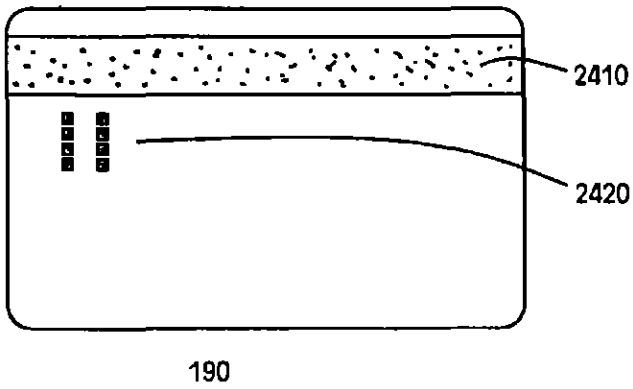


Fig. 10A

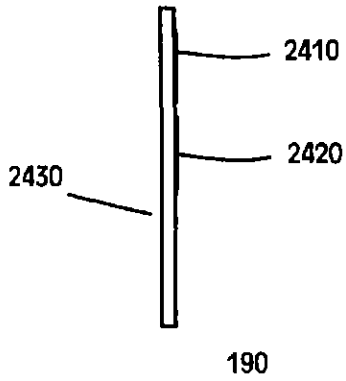


Fig. 10B

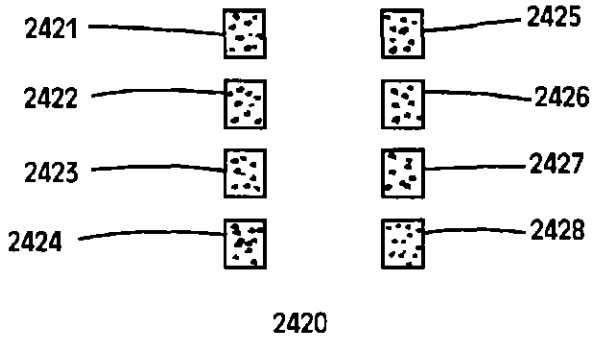


Fig. 10C

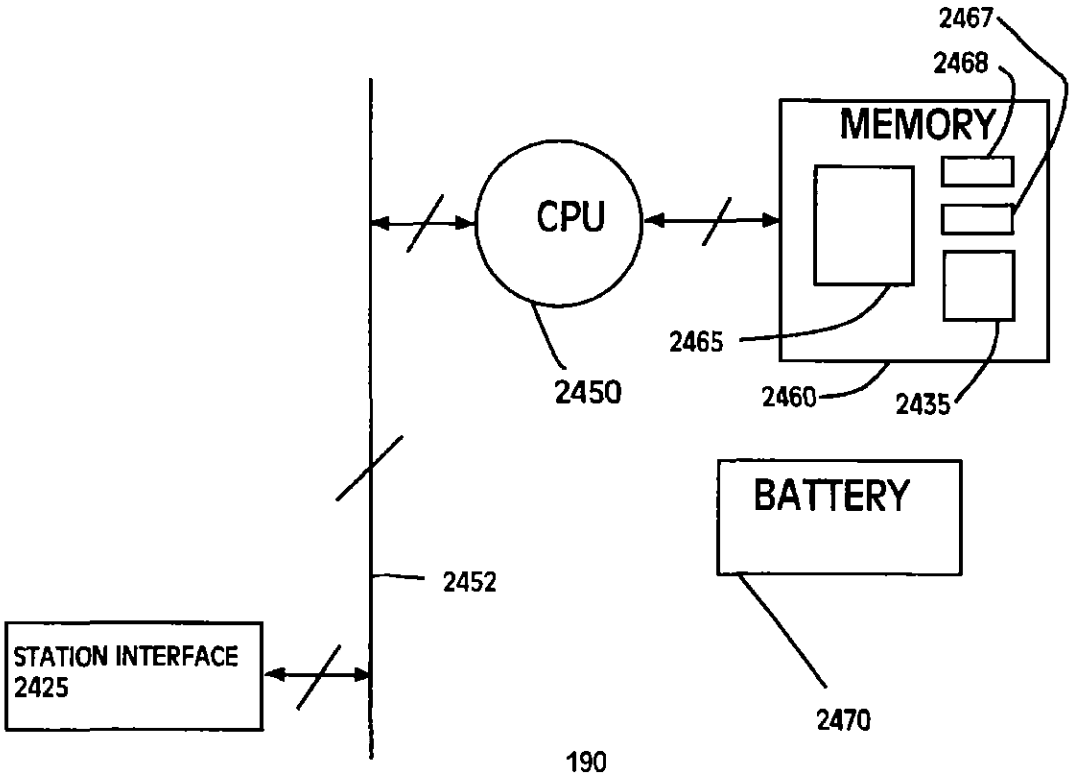

2467
2468
MEMORY
CPU
2465
2450
2460
2435
BATTERY
2452
STATION INTERFACE
2425
2470
190

Fig. 11

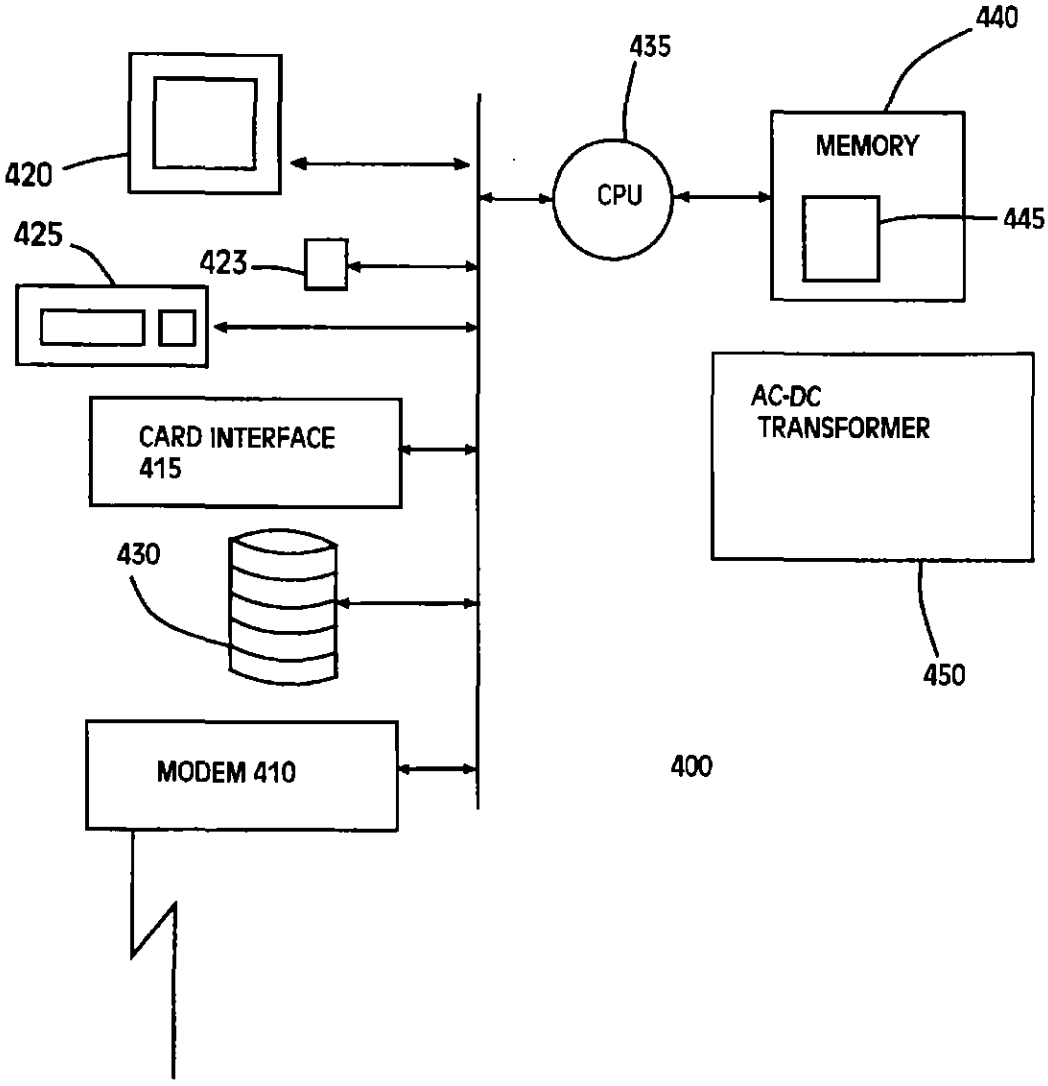

440
435
420
CPU
MEMORY
445
425
423
AC-DC
TRANSFORMER
CARD INTERFACE
415
430
450
MODEM 410
400

Fig. 12

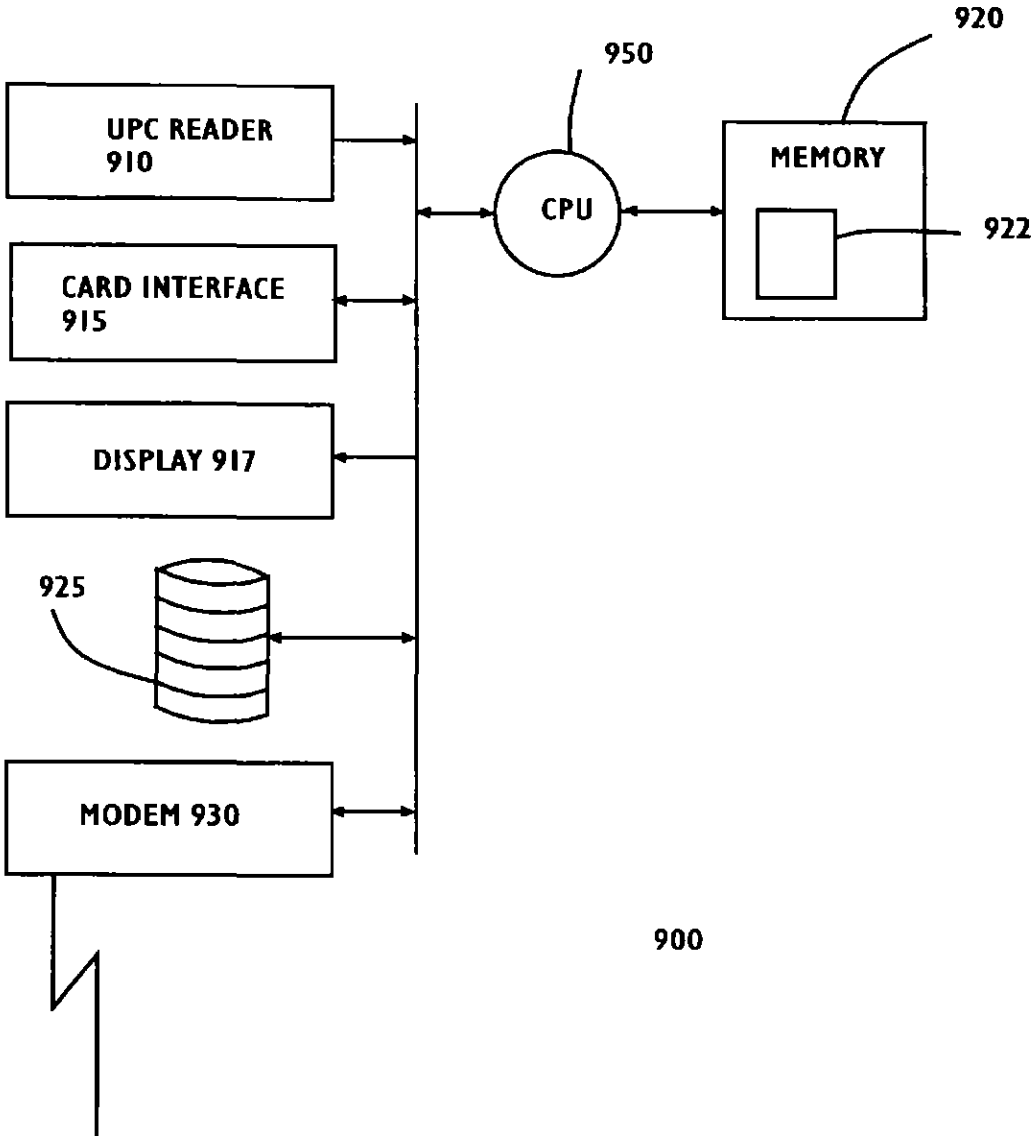

920
950
UPC READER
910
CPU
MEMORY
922
CARD INTERFACE
915
DISPLAY 917
925
MODEM 930
900

Fig. 13

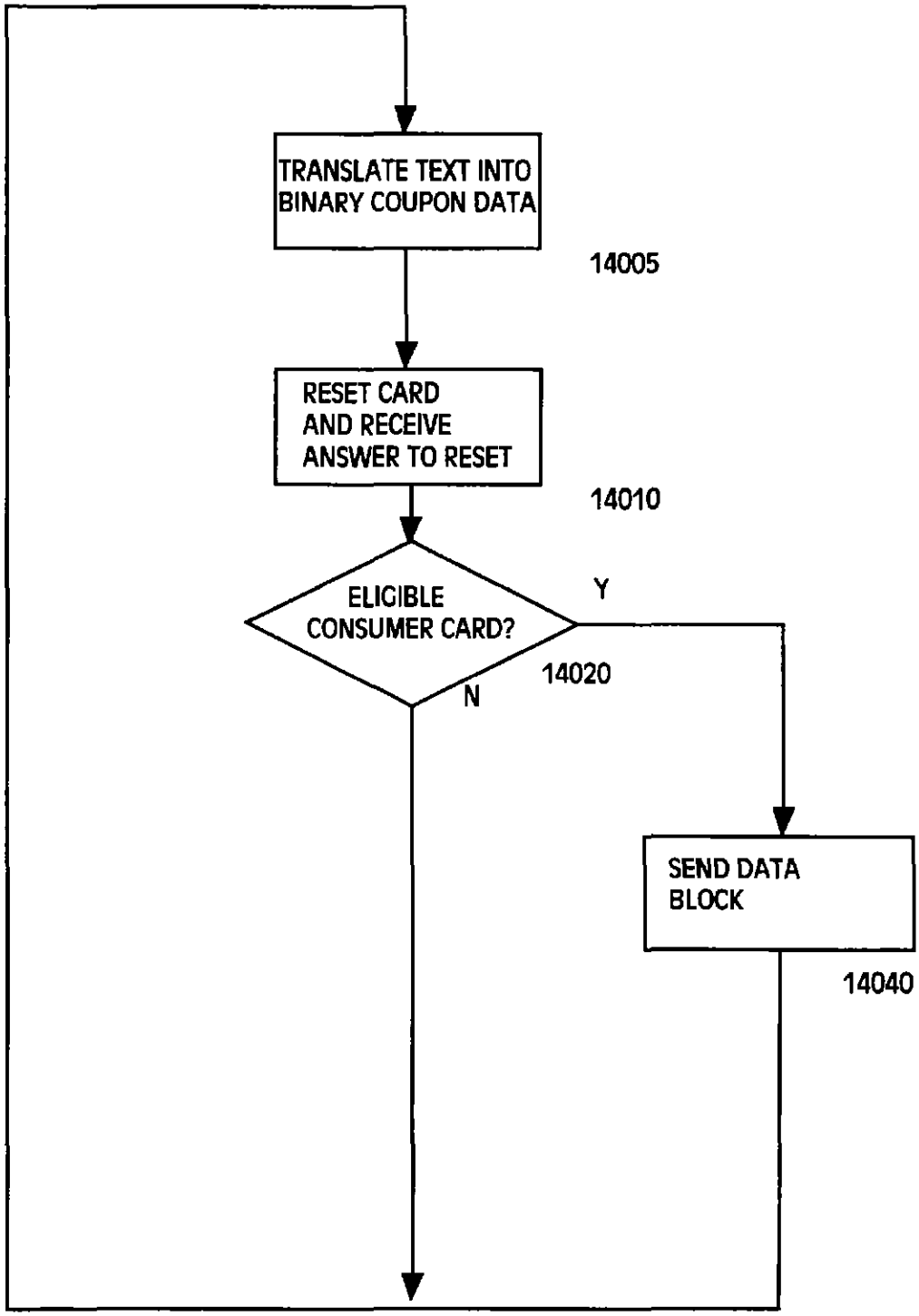

TRANSLATE TEXT INTO BINARY COUPON DATA
14005
RESET CARD AND RECEIVE ANSWER TO RESET
14010
ELIGIBLE CONSUMER CARD?
Y
N
14020
SEND DATA BLOCK
14040

FIG. 14

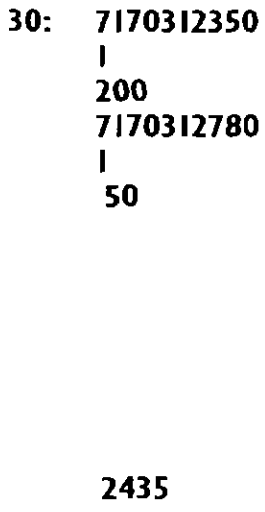


Fig. 15A

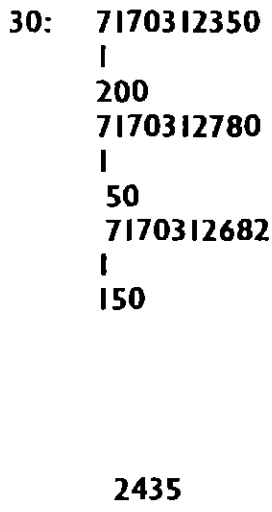


Fig. 15B

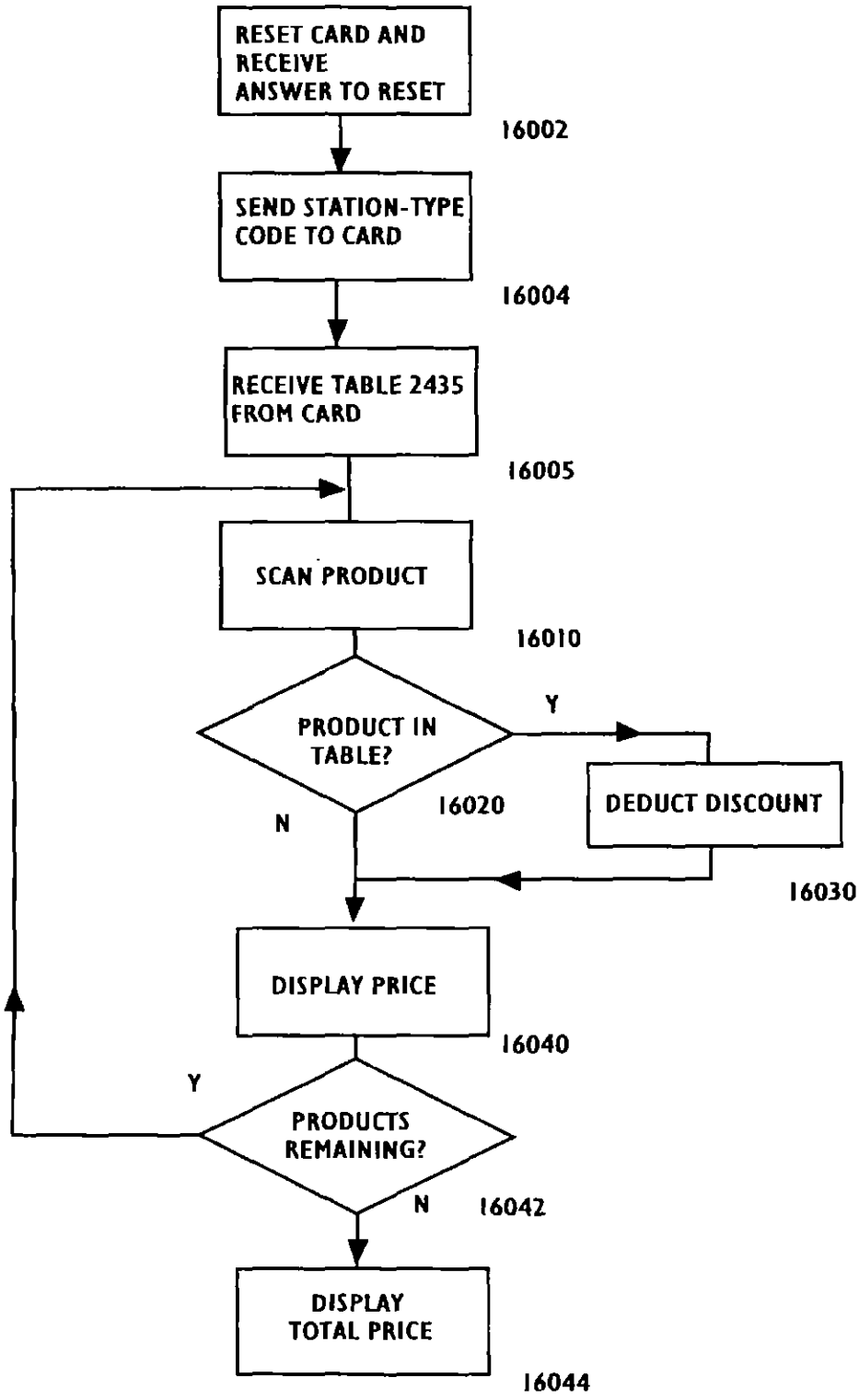

RESET CARD AND RECEIVE ANSWER TO RESET
16002
SEND STATION-TYPE CODE TO CARD
16004
RECEIVE TABLE 2435 FROM CARD
16005
SCAN PRODUCT
16010
PRODUCT IN TABLE?
Y
N
16020
DEDUCT DISCOUNT
16030
DISPLAY PRICE
16040
PRODUCTS REMAINING?
Y
N
16042
DISPLAY TOTAL PRICE
16044

FIG. 16

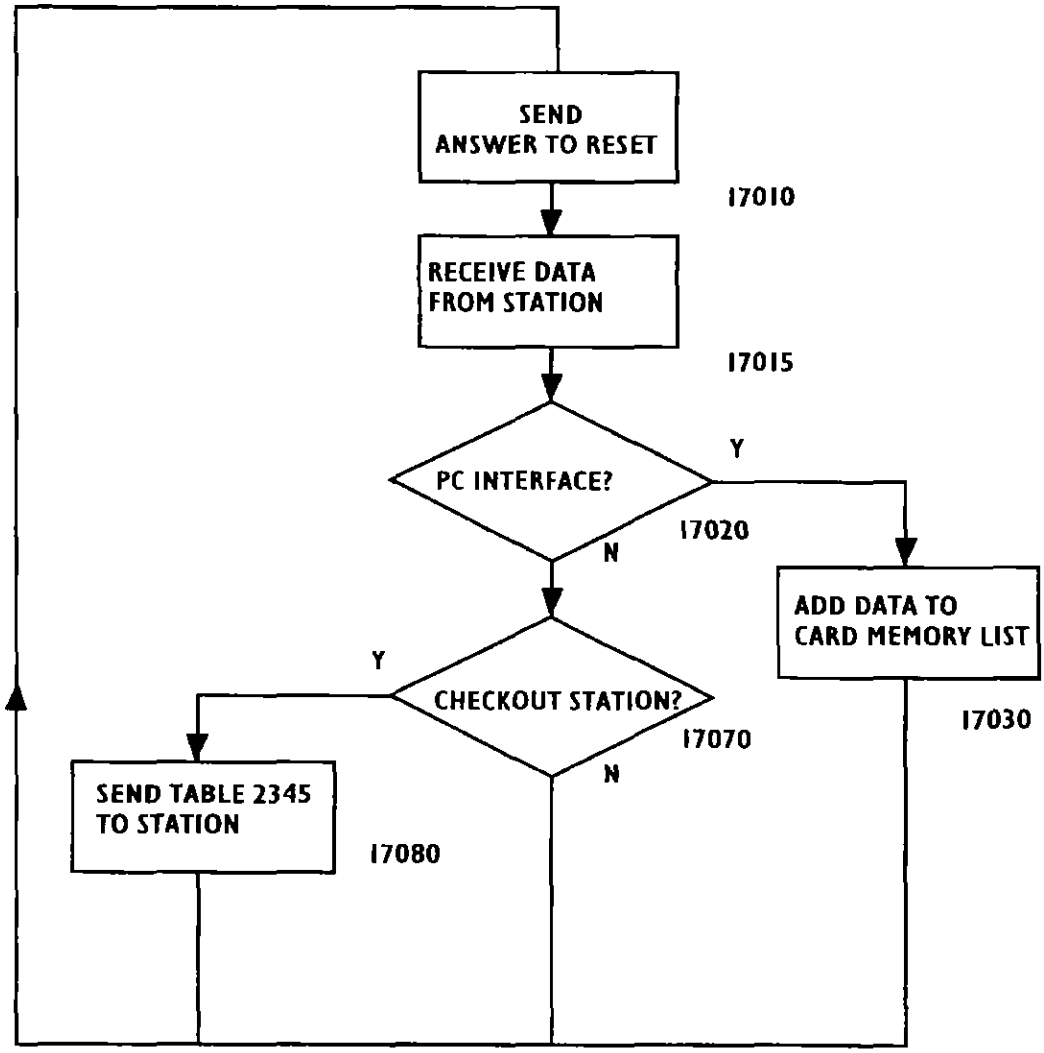

SEND ANSWER TO RESET
17010
RECEIVE DATA FROM STATION
17015
PC INTERFACE?
Y
N
17020
ADD DATA TO CARD MEMORY LIST
17030
CHECKOUT STATION?
Y
N
17070
SEND TABLE 2345 TO STATION
17080

FIG. 17

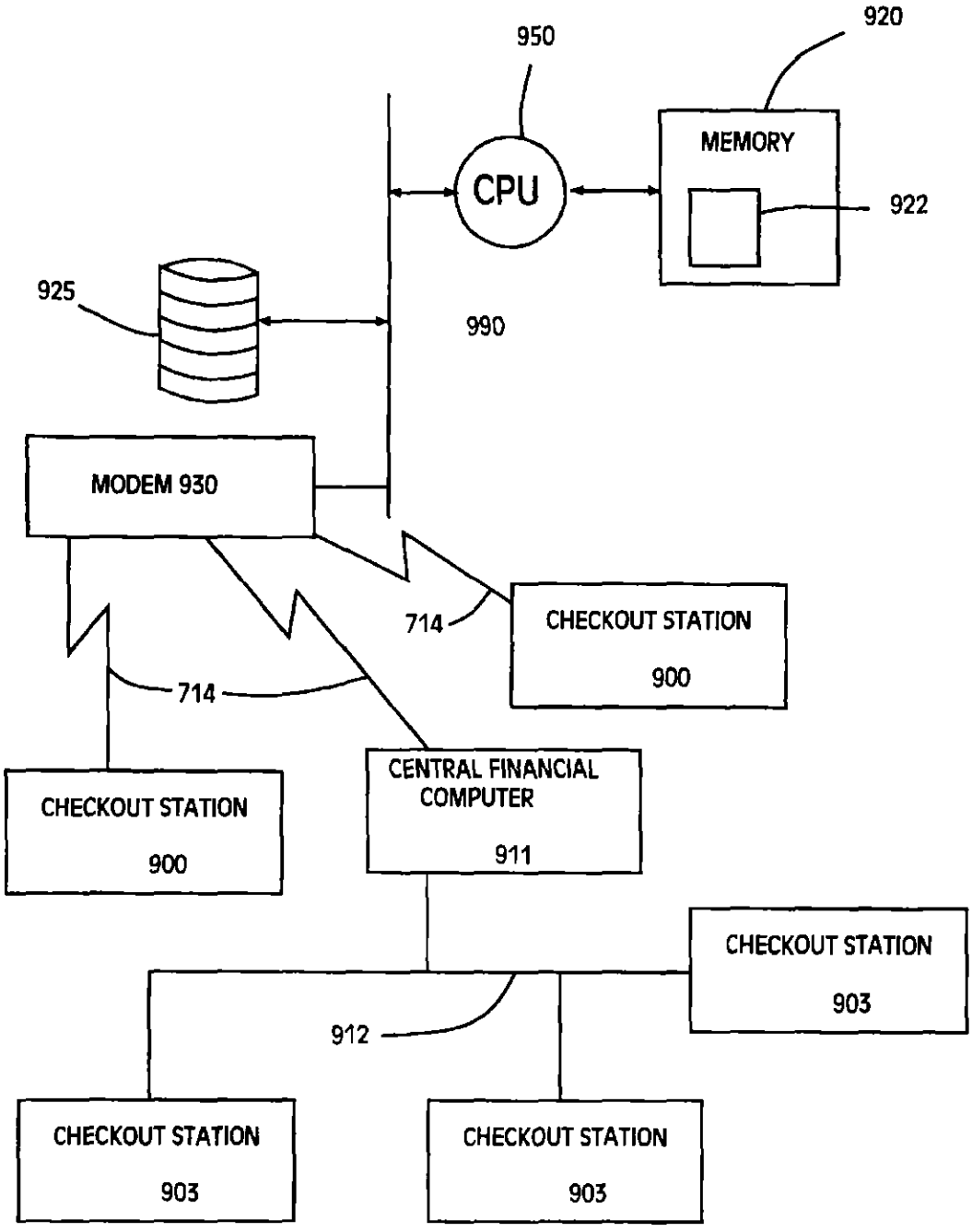

950
920
CPU
MEMORY
922
925
990
MODEM 930
714
CHECKOUT STATION
900
714
CHECKOUT STATION
900
CENTRAL FINANCIAL
COMPUTER
911
CHECKOUT STATION
903
912
CHECKOUT STATION
903
CHECKOUT STATION
903

Fig. 18

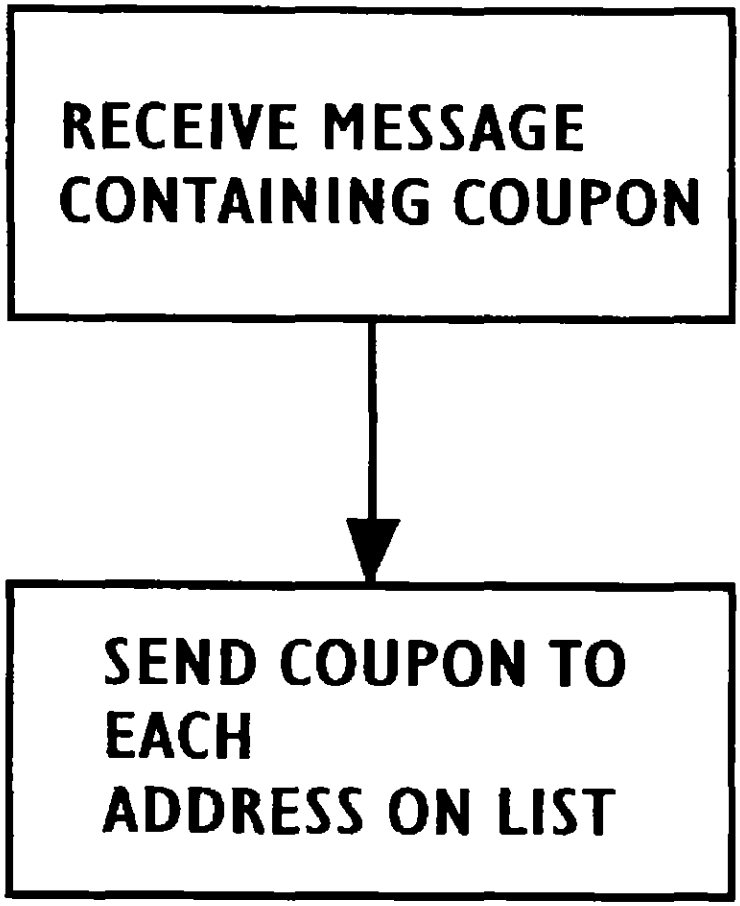

RECEIVE MESSAGE CONTAINING COUPON
1
SEND COUPON TO EACH ADDRESS ON LIST
2

FIG. 19

SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS

This Application is a Continuation of copending application Ser. No. 09/100,868 of KEN R. POWELL filed Jun. 22, 1998 for SYSTEM AND METHOD FOR CONTROLLING DISTRIBUTION OF COUPONS, the contents of which is hereby incorporated by reference, which is a Continuation of copending application Ser. No. 08/603,482 of KEN R. POWELL filed Feb. 20, 1996 for SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS, now U.S. Pat. No. 5,806,044 the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a retail system and, more particularly, to a system and method for distributing discount coupons through a system of computer networks.

