INSTORE INFORMATION DISPENSING SYSTEM

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Filed: Dec. 20, 1971

Appl. No.: 210,027

U.S. Cl. ................................ 340/152 R, 340/153 R

Int. Cl. ................................ H04q 5/00

Field of Search ....................... 340/152 R, 153 R

References Cited

UNITED STATES PATENTS

ABSTRACT

A couponning system for instore dispensing of directory and discount information. The couponning system is preprogrammed with an exchangeable record medium having audio directory information and information on items being discounted. The record medium also contains data for printing coupons with discount information to be presented with the purchase of special items. Actuation of a keyboard addresses a particular point on the record medium which is rapidly accessed to provide the information, and if called for by further keyboard actuation, the printing of a discount coupon. An automated production system provides for the rapid production of recording mediums for periodic replacement in the coupon dispensing system distributed throughout a plurality of user stores.

21 Claims, 13 Drawing Figures
DATA RECEIVE OPERATION

START

INITIALIZE

IS THERE AN ADDRESS

YES

ESTABLISH ADDRESS TAG

AUDI0

ENABLE INT. STORAGE AT AUDIO ADDRESS TAG LOCATION

NO

IS AUDIO ON

YES

RECORD

ALARM RESET

YES

NO

IS THERE AN OVERTIME

YES

NO

YES

NO

322

IS AUDIO ON

YES

NO

334

IS THERE A DIRECTORY INDIC.

YES

NO

336

ENABLE INT. STORAGE AT DIGITAL ADDRESS TAG LOCATION

YES

NO

SCAN BUFFER IF POSSIBLE

YES

NO

END DATA

337

338
TAPE RECORD OPERATION

FIG. 10

START 340

INITIALIZE "x"="1" & ESTABLISH TAPE CONTROL BANDS & 1 342

GO TO ADDRESS "x" ON TAPE 344

ACCESS AUDIO AT ADDRESS "x" INT. STORAGE 346

DRIVE TAPE 348

IS I PRESENT 350

NO

RECORD ON TAPE FROM INT. STORAGE 352

END OF AUDIO 354

STOP TAPE 356

INCREMENT "x" ADDRESS 360

IS THERE A DIRECTORY INDIC. 358

NO

ACCESS DIGITAL AT ADDRESS "x" 362

FORMAT DATA TO BUFFER 364

DRIVE TAPE 368

IS I PRESENT 370

NO

READ DATA FROM BUFFER 372

END DATA 374

YES

YES
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INSTALL INFORMATION DISPENSING SYSTEM

FIELD OF THE INVENTION

This invention relates to automated dispensing systems and in particular to user responsive automated systems for providing in-store information and discount coupons.

BACKGROUND OF THE INVENTION

The popularity of couponing as a marketing tool in grocery retailing is evidenced by the fact that the number of coupons distributed is reaching into the tens of billions per year according to a recent estimate. The success of couponing is all the more surprising when one considers the relatively low percentage of distributed coupons which are ultimately redeemed by a purchaser on the indicated goods. This low redemption rate is attributable to a relatively inefficient system of distribution through newspapers, direct mailing, magazines, or attachments to the package. The relatively low redemption rate is in addition to costing the manufacturer advertising money on printed coupons that are never used, often results in the distribution of a great deal of paper which never serves any useful purpose and becomes additional burdens on waste disposal systems and the Post Office.

Other deficiencies inherent in the present system of coupon dispensing make possible fraudulent redemption and misredemption of coupons. Fraudulent redemption is particularly possible where coupons are distributed through the mass media, allowing a store manager to collect many dollars worth of coupons with the purchase of newspapers or magazines at lower cost and to then redeem the coupons without ever having a bona fide sale of the coupon items. In cases of misredemption, a checkout girl at a supermarket erroneously accepts and gives a discount on coupons for goods which never pass through the checkout counter. What commonly happens is that she collects a handful of coupons and simply deducts the total "cents off" from all the coupons on the total bill without correlating each coupon with an item in the shoppers' selections.

Because coupons distributed through the media or the mails are received by the shopper substantially in advance of her next scheduled shopping trip, the coupons are easily forgotten or ignored in the interval between their receipt and the time when they can be used. This further contributes to the inefficiency of the present coupon distribution systems.