2. Description of Related Art

Discount coupons are a popular means to stimulate sales of products such as grocery store items. In 1992, approximately 310 billion coupons were distributed and 7.7 billion coupons were redeemed, saving customers $4 billion. It has been estimated that in-store couponing coupled with advertising increases sales by 544%.

A typical marketing scheme involves placing coupons in a newspaper, by printing the coupons in the newspaper or by inserting coupon inserts into the newspaper, and allowing customers to bring the printed coupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associated with this scheme. To alleviate this overhead, another marketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a newspaper, and capitalizing on the fact that 66% of buyer decisions are made at the time of product purchase. Both the in-store scheme and the newspaper scheme, however, are susceptible to fraud by an unscrupulous retailer that requests reimbursement payments by presenting unredeemed coupons to the clearing house. Other schemes include delivering coupons to customers through the mail, distributing coupons in or on the product package, and distributing coupons at checkout. All of these schemes have an overhead cost of handling the coupons and of sending the redeemed coupons to a clearing house to enable product manufacturers to reimburse retailers for the reduction in proceeds resulting from coupon redemptions.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is a retail system in a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises a first computer; and a second computer, wherein the first computer includes circuitry for sending first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, and wherein the second computer includes circuitry for receiving first signals, and wherein the system further includes: a plurality first processors, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product; and a second processor, in the store, for receiving the card signal from a portable card in the plurality of cards.

According to another aspect of the present invention there is a method in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending, from a first computer, a first signal to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network; receiving first signals, and the step, performed in one of the homes, of sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises a first computer; and a second computer, wherein the first computer includes circuitry for sending first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, and wherein the second computer includes circuitry for receiving first signals, and wherein the system further includes: a plurality first processors, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product; and a second processor, in the store, for receiving the card signal from a portable card in the plurality of cards.

According to yet another aspect of the present invention, there is a method in a system including a store, a plurality of portable cards, a plurality of homes and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending, from a first computer, a first signal to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first

and second computers; receiving first signals, and the step, performed in one of the homes, of sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending, from a first computer, a first signal to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network; means for receiving first signals; means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and means for receiving the card signal from the portable card in the store.

According to yet another aspect of the present invention, there is a retail system in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending, from a first computer, a first signal to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers; means for receiving first signals; means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and means for receiving the card signal from the portable card in the store.

According to yet another aspect of the present invention, there is a retail system in a system including a first computer, a second computer, a plurality of portable cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of portable cards, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises circuitry, in the first computer, that sends first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product.

According to yet another aspect of the present invention, there is a method in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals. The method further comprises the step, performed in one of the homes, of sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product. The method further comprises the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a first computer, a second computer, a plurality of portable cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of portable cards, and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises circuitry, in the first computer, that sends first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, thereby enabling the second computer to receive first signals; and a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product.

According to yet another aspect of the present invention, there is a method in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals. The method further comprises the step, performed in one of the homes, of sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product. The method further comprises the step of subsequently, moving the portable card to the

store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a first computer; a second computer, a plurality of portable cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of portable cards, and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises circuitry, in the first computer, that sends first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, thereby enabling the second computer to receive first signals; and a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product.

According to yet another aspect of the present invention, there is a method in a system including a store, a plurality of portable cards, a plurality of homes and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, thereby enabling the second computer to receive first signals. The method further comprises the step, performed in one of the homes, of sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product. The method further comprises the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail in a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and means for sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes.

According to yet another aspect of the present invention, there is a retail system in a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, thereby enabling the second computer to receive first signals; and means for sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1A** and **1B** are a schematic diagram of a system of computer networks, in accordance with a first preferred embodiment of the present invention.

FIG. **2** is a diagram emphasizing a part of the system shown in FIGS. **1A** and **1B**.

FIGS. **3A**, **3B**, and **3C** are diagrams showing a discount coupon sent through a system of computer networks from computer **230** to Home **160**.

FIG. **4** is a diagram of a personal computer inside Home **160**.

FIG. **5** is the display of the personal computer showing an electronic coupon received through the system of computer networks into home **160**.

FIG. **6** is a side view of the card-writing device in the personal computer for writing coupons onto portable cards in home **160**.

FIGS. **7A** and **7B** are a schematic diagram of a retail store in the preferred system.

FIGS. **8A**, **8B**, and **8C** are enlarged views of some products shown in FIGS. **7A** and **7B**.

FIG. **9** is a flow chart of a processing performed in the preferred system.

FIG. **10A** is a plan view of one of the customer cards in the preferred system.

FIG. **10B** is a side view of the card shown in FIG. **10A**.

FIG. **10C** is an enlarged, partial view of the card shown in FIG. **10A**.

FIG. **11** is a block diagram of the customer card.

FIG. **12** is a block diagram of the personal computer shown in FIG. **4**.

FIG. **13** is a block diagram of the check-out station shown in FIG. **7B**.

FIG. **14** is a flow chart of a step of the processing shown in FIG. **9**.

FIGS. **15A** and **15B** are diagrams of some memory contents of a customer card at different points in time.

FIG. **16** is a flow chart of another step of the processing shown in FIG. **9**.

FIG. **17** is a flow chart of the processings of step **9010** and of step **9035** of FIG. **9**.

FIG. **18** is a block diagram of a system including a clearing house and multiple check-out stations.

FIG. **19** is a flow chart of a possible processing in the preferred system.

The accompanying drawings which are incorporated in and which constitute a part of this specification, illustrate embodiments of the invention and, together with the description, explain the principles of the invention, and additional advantages thereof. Throughout the drawings, corresponding parts are labeled with corresponding reference numbers.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1A and 1B show a system of computer networks for distributing coupons in accordance with a first preferred embodiment of the present invention. Computer networks **105, 111, 115, 130, 135, 138, 125, 279, 142, 148, 144, 146, 281,** and **151** are interconnected. Each computer network includes a plurality of computers. Each of homes **152, 154, 156, 158, 160, 162, 164, 166, 168, 171, 172, 174, 176, 178, 181, 182, 310,** and **320** is coupled to one of the computers networks via a respective telephone signal path **177**.

The system includes portable customer cards **215, 225, 235, 245, 255, 275, 285, 190, 315, 325, 335, 345, 355, 365, 367, 369, 375,** and **385**. Each customer card is a portable customer card, approximately the size of a credit card. Each card contains a random access memory for storing electronic coupons.

A computer **230** within network **115** stores electronic coupons and distributes the stored coupons to the homes. As represented schematically in FIGS. 1A and 1B, a customer carries her respective card from her home to a store. A computer in each home receives a coupon from computer **230**, via one or more of the computer networks, and stores the received coupon onto one of the cards. For example, a computer in home **160** receives a coupon signal from computer **230** via networks **115, 130,** and **135** and stores the received coupon onto card **190**.

FIG. 2 shows a section of the preferred system, emphasizing a path between computer **230** and home **160**. Network **115** is a local area network (LAN), network **130** is a wide area network (WAN), network **135** is an LAN, and network **279** in a LAN.

Network **115** includes a plurality of first computers, computers **234, 238, 230, 236,** and **232**. Each of these first computers has a respective network address uniquely identifying the computer on network **115**. The first computers can communicate with each other by sending data packets in a certain format. Each network-**115**-packet has a field containing the destination address of the packet. Each network-**115**-packet is in a format conforming to the communication protocol of network **115**, meaning, for example, that the packet has a destination address field offset a certain number of bits from the start of the packet, and that the destination address field has a certain number of bits. Computer **230** includes circuitry (hardware and software) for sending a data packet through transmission cable **117**. The circuitry includes software for constructing a packet, having the packet format of network **115**, containing a discount coupon identifying a product.

Network **130** includes a second plurality of computers, computers **254, 250, 252, 258, 256, 262, 260,** and **272**. Computer **230** sends this product-identification signal to home **160** via computer **238**, as described in more detail below. Each of these second computers has a respective second network address uniquely identifying the computer on network **130**. The second computers communicate with each other by sending a packet in the format for network **130**.

The data packet from computer **230** includes a destination address field allowing computer **238** to recognize that the data packet is to be received by computer **238**. Computer **238** has an address on both LAN **115** and WAN **130**, meaning that computer **238** has circuitry for recognizing an its own address in a network-**115**-formatted packet sent over network **115**, and has circuitry for recognizing an its own address in a network-**130**-formatted packet sent over network **130**. Thus, computer **238** acts to route packets between networks **115** and **130**. In other words, computer **238** includes circuitry, responsive to an address on network **115**, for receiving a packet in the format of network **115**, containing an electronic coupon identifying a certain product, and for sending a second packet in the format of network **130**, the second packet containing a signal identifying the certain product. When computer **238** receives a packet destined for computer **276**, computer **238** constructs a packet addressed to computer **272**, using the protocol for network **130**.

Computer **272** has an address on both WAN **130** and LAN **135** and, therefore, computer **272** acts to route packets between networks **130** and **135**. When computer **272** receives the packet, computer **272** constructs a packet addressed to computer **276**, using the protocol of network **135**.

More specifically, computer **230** constructs an "IP" packet addressed to computer **276**, using the Internet Protocol (IP). Computer **230** then imbeds this IP packet within a network-**115**-formatted packet addressed to computer **238**, using the protocol of network **115**. When computer **238** receives the packet, computer **238** reads the IP address, determines that the IP packet should be sent over network **130**, and imbeds the IP packet within an network-**130**-formatted packet addressed to computer **272**, using the protocol of network **130**.

When computer **272** receives the packet, computer **272** reads the IP address, determines that the IP address corresponds to computer **276**, and imbeds the IP packet in a packet addressed to computer **276**, using the protocol of network **135**.

FIG. 3A shows data packet **3002** in the format of network **115**, sent by computer **230** through cable **117**. Header field **3010** includes a 20 bit destination address field **3011** identifying computer **238** on network **115**. Destination address field **3011** is 16-bits removed from the beginning of the data package **3002**. Header **3010** contains other fields, including a 20-bit field containing the address of the sender of packet **3002**, and a field containing data correction bits. Field **3020** includes an Internet Protocol (IP) address field **3021** identifying computer **276**. Field **3030** includes electronic coupon information in ASCII (American Standard Code for Information Interchange) text form.

Computer **238**, which resides on both LAN **115** and WAN **130**, includes circuitry to translate packet **3002** received from computer **230**, into packet **3004** shown in FIG. 3B. Packet **3004** includes header field **3012**. Header **3012** includes a 16 bit destination address field **3013** identifying computer **272** on WAN **130**. Address field **3013** is 32-bits removed from the start of packet **3004**. Header **3012** has other fields, including a field identifying the sender of packet **3004**, and a field containing data correction bits.

Computer **238** determines that the packet should be sent to computer **272** on network **130** by reading a routing table.

The routing table has an entry for network **135**. The entry for network **135** identifies network **130** and computer **272** as the path to be used when computer **238** is sending a packet to a computer on network **135**. Thus, computer **238** constructs packet **3004** in response to IP address field **3021** in packet **3002**.

As shown in FIG. **2**, computer **238** sends a packet to computer **272**, via computers **250, 254, 258**, and **260**.

In other words, each packet is essentially a type of signal having a network address of a certain length and having a certain number of digits. A signal on one network may include a first network address O1 digits removed from the start of the signal. A signal another network may include a second network address is O2 digits removed from the start of the signal, wherein O1 is not equal to O2, and the first network address includes N1 digits and the second network includes N2 digits, wherein N1 is not equal to N2.

Computer **272**, which resides on both WAN **130** and LAN **135**, includes circuitry to translate packet **3004** received from computer **238**, into packet **3006** shown in FIG. 3C. Packet **3006** includes header field **3014**. Header **3014** includes an address field **3015** identifying computer **276** on LAN **135**. Header **3014** includes a 16 bit destination address field **3015** identifying computer **276** on LAN **135**. Address field **3015** is 24-bits removed from the start of packet **3006**. Header **3014** has other fields, including a field identifying the sender of packet **3006**, and a field containing data correction bits.

Thus, the preferred system may be conceptualized as computers sending packets containing electronic coupons. The preferred system may also be conceptualized as programs, running on the computers, that send electronic mail (Email) messages to each other. Each Email message includes one or more of the packets described above. The programs include a coupon server (not shown), running on computer **230**, for constructing the Email message and sending the Email message to a customer, and Mail Transfer Agents and a User Agent (not shown) that route the Email messages between each other and ultimately store an Email message into an electronic mail box for the recipient of the message. An electronic mailbox is a memory area readable by the owner of the mail box. For example, FIG. **2** shows mail box **277** readable by personal computer **400** in home **160**.

FIG. **4** shows a personal computer **400** within home **160**. Computer **400** includes a modem **410**, a CRT display **420**, a keyboard **425**, a mouse **423**, and a coupon-writing device **415**. To receive an electronic coupon, the user establishes a telephone connection between computer **400** and computer **276** through modem **410**. Subsequently, the user logs onto computer **276** and invokes a program to read Email stored in mailbox **277**.

FIG. **5** shows CRT display **420** after the mail-reading program reads a coupon message from mailbox **277**. As shown in FIG. **5**, coupon data **3030** includes the ASCII text of an electronic mail (Email) message. Message field **5010** identifies the sender and receiver of the message, "couponhouse@usretail.com" being the Email address of the coupon server on node **230** and "bsmith@aol.com" being the Email address of the customer residing in home **160**. Message field **5015** is user readable text identifying the coupon. Message field **5020** is electronic coupon information encoded in text format. The user sends coupon data **3030** to device **415** by issuing a print command and specifying device "SCW:", which is a name designating card-writing device **415**. A driver program for device **415** receives the text data and translates the data into a certain binary format, described below, and sends the binary data to device **415**. Device **415** couples to a customer card **190** and sends data to card **190**.

FIG. **6** shows a side view of card-writing device **415**, including interface slot **4170**. Interface slot **4170** has a width sufficient to accommodate the width of one of the customer cards **190**. When a card **190** is in interface slot **4170**, conductive contact **4177** inside interface slot **4170** touches contact **2427** (described below) on the customer card. Interface slot **4170** has other contacts (not shown) for touching the other card contacts **2420** (described below).

FIGS. 7A and 7B show grocery store **1000**. FIGS. 7A and FIG. 7B are each a partial view of store **1000**. Customers **210, 220, 231, 240, 250, 270, 280**, and **290**, shop in the store. Before shopping in the store, each of these customers obtained a customer card. For example, customer **231** obtained customer card **235** from a bank, by completing an application for the bank. The application contained questions to collect demographic data, including birth date, income level, past buying patterns, geographic location, size of family, level of education, and job-related data. The bank subsequently wrote customer identification data for customer **231** onto customer card **235**, and issued customer card **235** to customer **231**, and sent the customer's demographic data to a clearinghouse which then stored the demographic data on disk. Each of customers **210, 220, 240, 250, 270, 280**, and **290** obtains a respective customer card in a similar manner. In other words, for each customer the preferred method writes demographic data for the customer onto a disk in the market research center, and writes personal identification data for the customer onto a respective card for the customer.

After redemption data, including customer identification data from a plurality of cards, is compiled and sent to a market research center, as described below, the customer identification data is used to access the corresponding demographic data, thereby providing the manufacturer with valuable marketing data on coupon program effectiveness and customer demographics.

Store **1000** includes shelves **10, 20**, and **30**, defining aisles between the shelves. The supermarket has a plurality of product areas, each corresponding to a respective product. Product Area **110** has Acme brand ammonia. Product Area **120** has Old World brand pasta. Product Area **271** has Lighthouse brand light bulbs.

More specifically, Product Area **1 10** has bottles of ammonia **112** grouped together on multiple shelves. Bottles of ammonia **112** are contiguously grouped, meaning that no other product is between any two bottles of ammonia **112**.

FIG. **8**A shows an enlarged view of some of the bottles of ammonia **112**. Each bottle of ammonia has a common Universal Product Code (UPC) label **114**, which is a group of parallel lines that encodes a number that uniquely identifies acme ammonia. In other words, label **114** is different than labels of units of other products. Each bottle of ammonia **112** also has a common character label **113**. Character label **113** is "ACME AMMONIA." Label **113** is different than labels of units of other products.

Product Area **120** has boxes of pasta **122** grouped together on multiple shelves. Boxes of pasta **122** are contiguously grouped, meaning that no other product is between any two boxes of pasta **122**.

FIG. **8**B shows an enlarged view of some of the boxes of pasta **122**. Each box of pasta **122** has a common Universal Product Code (UPC) label **124**, which is a group of parallel

lines that encodes a number that uniquely identifies Old World pasta. In other words, label **124** is different than labels of units of other products. Each box of pasta **122** also has a common character label **123**. Character label **123** is "OLD WORLD PASTA." Label **123** is different than labels of units of other products.

Product Area **271** has boxes of light bulbs **132** grouped together on multiple shelves. Boxes of light bulbs **132** are contiguously grouped, meaning that no other product is between two boxes of light bulbs **132**.

FIG. **8**C shows an enlarged view of some of the boxes of light bulbs **132**. Each box of light bulbs **132** has a common Universal Product Code (UPC) label **134**, which is a group of parallel lines that encodes a number that uniquely identifies Lighthouse light bulbs. In other words, label **134** is different than labels of other products. Each box **132** also has a common character label **133**. Character label **133** is "LIGHTHOUSE LIGHT BULBS." Label **133** is different than labels of other products.

Similarly, other product area in the store each have a set of respective products contiguously grouped together and a corresponding product station adjacent to the products. The respective units of a certain product have a common label, different than labels on units of other products, that uniquely identifies the certain product. Product area **140** has bottles of ketchup **142** contiguously grouped together. Product area **284** has loaves of bread **162** contiguously grouped together. Product area **170** has cartons of milk **172** contiguously grouped together. Product area **180** has packages of bacon **182**. Product area of **191** has packages of butter **192** contiguously grouped together.

Product area **150** has boxes of cereal **152** contiguously grouped together.

FIG. **9** shows a processing performed in the preferred system. Computer **230** sends an electronic coupon, in the form of an E-mail message, through computer networks **115**, **130**, and **135**. (Step **9003**). A customer, such as customer **290**, receives the electronic coupon, through modem **410**, onto her home computer (step **9005**), and writes the coupon onto her customer card **190** using writing device **415** (step **9010**). The customer then brings her respective customer card to a store **1000**. (step **9020**).

At store **1000**, the customer removes products from shelves **10**, **20**, and **30** and brings the products to checkout station **900** (step **9025**). In other words, while shopping in store **1000**, each of customers **210**, **220**, **231**, **240**, **250**, **270**, **280**, and **290** carries his or her respective customer card. Customer **290** carries card **190**, customer **220** carries card **225**, customer **231** carries card **235**, customer **240** carries card **245**, customer **250** carries card **255**, customer **270** carries card **275**, customer **280** carries card **285**, and customer **290** carries card **190**. Each customer tows a shopping cart to hold selected products. Customer **210** tows cart **212**, customer **220** tows cart **222**, customer **231** tow cart **232**, customer **240** tows cart **242**, customer **250** tows cart **252**, customer **270** tows cart **291**, customer **280** tows cart **282**, and customer **290** tows cart **292**. The customer then removes a product from the shelf and places the removed product into her cart. The customer thus shops throughout the store.

Checkout station **900** then scans the products and determines a price for each product depending on whether the customer card contains coupons for the scanned product (step **9035**). More specifically, the customer redeems the electronic coupons at the checkout area, by inserting her customer card into checkout station **915**. For example, a customer such as customer **240** in FIG. **7**B completes the purchase of her selected products **243** by transferring products **243** from her cart **242** to counter **900**, and by inserting card **245** into checkout station **915**. Subsequently, a checkout clerk (not shown) scans each selected product past UPC bar code reader **910**. Bar code reader **910** is an optical detector. In other words, bar code reader **910** detects an electromagnetic signal. A processor coupled to station **915** and reader **910** determines whether the most recently scanned product is on a discount list stored in card **245**. If the most recently scanned product is identified in this discount list, a price for the product is determined using the discount data corresponding to the product, and the resulting price is displayed on display **917**. Checkout counter **900** scans and processes each product **243** in a similar manner.

Similarly customer **280** in FIG. **7**B follows the procedure of FIG. **9** by transferring products **283** from her cart **282** to counter **900**, and by inserting card **285** into checkout station **915**; and the checkout clerk (not shown) scans each selected product **283** past UPC bar code reader **910**. Customer **270** follows the procedure of FIG. **9** by transferring products **273** from her cart **291** to counter **900**, and by inserting card **275** into checkout station **915**; and the checkout clerk (not shown) scans each selected product **273** past UPC bar code reader **910**.

Because of the large number of electronic coupons that may be available to a customer, a customer such as customer **310** may wish to insert their card into display station **710**, to review what coupons are currently stored on the card. Station **710** may also present the viewer with additional information about the products identified by the coupons on the card. Station **710** is described in detail in application of KEN R. POWELL for SYSTEM AND METHOD FOR DISPLAYING PRODUCT INFORMATION IN A RETAIL SYSTEM, Ser. No. 08/603,483 filed on Feb. 20, 1996, now U.S. Pat. No. 5,890,135 issued Mar. 30, 1999 the contents of which is herein incorporated by reference.

Step **9005** includes a step of reading an electronic mail (Email) message. An Email message from computer **230**, for the user of PC **400** in home **160**, resides in an electronic mailbox **277**, which is a memory area on computer **276**. The user of PC **400** dials into computer **276** using a telephone line, submits appropriate user identification including a password, and then invokes a program that reads the Email message from the memory of computer **276** into the memory of PC **400**.

The user then executes the driver for device **415**, by printing the Email message to device "SCW:". The driver translates the textual coupon shown in FIG. **5** into a binary format, described below. Thus, the driver program and device **415** are essentially responsive to the coupon data stored in packet **3004**, which was constructed by routing computer **238**.

To prevent an unscrupulous user from repeatedly writing a single Email coupon onto a customer card, which would be contrary to the intent of the coupon issuer, the driver maintains a list of Email coupons already processed, including the time and date of the Email as shown in field **5010** of FIG. **5**. Before writing an electronic coupon to a customer card, the driver compares the corresponding Email message to the list to verify that an identical coupon has not been processed.

Further, to prevent a user from changing the date and time field of a previously-printed Email message and reprinting the modified message to thwart this protection mechanism, each Email message from the coupon server on node **230** contains the encoded date and time in field **5020**. Thus, the

driver both verifies that an Email message with the date and time has not been previously processed, and verifies that the unencoded date and time in area **5010** matches the encoded date and time in field **5020**.

There are two preferred methods for getting the Email address for PC **400** to the coupon server on node **230**, to allow the server to send a coupon to PC **400**. The first preferred method is to program the coupon server using data collected from sources off of the Internet. The second preferred method is to allow the user of PC **400** to send her Email address, through the computer networks, to node **230**.

To implement this second method, it is presently preferred that the Email address for the user of PC **400** be sent by a web browser for the World Wide Web (WWW). With one scheme, a user sends an Email message requesting a coupon for a specific product, by invoking the browser to select Hypertext in a document advertising the product. Selection of the Hypertext invokes a "Form" in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on node **230**. The message contains the Email address given by the user and data identifying the product corresponding to the selected hypertext. Upon receiving the message, the coupon server sends an Email message to the user's address.

An alternate scheme is to have the user of PC **400** join a club, by invoking the browser to select Hypertext in a document advertising the club. The club is essentially a mailing list for certain types of coupons. Selection of the hypertext invokes a Form in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on node **230**. The message contains the Email address given by the user and data identifying the club corresponding to the selected hypertext. Upon receiving the message, the coupon server adds the Email address to the list for the club identified in the message. Subsequently, some event causes the coupon server to send a coupon to each address in the list. (FIG. **19**)

One such event would be receipt, by the coupon server, of an Email message from a coupon issuer. (FIG. **19** Step 1) The coupon issuer may be a distributor of the product corresponding to the coupon. The coupon server, in this case, acts as "mail exploder," and essentially echoes the single Email message from the coupon issuer to each member of the list. (FIG. **19** step **2**)

FIG. **10**A shows a plan view of customer card **190**, and FIG. **10**B shows a side view of card **190**. Card **190** is 8.5 cm by 5.4 cm, the length and width of a typical financial credit card. Card **190** is slightly thicker than a typical financial credit card. Card **190** includes a magnetic stripe **2410**, interface contacts **2420** for communication with the product stations and the checkout station, and embossed area **2430** for displaying the card owner's name. Magnetic stripe **2410** allows a conventional credit card stripe reader to read basic data from the card. Magnetic stripe **2410** is not necessary to the operation of the preferred embodiment of the invention, described in more detail below.

FIG. **10**C shows interface contacts **2420** in more detail. Interface contacts **2420** are configured in accordance with ISO7816-2: 1988(E), Identification cards—Integrated circuit (s) cards with contact—Part 2: Dimensions and locations of the contacts, promulgated by the International Organization for Standardization (ISO), and available from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, N.Y. 10036. According to ISO 7816-2, contact **2421** is assigned to VCC (supply voltage), contact **2422** is assigned to RST (reset signal), contact **2423** is assigned to CLK (clock signal), contact **2424** is reserved for future use, contact **2425** is assigned to GND (ground), contact **2426** is assigned to VPP (program and voltage), contact **2427** is assigned to I/O (data input/output), and contact **2428** is reserved for future use. Card **190** communicates with the product stations and the checkout stations through contact **2427** using a half duplex scheme, meaning that contact **2427** is for communicating data signals either to or from the card.

FIG. **11** is a block diagram of customer card **190**, including central processing unit **2450**, memory **2460**, and battery **2470** for supplying power to interface **2425**, processor **2450**, and memory **2460**. Memory **2460** is a random access, addressable device. Station interface **2425** includes a serial to parallel converter for transferring data signals between contact **2427** and CPU **2450** over parallel bus **2452**. Memory **2460** stores a program **2465** executed by processor **2450**, customer identification data **2467**, and authorization data **2468**. Customer identification data **2467** includes a sequence of digits that uniquely identifies the holder of the card. Customer identification data **2467** includes the card holder's social security number. For example, identification data **2467** in customer card **235** uniquely identifies customer **231**. Authorization data **2468** also includes date data indicating an expiration date for the card. Authorization data **2468** also contains a field identifying that the card is a customer card.

Memory **2460** also stores electronic coupons in coupon list **2435**. When a customer inserts a customer card into device **415**, processor **2450** receives an identification code for the product from interface **415** and adds the code to the list **2435**.

Each of customer cards **215**, **225**, **235**, **245**, **255**, **275**, **285**, **315**, **325**, **335**, **345**, **355**, **365**, **367**, **369**, **375**, and **385** has the same hardware structure as customer card **190**.

FIG. **12** shows a block diagram PC **400**, including central processing unit **435**, memory **440**, and AC-DC transformer **450**. Memory **440** is a random access, addressable device. Memory **440** stores driver program **445** for sending coupons to card-writing device **415**. CPU **435** executes driver **445**.

FIG. **13** is a block diagram of checkout counter **900** shown in FIG. **7**B. Disk **925** provides long term storage. CPU **950** executes instructions in random access, addressable memory **920**. Checkout counter **900** also includes UPC reader **910** for reading bar codes on products, and checkout station **915** for communicating with a customer card. Since station **915** is in store **1000** and card-writing device **415** is in home **160**, which is a separate building from store **1000**, station **915** is spatially removed from card-writing device **415**.

CPU **950** and program **922** act to detect a product scanned by UPC reader **910**, determine a reference price for the product, search for the product's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card memory. CPU **950** then displays the price of the product on display **917**. In other words, CPU **950** and program **922** act to receive a purchase signal identifying a product, to receive to receive a card signal, and to determine a price for the product depending on whether the product identified by the card signal corresponds to the product identified by the purchase signal.

CPU **950** writes coupon redemption data onto disk **925**. Periodically, CPU **950** sends the redemption data to an electronic clearing house through modem **930**.

FIG. **14** shows the processing of step **9010** of FIG. **9** in more detail. CPU **435** executes device driver program **445** in memory **440** to perform the processing shown in FIG. **14**. When a person prints text to device "SCW:", device driver program **445** receives the text and verifies that identical text has not been processed before, by comparing the text received with a list of previous Email messages received. Program **445** also compares the time and date in field **5010** of the text with the encoded time and date in field **5020** of the text, to verify that the text is an authentic Email message from the coupon server on computer **230**. If the Email message is an authentic message that has not been processed before, program **445** then translates the text in field **5020** into binary coupon data. (step **14005**).