Finally, under the present methods of distributing coupons, there is no convenient way for using the coupons to analyze shopper behavior by determining when and where coupons are used. Without this data on shopping patterns retailers are unable to optimize their couponing techniques and distribute couponing appeals at the most effective and convenient times.

BRIEF SUMMARY OF THE INVENTION

According to the present invention, an in-store couponing system is disclosed which substantially overcomes the deficiencies of the prior systems of coupon distribution and redemption. According to a preferred embodiment to the present invention an in-store coupon dispensing system operates to couple the couponing stimulus directly with the shopper's trip to the grocery store and to provide a coupon only in response to a shopper decision that she wishes to buy the discounted item. The automated in-store couponing system is selectively programmed so as to provide coupons for any of the many items which may be currently discounted at any given grocery store. Each coupon which is distributed by the automated in-store system is individually printed with item and price data for the selected item as well as store and time of purchase information to facilitate later data analysis.

As specifically implemented according to a preferred embodiment for the invention, a record medium, such as an endless strip of magnetic tape which has a plurality of channels across its width, is prerecorded, using an automated and computerized recording system, with directory information indicating the store location of particular item categories and with specific information on particular items which are being couponed at a discount. The tape is inserted into a tape reader within the in-store coupon dispensing system and control data prerecorded on the tape cooperate with a keyboard on the in-store system so that particular portions of the tape having predetermined information are rapidly accessed in response to actuation of the corresponding key by a shopper. Where the shopper only desires directory data, the system rapidly locates the appropriate portion on the endless tape containing that information and plays it to her over a loudspeaker. If the shopper wishes to purchase a couponed item for the indicated discount, a keyboard selection of the desired item is made. The system will then quickly locate the corresponding portion on tape and provide the shopper with an audio stimulus for purchasing of that couponed item. If the shopper still wishes to purchase that item a coupon button is pushed and the system will print and provide a coupon indicating the item and its price or discount. The entire operation from initial key actuation to actual receipt of the coupon takes only a few seconds allowing the system to process several hundred coupon requests per hour during peak shopping periods. It can be seen that the above indicated couponing system substantially eliminates the high percentage of waste in coupons in the present systems of distribution by providing coupons only to those shoppers who have expressed a desire to use them by first selecting a button to receive promotional data on a specific item and second by actuating a further button to actually initiate the generation of a printed coupon. The redemption rate can be made close to one hundred percent using such a system.

The automatic, in-store coupon dispensing system further includes circuitry for printing on each coupon digital information on the item selected and the date, time, and store at which each coupon is printed. The calendar data is also used to turn the system on and off at preselected times for each day. The calendar data generating circuitry is provided with a stand-by, battery driven unit so that it keeps accurate time throughout power failures or erroneous disconnection of the system. The printed item, store and calendar data is provided in a format which is machine readable at a subsequent time to provide data processing for shopping behavior patterns. The calendar and item data also provide a means for discouraging fraudulent redemption by disclosing unusual patterns of use of the system.

To reduce the number of cases of misredemption, the coupons may be printed with the actual price for the item being discounted rather than the discount or cents
off. The amount saved can be indicated in the audio information. In this manner a checkout girl is forced to correlate each coupon with a particular item passing through her counter in order to charge it up properly. Finally, the couponing system of the present invention stimulates both the purchaser and passers-by to take advantage of the coupon specials. This is achieved first as the shopper sees the machine in the store with other shoppers using it and secondly when she hears an auditory promotion pushing for a particular item on special.

Since the items being couponed in a given grocery or supermarket are changed periodically, typically on a week to week basis, an automatic system is provided for prerecording the endless strips of tape with the control data, audio information and print data so that a plurality of tapes can be readily produced for exchanging in the various couponing systems located in stores throughout a region. To provide this automated production of tapes a computer is operative with an audio input source and a digital input source to receive the audio and digital information for each tape and to assemble it in memory with appropriate addressing tags indicating the positions on tape where the information is to be recorded. In a record mode, the computer then operates with a tape recorder similar to the tape reader of the in-store console to record information and control indicia on a plurality of tapes in accordance with the address data in computer memory. Field operators, on their weekly visits to each store, are supplied with a plurality of tapes for exchange with the old tapes used during the previous week.

DESCRIPTION OF THE DRAWINGS

These and other features of the invention will be more fully understood by reference to the following detailed description of a preferred embodiment presented for purposes of illustration, and not by way of limitation, and to the accompanying drawings of which:

FIG. 1 is a pictorial view of the console of the invention housing an automated, in-store coupon dispensing system;

FIGS. 2 and 2A indicate the data format of coupons printed by the console indicated in FIG. 1;

FIG. 3 indicates the general approach to data analysis made feasible by the couponing system disclosed;

FIG. 4 is a block diagram of general system components of the console of FIG. 1;

FIGS. 5 and 5A indicate the information and data format on the endless loop of prerecorded magnetic tape used by each in-store console;

FIGS. 6 and 6A are partial block and schematic diagrams of detailed circuitry employed to locate a particular set of information and data on the endless loop of tape;

FIG. 7 is a partial block and schematic diagram of circuitry for printing a coupon with item and price data as well as calendar and store information;

FIG. 8 is a block diagram of the components of an automated system for prerecording a plurality of tapes with new coupon information to be used during a subsequent time period in the in-store consoles;

FIG. 9 is a flow chart indicating the computer control sequencing of the automated prerecording system in FIG. 8 in receiving voice and digital information to be recorded on endless loop tapes; and

FIG. 10 is a further flow chart indicating the computer controlled sequencing for producing one or more endless loop tapes from the information received according to the FIG. 9 algorithm.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A detailed understanding of the preferred embodiment of the present invention will commence by reference to FIG. 1 showing pictorial views of an automatic, in-store coupon dispensing console 12 having a front facing keyboard panel 14 composed of directory keys 16, and coupons keys 18. The keys 16 access directory information regarding departments described in portions 20, listing, for example, diet beverages. By pushing one of the keys 16 the shopper is given a brief (typically several seconds) verbal guide to the location of that particular store section and optionally data on a special within that section. The keys 18 of the keyboard have associated therewith portions 22 which describe the specific items, such as Brand X Soap, that are being couponed. By actuation of one of the keys 18 the shopper is also given a short verbal account of the couponed item and a stimulus to purchase it. A print button 24 located below the keyboard 14 may be actuated during or after the audio information is presented in order to cause a printer 26 to print a coupon with the price and other descriptive information relative to the item described. The coupon, which is indicated in FIG. 2, is ejected through a slot 28 in the front of the console 12 preferably through a chute which prevents children being hit by the coupon or having their hands caught in the printer mechanism. Signals which control the printing of the coupon and the audio description are recorded on an endless band of tape which is inserted into a tape reading unit 30 located within the console 12. Actuation of the buttons 16 and 18 address a particular portion and channel of the tape and the tape reader 30 rapidly positions the tape to provide the audio and, where appropriate, digital readouts.

Turning now to FIG. 2 coupon format is indicated by a sample coupon 32. Four rows of data, 34, 36, 38 and 40, are printed on each coupon by the printer 26, normally one column at a time. The row 34 typically provides information on the size, such as 8 oz. while the row 36 indicates the item, such as Brand X Soap. Row 38 for later market analysis is printed with an indication of the minute of the year, item number and the store at which the coupon is printed, and row 40 indicates the price (or optionally the discount) and the date at which the printing of the coupon occurred, or optionally, when the coupon will expire.

The coupon can advantageously be provided as a fanfolded stack 42 as indicated in FIG. 2A. In this case a hole 44 can be cut in the coupons at the fold to indicate coupon position for the printer 26 to print and ultimately cut them before ejection through the slot 28.

It can be appreciated that by appropriate selection of a format for the printing of the rows 34 through 40 on the coupon 32 the essential data can be encoded in one row such as 34 and later automatically detected by an optical character reader 46 as indicated in FIG. 3. The detected data can be applied to a computer 48 for collection in a data bank along with the data from hundreds or thousands of other coupons. The computer 48 is programmed to analyze the coupons for determining habits of shoppers on the basis, for example, of day to
day coupon purchases of given items or for detecting off-hour and unusual patterns of printing of coupons in order to reveal cases of fraudulent redemption. The success of particular couponing efforts at individual stores can also be detected and the redemption fee to be paid to each store manager automatically tabulated by the computer 48.