Subsequently, program **445** sends a reset command to card interface **415**, causing interface **415** to reset the card by applying a clock signal to card contact **2423**. (The card then answers the reset by sending an answer-to-reset data block, including identification data **2467** and authorization data **2468**, through card contact **2427**. Authorization data **2468** contains a card-type code indicating a customer card.) Program **445** then receives the answer-to-reset data block from card interface **415** (step **14010**).

The communication protocol between interface **415** and a customer card is described in more detail in ISO/IEC 7816-3: 1989 (E), Identification cards—Integrated circuit(s) cards with contacts—Part 3: Electronic signals and transmission protocols; and ISO/IEC 7816-3: 1989/Amd.1: 1992 (E), Part 3: Electronic signals and transmission protocols, AMENDMENT 1: Protocol type technique=1, synchronous half duplex block transmission protocol. Both of these standards are promulgated by the International Organization for Standardization (ISO) and distributed by the American National Standards Institute (ANSI).

CPU **435** analyzes the authorization data in the received answer-to-reset block to determine whether the card is a customer card that is eligible to receive electronic coupons from interface **415** (step **14020**). CPU **435** determines that the card is a customer card if the received authorization data contains a card-type code indicating a customer card. If the card is a customer card, meaning that the authorization data is authorization data **2468**, CPU **435** determines if the card is eligible to receive electronic coupons if authorization data **2468** contains certain codes, and the date and time in Email field **5010** is not later than the date data in authorization data **2468**. If the card is an eligible customer card, CPU **435** sends to the customer card a block containing a station-type code, indicating a PC interface, and the binary coupon data (step **14040**). The binary coupon data includes an identification code for the product received from PC **400** (Old World Pasta **122**) and the discount currently being offered for that product. If the card is not an eligible customer card (step **14020**), there is no further processing.

FIG. **15A** shows some the contents list **2435**, starting at location **30** memory **2460**, of customer card **190**, before CPU **435** of PC **400** executes step **14040**. An electronic coupon is represented by three rows in list **2435**: a 10 digit UPC product code in the first row, discount format data in the second row ("1" signifying cents, "2" signifying percentage), and discount quantity data in the third row. In FIG. **15SA**, the customer card is storing two electronic coupons. After CPU **435** executes step **14040** (thereby sending another electronic coupon to the customer card), CPU **2450** in customer card **190** receives the data and adds the data to list **2435**, resulting in three electronic coupons in list **2435** as shown in FIG. **15B**.

In list **2435** in FIGS. **15A** and **15B**, the memory field having the product code 7170312350 corresponds to the UPC code on boxes of Lighthouse Light Bulbs **134**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **200**, signifying that the discount being offered for Lighthouse Light Bulbs **134** is $2.00. The memory field having the product code 7170312780 corresponds to the UPC code on ammonia bottles **112**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **50**, signifying that the discount being offered for ammonia bottles **112** is 50 cents. In list **2435** in FIG. **15B**, the memory field having the product code 7170312682 corresponds to the UPC code on boxes of Old World Pasta **124**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **150**, signifying that the discount being offered for Old World Pasta **124** is $1.50.

FIG. **16** shows aspects of the processing of step **9035** of FIG. **9**. The processing of FIG. **16** is processing performed by CPU **950** and program **922** in checkout counter **900**, when a customer checks out of store **1000**. When a customer, such as customer **290**, inserts customer card **190** into interface slot **914**, a switch (not shown) in interface slot **914** alerts CPU **950** that a card has been inserted into the slot. When a customer card is in interface slot **914**, conductive contacts (not shown) inside interface slot **914** touch each card contact **2420**. Subsequently, CPU **950** causes card interface **925** to reset the card by applying a clock signal to card contact **2423**. (If the card is a customer card, the card then answers the reset by sending a block of data, including identification data **2467** and authorization data **2468**, through card contact **2427**.) CPU **950** then receives the answer-to-reset from the card (step **16002**). CPU **950** then sends a data block containing a station-type code indicating a checkout station (step **16004**). CPU **950** then receives the contents of table **2435** in memory **2460** of the customer card, and temporarily stores these table contents in memory **920** of the checkout station (step **16005**). During step **16005**, CPU **950** also causes customer card **190** to remove all entries from list **2435**, so that the electronic coupons in the list cannot be redeemed again. When the checkout clerk (not shown) moves a product past UPC reader **910**, UPC reader **910** detects the UPC code on the product and sends the UPC code to CPU **750** (step **16010**). CPU **950** searches the received table contents to determine whether the product scanned is identified in the table (step **16020**). If the products is not in the received table, CPU **950** displays the prices (step **16040**). If the product is in the received table, CPU **950** subtracts the discount, as determined by the discount data stored in the received table, from a product reference price read from disk **925** (step **16030**), and displays the resulting price of the product on display **917** (step **16040**). If there are products remaining (step **16042**), processing proceeds to step **16010**. If there are no products remaining, processing proceeds to step **16044** for display of the total price.

Product data, customer identification data **2467**, authorization data **2468**, and the data in list **2435** are each a type of signal.

In other words, the preferred retail system **1000** includes product areas **110**, **120**, **271**, **140**, **284**, **170**, **180**, and **191**; a plurality of customer cards each having a memory, and a checkout counter **900** having checkout station **915** acting as a communication device. A method of operating system

1000 comprises the steps of writing a first signal into memory 2460 of a card in the plurality of cards, in response to a person inserting the card into the interface slot of a PC card interface, the first signal identifying a product; reading the first signal from memory 2460, in response to a person inserting the card into the interface slot of the checkout station; receiving another signal, from UPC reader 910, identifying a product; and determining a price for the product depending on whether the product identified by the first signal, read in the reading step, corresponds to the product identified by the other signal.

In summary, after UPC barcode reader 910 scans a product, processor 950 determines eligibility for a discount. If a product qualifies, processor 950 displays the discounted price on display 917.

FIG. 17 shows aspects of the processing of steps 9010 and 9035 of FIG. 9. The processing of FIG. 17 processing is performed by one of the customer cards, such as customer card 190, in the preferred retail system. After the card is reset through contacts 2420, the customer card sends an "answer to reset" data block in accordance with the ISO standard ISO/ICE 7816-3: 1989(E), cited above. The customer card sends identification data 2467 and authorization data 2468 in the answer-to-reset data block (step 17010). If the station then sends a block of data to the customer card, the customer card then receives the block of data through contact 2427 (step 17015). If the block contains a station-type code indicating a PC card interface (step 17020), the customer card then adds product coupon information, from a certain location in the block, to the list 2345 (step 17030).

If the customer card is not eligible, the PC interface will not send a block of data, step 17015 therefore does not execute, and processing ceases until the customer card is reinserted into an interface slot, at which time the station will reset the card and processing will restart at step 17010.

Alternatively, if the block contains a station-type code indicating a Checkout station (step 17070), the customer card then sends list 2345 to the display station (step 17080). In other words, CPU 2450 reads list 2435 from memory 2460, in response to a customer inserting card 190 into checkout station 915, and sends a signal corresponding to the list 2345 to the checkout station (step 17080). If the block does not contain a station-type code indicating a Checkout station, there is no additional processing.

FIG. 18 shows a block diagram of a preferred retail system including a clearinghouse 990, and a plurality of checkout stations 900. Periodically, checkout counter 900 sends redemption data to an electronic clearing house. The redemption data sent to the clearing house includes the identification of the store, identification of the coupons redeemed and of respective quantities of coupon redemptions. Periodically, checkout counter 900 sends redemption data to a market research center. The redemption data sent to the research center includes the identification of the store and of the customers who presented electronic coupons for redemption. The checkout stations send the redemption data blocks, over telephone signal paths 714.

Checkout stations 903 are located within a single company. Checkout stations 903 are similar to checkout stations 900, described above, except that checkout stations 903 have circuitry for communicating over network 912. Checkout stations 903 send transaction data blocks to central financial computer 911 located within the company. Central financial computer 911 periodically sends the compiled transaction data to clearing house 990, over telephone signal paths 714.

Thus, the preferred systems provides a convenient and stimulating shopping environment. The systems allow the user to receive electronic coupons at home and then bring the received coupons to a retail store.

Other applications of electronic coupons are the subject of copending application of KEN R. POWELL for RETAIL SYSTEM, Ser. No. 08/468,816, filed on Jun. 6, 1995, the contents of which is herein incorporated by reference; and of application of KEN R. POWELL for DEVICE AND METHOD OF PROGRAMMING A RETAIL SYSTEM, Ser. No. 08/468,820, filed on Jun. 6, 1995, now U.S. Pat. No. 5,727,153 issued Mar. 10, 1998 for RETAIL STORE HAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is herein incorporated by reference.

Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or the scope of Applicants' general inventive concept. The invention is defined in the following claims.

What is claimed is:

1. A system comprising:

a plurality of portable cards;

a first computer network including a first plurality of computers, each having a respective first network address, the plurality of first computers including a first computer having means for sending a first signal including a first network address, an inter-network address corresponding to a computer on another network, and a signal corresponding to a product;

a second computer network including a second plurality of computers, each having a respective second network address;

means, responsive to the inter-network address from the first signal, for sending a second signal including a second network address and the signal corresponding to the product; and

means, responsive to the signal corresponding to the product from the second signal, for sending a card signal, to a portable card in the plurality of cards; and

means, spatially removed from the previous means, for reading the card signal from the portable card.

2. In a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

a first computer; and

a second computer, wherein the first computer includes circuitry for sending first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, and wherein the second computer includes circuitry for receiving first signals, and wherein the system further includes:

a plurality first processors, each located in one of the plurality of homes, responsive to a first signal received

by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product; and

a second processor, in the store, for receiving the card signal from a portable card in the plurality of cards.

3. The retail system of claim 2 wherein each first processor includes a computer spatially removed from the second computer.

4. The retail system of claim 2 wherein the store includes

a receiver for receiving a purchase signal corresponding to a product; and

a determiner for determining a price for the product depending on whether the card signal, received by the second processor, corresponds to the purchase signal.

5. The retail system of claim 4 wherein the store further includes

an electromagnetic detector for generating the purchase signal.

6. The retail system of claim 4 wherein the store further includes

a bar code reader for generating the purchase signal.

7. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a method comprising:

sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network;

receiving first signals, and

the step, performed in one of the homes, of

sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of

subsequently, moving the portable card to the store, and the step, performed in the store, of

receiving the card signal from the portable card.

8. The method of claim 7 further including the steps, performed in the store, of

receiving a purchase signal corresponding to a product; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

9. The method of claim 7 further including the steps, performed in the store, of

generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

receiving the purchase signal; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

10. The method of claim 7 further including the steps, performed in the store, of

generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

receiving a purchase signal; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

11. In a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

a first computer; and

a second computer, wherein the first computer includes circuitry for sending first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, and wherein the second computer includes circuitry for receiving first signals, and wherein the system further includes:

a plurality first processors, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product; and

a second processor, in the store, for receiving the card signal from a portable card in the plurality of cards.

12. The retail system of claim 11 wherein each first processor includes a computer spatially removed from the second computer.

13. The retail system of claim 11 wherein the store further includes

a receiver for receiving a purchase signal corresponding to a product; and

a determiner for determining a price for the product depending on whether the card signal, received by the second processor, corresponds to the purchase signal.

14. The retail system of claim 13 wherein the store further includes an electromagnetic detector for generating the purchase signal.

15. The retail system of claim 13 wherein the store further includes

a bar code reader for generating the purchase signal.

16. In a system including a store, a plurality of portable cards, a plurality of homes and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a method comprising:

sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers;

receiving first signals, and the step, performed in one of the homes, of

sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of

subsequently, moving the portable card to the store, and the step, performed in the store, of

receiving the card signal from the portable card.

17. The method of claim 16 further including the steps, performed in the store, of

receiving a purchase signal corresponding to a product; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

18. The method of claim **16** further including the steps, performed in the store, of

generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

receiving the purchase signal; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

19. The method of claim **16** further including the steps, performed in the store, of

generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

receiving a purchase signal; and

determining a price for the product depending on whether the card signal corresponds to the purchase signal.

20. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network;

means for receiving first signals;

means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and

means for receiving the card signal from the portable card in the store.

21. The retail system of claim **20** wherein the store includes

means for receiving a purchase signal corresponding to a product; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

22. The retail system of claim **20** wherein the store includes

means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

means for receiving the purchase signal; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

23. The retail system of claim **20** wherein the store includes

means for generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

means for receiving a purchase signal; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

24. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers;

means for receiving first signals;

means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and

means for receiving the card signal from the portable card in the store.

25. The retail system of claim **24** wherein the store includes

means for receiving a purchase signal corresponding to a product; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

26. The retail system of claim **24** wherein the store includes

means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

means for receiving the purchase signal; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

27. The retail system of claim **24** wherein the store includes

means for generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

means for receiving a purchase signal; and

means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.

28. In a system including a first computer, a second computer, a plurality of portable cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of portable cards, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

circuitry, in the first computer, that sends first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and

a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received

43. The method of claim 40 further including the steps, performed in the store, of

generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

receiving a purchase signal; and

determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

44. In a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and

means for sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes.

45. The retail system of claim 44 wherein the store includes

a second receiver that receives a purchase signal corresponding to a product; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

46. The retail system of claim 44 wherein the store includes

means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

a second receiver that receives the purchase signal; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

47. The retail system of claim 44 wherein the store includes

means for generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

a second receiver that receives a purchase signal; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

48. In a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:

means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers, thereby enabling the second computer to receive first signals; and

means for sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes.

49. The retail system of claim 48 wherein the store includes

a second receiver that receives a purchase signal corresponding to a product; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

50. The retail system of claim 48 wherein the store includes

means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;

a second receiver that receives the purchase signal; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

51. The retail system of claim 48 wherein the store includes

means for generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;

a second receiver that receives a purchase signal; and

means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.

* * * * *

EXHIBIT / ATTACHMENT

C

(To be scanned in place of tab)

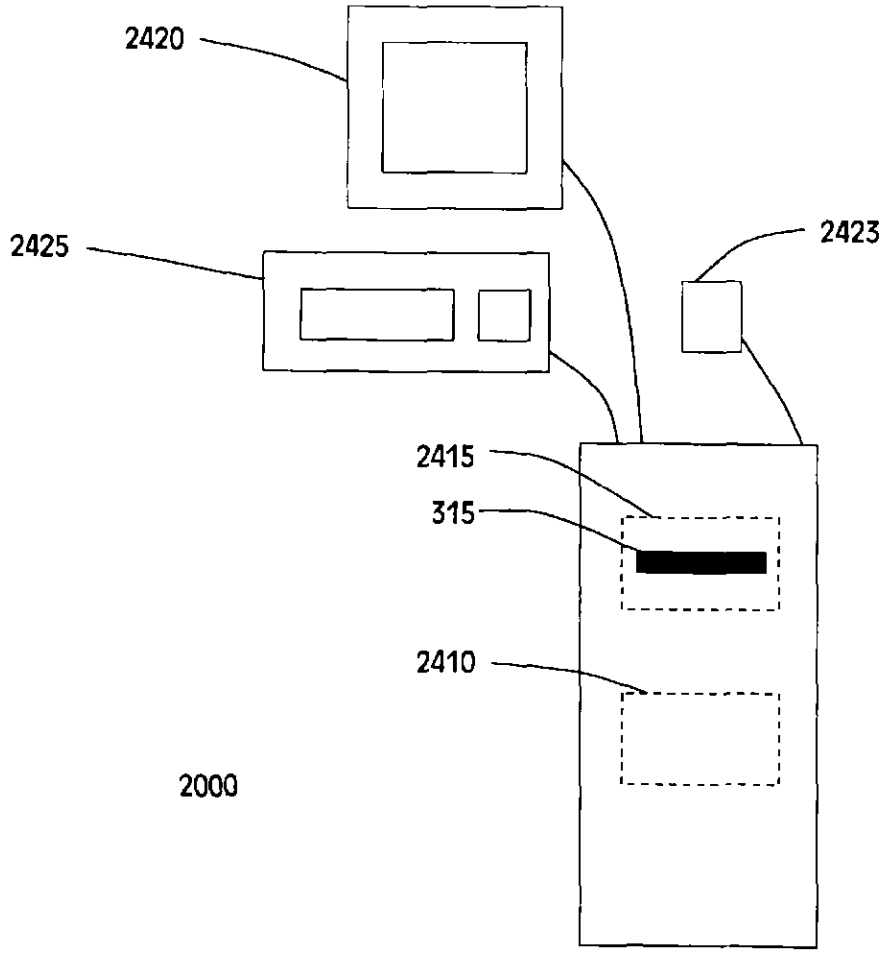
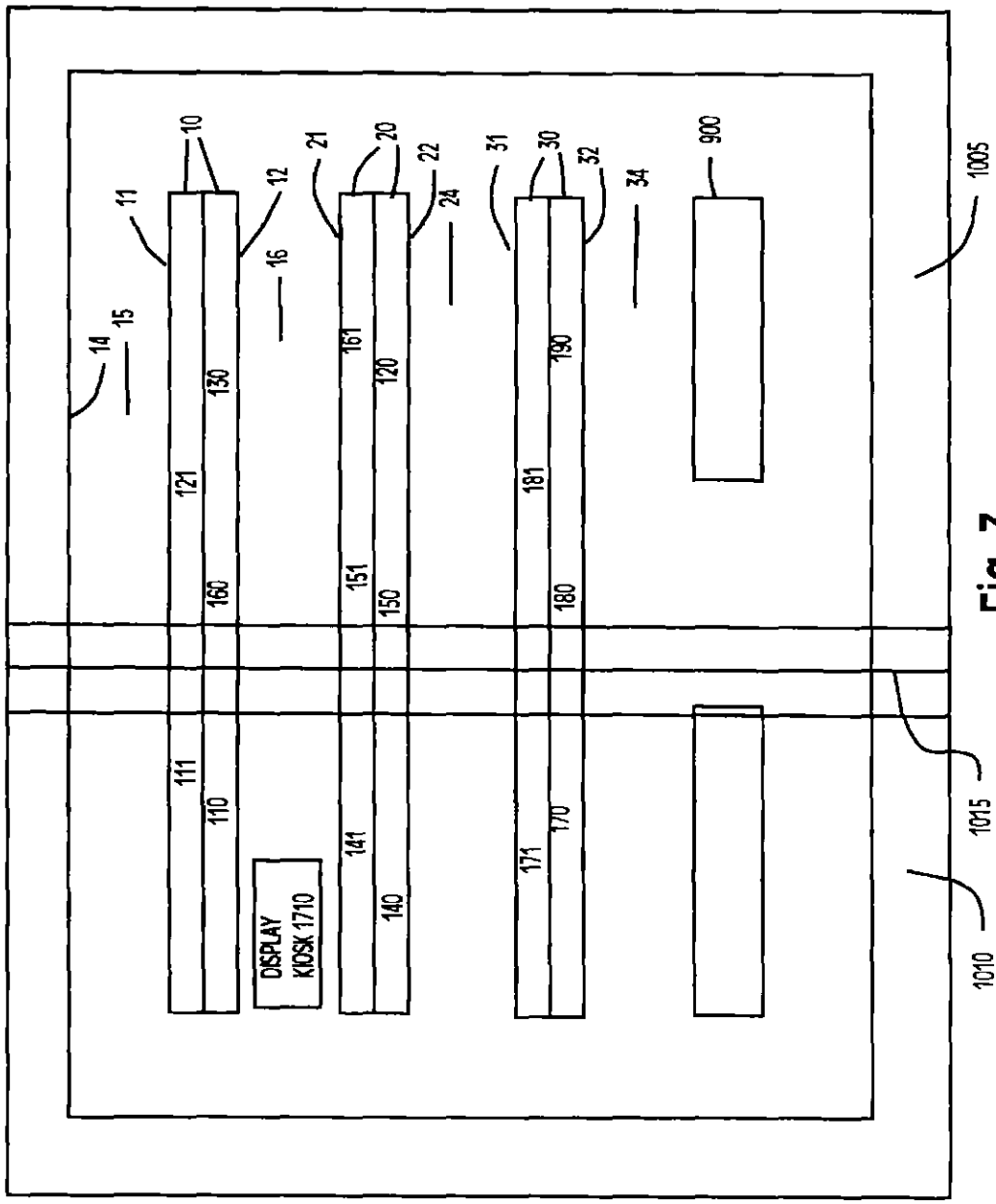


Fig. 2


10
11
12
14
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16
21
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22
24
31
30
32
34
900
1005
1015
1010
DISPLAY KIOSK 1710
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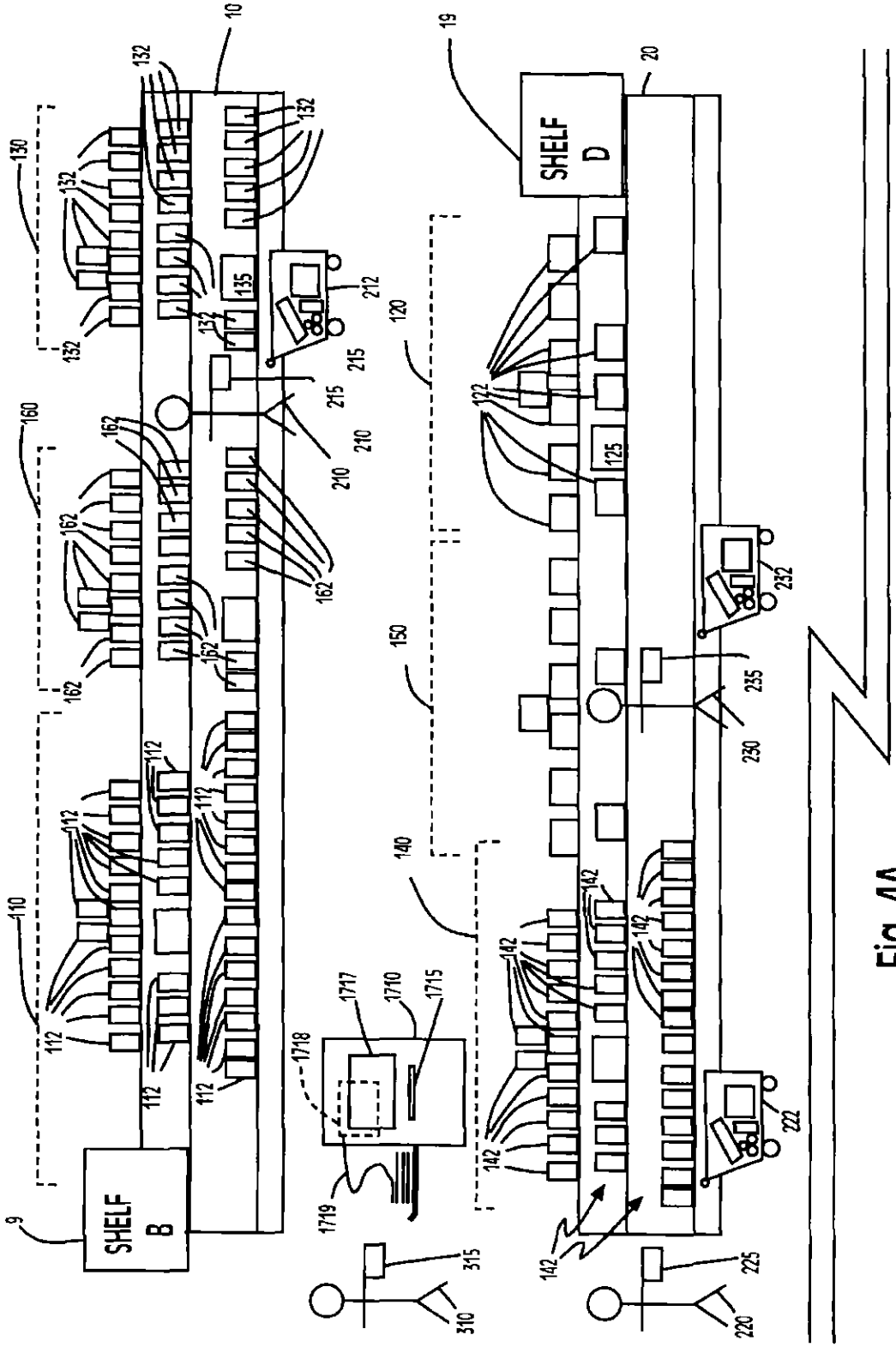
171
170
181
180
190

Fig. 3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SHELF D
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10
19
20
110
112
120
122
125
130
132
135
140
142
150
160
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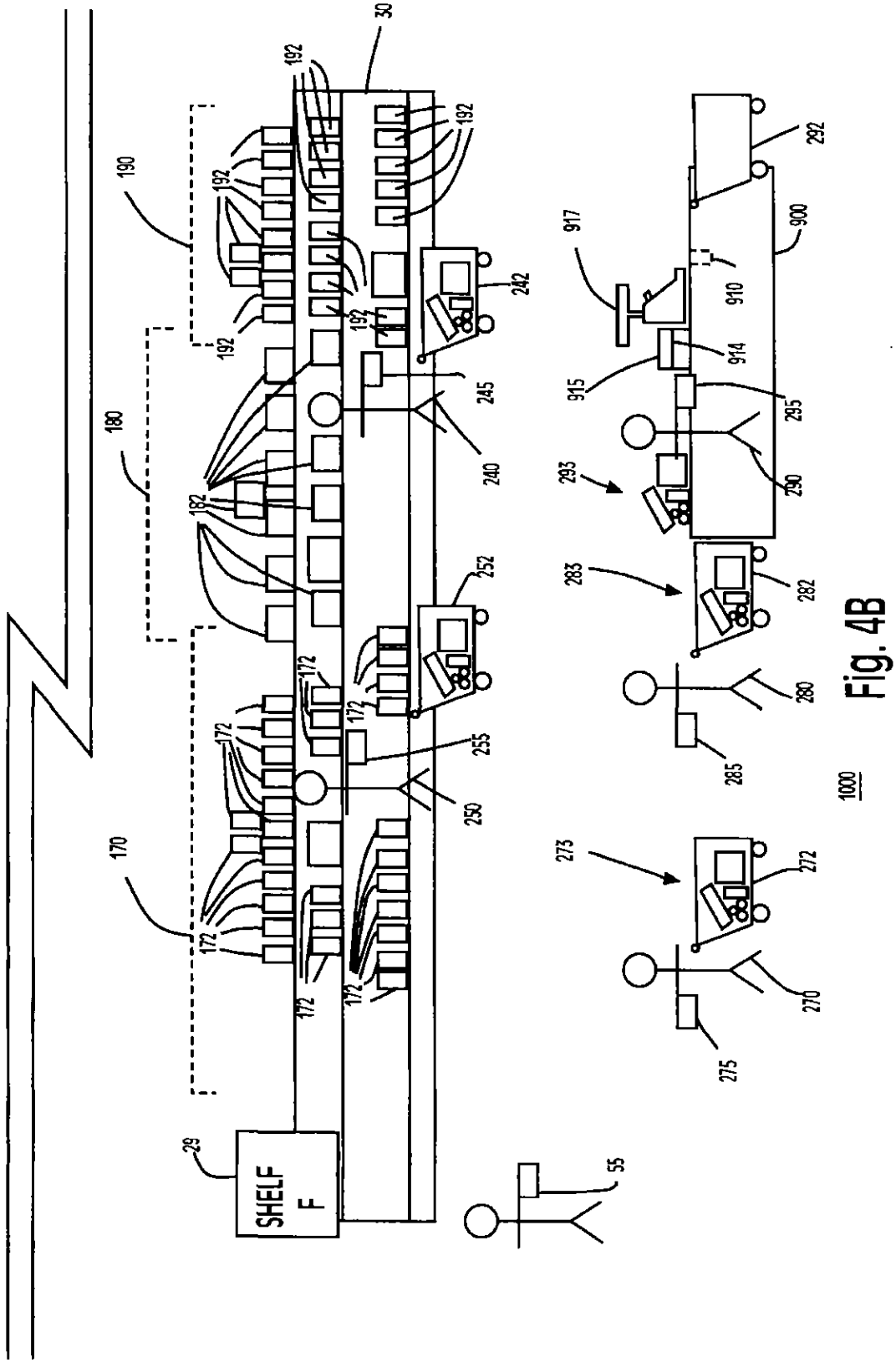
235
310
315
220
1710
1715
1717
1718
1719

Fig. 4A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180
182
170
172
242
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240
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255
250
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SHELF
F
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292
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272
270
275
1000