Referring now to the generalized system block diagram of FIG. 4, a keyboard 50 cooperates with a selection system 52 to cause a magnetic tape head decoder 54 to select one head from a plurality of message heads 56 corresponding to each of a plurality of channels recorded on the endless loop of tape. The keyboard 50 also cooperates with a tape drive system 58 to cause the endless loop of magnetic tape to be driven to a particular point or address on the tape loop where recordings of the selected information begin. Control heads 60 detect indicia in two control channels on the tape loop and provide signals to the selection system 52 and tape drive system 58 to control tape positioning.

When the appropriate information is in position for playback through the message heads 56, the head decoder 54 provides an output from the appropriate head to first and second gate systems 62 and 64. The gate 62 responds to a signal from the control heads 60 to cause the signal on the selected head to be applied to a loudspeaker 66 during the audio portions of the desired information recorded on the tape while a gate 64 responds to a signal from the tape drive 58 and in turn to actuation of the print button in the keyboard 50 to direct digital information from the correct head to a printer 68 for appropriate marking of a coupon when such is desired.

The format of recorded indicia on the endless loop of tape may be better understood by reference to FIGS. 5 and 5A. FIG. 5 shows a portion of an endless loop of tape 70 having a plurality, typically 16, of parallel signal channels each running the full length of the tape loop. The top two channels 72 and 74 contain control indicia. The channel 72 contains a plurality of tab indicia 76 having periodic impulses recorded therein and spaced along the loop. The channel 74 contains one reset indicia 78 of similar impulses located partially coextensive with one of the tab indicia 76. The remaining portions of the tape 70 comprise information channels 80. In a typical information channel 80 a series of audio and digital information portions 82 and 84 respectively are associated with each tab indicia 76. Portions 82 and 84 are separated by an indexing portion 86 between the digital and audio and an indexing portion 88 between the audio and digital so as to allow the tape to reach speed. The index portion 86 starts just in advance of a position of alignment with the trailing edge of the tab indicia 76 and the subsequent audio portion 82 terminates and portion 88 begins in alignment with the beginning of the subsequent tab indicia 76. Following the audio portion 82 the index section 88 provides separation from the following digital data section 84. The one reset tab 78 which occurs in the endless loop commences in alignment with the termination of the index portion 88 and extends to the termination of the index portion 86. Certain digital portions such as those indicated at 90 are left free of recorded data as will be explained below.

The digital data recorded in the portions 84 follow a format indicated in FIG. 5A. Directly following the index portion 88 a uniquely recognizable synchronizing code 92 is recorded and followed by three digitally coded characters 94, 96, and 98. Subsequently a further synchronizing word 92 is recorded and three further characters 94, 96, and 98 are recorded. The characters 94, 96, and 98 represent the figures which are to be printed in a single column on the coupon. The fourth character for the column to represent the calendar, item or store information is provided internally of the printer 68 in FIG. 4 as will be explained below.

Referring now to FIGS. 6 and 6A, detailed circuitry in block and schematic form is indicated to accomplish the functions of addressing a particular channel 80 and the correct sequence of audio and digital portions 82 and 84 on the tape 70. In FIG. 6 the tape 70, fashioned in an endless loop, is indicated as passing over support rollers 100, 102 and 104. Indicated diagrammatically, message heads 106, tab head 108 and reset head 110 are positioned above the tape 70 to sense indicia recorded respectively in the message channels 80 and the control channels 72 and 74. The arrangement is pictorially indicated in FIG. 6B. Following the message heads 106 arranged adjacent to the tab and reset heads 108 and 110 in a column on a head block 112. Fewer heads are indicated in the FIG. 6 and 6A representations for economy of space.

The output of the tab head 108 is applied to a counter 114 through a tape position indicator 116 causing counter 114 to advance one binary state upon the detection of each tab portion 76 in the channel 72. The signal from the reset tab 110 is also applied to counter 114 through position indicator 116 to cause resetting of the counter to a predetermined binary state upon the passage of each reset portion 78. The tape position indicator 116 responds to the impulses in tab portion 76 as detected by the tab head 108 to provide a single pulse to counter 114 when the leading edge of portion 76 is detected and similarly to provide a single pulse from head 110 signals at the leading edge of the portion 78. Position indicator 116 also provides a reset output on line 118 coincident with the trailing edge of the portion 76 passing beneath the tab head 108, and a further output on line 120 coincident with the leading edge of the portion 76 passing beneath the tab head 108.

The outputs of the message heads 106 are applied to a head multiplexer 122 from which the signal from a particular head is selected as an output on a line 124. This selection is in response to the binary state of a register 126 having parallel binary state outputs supplied to the multiplexer 122. A portion of the logic within the multiplexer 122 demonstrates the manner in which a particular binary state in the register 126 causes the signal on one and only one message head 106 to be applied to the output 124. In the example of four binary states in the register 126 AND gates 128 and 130 provide an output signal only in the condition when the first three binary states of register 126 are zero. Gate 128 provides an output if the fourth binary state is nonzero and gate 130 provides it if that state is zero. The outputs of the gates 128 and 130 are applied as control inputs of FET transistors 132 and 134. These transistors also receive respectively signals from separate message heads on lines 136 and 138. The outputs of the transistors 132 and 134 are provided as inputs to a summing amplifier 142 from which the output 124 for the multiplexer 122 is taken. The indicated structure will provide on the output 124 the signal on the line 136.
under the conditions in which the binary register 126 holds the state 1000. The signal on line 138 and only that signal will be applied to the output line 124 when the binary register 126 contains the state 0000. Additional gates and inverters are required to complete the decoding for all of the message heads 106.

The description of the FIG. 6 circuitry now proceeds to structure which responds to the actuation of one key in the keyboard 14 of FIG. 1 to generate a binary state uniquely representative of the key actuated. A 20 KHz clock oscillator 144, indicated in the top right of FIG. 6, provides clock pulses at the 20KHz rate to a gate circuit 146. The gate 146, under conditions determined by its inputs, which are subsequently described, applies the 20 KHz pulses to a four bit column counter 148 with the carry output thereof applied to a four bit row counter 150. The binary state outputs of the column counter 148 are applied in parallel to a multiplexer 152 while the binary state outputs of the row counter 150 are also applied in parallel to a decoder circuit 154.

The decoder 154 responds to the binary state of the row counter 150 and actuates a corresponding output of a plurality of lines, each corresponding to one binary state of the row counter 150. Each output line from the decoder 154 is connected to corresponding row terminals of a switch matrix 156. The matrix 156 has a plurality of switches 158, actuation of one of which connects a single row and column. Switches 158 respond to console buttons in keyboard 14. The multiplexer 152 has its inputs connected to the column terminals of the matrix 156. In this manner as the row counter 150 is cycled through its binary states in response to the carry pulses from the column counter 158, the decoder 154 will activate each of its outputs in series. When an actuated output of the decoder 154 is connected to an actuated switch 158 the multiplexer 152 will receive an input on the line for the column in which the activated switch lies. Since the multiplexer 152 receives the binary state outputs of the column counter 148, and because the column counter 148 will cycle through all of its binary states for each binary increment in the row counter 150, then when the column counter reaches the binary state corresponding to the activated input of multiplexer 152 a disable output 160 of multiplexer 152 is activated. At this point the disable output, applied through an inverter 162, causes the gate 146 to inhibit pulses from the clock 144, stopping the row and column counters 150 and 148 at binary states corresponding to the particular switch in the matrix 156 which has been activated.

The disable output from the multiplexer 152 is also applied to a set input of a flip-flop 172 within a tape drive controller 174. The output of flip-flop 172 is applied to first and second AND gates 176 and 178. The AND gate 176 receives a further input from an inverting circuit 180 which in turn receives an identity output from a comparator 182. The comparator 182 receives parallel inputs representative of the state of the column counter 148 and parallel inputs representative of the state of the counter 114. As will be the normal case, the comparator 182 will indicate a nonidentity condition between its two parallel inputs and correspondingly the AND gate 176 will provide the output to a fast tape drive 184 causing a driven roller 186 to be applied against the roller 102 for rapid driving of the tape 70. When the counter 114 has been advanced to the point where the comparator 182 detects identity between the binary states of its two parallel inputs the AND gate 176 is disabled and correspondingly the fast drive for the tape 70 is halted with the message heads 106 positioned such that the particular head whose output is applied to the line 124 by the multiplexer 122 is positioned at the index portion 86 preceding the audio information portion 82 for the information that corresponds to the button actuated. At this point the identity output from comparator 182 sets a flip-flop circuit 187. The output of circuit 187 is applied to an input of an OR gate 188 and its output in turn is applied as an input to the AND gate 178. The output of the AND gate 178 is applied to a clutch mechanism 190 to cause a slowly driven roller 192 to advance the tape 70 at a speed such that audio information in the portion 82 appears at a coherent frequency on the output 124.