Fig. 4B

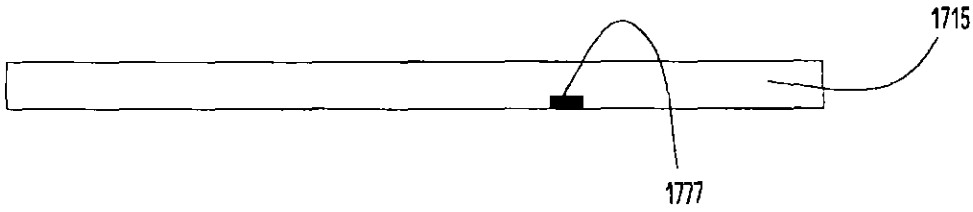

Fig. 5

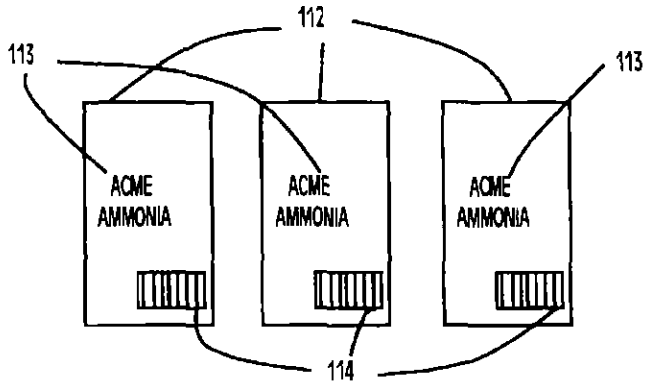

Fig. 6A

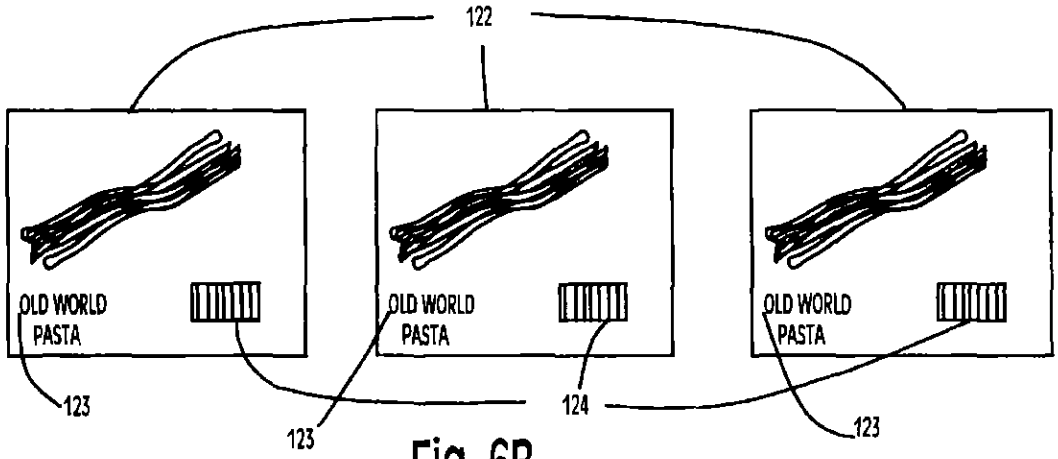

Fig. 6B

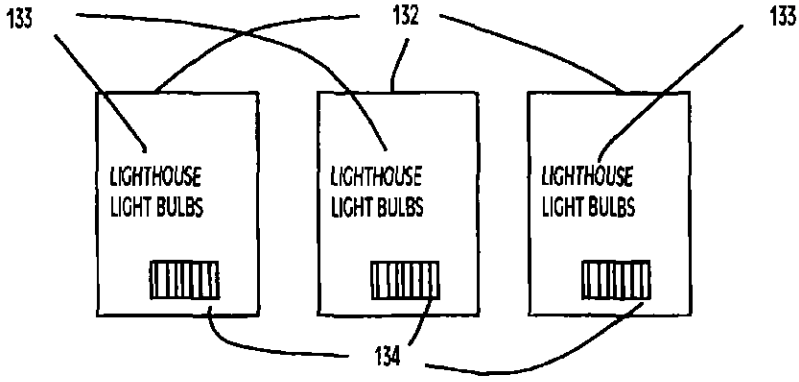

Fig. 6C

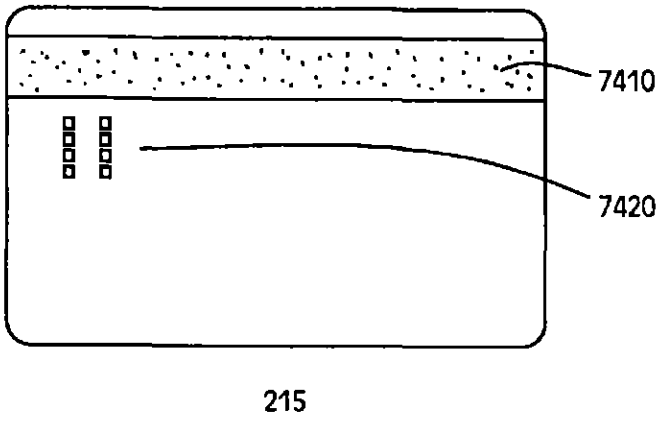

Fig. 7A

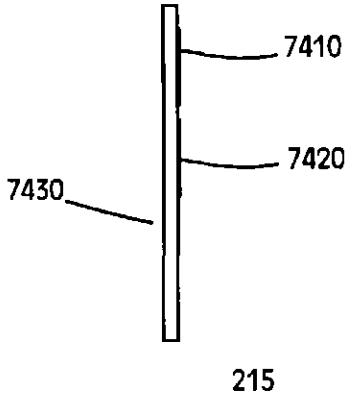

Fig. 7B

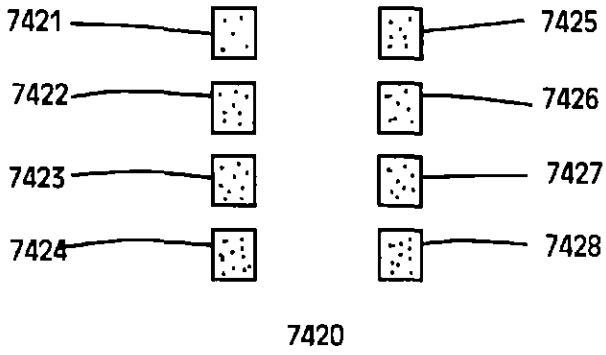

Fig. 7C

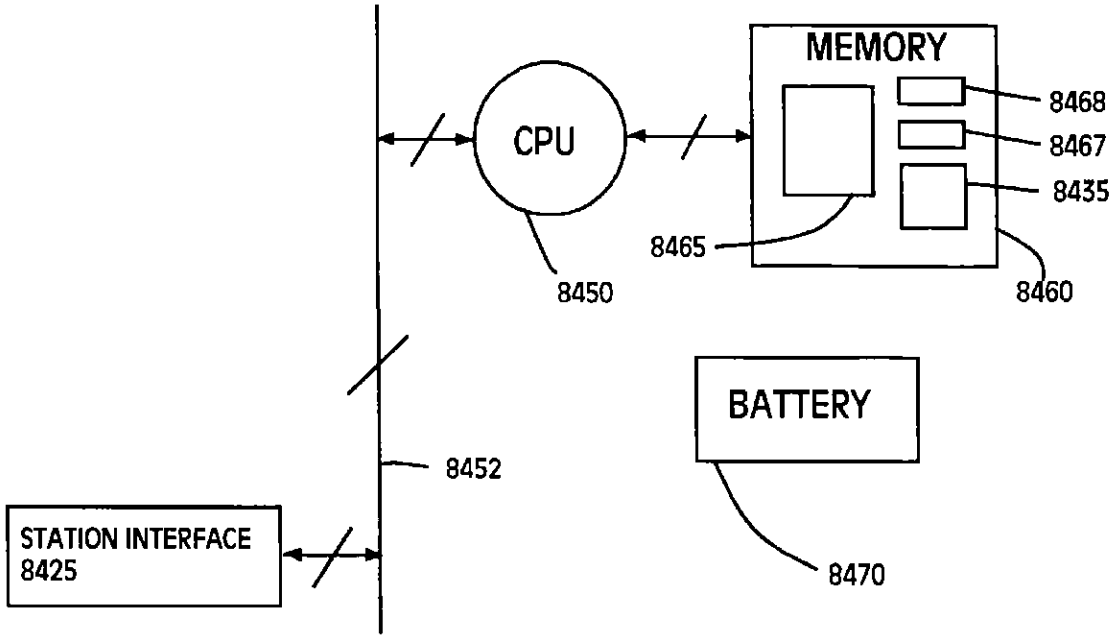
MEMORY
CPU
8468
8467
8435
8465
8450
8460
BATTERY
8452
STATION INTERFACE
8425
8470
215

Fig. 8

30: 7170312682
1
150
7170312350
1
200
7170312780
1
50

8435

Fig. 9

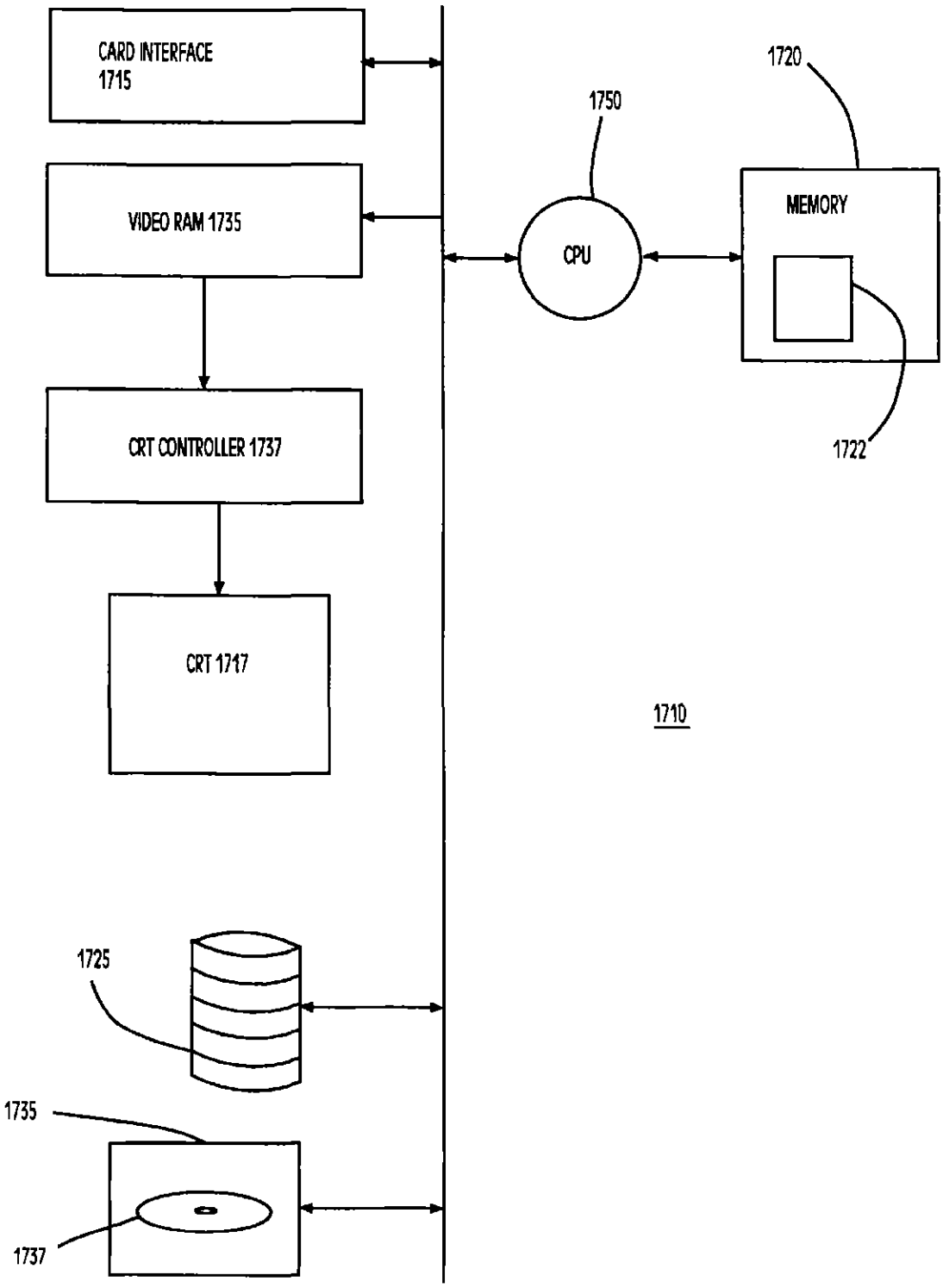
CARD INTERFACE
1715
VIDEO RAM 1735
CRT CONTROLLER 1737
CRT 1717
1750
CPU
1720
MEMORY
1722
1710
1725
1735
1737

Fig. 10

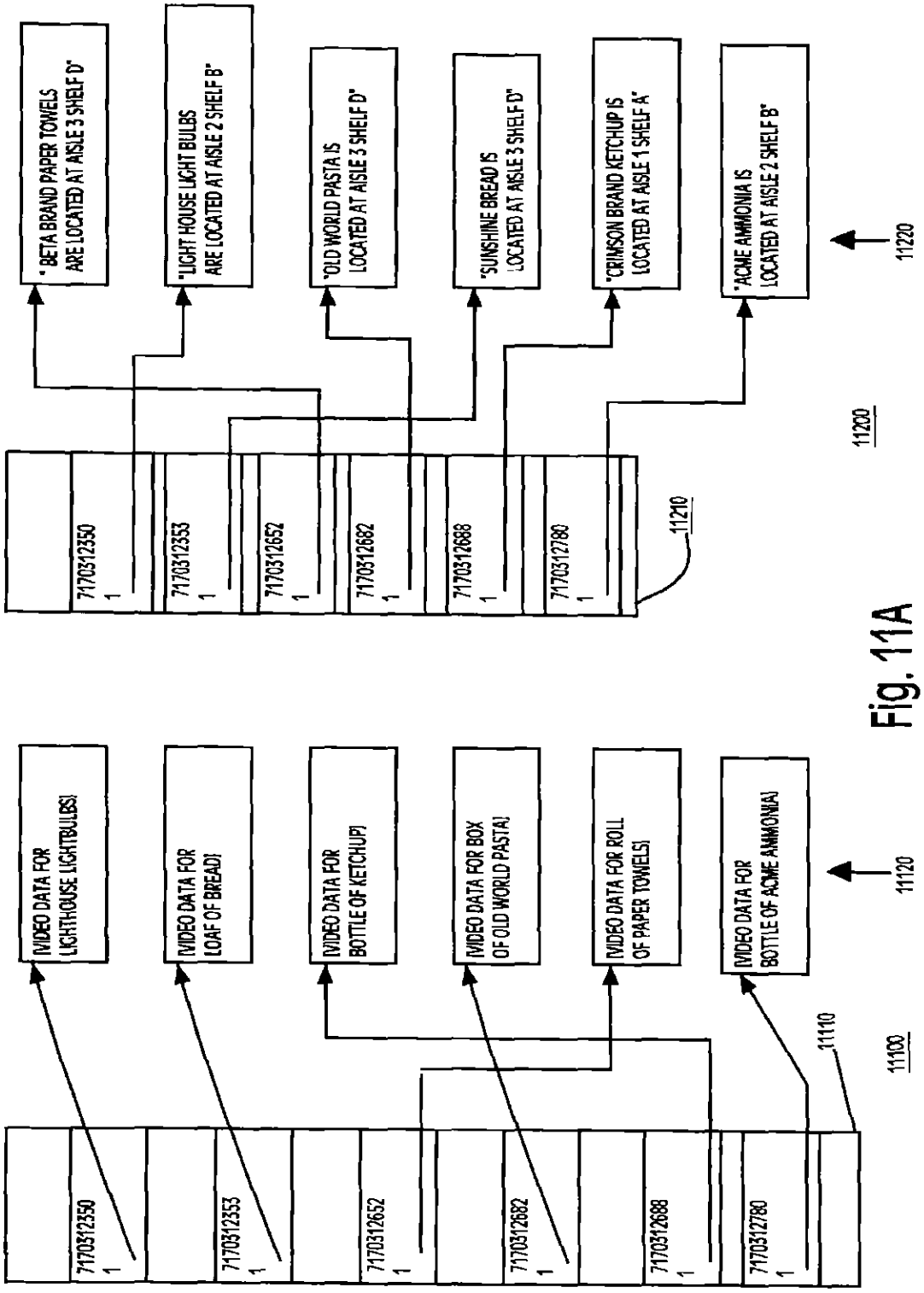
"BETA BRAND PAPER TOWELS ARE LOCATED AT AISLE 3 SHELF D"
"LIGHT HOUSE LIGHT BULBS ARE LOCATED AT AISLE 2 SHELF B"
"OLD WORLD PASTA IS LOCATED AT AISLE 3 SHELF D"
"SUNSHINE BREAD IS LOCATED AT AISLE 3 SHELF D"
"CRIMSON BRAND KETCHUP IS LOCATED AT AISLE 1 SHELF A"
"ACME AMMONIA IS LOCATED AT AISLE 2 SHELF B"
11220
7170312350
7170312353
7170312652
7170312682
7170312688
7170312780
11210
11200
[VIDEO DATA FOR LIGHTHOUSE LIGHTBULBS]
[VIDEO DATA FOR LOAF OF BREAD]
[VIDEO DATA FOR BOTTLE OF KETCHUP]
[VIDEO DATA FOR BOX OF OLD WORLD PASTA]
[VIDEO DATA FOR ROLL OF PAPER TOWELS]
[VIDEO DATA FOR BOTTLE OF ACME AMMONIA]
11120
11110
11100

Fig. 11A

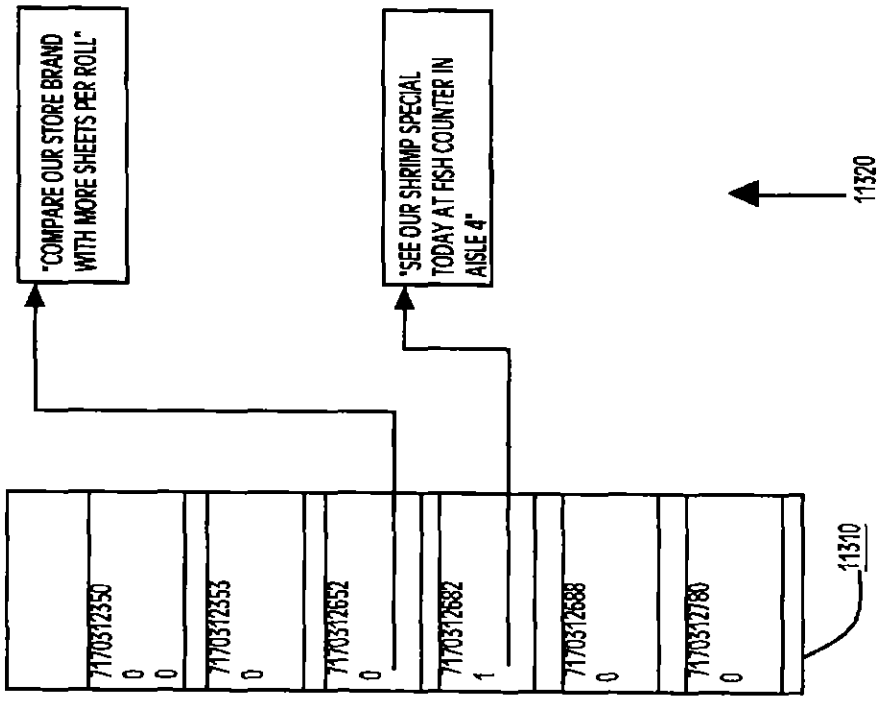
"COMPARE OUR STORE BRAND WITH MORE SHEETS PER ROLL"
"SEE OUR SHRIMP SPECIAL TODAY AT FISH COUNTER IN AISLE 4"
11320
7170312350
0
0
7170312353
0
7170312652
0
7170312682
1
7170312688
0
7170312780
0
11310
11300

Fig. 11B

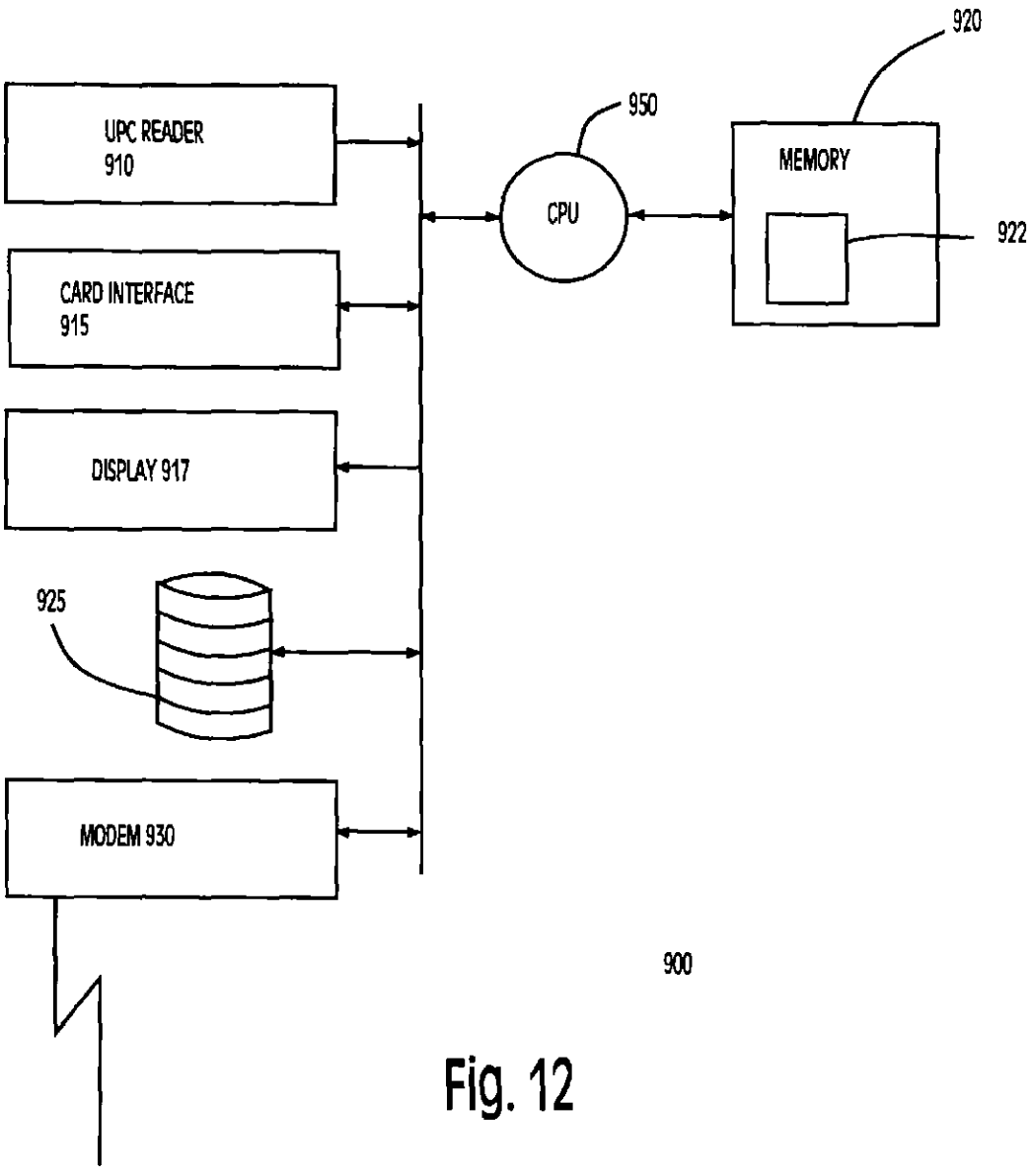
920
950
UPC READER
910
CPU
MEMORY
922
CARD INTERFACE
915
DISPLAY 917
925
MODEM 930
900

Fig. 12

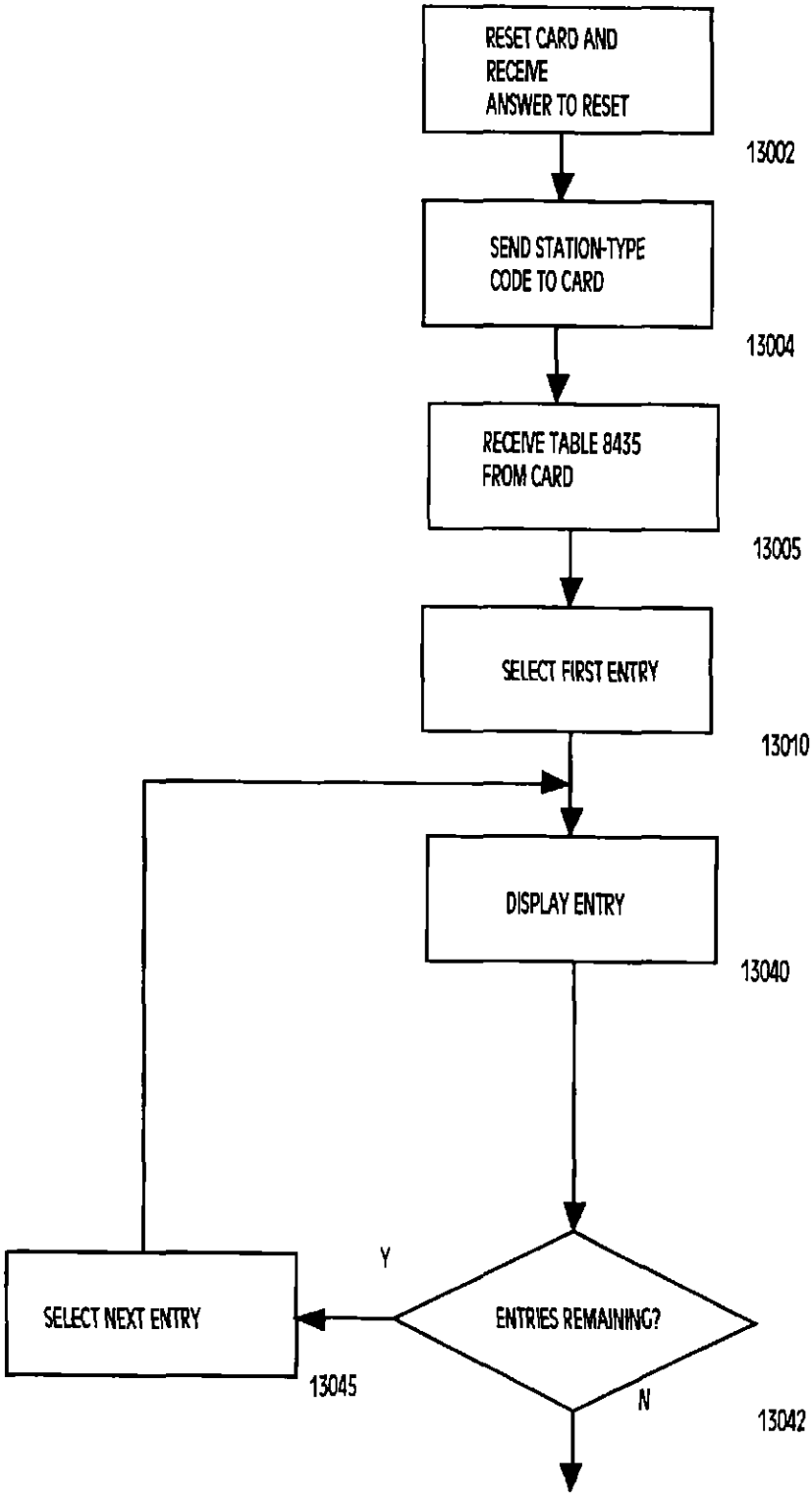
RESET CARD AND RECEIVE ANSWER TO RESET
13002
SEND STATION-TYPE CODE TO CARD
13004
RECEIVE TABLE 8435 FROM CARD
13005
SELECT FIRST ENTRY
13010
DISPLAY ENTRY
13040
ENTRIES REMAINING?
Y
N
13042
SELECT NEXT ENTRY
13045

Fig. 13

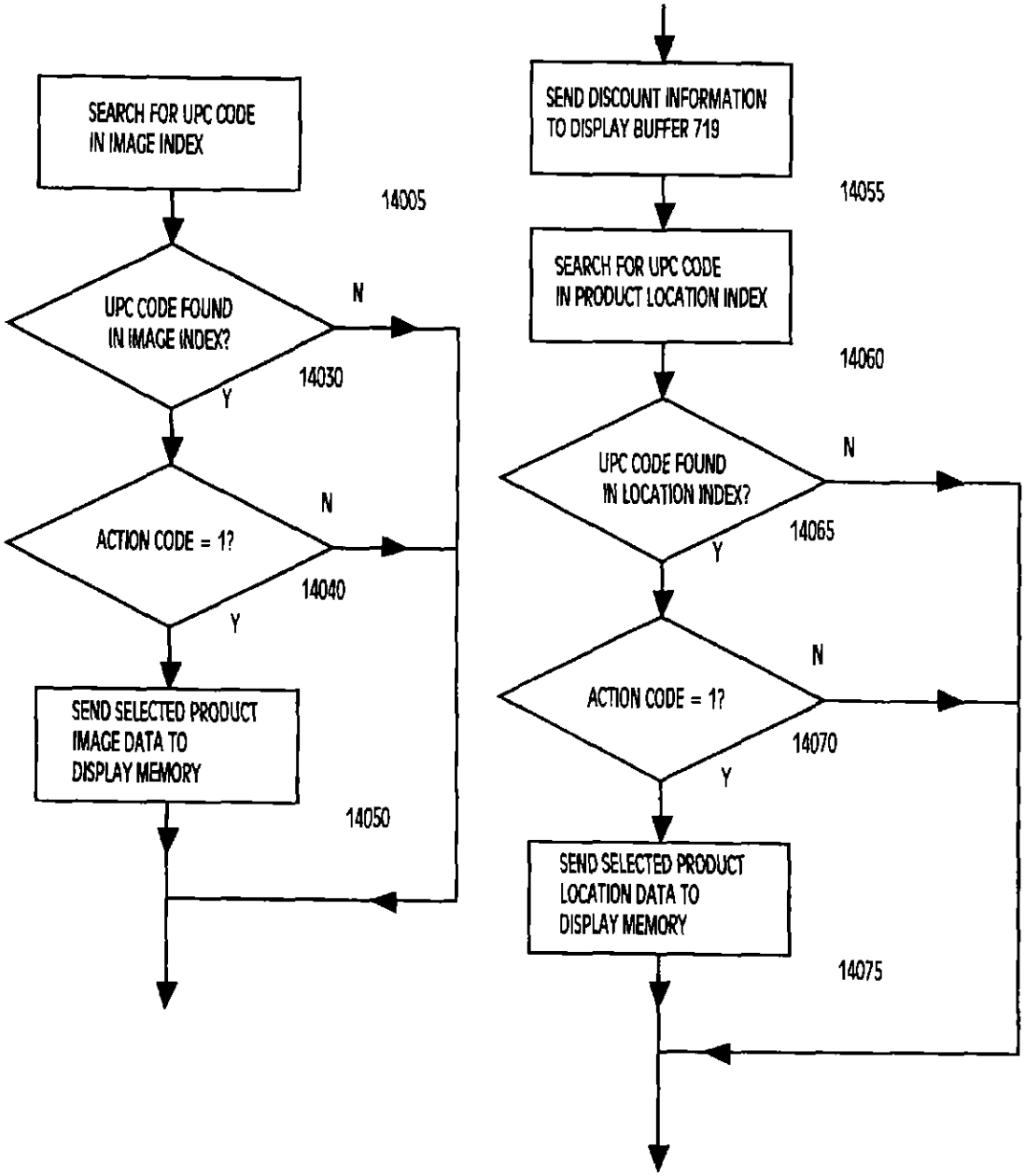
SEARCH FOR UPC CODE IN IMAGE INDEX
14005
UPC CODE FOUND IN IMAGE INDEX?
N
Y
14030
ACTION CODE = 1?
N
Y
14040
SEND SELECTED PRODUCT IMAGE DATA TO DISPLAY MEMORY
14050
SEND DISCOUNT INFORMATION TO DISPLAY BUFFER 719
14055
SEARCH FOR UPC CODE IN PRODUCT LOCATION INDEX
14060
UPC CODE FOUND IN LOCATION INDEX?
N
Y
14065
ACTION CODE = 1?
N
Y
14070
SEND SELECTED PRODUCT LOCATION DATA TO DISPLAY MEMORY
14075