When the output 120 of the tape position indicator 116 is pulsed at the leading edge of portion 76, that pulse is applied to reset circuit 187 stopping the driving of the tape 70. A further input to the OR gate 188 is provided from a flip-flop 194 which is activated in response to closure of a print switch 196 controlled by the print button 24 on the panel 14 in FIG. 1. This additional input to the OR gate 188 causes the tape 70 to be again driven at a slow rate so that the print data may be detected by the appropriate message head and applied to the output 124 of the multiplexer 122. When the trailing edge of the portion 76 is detected, the reset line 118 from the tape position indicator 116 is activated to reset the flip-flops 172 and flip-flop 194 through logic 197 and in turn the tape drive mechanism is stopped until another selection is made in the switch matrix 156.

While the mechanism for driving the tape 70 at fast and slow rates has been described in sufficient detail to enable the practicing of the invention, a more complete description of the drive mechanism may be found in U.S. Pat. No. 3,237,951.

At the end of the audio portion 82, the leading edge of tab portion 76 causes a pulse on line 120. This pulse is applied to register 126 causing it to hold the contents of row counter 150 rather than merely to pass these binary states to multiplexer 122. A delayed version of the pulse on line 120 is applied to enable gate 146 through a logic circuit 197. Logic circuit 197 also receives as inputs, signals from switch 196 and line 118. The logic 197 will respond to activation of the print button 196 anytime up to a predetermined interval after the delayed line 120 signal to inhibit the delayed line 120 pulse from enabling the gate 146 until logic 197 detects the signal on line 118 at the end of the digital portion. The output of logic 197 is also applied to reset flip-flop circuit 172 and 174.

As mentioned above, the keyboard 14 of the console 12 in FIG. 1 has two sets of buttons 16 and 18, the set 16 providing only directory information and not having recorded digital portions of coupons. Accordingly, a decoder circuit 198 in FIG. 6 is provided to sample the binary state outputs of the row and column counters 150 and 148 and on the sensing of predetermined states, corresponding to actuation of the buttons 16, provides a print inhibit output on a line 200, the function of which will be explained below.

Referring to FIG. 7 and the print control portion of the system, the output of the head multiplexer 122 on line 124 is applied as one input to a gate 202. The output of gate 202 is applied to an amplifier 204 which in
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... of the audio signal from the multiplexer 122 to the speaker 206 when the appropriate head is detecting audio information on the tape 70. The flip-flop 210 is reset by the signal on line 120 from the tape position indicator 116 when it indicates termination of the audio portion 82 on the tape 70. In this manner the speaker 206 is activated only during the time when the appropriate one of the message heads 106 is reading audio on the tape 70. The output on line 124 from the head multiplexer is applied to a further gate 212 which has its output applied to a printer amplifier 214 and in turn to a printer 216. The gate 212 is controlled by a flip-flop 218 which is set into a condition to enable gate 212 to pass digital signals to the amplifier 214 by closing of print switch 196. Flip-flop 218 is reset by the signal on line 118 from the tape position indicator 116 at the termination of the digital portion 84 on tape 70.