Fig. 14A

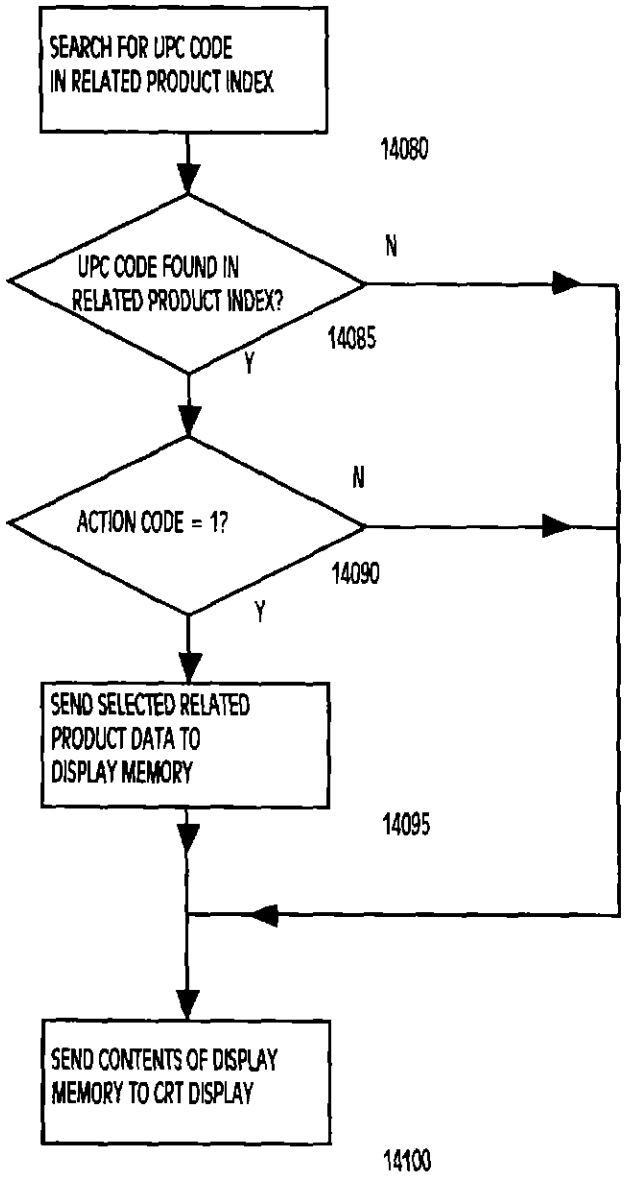
SEARCH FOR UPC CODE IN RELATED PRODUCT INDEX
14080
UPC CODE FOUND IN RELATED PRODUCT INDEX?
N
14085
Y
ACTION CODE = 1?
N
14090
Y
SEND SELECTED RELATED PRODUCT DATA TO DISPLAY MEMORY
14095
SEND CONTENTS OF DISPLAY MEMORY TO CRT DISPLAY
14100

Fig. 14B

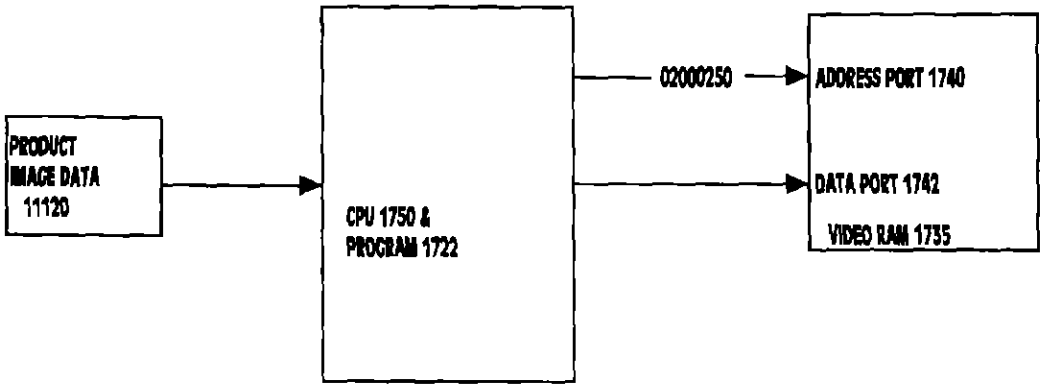

Fig. 15A

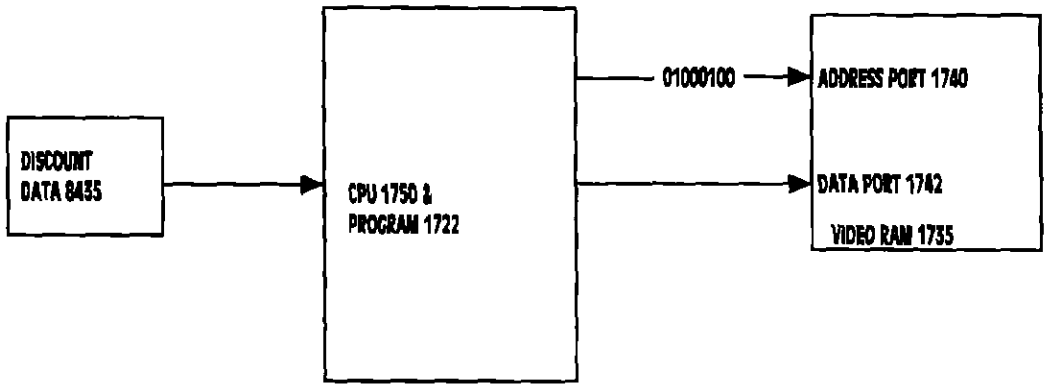

Fig. 15B

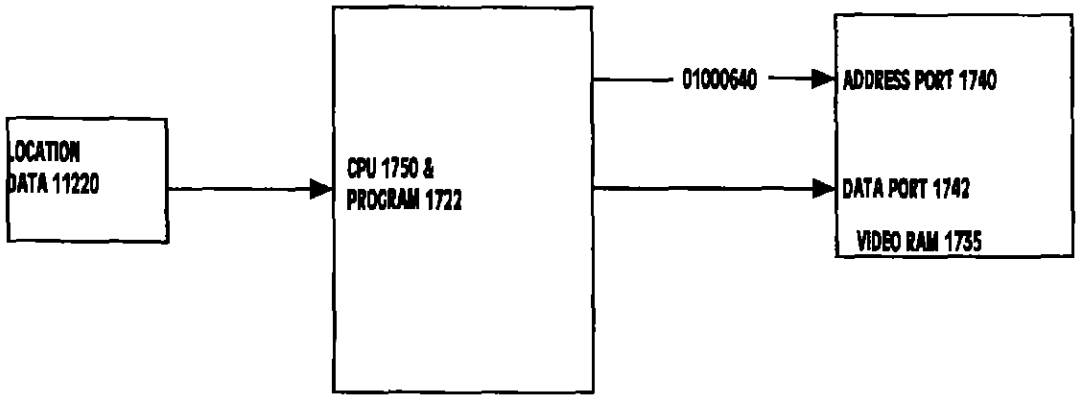

Fig. 15C

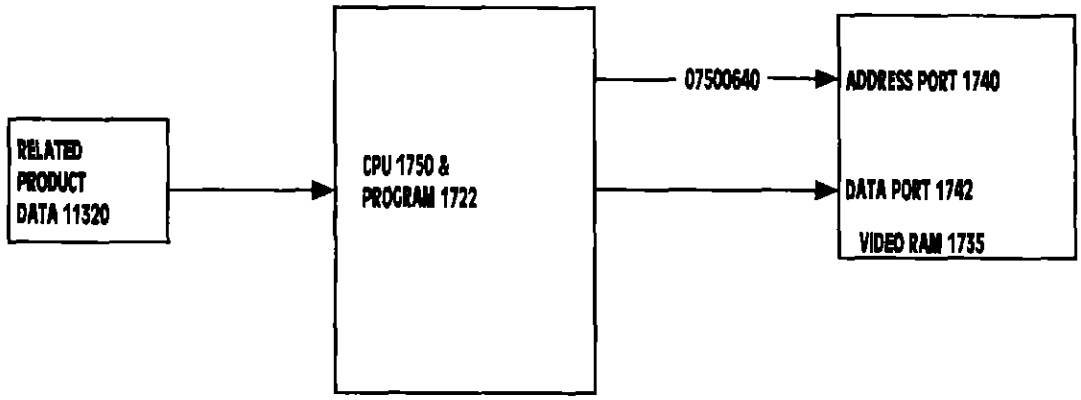

Fig. 15D

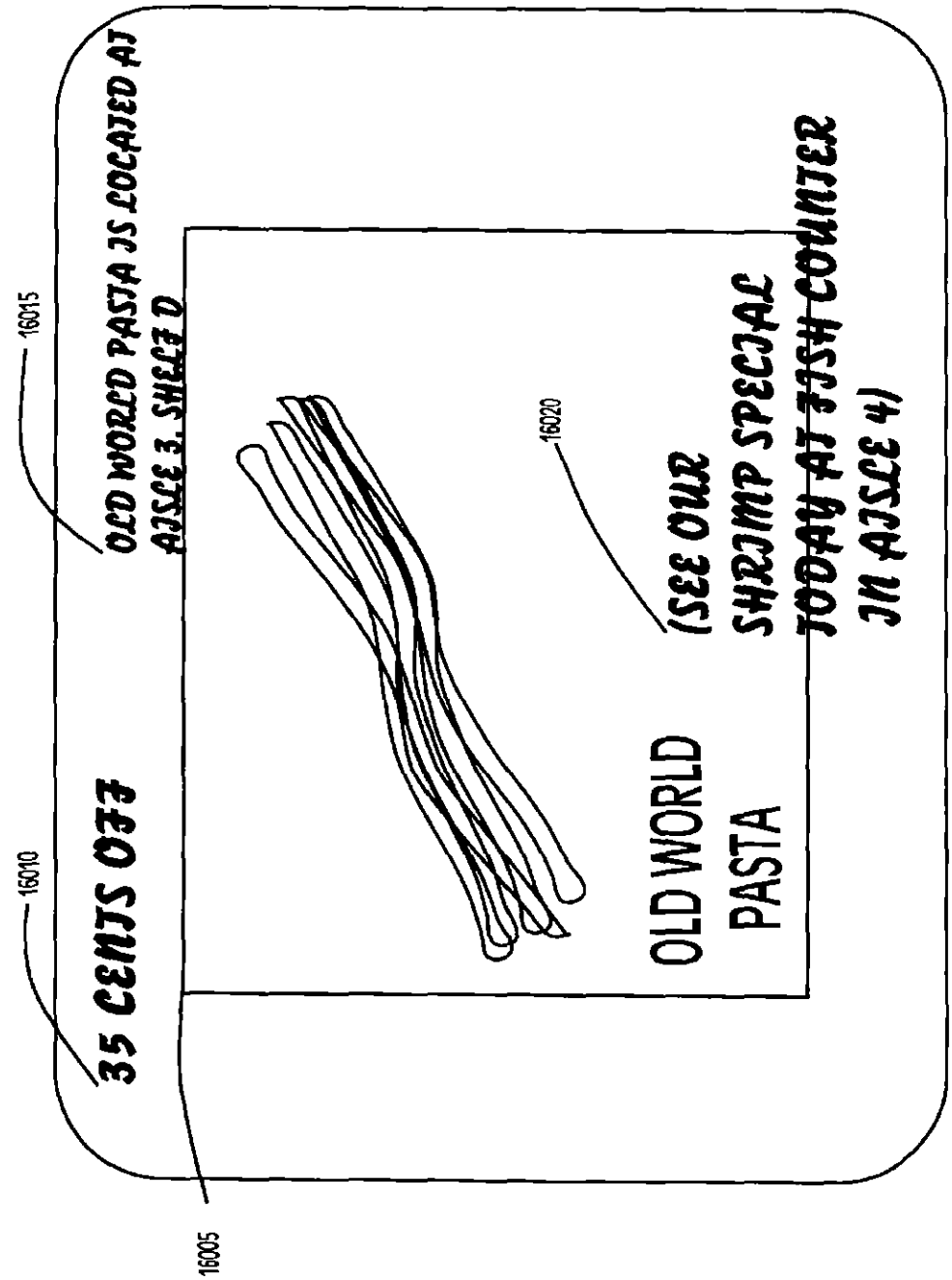
16005
16010
35 CENTS OFF
16015
OLD WORLD PASTA IS LOCATED AT AISLE 3, SHELF D
16020
OLD WORLD PASTA
(SEE OUR SHRIMP SPECIAL TODAY AT FISH COUNTER IN AISLE 4)

Fig. 16

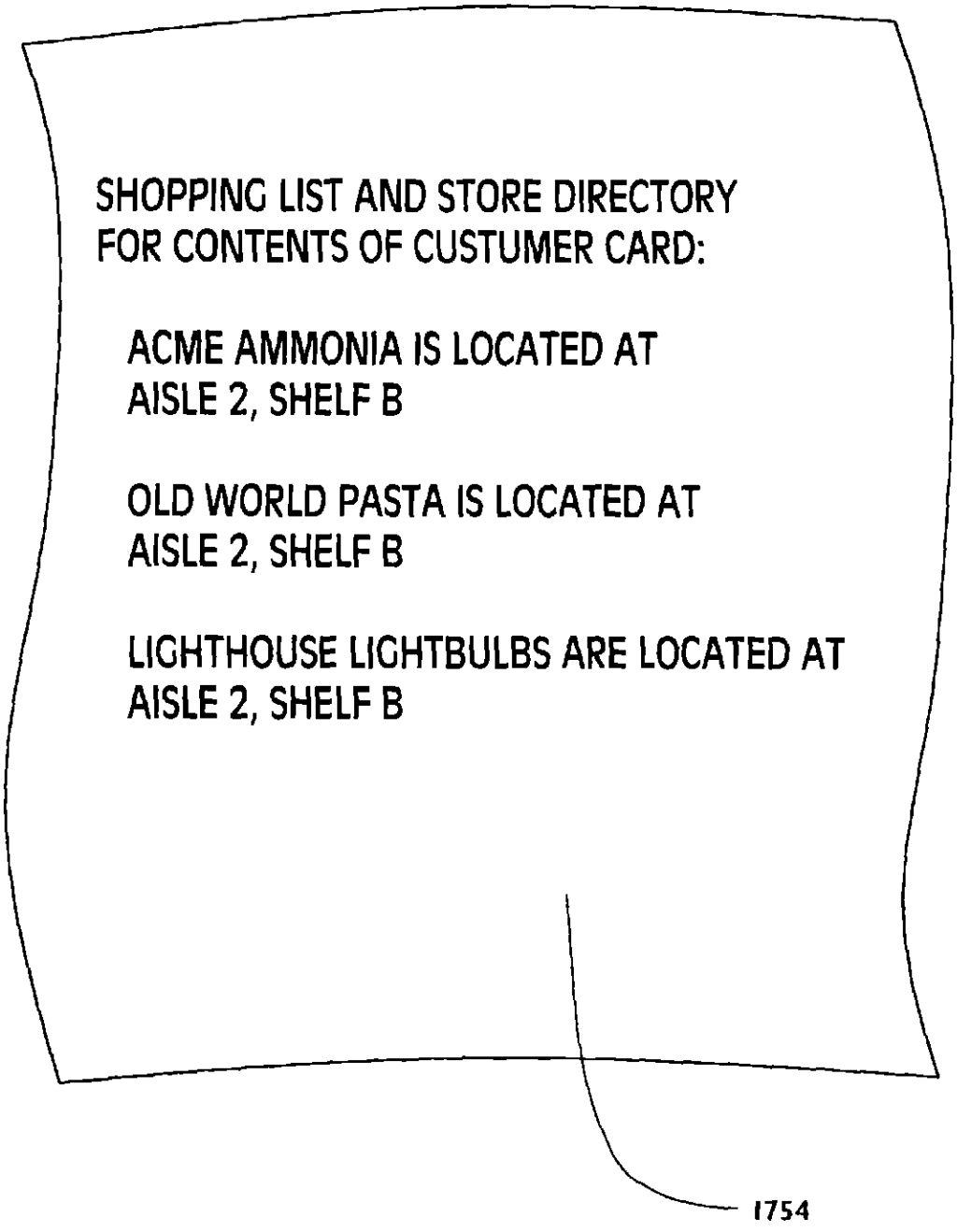
SHOPPING LIST AND STORE DIRECTORY
FOR CONTENTS OF CUSTUMER CARD:
ACME AMMONIA IS LOCATED AT
AISLE 2, SHELF B
OLD WORLD PASTA IS LOCATED AT
AISLE 2, SHELF B
LIGHTHOUSE LIGHTBULBS ARE LOCATED AT
AISLE 2, SHELF B
1754

Fig. 17

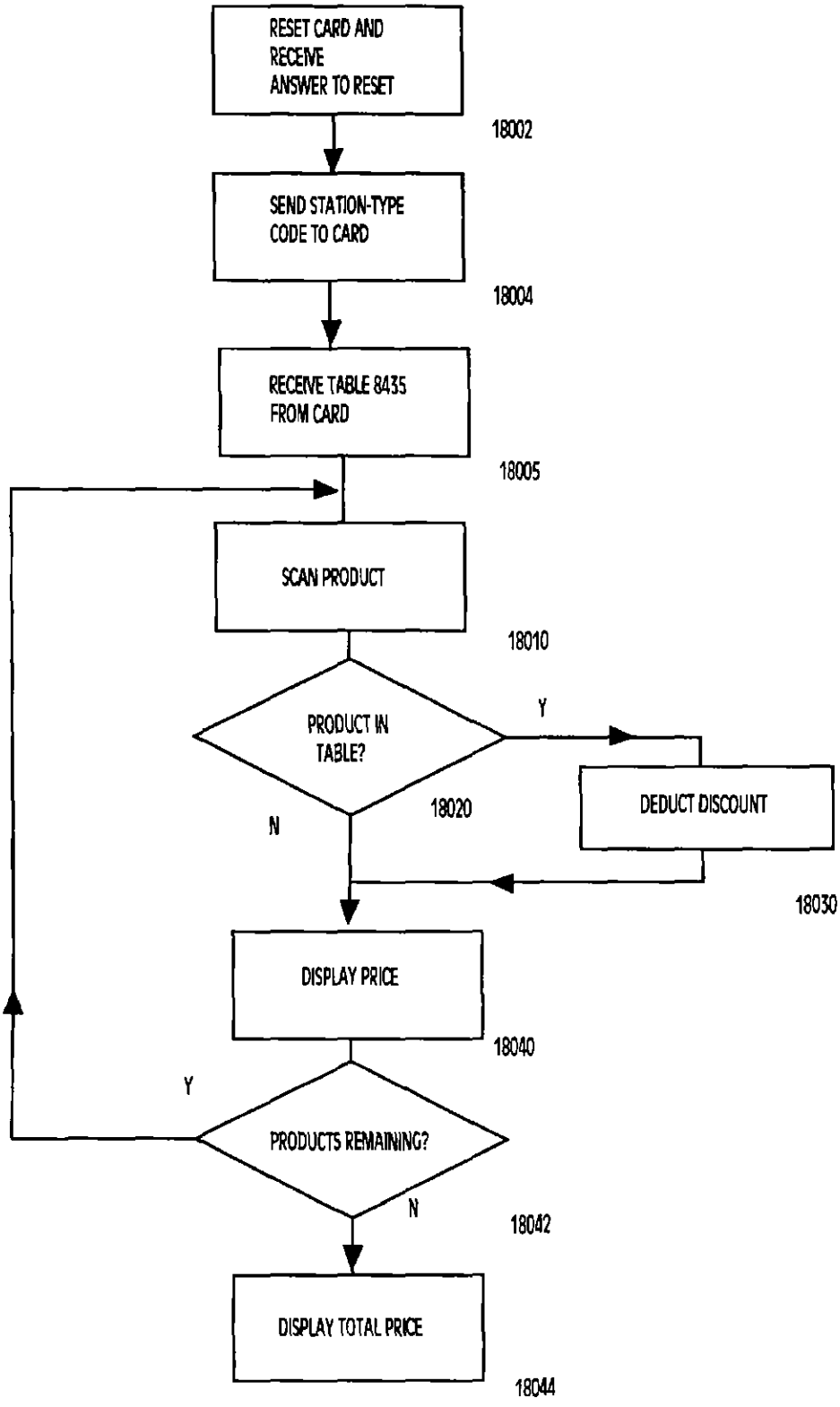
RESET CARD AND RECEIVE ANSWER TO RESET
18002
SEND STATION-TYPE CODE TO CARD
18004
RECEIVE TABLE 8435 FROM CARD
18005
SCAN PRODUCT
18010
PRODUCT IN TABLE?
Y
N
18020
DEDUCT DISCOUNT
18030
DISPLAY PRICE
18040
Y
PRODUCTS REMAINING?
N
18042
DISPLAY TOTAL PRICE
18044

Fig. 18

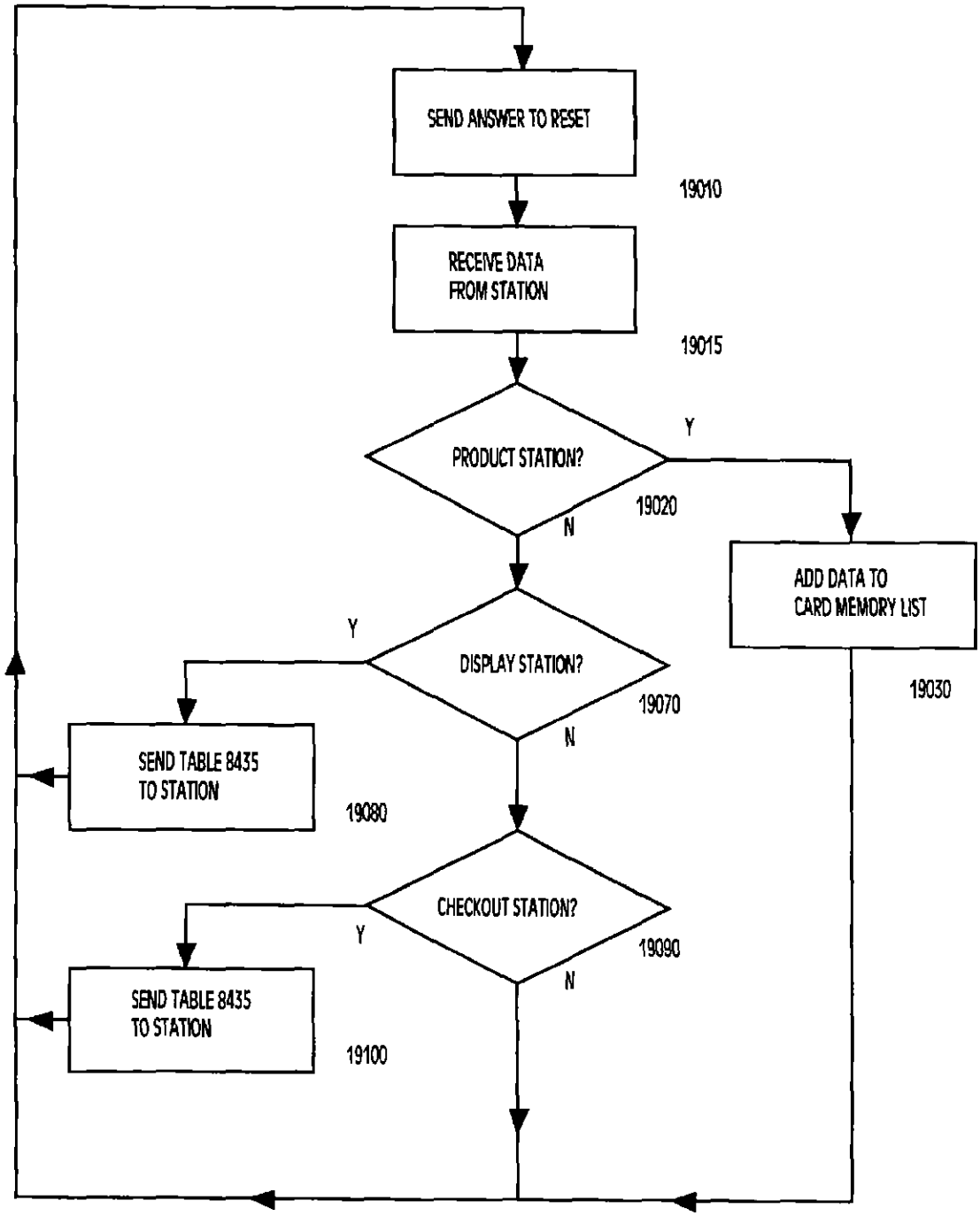
SEND ANSWER TO RESET
19010
RECEIVE DATA FROM STATION
19015
PRODUCT STATION?
Y
N
19020
ADD DATA TO CARD MEMORY LIST
19030
DISPLAY STATION?
Y
N
19070
SEND TABLE 8435 TO STATION
19080
CHECKOUT STATION?
Y
N
19090
SEND TABLE 8435 TO STATION
19100

Fig. 19

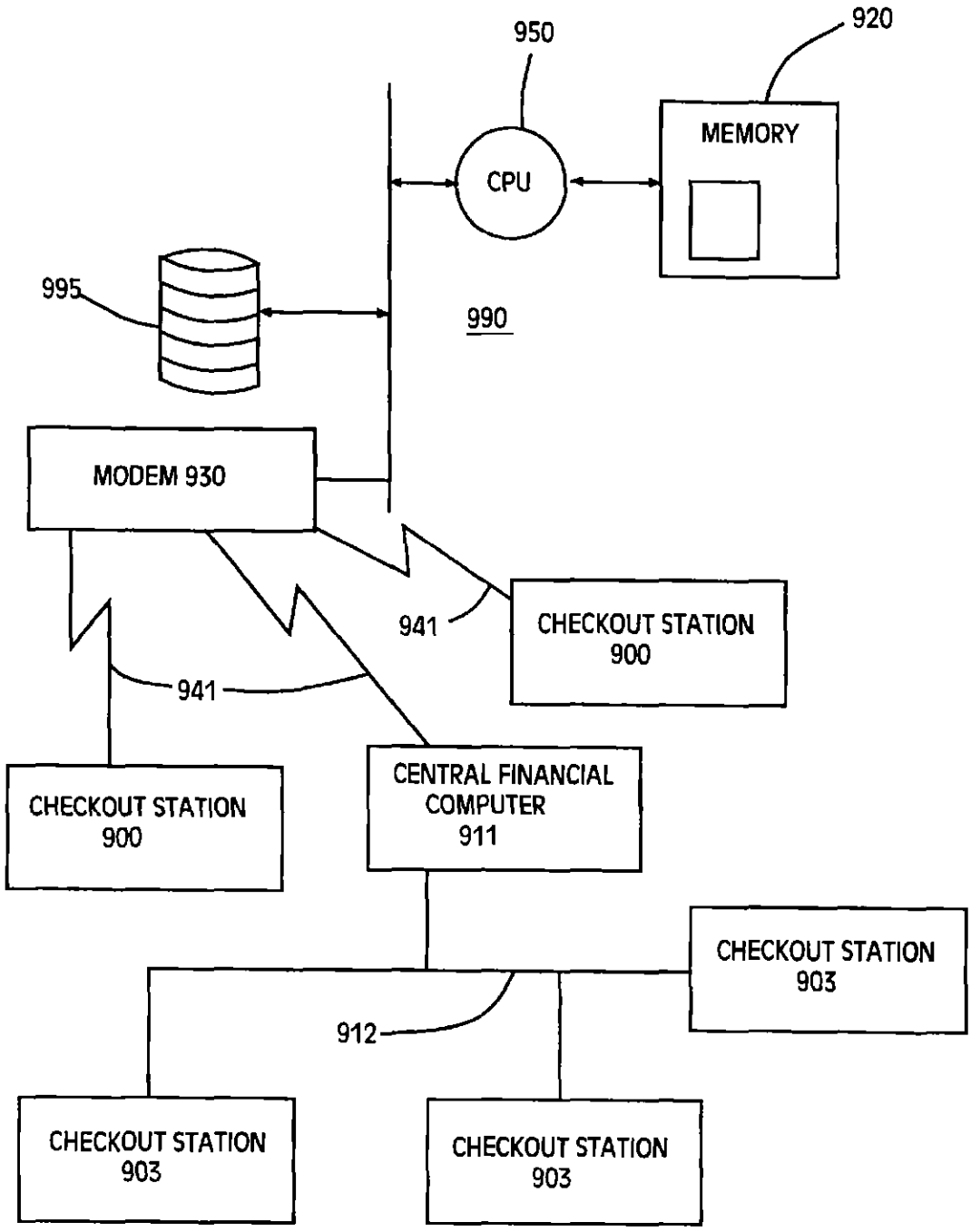
950
920
MEMORY
CPU
995
990
MODEM 930
941
CHECKOUT STATION
900
941
CHECKOUT STATION
900
CENTRAL FINANCIAL
COMPUTER
911
CHECKOUT STATION
903
912
CHECKOUT STATION
903
CHECKOUT STATION
903

Fig. 20

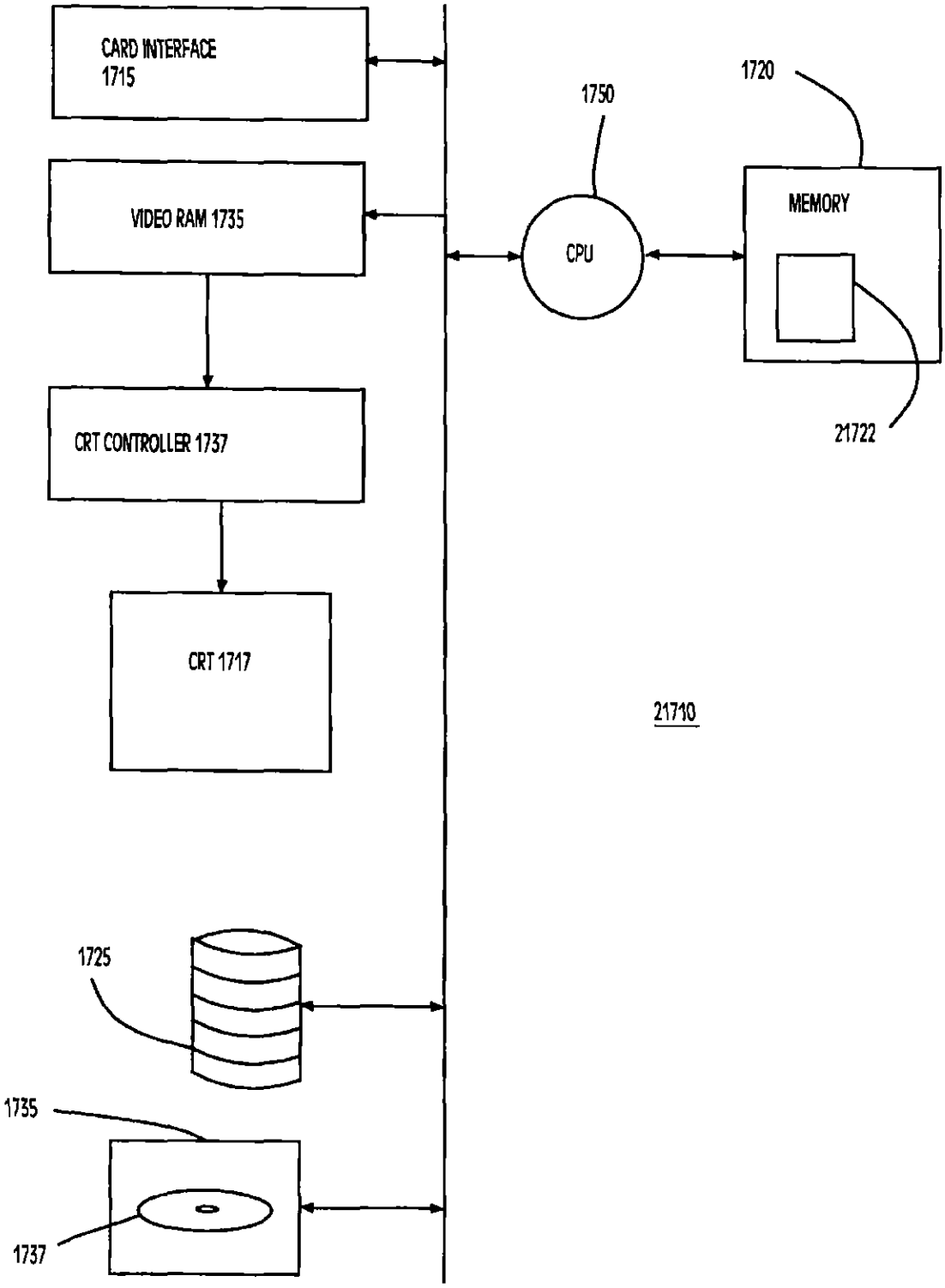
CARD INTERFACE
1715
VIDEO RAM 1735
CRT CONTROLLER 1737
CRT 1717
1750
CPU
1720
MEMORY
21722
21710
1725
1735
1737

Fig. 21

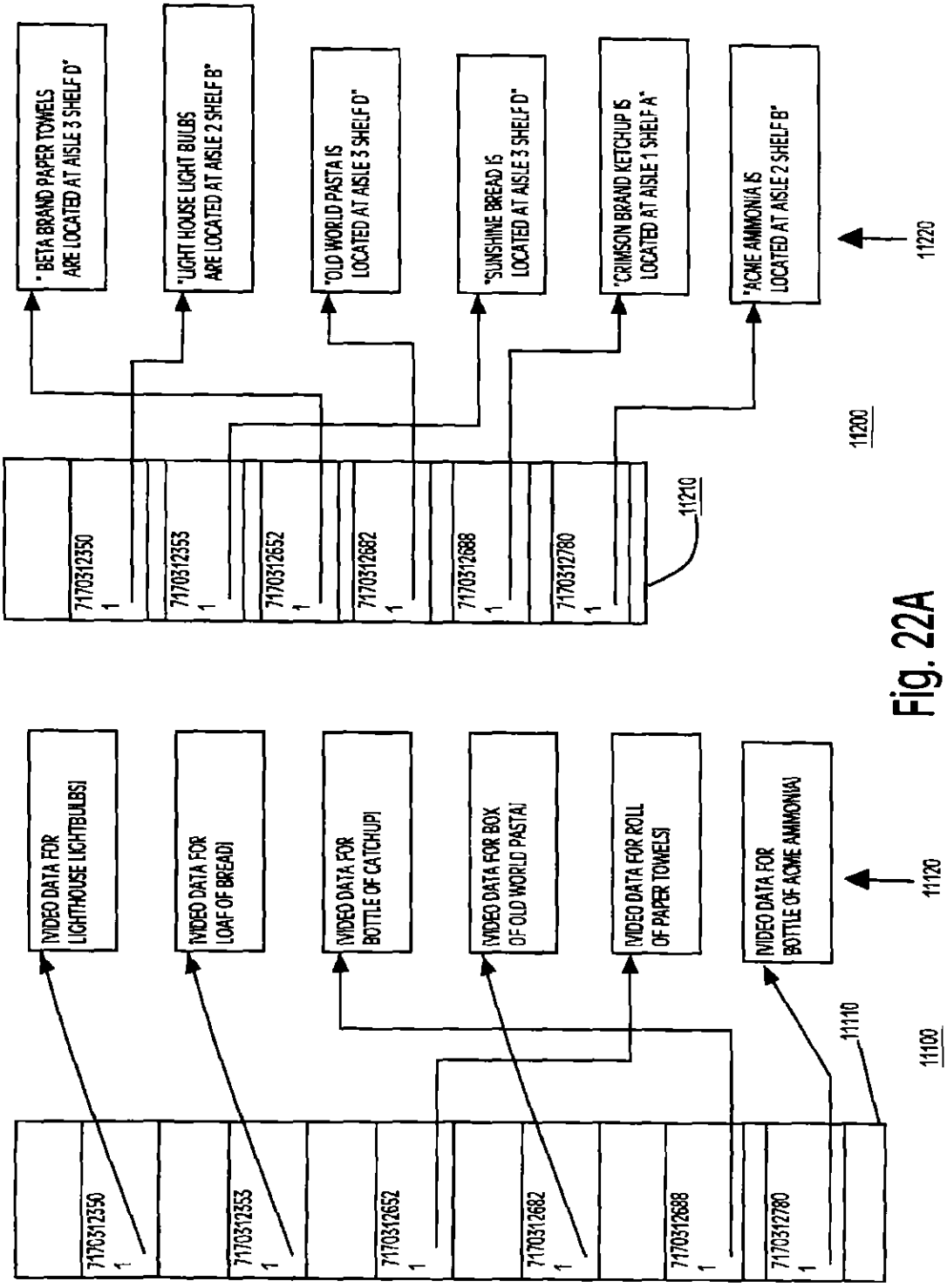
" BETA BRAND PAPER TOWELS ARE LOCATED AT AISLE 3 SHELF D"
"LIGHT HOUSE LIGHT BULBS ARE LOCATED AT AISLE 2 SHELF B"
"OLD WORLD PASTA IS LOCATED AT AISLE 3 SHELF D"
"SUNSHINE BREAD IS LOCATED AT AISLE 3 SHELF D"
"CRIMSON BRAND KETCHUP IS LOCATED AT AISLE 1 SHELF A"
"ACME AMMONIA IS LOCATED AT AISLE 2 SHELF B"
11220
7170312350
7170312353
7170312652
7170312682
7170312688
7170312780
11210
11200
IVIDEO DATA FOR LIGHTHOUSE LIGHTBULBSI
IVIDEO DATA FOR LOAF OF BREADI
IVIDEO DATA FOR BOTTLE OF CATCHUPI
IVIDEO DATA FOR BOX OF OLD WORLD PASTAI
IVIDEO DATA FOR ROLL OF PAPER TOWELSI
IVIDEO DATA FOR BOTTLE OF ACME AMMONIAI
11120
11110
11100

Fig. 22A

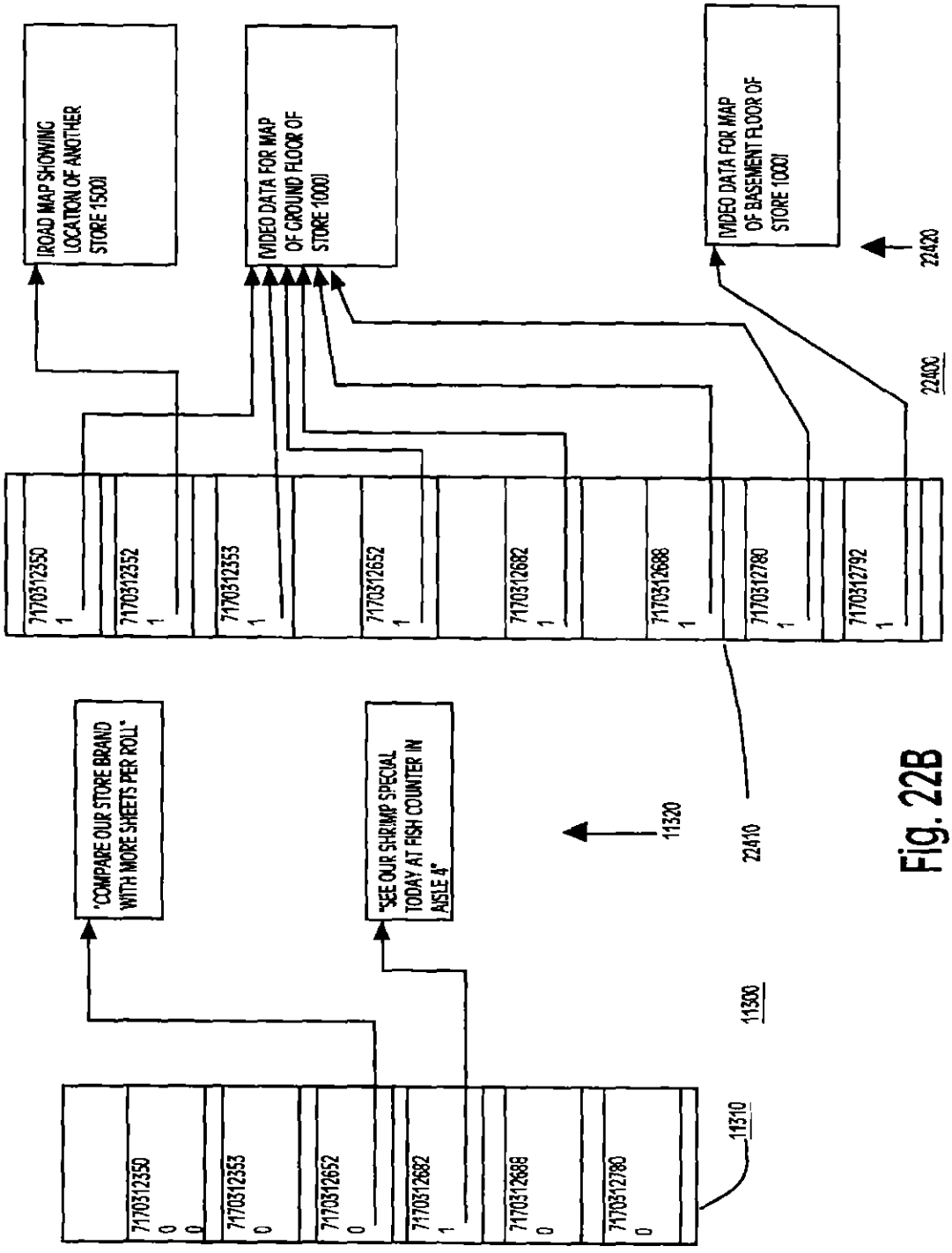
[ROAD MAP SHOWING LOCATION OF ANOTHER STORE 15001
[VIDEO DATA FOR MAP OF GROUND FLOOR OF STORE 10001
[VIDEO DATA FOR MAP OF BASEMENT FLOOR OF STORE 10001
22420
22400
7170312350 1
7170312352 1
7170312353 1
7170312652 1
7170312682 1
7170312688 1
7170312780 1
7170312792 1
"COMPARE OUR STORE BRAND WITH MORE SHEETS PER ROLL"
"SEE OUR SHRIMP SPECIAL TODAY AT FISH COUNTER IN AISLE 4"
11320
22410
11300
7170312350 0 0
7170312353 0
7170312652 0
7170312682 1
7170312688 0
7170312780 0
11310

Fig. 22B

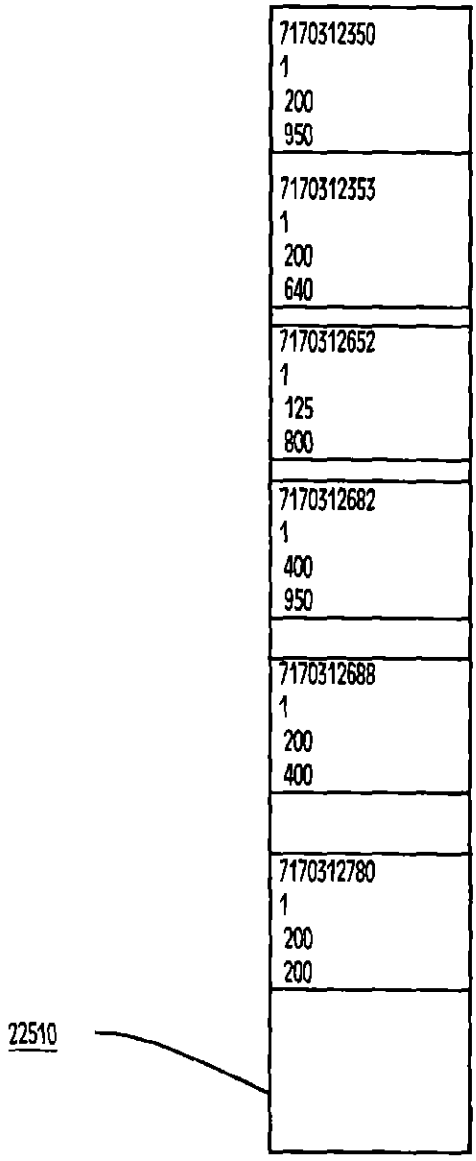
7170312350
1
200
950
7170312353
1
200
640
7170312652
1
125
800
7170312682
1
400
950
7170312688
1
200
400
7170312780
1
200
200
22510

Fig. 22C

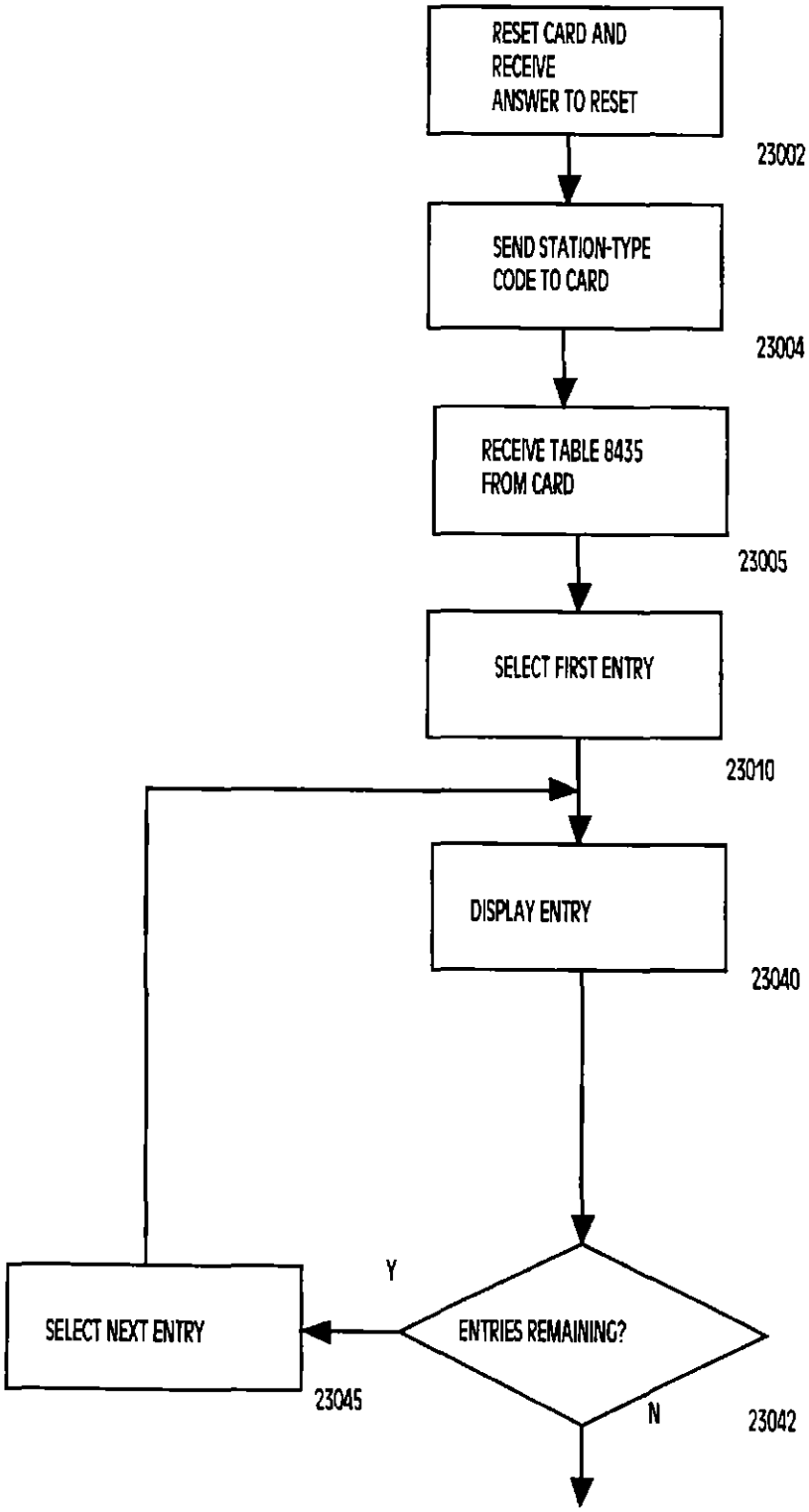
RESET CARD AND RECEIVE ANSWER TO RESET
23002
SEND STATION-TYPE CODE TO CARD
23004
RECEIVE TABLE 8435 FROM CARD
23005
SELECT FIRST ENTRY
23010
DISPLAY ENTRY
23040
ENTRIES REMAINING?
Y
N
23042
SELECT NEXT ENTRY
23045

Fig. 23

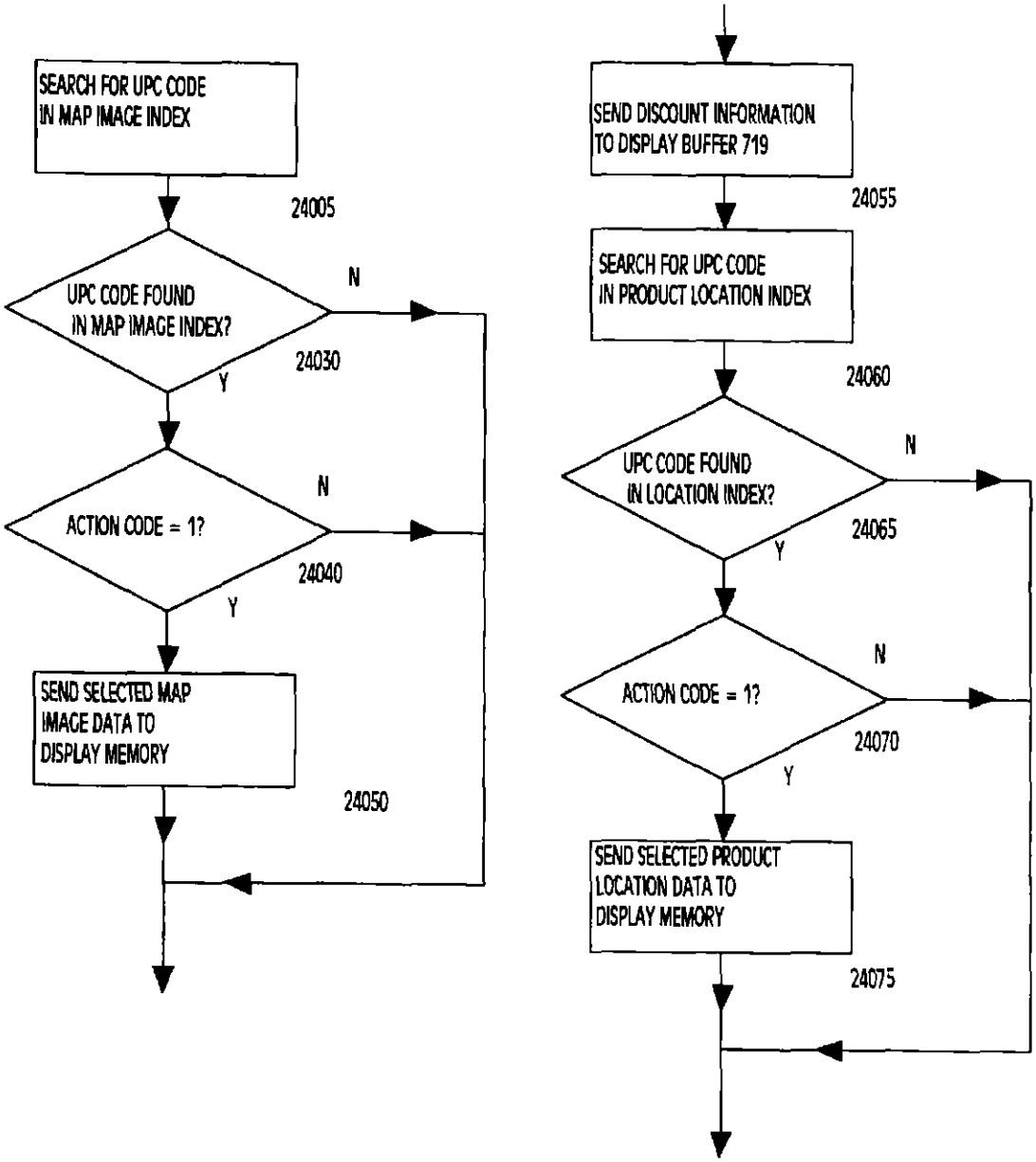
SEARCH FOR UPC CODE IN MAP IMAGE INDEX
24005
UPC CODE FOUND IN MAP IMAGE INDEX?
N
24030
Y
ACTION CODE = 1?
N
24040
Y
SEND SELECTED MAP IMAGE DATA TO DISPLAY MEMORY
24050
SEND DISCOUNT INFORMATION TO DISPLAY BUFFER 719
24055
SEARCH FOR UPC CODE IN PRODUCT LOCATION INDEX
24060
UPC CODE FOUND IN LOCATION INDEX?
N
24065
Y
ACTION CODE = 1?
N
24070
Y
SEND SELECTED PRODUCT LOCATION DATA TO DISPLAY MEMORY
24075

Fig. 24A

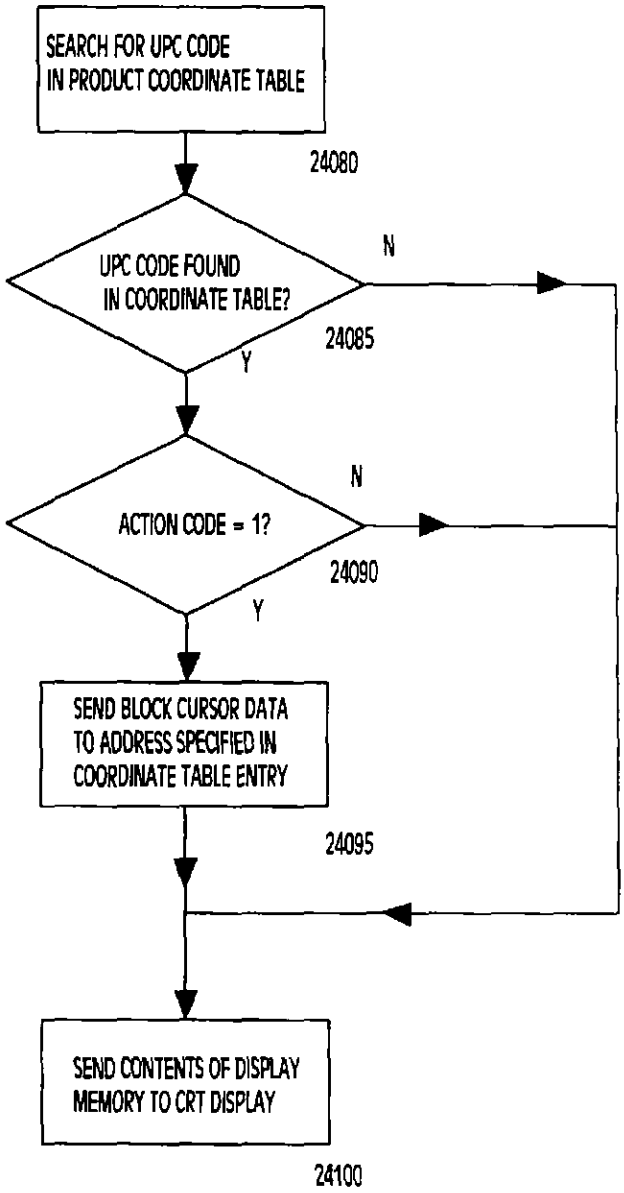
SEARCH FOR UPC CODE IN PRODUCT COORDINATE TABLE
24080
UPC CODE FOUND IN COORDINATE TABLE?
N
24085
Y
ACTION CODE = 1?
N
24090
Y
SEND BLOCK CURSOR DATA TO ADDRESS SPECIFIED IN COORDINATE TABLE ENTRY
24095
SEND CONTENTS OF DISPLAY MEMORY TO CRT DISPLAY
24100

Fig. 24B

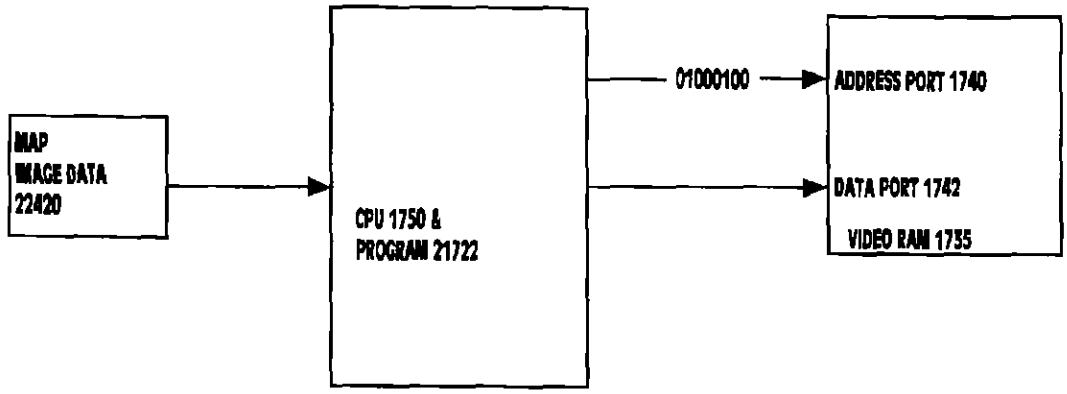

Fig. 25A

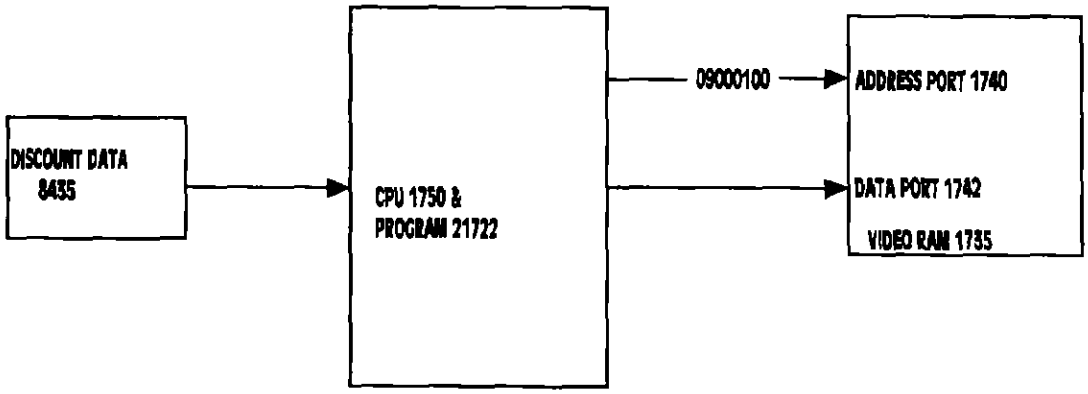

Fig. 25B

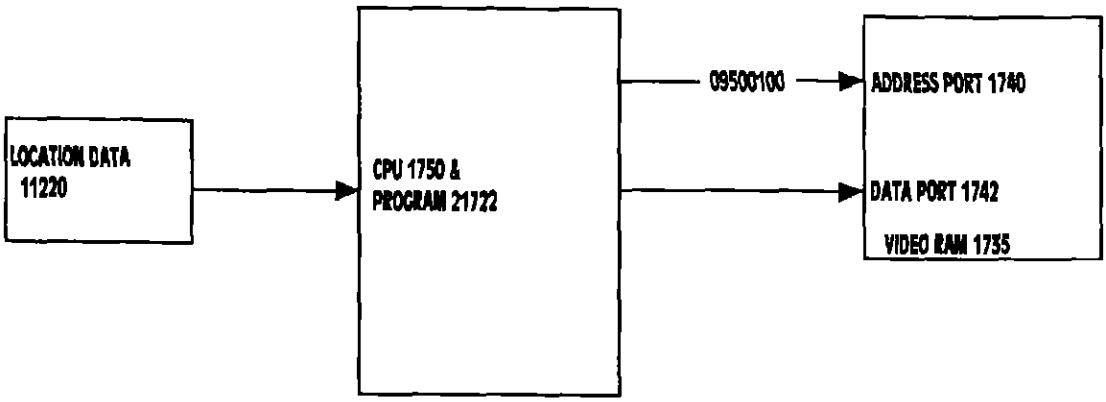

Fig. 25C

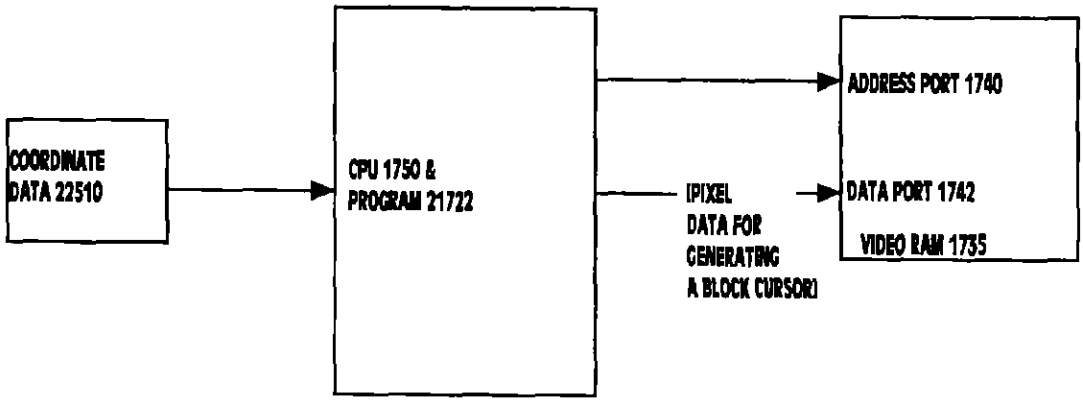

Fig. 25D

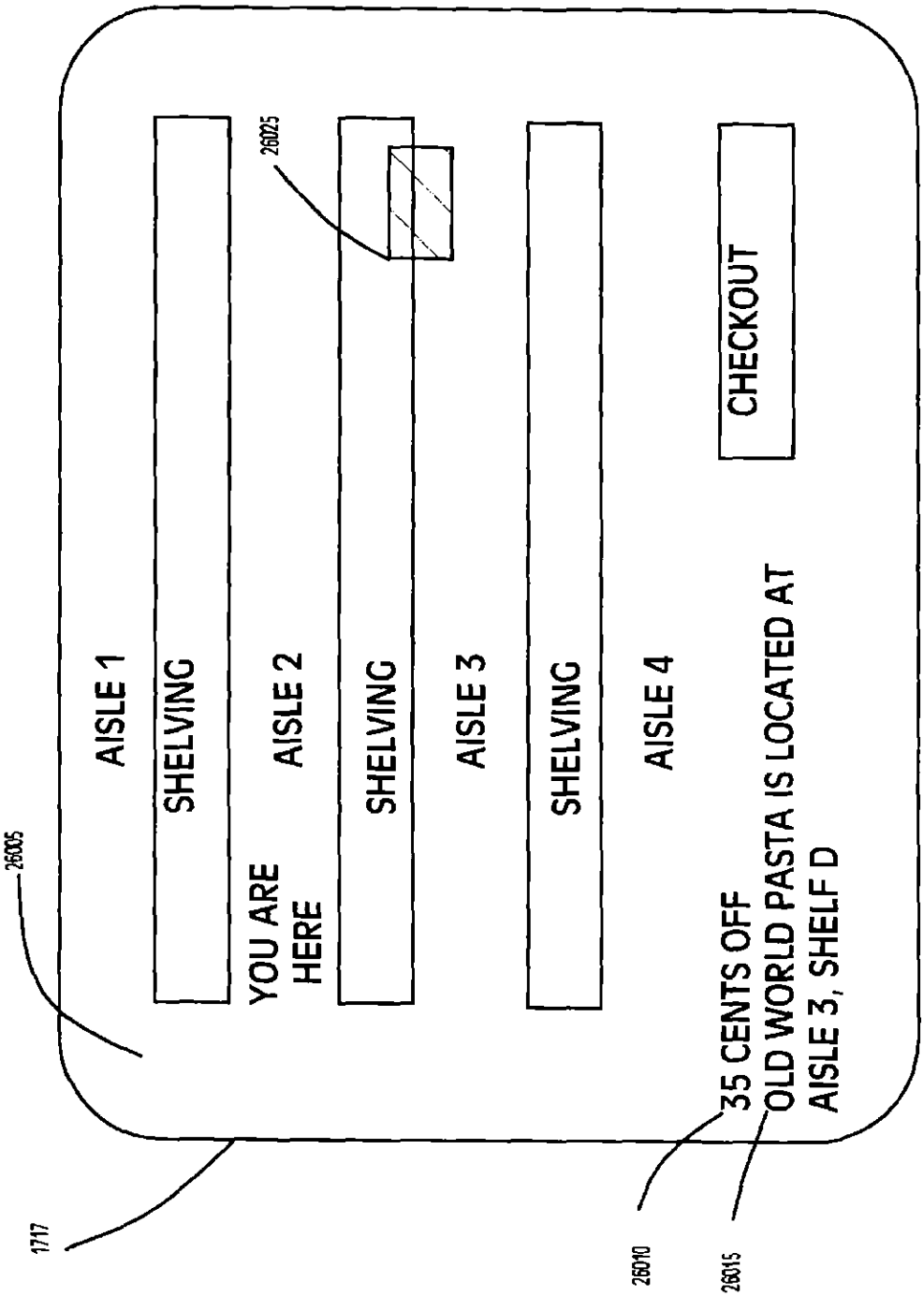
26005
AISLE 1
SHELVING
YOU ARE HERE
AISLE 2
26025
SHELVING
AISLE 3
SHELVING
AISLE 4
CHECKOUT
35 CENTS OFF
OLD WORLD PASTA IS LOCATED AT
AISLE 3, SHELF D
1717
26010
26015

Fig. 26

SYSTEM AND METHOD FOR DISPLAYING PRODUCT INFORMATION IN A RETAIL SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to a retail system and, more particularly, to a system and method for displaying product information in a retail system.

2. Description of Related Art

Discount coupons are a popular means to stimulate sales of products such as grocery store items. In 1992, approximately 310 billion coupons were distributed and 7.7 billion coupons were redeemed, saving customers $4 billion. It has been estimated that in-store couponing coupled with advertising increases sales by 544%.

A typical marketing scheme involves placing coupons in a newspaper, by printing the coupons in the newspaper or by inserting coupon inserts into the newspaper, and allowing customers to bring the printed coupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associated with this scheme. To alleviate this overhead, another marketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a newspaper, and capitalizing on the fact that 66% of buyer decisions are made at the time of product purchase. Both the in-store scheme and the newspaper scheme, however, are susceptible to fraud by an unscrupulous retailer that requests reimbursement payments by presenting unredeemed coupons to the clearing house. Other schemes include delivering coupons to customers through the mail, distributing coupons in or on the product package, and distributing coupons at checkout. All of these schemes have an overhead cost of handling the coupons and of sending the redeemed coupons to a clearing house to enable product manufacturers to reimburse retailers for the reduction in proceeds resulting from coupon redemptions.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a convenient and stimulating shopping environment that allows the customer to acquire discount coupons and to track relationships between the acquired coupons and available products.

It is another object of the present invention to display an image of the products corresponding to the acquired coupons.

To achieve these and other objects of the present invention, in a system including a communication device and a plurality of portable cards each having a memory, a method of operating the system comprises the steps of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product; generating, responsive to the first signal, a second signal containing an image of the product; and displaying the second signal.

According to another aspect of the present invention, a retail system comprises a plurality of portable cards each having a card memory; a communication device; first memory for storing a signal containing an image of a product; a reader that reads a first signal from the card memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product; a generator for accessing the first memory, using the first signal, to generate a second signal; and a display for displaying the second signal.

According to yet another aspect of the present invention, in a system including a plurality of product areas, a plurality of portable cards each having a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprises the steps of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the first communication device, the first signal corresponding to a product in one of the product areas; displaying, responsive to the first signal, an image of the product; removing the product from one of the product areas; and reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device.

According to yet another aspect of the present invention, in a system including a plurality of portable cards each having a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprising the steps of a first reading step of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product; generating, responsive to the first signal, a second signal containing an image of the product; displaying the second signal; a second reading step of reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device; receiving a third signal corresponding to a product; and determining a price for the product depending on whether the first signal, read in the second reading step, corresponds to the third signal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of a retail system in accordance with a first preferred embodiment of the present invention.

FIG. **2** is a drawing of a home computer in the first preferred retail system.

FIG. **3** is a plan view of a retail store in the first preferred system.

FIGS. **4A** and **4B** are another type of view of the retail store.

FIG. **5** is a drawing of portion of the display kiosk shown in FIG. **4A**.

FIGS. **6A**, **6B**, and **6C** are enlarged views of some products shown in FIGS. **4A** and **4B**.

FIG. **7A** is a plan view of one of the customer cards in the preferred system.

FIG. **7B** is a side view of the card shown in FIG. **7A**.

FIG. **7C** is an enlarged, partial view of the card shown in FIG. **7A**.

FIG. **8** is a block diagram of the customer card.

FIG. **9** is a diagram of some memory contents of one of the customer card.

FIG. **10** is a block diagram of the first preferred display kiosk shown in FIGS. **1**, **3**, and **4A**.

FIGS. **11A** and **11B** are diagrams of some data structures in the first preferred display kiosk.

FIG. **12** is a block diagram of the check-out station shown in FIG. **4B**.

FIG. **13** is a flow chart of a processing performed by the display kiosk.

FIGS. **14A** and **14B** are a flow chart showing a portion of the processing of FIG. **13** in more detail.

FIGS. **15A**, **15B**, **15C**, and **15D** are diagrams showing data paths within the display kiosk during the execution of the processing shown in FIGS. **14A** and **14B**.

FIG. **16** is a diagram of a CRT display generated by the display kiosk.

FIG. **17** is a diagram of a paper printout generated by the display kiosk.

FIG. **18** is a flow chart of a processing performed by the check-out station.

FIG. **19** is a flow chart of a processing performed by one of the customer cards.

FIG. **20** is a block diagram of a system including a market research center and multiple check-out stations.

FIG. **21** is a block diagram of a display kiosk in accordance with a second preferred embodiment of the present invention.

FIGS. **22A**, **22B**, and **22C** are diagrams of some data structures in the second preferred display kiosk shown in FIG. **21**.

FIG. **23** is a flow chart of a processing performed by the second preferred display kiosk.

FIGS. **24A** and **24B** are a flow chart showing a portion of the processing of FIG. **23** in more detail.

FIGS. **25A**, **25B**, **25C**, and **25D** are diagrams showing data paths within the display kiosk during the execution of the processing shown in FIGS. **24A** and **24B**.

FIG. **26** is a diagram of a CRT display generated by the second preferred display kiosk.

The accompanying drawings which are incorporated in and which constitute a part of this specification, illustrate embodiments of the invention and, together with the description, explain the principles of the invention, and additional advantages thereof. Throughout the drawings, corresponding parts are labeled with corresponding reference numbers.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** shows a system of distributing discount coupons to retail customers in accordance with a first preferred embodiment of the present invention. The first preferred system includes computer networks **1020**, residential homes **1025**, **1035**, and **1030**, portable cards **295**, **315**, **285**, and store **1000**. A coupon-dispensing computer within computer networks **1020** stores electronic coupons and distributes the stored coupons to the homes via telephone signal paths **180**. A computer and special processor in each of homes **1025**, **1030**, and **1035** has hardware and software for receiving a coupon from computer networks **1020** and storing the coupon on each of portable cards **295**, **315**, and **285**, respectively. Customers then bring cards **295**, **315**, and **285** to store **1000**, as shown schematically in FIG. **1**.

Store **1000** includes roof structure **1017** and display kiosk **1710** under roof structure **1017**. Roof structure **1017** includes roof section **1010**, window **1015** coupled to roof section **1010**, and roof section **1005** coupled to window **1015**. Display kiosk **1710** includes circuitry (hardware and software) for reading product identification data from a portable card and displaying information about the product identified by the data, including an image of the product and a spacial location of the product, as discussed in more detail below.

FIG. **2** shows a part of home **1035** in more detail. Home **1035** includes personal computer **2000** having keyboard **2425**, cathode ray tube (CRT) **2420**, and mouse **2423**. To receive an electronic coupon, the user establishes a telephone connection between computer **2000** and a computer within network **1020** through modem **2410**. Subsequently, the user logs onto the computer within network **1020** and reads Electronic mail sent by the coupon-dispensing computer. The customer then prints the mail message to loading device **2415**. Device **2415** receives a customer card **315**. A device driver program, executed by PC **2000**, and device **2415** act to translate the textual electronic mail message into a binary electronic coupon and write the coupon onto card **315**. In other words, device **2415** writes a product identification signal, corresponding to a selected product, onto the customer card **315**.

An invention embodied in this process of sending discount coupons to a customer card is the subject of copending U.S. application Ser. No. 08/603,482 of KEN R. POWELL for SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS, filed Feb. 20, 1996, the contents of which is herein incorporated by reference.

FIG. **3** is a plan view of store **1000**, including shelves **11**, **12**, **21**, **22**, **31**, and **32** and product areas **111**, **121**, **110**, **120**, **130**, **141**, **151**, **161**, **140**, **150**, **160**, **171**, **181**, **170**, **180**, and **190**. Customers shop in store **1000**, by removing products from the shelves and bringing the products to checkout counter **900**. When a customer visits store **1000**, a customer can insert their customer card to display kiosk **1710** to view information about information about the products identified on the card, including the appearance and location of the product.

In FIG. **3**, shelf assembly **10** includes shelf **11**, which is designated as "SHELF A" by a poster within store **1000**, and shelf **12**, designated "SHELF B" by a poster within store **1000**. Shelf assembly **20** includes shelf **21**, designated "SHELF C" by a poster with store **1000**, and shelf **22**, designated "SHELF D" by a poster within store **1000**. Shelf assembly **30** includes shelf **31**, designated "SHELF E" by a poster within store **1000**, and shelf **32**, designated "SHELF F" by a poster within store **1000**.

Shelf assembly **10** and wall **14** define an aisle **15**. Aisle **15** is designated "AISLE 1" by a poster within store **1000**. Shelf assembly **10** and shelf assembly **20** define aisle **16**. Aisle **16** is designated "AISLE 2" by a poster within store **1000**. Shelf assembly **20** and shelf assembly **30** define an aisle **24**. Aisle **24** is designated "AISLE 3" by a poster within store **1000**. Shelf assembly **30** and checkout counter **900** define an aisle **34**. Aisle **34** is designated "AISLE 4" by a poster within store **1000**.

FIGS. **4A** and **4B** show another view of store **1000** in accordance with a first preferred embodiment of the present invention. FIGS. **4A** and FIG. **4B** are each a partial view of store **1000**. Customers **210**, **220**, **230**, **240**, **250**, **270**, **280**, and **290**, shop in store **1000**.

Store **1000** includes shelve assemblies **10**, **20**, and **30**, defining aisles between the shelves. Store **1000** has a plurality of product areas, each corresponding to a respective product. Product Area **110** has Acme brand ammonia. Product Area **120** has Old World brand pasta. Product Area **130** has Lighthouse brand light bulbs.

In FIGS. **4A** and **4B**, poster **9** contains the text SHELF B, allowing the customers to identify the shelf containing product areas **110**, **160**, and **130** as shelf B. Poster **19** contains the text SHELF D, allowing the customers to

identify the shelf containing the product areas **140, 150,** and **120** as shelf D. Poster **29** contains the text SHELF F, allowing the customers to identify the shelf containing product areas **170, 180,** and **190** as shelf F. Similarly, other posters (not shown) identify other shelves and aisles within store **1000.**

Because of the large number of coupons that may be available to a customer, from either in the store or outside the store, a customer such as customer **310** may wish to present their card **315** to display kiosk **1710.** Kiosk **1710** has circuitry for displaying information about the coupons loaded onto the card, including the product and discount amount of the coupon. Kiosk **1710** also has circuitry for displaying information about the products corresponding to the coupons loaded onto the card, including a verbal description of the product, an image of the product, and a spacial location of the product. Kiosk **1710** has circuitry to display information on paper **1719,** using printer **1718,** or on cathode ray tube (CRT) **1717.**

FIG. **5** shows a section of display kiosk **1710** in more detail. Interface slot **1715** has a width sufficient to accommodate the width of one of the customer cards. When a customer card is in interface slot **1715,** conductive contact **1777** inside interface slot **1715** touches contact **7427** (shown in FIG. 7C) on a customer card. Interface slot **1715** has other contacts (not shown) for touching the other card contacts **7420** (shown in FIG. 7C). The operation of station **1710** will be discussed in more detail below.

FIG. **6**A shows an enlarged view of some of the bottles of ammonia **112.** Each bottle of ammonia has a common Universal Product Code (UPC) label **114,** which is a group of parallel lines that encodes a number (7170312780) that uniquely identifies acme ammonia. In other words, label **114** is different than labels of units of other products. Each bottle of ammonia **112** also has a common character label **113** that verbally describes the product. Character label **113** is "ACME AMMONIA." Label **113** is different than labels of units of other products.

Product Area **120** has boxes of pasta **122** grouped together on multiple shelves. Boxes of pasta **120** are contiguously grouped, meaning that no other product is between any two boxes of pasta **120.** No other product is between product station **125** and boxes of pasta **122.** Product Station **125** is on a shelf under some of the boxes **122.** In other words, station **125** is adjacent to boxes **122** and supported by a shelf in vertical alignment with some of the boxes **122.**

FIG. **6**B shows an enlarged view of some of the boxes of pasta **122.** Each box of pasta **122** has a common Universal Product Code (UPC) label **124,** which is a group of parallel lines that encodes a number (7170312682) that uniquely identifies Old World pasta. In other words, label **124** is different than labels of units of other products. Each box of pasta **122** also has a common character label **123** that verbally describes the product. Character label **123** is "OLD WORLD PASTA." Label **123** is different than labels of units of other products.

Product Area **130** has boxes of light bulbs **132** grouped together on multiple shelves. Boxes of light bulbs **132** are contiguously grouped, meaning that no other product is between two boxes of light bulbs **132.** No other product is between product station **135** and boxes of light bulbs **132.** Product Station **135** is on a shelf under some of the boxes **132.** In other words, station **135** is adjacent to boxes **132** and supported by a shelf in vertical alignment with some of the boxes **132.**

FIG. **6**C shows an enlarged view of some of the boxes of light bulbs **132.** Each box of light bulbs **132** has a common Universal Product Code (UPC) label **134,** which is a group of parallel lines that encodes a number (7170312350) that uniquely identifies Lighthouse light bulbs. In other words, label **134** is different than labels of other products. Each box **132** also has a common character label **133** that verbally describes the product. Character label **133** is "LIGHTHOUSE LIGHT BULBS." Label **133** is different than labels of other products.

Similarly, other product area in the store each have a set of respective products contiguously grouped together. The respective units of a certain product have a common label, different than labels on units of other products, that uniquely identifies the certain product. Product area **140** has bottles of ketchup **142** contiguously grouped together. Product area **160** has loaves of bread **162** contiguously grouped together. Product area **170** has cartons of milk **172** contiguously grouped together. Product area **180** has packages of bacon **182.** Product area of **190** has packages of butter **192** contiguously grouped together. Product area **111** (FIG. **3**) has boxes of paper towels contiguously grouped together. Product area **121** has rolls of paper towel contiguously grouped together. Product area **141** has boxes of crackers contiguously grouped together. Product area **151** has canned fruit contiguously grouped together. Product area **161** has canned vegetables contiguously grouped together. Product area **171** has cans of meat contiguously grouped together. Product area **181** has boxes of flour contiguously grouped together.

An overview of processing performed by the customers and hardware will now be described. Before shopping in the store, each of these customers obtained a customer card. For example, customer **230** obtained customer card **235** from a bank, by completing an application for the bank. The application contained questions to collect demographic data, including birth date, income level, past buying patterns, geographic location, size of family, level of education, and job-related data. The bank subsequently wrote customer identification data for customer **230** onto customer card **235,** and issued customer card **235** to customer **230,** and sent the customer's demographic data to a marketing research center which then stored the demographic data on disk. Each of customers **210, 220, 240, 250, 270, 280,** and **290** obtains a respective customer card in a similar manner. In other words, for each customer the preferred method writes demographic data for the customer onto a disk in market research center, and writes personal identification data for the customer onto a respective card for the customer.

After redemption data, including customer identification data from a plurality of cards, is compiled and sent to a marketing research center, as described below, the customer identification data is used to access the corresponding demographic data, thereby providing the manufacturer with valuable marketing data on coupon program effectiveness and customer demographics.

A customer may start shopping with a card already loaded with electronic coupons. For example, the store may preload new cards as an incentive for completing and submitting a check cashing application. Further, the customer may have a device at home, such as computer **2000** shown in FIG. **2,** for depositing coupons onto the card. Thus, a customer may arrive at store **1000** with coupons already on the card.

While shopping in store **1000,** each of customers **210, 220, 230, 240, 250, 270, 280,** and **290** carries his or her respective customer card. Customer **210** carries card **215,** customer **220** carries card **225,** customer **230** carries card **235,** customer **240** carries card **245,** customer **250** carries card **255,** customer **270** carries card **275,** customer **280**

carries card **285**, and customer **290** carries card **295**. Each customer tows a shopping cart to hold selected products. Customer **210** tows cart **212**, customer **220** tows cart **222**, customer **230** tow cart **232**, customer **240** tows cart **242**, customer **250** tows cart **252**, customer **270** tows cart **272**, customer **280** tows cart **282**, and customer **290** tows care **292**. Each customer removes one or more desired products from a shelf and places the removed product into her cart.

Upon completion of shopping, the customer brings selected products from shelves **10**, **20**, and **30** to checkout counter **900**. The customer redeems the electronic coupons at the checkout area, by inserting her customer card into checkout station **915**. For example, a customer such as customer **290** in FIG. **4B** completes the purchase of her selected products **293** by transferring products **293** from her cart **292** to counter **900**, and by inserting card **295** into checkout station **915**. Subsequently, a checkout clerk (not shown) scans each selected product past UPC bar code reader **910**. Bar code reader **910** is an optical detector. In other words, bar code reader **910** detects an electromagnetic signal. A processor coupled to station **915** and reader **910** determines whether the most recently scanned product is on a discount list stored in card **295**. If the most recently scanned product is identified in this discount list, a price for the product is determined using the discount data corresponding to the product, and the resulting price is displayed on display **917**. Checkout counter **900** scans and processes each product **293** in a similar manner.

Similarly customer **280** in FIG. **4B** will complete the purchase of her selected products **283** by transferring products **283** from her cart **282** to counter **900**, and by inserting card **285** into checkout station **915**; and the checkout clerk (not shown) will scan each selected product **283** past UPC bar code reader **910**. Customer **270** will complete the purchase of her selected products **273** by transferring products **273** from her cart **272** to counter **900**, and by inserting card **275** into checkout station **915**; and the checkout clerk (not shown) will scan each selected product **273** past UPC bar code reader **910**.

Periodically, checkout counter **900** sends redemption data to an electronic clearing house. The redemption data sent to the clearing house includes the identification of the store, identification of the coupons redeemed and of respective quantities of coupon redemptions. Periodically, checkout counter **900** sends redemption data to a market research center. The redemption data sent to the research center includes the identification of the store and of the customers who presented electronic coupons for redemption.

The preferred system and method will now be described in more detail.

FIG. **7A** shows a plan view of customer card **215** carried by customers **210**, and FIG. **7B** shows a side view of card **215**. Card **215** is 8.5 cm by 5.4 cm, the length and width of a typical financial credit card. Card **215** is slightly thicker than a typical financial credit card. Card **215** includes a magnetic stripe **7410**, interface contacts **7420** for communication with the product stations and the checkout station, and embossed area **7430** for displaying the card owner's name. Magnetic stripe **7410** allows a conventional credit card stripe reader to read basic data from the card. Magnetic stripe **7410** is not necessary to the operation of the preferred embodiment of the invention, described in more detail below.

FIG. **7C** shows interface contacts **7420** in more detail. Interface contacts **7420** are configured in accordance with ISO7816-2: 1988(E), Identification cards—Integrated circuit(s) cards with contact—Part 2: Dimensions and locations of the contacts, promulgated by the International Organization for Standardization (ISO), and available from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, N.Y. 10036. According to ISO 7816-2, contact **7421** is assigned to VCC (supply voltage), contact **7422** is assigned to RST (reset signal), contact **7423** is assigned to CLK (clock signal), contact **7424** is reserved for future use, contact **7425** is assigned to GND (ground), contact **7426** is assigned to VPP (program and voltage), contact **7427** is assigned to I/O (data input/output), and contact **7428** is reserved for future use. Card **215** communicates with the product stations and the checkout stations through contact **7427** using a half duplex scheme, meaning that contact **7427** is for communicating data signals either to or from the card.

FIG. **8** is a block diagram of customer card **215**, including central processing unit **8450**, memory **8460**, and battery **8470** for supplying power to interface **8425**, processor **8450**, and memory **8460**. Memory **8460** is a random access, addressable device. Station interface **8425** includes a serial to parallel converter for transferring data signals between contact **8427** and CPU **8450** over parallel bus **8452**. Memory **8460** stores a program **8465** executed by processor **8450**, customer identification data **8467**, and authorization data **8468**. Customer identification data **8467** includes a sequence of digits that uniquely identifies the holder of the card. Customer identification data **8467** includes the card holder's social security number. For example, identification data **8467** in customer card **235** uniquely identifies customer **230**. Authorization data **8468** includes a sequence of digits that includes a code identifying the store or stores in which the card may be used to obtain a paperless coupon. Authorization data **8468** also includes date data indicating an expiration date for the card. Depending on the card holder's contractual relationship with the card issuer, the card issuer may periodically update this date data to renew the card when the current date data indicates the card is expired. Store authorization data **8468** also contains a field identifying that the card is a customer card (rather than a programming card, which is described below).

Memory **8460** also stores product data received from one or more coupon dispensing devices. This product data includes a list of product discounts **8435**. When a customer inserts a customer card into a coupon dispensing device, processor **8450** receives an identification code for the product from the device and adds the code to the list.

FIG. **9** shows some the contents list **8435** starting at location **30** of memory **8460** of customer card **215**. An electronic coupon is represented by three rows in list **8435**: a 10 digit UPC product code in the first row, discount format data in the second row ("1" signifying cents, "2" signifying percentage), and discount quantity data in the third row. In FIG. **9**, the customer card is storing three electronic coupons, reflecting the fact that customer **210** has received electronic coupons from devices either before or during her current visit to store **1000**. In list **8435**, the memory field having the product code 7170312682 corresponds to the UPC code on boxes of Old World Pasta **124**. The next memory field stores the format of the discount quantity data, with "1" signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, **150**, signifying that the discount being offered for Old World Pasta **124** is $1.50. The memory field having the product code 7170312350 corresponds to the UPC code on boxes of Lighthouse Light Bulbs **134**. The next memory field stores the format of the discount quantity data, with "1" signifying

cents. The next memory field stores the discount quantity data, **200**, signifying that the discount being offered for Lighthouse Light Bulbs **134** is $2.00. The memory field having the product code 7170312780 corresponds to the UPC code on ammonia bottles **112**. The next memory field stores the format of the discount quantity data, with "1" signifying cents. The next memory field stores the discount quantity data, **50**, signifying that the discount being offered for ammonia bottles **112** is 50 cents.

Each customer cards has the same hardware structure as customer card **215**.

Programming card **55** has the same hardware structure as customer card **215**. An invention embodied in programming card **55** is the subject of copending application of KEN R. POWELL for DEVICE AND METHOD OF PROGRAMMING A RETAIL SYSTEM, Ser. No. 08/468,820, filed on Jun. 6, 1995, the contents of which is herein incorporated by reference. The product stations are the subject of copending application of KEN R. POWELL for RETAIL SYSTEM, Ser. No. 08/468,816, filed on Jun. 6, 1995, now U.S. Pat. No. 5,727,153 for RETAIL STORE HAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is herein incorporated by reference.

FIG. **10** is a block diagram of display kiosk **1710** shown in FIGS. **1**, **3**, and **4A**. Magnetic disk drive **1725** provides storage of programs and of product data. The product data stored on disk **1725** includes product name data and product location data. Optical disk drive **1735** contains a CD-ROM (Compact Disk-Read Only Memory) disk that stores product image data. The contents of CD-ROM **1737** tend to remain current for at least several months, since the packaging of a product corresponding to a certain UPC code tends to remain constant over time. Preferably, CD-ROM **1737** can be obtained from a national supplier.

CRT display **1717** is 1024 pixel rows by 1280 pixel columns. Video ram **1735** has 1024×1280 locations, a location for each pixel on display **1717**. CRT controller **1737** has circuitry to read video ram **1735** to generate and send signals to CRT **1717**. Thus, the address of a pixel in video ram **1735** determines the location of the pixel on display **1717**.

CPU **1750** executes program **1722**, in random access, addressable memory **1720**, to display information reflecting the contents of a customer card. CPU **1750** displays the information on CRT display **1717**, by writing pixel data into video RAM **1735**. CRT controller **1737** reads the pixel data from RAM **1737** to send video signals to CRT **1717**.

FIGS. **11A** and **11B** show some data structures within display kiosk **1710**. Structure **11100** includes image data for displaying an image of products corresponding to coupons on a customer card. Structure **11100** normally resides on CD-ROM **1737**. Structure **11100** includes UPC table **11110**, which is a list of entries sorted by UPC code. Each entry in table **11110** includes three fields. A first field is a UPC code; a second field is an action code, described in more detail below; and a third field is a pointer to video data **11120** for the product identified by the UPC code. Video data **11120** is a group of records each containing pixel data for a respective product. CPU **1750** uses the pointer, in the third field of an entry in table **11100**, to access a selected record of pixel data **11120**.

During processing by CPU **1750**, various parts of data structure **11100** may be automatically brought into memory **1720** with a virtual memory mapping, as is well known in the art.

Data structure **11200** stores product location information. In contrast to data structure **11100**, data structure **11200** tends to contain product information that is specific to store **1000**. Data structure **11200** normally resides on disk **1725**. Data structure **11200** includes table **11210**, which is a list of entries sorted by UPC code. Structure **11200** also includes spacial location data **11200**, which is a group of records each containing ASCII (American Standard Code for Information Interchange) text identifying the spatial location of a respective product. Each entry in table **11210** includes a UPC code in a first field, an action code in a second field, and a pointer to a selected location data record **11220** in a third field. CPU **1750** uses the pointer to access a selected record of location information.

Thus, memory **1720**, magnetic disk **1725**, and optical disk drive **1735**, together act to store product image and product location information.

CPU **1750** brings various parts of data structure **11200** into memory **1720**, using a virtual memory mapping scheme.

Data structure **11300** includes table **11310** and supplementary product data **11320**. Data structure **11300** normally resides on disk **1725**. Supplementary product data contains ASCII text providing additional information about products in the store. As shown in data structure **11300**, supplementary product record **11325** provides information about a product different from the product identified in the corresponding entry in table **11310**.

FIG. **12** is a block diagram of checkout counter **900** shown in FIG. **4B**. Disk **925** provides long term storage. CPU **950** executes instructions in random access, addressable memory **920**.

CPU **950** and program **922** act to detect a product scanned by UPC reader **910**, determine a reference price for the product, search for the product's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card memory. CPU **950** then displays the price of the product on display **917**. CPU **950** writes coupon redemption data onto disk **925**. Periodically, CPU **950** sends marketing redemption data to a market research center through modem **930**. Periodically, CPU **950** also sends clearing house redemption data to a clearing house through modem **930**.

FIG. **13** shows a processing performed by CPU **1750** and program **1722** in display kiosk **1710**, when a customer inserts a card into card interface **1715**. When a customer, such as customer **310**, inserts customer card **315** into interface slot **1715**, a switch (not shown) in interface slot **1715** alerts CPU **1750** that a card has been inserted into the slot. When a customer card is in interface slot **1715**, conductive contacts (not shown) inside interface slot **1715** touch each card contact **7420**. Subsequently, CPU **1750** causes card interface **1725** to reset the card by applying a clock signal to card contact **7423**. The customer card then answers the reset by sending a block of data, including identification data **8467** and authorization data **8468**, through card contact **7427**. CPU **1750** then receives the answer-to-reset from the card (step **13002**). CPU **1750** then sends a data block containing a station-type code indicating a display kiosk (step **13004**). CPU **1750** then receives the contents of table **8435** in memory **8460** of the customer card, and temporarily stores these table contents in memory **1720** of the display kiosk (step **13005**). CPU **1750** selects the first entry in table **8435** (step **13010**). CPU **1750** displays product and price information for the presently selected entry on display **1717**. (Step **13040**). If there are entries remaining (step **13042**),

CPU **1750** selects the next entry in table **8435** (step **13045**) and processing proceeds to step **13040**. If there are no entities remaining (step **13042**), there is no further processing shown in FIG. **13**.

Steps **13040**, **13042**, and **13045** may execute repeatedly without manual intervention. For example, step **13040** may pause for 10 seconds before control passes to the next step. Alternatively, step **13040** may pause until the user presses a button entitled DISPLAY NEXT COUPON (not shown) on station **1710**.

The communication protocol between display kiosk **1710** and a customer card is described in more detail in ISO/IEC 7816-3: 1989 (E), Identification cards—Integrated circuit(s) cards with contacts—Part 3: Electronic signals and transmission protocols; and ISO/IEC 7816-3: 1989/Amd.1: 1992 (E), Part 3: Electronic signals and transmission protocols, AMENDMENT 1: Protocol type T=1, synchronous half duplex block transmission protocol. Both of these standards are promulgated by the International Organization for Standardization (ISO) and distributed by the American National Standards Institute (ANSI).

FIGS. **14A** and **14B** show the processing of step **13040** of FIG. **13** in more detail. To display an entry in table **8435**, CPU **1750** searches for the entry's UPC code in image data index **11110**. (step **14005**). If CPU **1750** finds the UPC code in the image index (step **14030**), CPU **1750** determines whether the second field of the found entry is equal to 1(step **14040**). If the second field is equal to 1, CPU **1750** uses the third field as a pointer to an image data record **11120** and sends this selected record to video RAM **1735** (step **14050**). If CPU **1750** does not find the UPC code in the image index (step **14030**) or determines that the second field of the found entry is not equal to 1 (step **14040**), CPU **1750** skips step **14050**.

CPU **1750** then reads discount information **8435** from the customer card, translates the binary-encoded numerical discount data into character data, translates the character data into graphics data, and sends the graphics data to video RAM **1735** (step **14055**).

Next, CPU **1750** searches the product location index **11210** (step **14060**) and if the UPC code is found in the location index (step **14065**), and the second field of the found entry is 1 (step **14070**), CPU **1750** uses the third field of the found entry to point to a selected record of location text **11220**. CPU **1750** translates this location text to pixel data and sends the pixel data to video RAM **1735**. (step **14075**). If the UPC code is not found in the location index (step **14065**) or the second field of the found entry is not equal to 1 (step **14070**), CPU **1750** skips step **14075**.

CPU **1750** then searches for the UPC code in related product index **11310** (step **14080**) and if the UPC code is found (step **14085**), CPU **1750** reads the second field of the found entry (step **14090**) and if the second field is equal to 1, CPU **1750** uses the third field as a pointer to text describing the related product, translates the text to pixel data and sends the pixel data to video RAM **1735** (step **14095**). If the UPC code is not found or if the second field of the found entry is not equal to 1 (step **14090**), CPU **1750** skips step **14095**.

CRT controller **1737** reads video RAM **1735** to generate and send display signals to CRT **1717** (step **14100**).

In other words, data structure **11100** stores a certain type of product information (product image data), and data structure **11200** stores two other types of product information (a verbal description of the product and a location of the product). CPU **1750** reads a coupon from the memory of a card, in response to a person inserting the card into slot **1715**, and generates, responsive to the coupon, a display signal. CPU **1750** generates the display signal by using the UPC code in the read coupon to access data structure **11100**, and by using the UPC code in the read coupon to access data structure **11200**.

FIGS. **15A**, **15B**, **15C**, and **15D** show data flows within display kiosk **1710** during the processing of the method shown in FIGS. **14A** and **14B**. FIG. **15A** shows a data flow during the processing of step **14050**. CPU **1750** and program **1722** read a selected record of product image data **11120** and sends data **11120** to data port **1742** of video RAM **1735**. CPU **1750** and program **1722** also send an address to address port **1740**, to determine where pixels will be displayed on display **1717**. As shown in FIG. **15A**, the first four digits of the address signal specify the row on display **1717** and the last four digits specify the column on display **1717**. Product image data **11120** is displayed beginning at row 0200, column 0250.

FIG. **15B** shows a data flow within display kiosk **1710** when CPU **1750** executes step **14055**. CPU **1750** and program **1722** read binary-encoded discount data **8435** from a customer card, translate the discount data to pixel data, and send the pixel data to data port **1742** of video RAM **1735**. CPU **1750** and program **1722** also send an address signal **01000100** to address port **1740**, to display the discount data beginning at row 100, column 100.

FIG. **15C** shows a data flow within display kiosk **1710** when CPU **1750** executes step **14075**. CPU **1750** and program **1722** read a selected record of ASCII location data **11220**, translate the ASCII data to pixel data, and send the pixel data port **1742** of video RAM **1735**. CPU **1750** and program **1722** also send an address signal **01000640** to address port **1740**, to display the location data beginning at row 100, column 640.

FIG. **15D** shows a data flow within display kiosk **1710** when CPU **1750** executes step **14095**. CPU **1750** and program **1722** read a selected record of ASCII related product data **11320**, translate the ASCII data to pixel data, and send the pixel data port **1742** of video RAM **1735**. CPU **1750** and program **1722** also send an address signal **07500640** to address port **1740**, to display the related product data beginning at row 750, column 640.

FIG. **16** shows a view of the CRT display **1717** after CPU **1750** performs the processing of FIGS. **14A** and **14B**. Pixel **16005** has coordinates (200, 250), meaning that pixel **16005** is in the row 200, column 250 of CRT display **1717**. Pixel **16005** is the upper left of a display region for product image data. Pixel **16010**, having coordinates (100, 100), is the upper left of a display region for coupon discount information. Pixel **16015**, having coordinates (100, 640), is the upper left of a display region for product location information. Pixel **16020**, having coordinates (750, 640), is the upper left of a display region for related product information.

Because the processing of FIGS. **14A** and **14B** writes the image of the product to video ram **1735** first, and then writes other data, the other data will overwrite some of the image data in video ram **1735**. Thus, the other data will appear superimposed over the product image, as shown in FIG. **16**.

FIG. **17** shows the result of another processing mode of display kiosk **1710**. Display kiosk **1710** uses printer **1752** to print a shopping list onto paper **1754**.

FIG. **18** shows a processing performed by CPU **950** and program **922** in checkout counter **900**, when a customer checks out of store **1000**. When a customer, such as cus-

tomer **290**, inserts customer card **295** into interface slot **914**, a switch (not shown) in interface slot **914** alerts CPU **950** that a card has been inserted into the slot. When a customer card is in interface slot **914**, conductive contacts (not shown) inside interface slot **914** touch each card contact **7420**. Subsequently, CPU **950** causes card interface **925** to reset the card by applying a clock signal to card contact **7423**. (If the card is a customer card, the card then answers the reset by sending a block of data, including identification data **8467** and authorization data **8468**, through card contact **7427**.) CPU **950** then receives the answer-to-reset from the card (step **18002**). CPU **950** then sends a data block containing a station-type code indicating a checkout station (step **18004**). CPU **950** then receives the contents of table **8435** in memory **8460** of the customer card, and temporarily stores these table contents in memory **920** of the checkout station (step **18005**). During step **18005**, CPU **950** also causes customer card **295** to remove all entries from list **8435**, so that the electronic coupons in the list cannot be redeemed again. When the checkout clerk (not shown) moves a product past UPC reader **910**, UPC reader **910** detects the UPC code on the product and sends the UPC code to CPU **750** (step **18010**). CPU **950** searches the received table contents to determine whether the product scanned is identified in the table (step **18020**). If the product is in the received table, CPU **950** subtracts the discount, as determined by the discount data stored in the received table, from a product reference price read from disk **925** (step **18030**), and displays the resulting price of the product on display **917** (step **18040**). If the product is not in the received table (step **18020**), CPU **950** skips step **18030**. If there are products remaining (step **18042**), processing proceeds to step **18010**. If there are no products remaining (step **18042**), the total price is displayed (step **18044**).

Product data, customer identification data **8467**, authorization data **8468**, and the data in list **8435** are each a type of signal.

In summary, after UPC barcode reader **910** scans a product, processor **950** determines eligibility for a discount. If a product qualifies, processor **950** displays the discounted price on display **917**.

FIG. **19** shows a processing performed by one of the customer cards, such as customer card **215**, in the preferred retail system. After the card is reset through contacts **2420**, the customer card sends an "answer to reset" data block in accordance with the ISO standard ISO/ICE 7816-3: 1989 (E), cited above. The customer card sends identification data **8467** and authorization data **8468** in the answer-to-reset data block (step **19010**). If the station then sends a block of data to the customer card, the customer card then receives the block of data through contact **7427** (step **19015**). If the block contains a station-type code indicating a product station (step **19020**), the customer card then adds product coupon information, from a certain location in the block, to the list **8435** (step **19030**). If the block does not contain a station-type code indicating a product station (step **19020**), processing proceeds to step **19070**.

If the customer card is not eligible, the station will not send a block of data, step **19015** therefore does not execute, and processing ceases until the customer card is reinserted into a station, at which time the station will reset the card and processing will restart at step **19010**.

Alternatively, if the block contains a station-type code indicating a display kiosk (step **19070**), the customer card then sends list **8435** to the display kiosk (step **19080**). In other words, CPU reads list **8435** from memory **8460**, in response to a customer inserting card **215** into display kiosk **710**, and sends a signal corresponding to the list **8435** to the display kiosk (step **19080**).

Alternatively, if the block contains a station-type code indicating a Checkout station (step **19090**), the customer card then sends list **8435** to the display kiosk (step **19010**). In other words, CPU **2450** reads list **8435** from memory **8460**, in response to a customer inserting card **215** into checkout station **915**, and sends a signal corresponding to the list **8435** to the checkout station (step **19100**).

FIG. **20** shows a block diagram of a preferred retail system including marketing research center **990**, with disk **995**, CPU **950**, and memory **920**. FIG. **20** also shows a plurality of checkout stations **900**. Periodically, each checkout station **900** sends a block of data summarizing the redemption transactions. The checkout stations send the data blocks, over telephone lines **941**, to research center **990**. Checkout stations **903** are located within a single company. Checkout stations **903** are similar to checkout stations **900**, described above, except that checkout stations **903** have circuitry for communicating over network **912**. Checkout stations **903** send transaction data blocks to central financial computer **911** located within the company. Central financial computer **911** periodically sends the compiled transaction data to market research center **990**, over telephone lines **941**. Central financial computer **911** also periodically sends clearing house redemption data to an electronic clearing house (not shown), over telephone lines **941**.

FIG. **21–26** show a second preferred embodiment of the present invention. The second preferred system has features similar to those of the first preferred system, with additional features described below. In the follow description, elements of the second preferred system corresponding to elements of the first preferred system are labelled with corresponding reference numbers.

FIG. **21** is a block diagram of display kiosk **21710**. CPU **1750** executes program **21722**, in random access, addressable memory **1720**, to display product information reflecting the contents of a customer card. CPU **1750** displays the product information on CRT display **1717**, by writing pixel data into video RAM **1735**. CRT controller **1737** reads the pixel data from RAM **1737** to send video signals to CRT **1717**.

FIGS. **22A**, **22B**, and **22C** show some data structures within the second preferred display kiosk **21710**. Structures **11100** and **11200** in FIG. **22A** and **11300** in FIG. **22B** are described above in connection with the first preferred display kiosk.

In FIG. **22B** Structure **22400** contains image data for displaying a map for indicating the spacial location of products corresponding to coupons on a customer card. Structure **22400** normally resides on disk **1725**. Structure **22400** includes UPC table **22410**, which is a list of entries sorted by UPC code. Each entry in table **22410** includes three fields. A first field is a UPC code; a second field is an action code, described in more detail below; and a third field is a pointer to pixel data for a certain map.

Structure **22400** also includes video data **22420**, which is a group of records each containing pixel data for a respective map. CPU **1750** uses the pointer, in the third field of an entry in table **22410**, to access a selected record of pixel data **22420**. In FIG. **22B**, multiple pointers point to a common map, the map for the ground floor of store **1000**, because the location of multiple products can be indicated on this common map. Another pointer points to a map for the basement floor of store **1000**, because the product corre-

sponding to this pointer is located in the basement of store **1000**. Another pointer points to a road map indicating the location of a store **1500** (not shown), because the product corresponding to this other pointer is located in store **1500**.

In FIG. **22**C, table **22510** stores coordinate for displaying a map location of products corresponding to coupons on a customer card. Table **22510** normally resides on disk **1725**. Each entry in table **22410** includes four memory fields. A first field is a UPC code, a second field is an action code, a third field is a Y coordinate in the form of a pixel row number for displaying the location of a product, and a fourth field is an X coordinate in the form of a pixel column number for displaying the location of the product.

FIG. **23** shows a processing performed by CPU **1750** and program **1722** in display kiosk **1710**, when a customer inserts a card into card interface **1715**. When a customer, such as customer **310**, inserts customer card **315** into interface slot **1715**, a switch (not shown) in interface slot **1715** alerts CPU **1750** that a card has been inserted into the slot. When a customer card is in interface slot **1715**, conductive contacts (not shown) inside interface slot **1715** touch each card contact **7420**. Subsequently, CPU **1750** causes card interface **1725** to reset the card by applying a clock signal to card contact **7423**. The customer card then answers the reset by sending a block of data, including identification data **8467** and authorization data **8468**, through card contact **7427**. CPU **1750** then receives the answer-to-reset from the card (step **23002**). CPU **1750** then sends a data block containing a station-type code indicating a display kiosk (step **23004**). CPU **1750** then receives the contents of table **8435** in memory **8460** of the customer card, and temporarily stores these table contents in memory **1720** of the display kiosk (step **23005**). CPU **1750** selects the first entry in table **8435** (step **23010**). CPU **1750** displays product and price information for the presently selected entry on display **1717**. (Step **23040**). If there are entries remaining (step **23042**), CPU **1750** selects the next entry in table **8435** (step **23045**) and processing proceeds to step **23040**. If there are no entries remaining (step **23042**), there is no further processing shown in FIG. **23**.

Steps **23040**, **23042**, and **23045** may execute repeatedly without manual intervention. For example, step **23040** may pause for 10 seconds before control passes to the next step. Alternatively, step **23040** may pause until the user presses a button entitled DISPLAY NEXT COUPON (not shown) on station **21710**.

FIGS. **24**A and **24**B show the processing of step **23040** of FIG. **23** in more detail. To display information for an entry in table **8435**, CPU **1750** searches for the entry's UPC code in map image index **22410**. (step **24005**). If CPU **1750** finds the UPC code in map image index **22410** (step **24030**), CPU **1750** determines whether the second field of the found entry is equal to 1 (step **24040**). If the second field is equal to 1, CPU **1750** uses the third field as a pointer to a map image record **22420** and sends this selected record to video RAM **1735** (step **24050**). If CPU **1750** does not find the UPC code in map image index **22410** (step **24030**) or determines that the second field of the found entry is not equal to 1 (step **24040**), CPU **1750** skips step **24050**.

CPU **1750** then reads discount information **8435** from the customer card, translates the binary-encoded numerical discount data into character data, translates the character data into graphics data, and sends the graphics data to video RAM **1735** (step **24055**).

Next, CPU **1750** searches the product location index **11210** (step **24060**) and if the UPC code is found in the location index (step **24065**), and the second field of the found entry is 1 (step **24070**), CPU **1750** uses the third field of the found entry to point to a selected record of location text **11220**. CPU **1750** translates this location text to pixel data and sends the pixel data to video RAM **1735**. (step **24075**). If the UPC code is not found in the location index (step **24065**) or the second field of the found entry is not 1 (step **24070**), CPU **1750** skips step **24075**.

Next, CPU **1750** searches the product coordinate table **22510** (step **24080**) and if the UPC code is found in the location index (step **24085**), and the second field of the found entry is 1 (step **24090**), CPU **1750** uses the third and fourth fields to generate an address signal for video ram **1735**. CPU **1750** generates a data signal for video ram **1735** to display a block cursor at a location on CRT **1717** corresponding to the location of the product (step **24095**). If the UPC code is not found in the location index (step **24085**) or the second field of the found entry is not 1 (step **24090**), CPU **1750** skips step **24095**.

CRT controller **1737** reads video RAM **1735** to generate and send display signals to CRT **1717** (step **24100**).

FIGS. **25**A, **25**B, **25**C, and **25**D show data flows within display kiosk **1710** during the processing of the method shown in FIGS. **24**A and **24**B. FIG. **25**A shows a data flow during the processing of step **24050**. CPU **1750** and program **21722** read a selected record of map image data **22420** and sends data **22420** to data port **1742** of video RAM **1735**. CPU **1750** and program **21722** also send an address to address port **1740**, to determine where pixels will be displayed on display **1717**. As shown in FIG. **25**A, the first four digits of the address signal specify the row on display **1717** and the last four digits specify the column on display **1717**. Map image data **22420** is displayed beginning at row 0100, column 0100.

FIG. **25**B shows a data flow within display kiosk **21710** when CPU **1750** executes step **24055**. CPU **1750** and program **21722** read binary-encoded discount data **8435** from a customer card, translate the discount data to pixel data, and send the pixel data to data port **1742** of video RAM **1735**. CPU **1750** and program **21722** also send an address signal **09000100** to address port **1740**, to display the discount data beginning at row 900, column 100.

FIG. **25**C shows a data flow within display kiosk **21710** when CPU **1750** executes step **24075**. CPU **21750** and program **21722** read a selected record of ASCII location data **11220**, translate the ASCII data to pixel data, and send the pixel data port **1742** of video RAM **1735**. CPU **1750** and program **21722** also send an address signal **09500100** to address port **1740**, to display the location text beginning at row 950, column 100.

FIG. **25**D shows a data flow within display kiosk **1710** when CPU **1750** executes step **24095**. CPU **1750** and program **21722** read a the third and fourth fields of an entry in coordinate table **22510** to generate an address signal for address port **1740**. CPU **1750** and program **21722** generate a data signal for data port **1742** to generate a block cursor at a CRT display location corresponding to the address signal.

FIG. **26** shows a view of the CRT display **1717** after CPU **1750** performs the processing of FIGS. **24**A and **24**B. Pixel **26005** has coordinates (100, 100), meaning that pixel **26005** is in the row 100, column 100 of CRT display **1717**. Pixel **26005** is the upper left of a display region for map image data. Pixel **26010**, having coordinates (900, 100), is the upper left of a display region for coupon discount information. Pixel **26015**, having coordinates (950, 100), is the upper left of a display region for product location informa-

tion. Pixel **26025**, having coordinates (400,950), is the upper left of a display region for the block cursor when the block cursor is identifying the spacial location of Old World Pasta.

Thus, the preferred systems provide a convenient and stimulating shopping environment that allows the user to conveniently review the coupons stored on a customer card.

Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or the scope of Applicants' general inventive concept. The invention is defined in the following claims.

What is claimed is:

1. In a system including a communication device and a plurality of portable cards each having a memory, a method of operating the system comprising the steps of:

reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product;

generating, responsive to the first signal, a second signal containing an image of the product; and

displaying the second signal.

2. The method of claim **1** further including

receiving a third signal corresponding to a product; and

determining a price for the product depending on whether the first signal corresponds to the third signal.

3. The method of claim **1** wherein the system includes a cathode ray tube (CRT), and displaying step includes

displaying the second signal on the CRT.

4. The method of claim **1** wherein the system includes a printer for printing on a substrate, and wherein the displaying step includes

printing, using the printer, the second signal on the substrate.

5. The method of claim **1** wherein the reading step includes reading a first signal corresponding to pricing information for a product.

6. The method of claim **1** wherein the system further includes an electronic display, and the displaying step includes

displaying the second signal on the electronic display.

7. The method of claim **1** wherein the displaying step includes displaying other information about the product with the image of the product.

8. The method of claim **1** wherein the displaying step includes displaying a verbal description of the product with the image of the product.

9. The method of claim **1** wherein the displaying step includes displaying a location of the product with the image of the product.

10. The method of claim **1** wherein the displaying step includes displaying pricing information for the product with the image of the product.

11. A retail system comprising:

a plurality of portable cards each having a card memory;

a communication device;

first memory for storing a signal containing an image of a product;

a reader that reads a first signal from the card memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product;

a generator for accessing the first memory, using the first signal, to generate a second signal; and

a display for displaying the second signal.

12. The system of claim **11** wherein each portable card includes a card memory for storing a first signal corresponding to pricing information for a product.

13. The system of claim **11** further including

a receiver means for receiving a third signal corresponding to a product; and

a determiner means for determining a price for the product depending on whether the first signal corresponds to the third signal.

14. The system of claim **11** wherein the display includes an electronic display.

15. The system of claim **11** wherein the display includes a cathode ray tube.

16. The system of claim **11** wherein the display includes a printer.

17. The system of claim **11** wherein the generator includes circuitry that generates a second signal containing the image of the product and other information about the product.

18. The system of claim **11** wherein the generator includes circuitry that generates a second signal containing the image of the product and a verbal description of the product.

19. The system of claim **11** wherein the generator includes circuitry that generates a second signal containing the image of the product and a location of the product.

20. The system of claim **11** wherein the generator includes circuitry that generates a second signal containing the image of the product and pricing information for the product.

21. In a system including a plurality of portable cards each having a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprising the steps of:

a first reading step of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product;

generating, responsive to the first signal, a second signal containing an image of the product;

displaying the second signal;

a second reading step of reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device;

receiving a third signal corresponding to a product; and

determining a price for the product depending on whether the first signal, read in the second reading step, corresponds to the third signal.

22. The method of claim **21** wherein the system includes a cathode ray tube (CRT), and displaying step includes

displaying the second signal on the CRT.

23. The method of claim **21** wherein the system includes a printer for printing on a substrate, and wherein the method includes

printing, using the printer, the second signal on the substrate.

24. The method of claim **21** wherein the second reading step includes reading a first signal corresponding to pricing information for a product.

25. The method of claim **21** wherein the system further includes an electronic display, and the displaying step includes

displaying the second signal on the electronic display.

26. The method of claim **21** wherein the displaying step includes displaying other information about the product with the image of the product.

27. The method of claim 21 wherein the displaying step includes displaying a verbal description of the product with the image of the product.

28. The method of claim 21 wherein the displaying step includes displaying a location of the product with the image of the product.

29. The method of claim 21 wherein the displaying step includes displaying pricing information for the product with the image of the product.

30. In a system including a plurality of product areas, a plurality of portable cards each having a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprising the steps of:

reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the first communication device, the first signal corresponding to a product in one of the product areas;

displaying, responsive to the first signal, an image of the product;

removing the product from one of the product areas; and

reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device.

31. The method of claim 30 wherein the reading step includes reading a first signal corresponding to pricing information for a product.

32. The method of claim 30 wherein the system further includes an electronic display, and the displaying step includes

displaying on the electronic display.

33. The method of claim 30 wherein the system further includes a cathode ray tube (CRT), and displaying step includes

displaying on the CRT.

34. The method of claim 30 wherein the system further includes a printer for printing on a substrate, and wherein the displaying step includes

using the printer to display on the substrate.

35. The method of claim 30 wherein the displaying step includes displaying other information about the product with the image of the product.

36. The method of claim 30 wherein the displaying step includes displaying a verbal description of the product with the image of the product.

37. The method of claim 30 wherein the displaying step includes displaying a location of the product with the image of the product.

38. The method of claim 30 wherein the displaying step includes displaying pricing information for the product with the image of the product.

* * * * *

AO 440 (Rev. 10/93) Summons in a Civil Action

UNITED STATES DISTRICT COURT ORIGINAL

NORTHERN DISTRICT OF GEORGIA

SUMMONS IN A CIVIL CASE

SOFTCARD SYSTEMS, INC.

V.

CASE NUMBER: 1 03 CV 85

TARGET CORPORATION and
VISA U.S.A., INC.

TO C.T. Corporation System
Registered agent for TARGET CORPORATION
1201 West Peachtree Street, NE
Atlanta, Georgia 30361

YOU ARE HEREBY SUMMONED and required to serve upon PLAINTIFF'S ATTORNEY (name and address)

John L. North
Malvern U. Griffin, III
William R. Silverio
John D. Hamann
Sutherland Asbill & Brennan LLP
999 Peachtree Street, N.E.
Atlanta, Georgia 30309-3996

an answer to the complaint which is herewith served upon you, within 20 days after service of this summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint. You must also file your answer with the Clerk of this Court within a reasonable period of time after service.

CLERK LUTHER D. THOMAS

DATE NOV 25 2003

(BY) DEPUTY CLERK

AO 440 (Rev. 10/93) Summons in a Civil Action

RETURN OF SERVICE

Service of the Summons and complaint was made by me(1)	DATE
NAME OF SERVER *(PRINT)*	TITLE

Check one box below to indicate appropriate method of service

☐ Served personally upon the third-party defendant. Place where served: _____

☐ Left copies thereof at the defendant's dwelling house or usual place of abode with a person of suitable age and discretion then residing therein.

Name of person with whom the summons and complaint were left: _____

☐ Returned unexecuted: _____

☐ Other (specify): _____

STATEMENT OF SERVICE FEES

TRAVEL	SERVICES	TOTAL

DECLARATION OF SERVER

I declare under penalty of perjury under the laws of the United States of America that the foregoing information contained in the Return of Service and Statement of Service Fees is true and correct.

Executed on _____ _____
Date Signature of Server

_____
Address of Server

(1) As to who may serve a summons see Rule 4 of the Federal Rules of Civil Procedure.

AO 440 (Rev. 10/93) Summons in a Civil Action

ORIGINAL

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF **GEORGIA**

SUMMONS IN A CIVIL CASE

SOFTCARD SYSTEMS, INC.

V.

CASE NUMBER:
1 03 CV 3585

TARGET CORPORATION and
VISA U.S.A., INC.

TO C.T. Corporation System
Registered agent for VISA U.S.A., INC.
1201 West Peachtree Street, NE
Atlanta, Georgia 30361

YOU ARE HEREBY SUMMONED and required to serve upon PLAINTIFF'S ATTORNEY (name and address)

John L. North
Malvern U. Griffin, III
William R. Silverio
John D. Hamann
Sutherland Asbill & Brennan LLP
999 Peachtree Street, N.E.
Atlanta, Georgia 30309-3996

an answer to the complaint which is herewith served upon you, within 20 days after service of this summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint. You must also file your answer with the Clerk of this Court within a reasonable period of time after service.

CLERK LUTHER D. THOMAS

DATE NOV 25 2003

(BY) DEPUTY CLERK

AO 440 (Rev. 10/93) Summons in a Civil Action

RETURN OF SERVICE

Service of the Summons and complaint was made by me[1]	DATE
NAME OF SERVER *(PRINT)*	TITLE

Check one box below to indicate appropriate method of service

☐ Served personally upon the third-party defendant. Place where served: _____

_____

☐ Left copies thereof at the defendant's dwelling house or usual place of abode with a person of suitable age and discretion then residing therein.

Name of person with whom the summons and complaint were left: _____

☐ Returned unexecuted: _____

_____

_____

☐ Other (specify): _____

_____

_____

STATEMENT OF SERVICE FEES

TRAVEL	SERVICES	TOTAL

DECLARATION OF SERVER

I declare under penalty of perjury under the laws of the United States of America that the foregoing information contained in the Return of Service and Statement of Service Fees is true and correct.

Executed on _____ _____
Date Signature of Server

_____
Address of Server

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