Tung now to a consideration of the detailed functioning of the circuitry and mechanism, within the printer 216 a coupon 220 is advanced by a stepping motor 222 between a revolving drum 224 having four bands of characters 226 and four corresponding hammer mechanisms 228, 230, 232 and 234. Printing of the coupon 220 is accomplished by selected actuation of the hammers 228 through 234 at appropriate positions of the drum 224. The hammer mechanisms 228 through 234 are activated by comparators 236, 238, 240 and 242. The comparator 236 receives parallel binary state inputs from a register 244 while the comparators 238 through 242 receive parallel binary state inputs from three respective sections of a register 246. Each of the comparators 236 through 242 also receive parallel binary state signals from a digital position indicator 248 which responds to shaft position of a drum 224 driven by motor 250 to provide its digital output a unique binary state corresponding to the positioning of each character on the drum 224. The comparators 236 through 242 provide a signal to the hammer actuators 228 through 234 respectively when the parallel digital inputs to the comparators from the registers 244 and 246 indicate identical binary states with the digital output of indicator 248.

The binary states of the register 246 are determined by the data contents of shift register 247 which receives as a serial input the output of the print amplifier 214 and provides a register full output to a synchronizing code detector 252. The output of amplifier 214 is also applied to synchronizing code detector circuit 252 which senses the occurrence of each synchronizing code 92 as indicated in the data format of FIG. 5A. When the synchronizing code detector 252 senses this code and the full signal from the shift register 248 it is set to a stable condition which provides a load signal to the register 246 causing it to assume the binary states in the shift register 247 and hold that digital information until a subsequent load signal. A print interval control 253 senses a predetermined angle in the rotation of motor 250 and also senses the load signal from the synchronizing code detector 252. After the load signal is sensed, the next angle signal sets the controller 253 to enable indicator 248 to cycle once. The second occurrence of that shaft angle resets controller 253 and its resulting output clears shift register 247 and synchronizing code detector 252. The reset output of the controller 253 is also applied to the stepping motor 222 to cause it to advance the coupon 220 one column of printing.

The register 244 receives parallel data from a multiplexer 254 which in turn receives parallel input data from a read-only-memory 256, having a store identifying code, and from decoders 258 and 259. The decoder 258 converts the parallel outputs of a divider 260 to calendar data. The driver 260 is fed through a switch-relay system 262 from a 60 cycle source 264. A relay 266 in system 262 is closed when 60 cycle excitation is applied to the switch relay system 262 so as to pass the 60 cycle signal to divider 260; but in the absence of 60 cycle excitation the relay switches to pass 60 cycle excitation from an oscillator converter 268 driven by a standby battery 270. A charging circuit 272 maintains the battery 270 at appropriate charge during normal operation. The battery and converter 268 are provided so that the calendar information provided by divider 260 is maintained in the event of power failure or accidental removal of the unit plug. The decoder 259 is fed the binary states from the row and column counters 148 and 150 to identify the item button number. Correlation with the date of purchase then allows exact item identification.

A power controller 271 responds to signals from the divider 260 and "on-off" selections from time selector switches 273 to apply system operating power only during selected business hours for the store in which the console 12 is located. The multiplexer 254 is controlled by binary states in a counter 274 which is advanced one step with each signal on the load output of the controller 253. The multiplexer 254 responds to the binary states of counter 274 to apply to the register 244 appropriate binary data from the read-only-memory 256 or the decoders 258 and 259.

A ticket position detector 276 is provided to cooperate with a photo detector 278 to sense the position of the ticket 220 by detection of the hole 44 indicated in FIG. 2A. The output of the ticket detector 276 is applied to a sequencer 280 which operates to control the motion of the stepping motor 222. The sequencer 280 also receives a reset signal from the line 118, a synchronizing code detection indication from the synchronizing code detector 252, and a signal indicating activation of the print button 196 through a gate 282. The gate 282 senses the print inhibit signal from the decoder 198 in FIG. 6 to prevent the signal from the print switch 196 from passing through the sequencer 280 when printing is to be inhibited for directory information.

In operation, the sequencer 280 provides a logic function. It responds to closure of the print switch 196 as applied through the gate 282 to advance the ticket 220 a predetermined number of steps with the motor 222 to position it at a point in registration to receive the first column of printed data from the hammer actuators 228 through 234. As the step motor 222 is advanced one step coincident with each indication synchronizing code from the detector 252, the sequencer 280 responds to the same signals and when all columns have been indicated as being printed, causes a stepping motor 222 to drive the coupon 220 until the ticket detector 276 and photo detector 278 indicate the pres-
ence of hole 44. The photo detector 278 is positioned such that this event occurs at appropriate positioning of the coated 220 cutting mechanism, not shown, so that the coupon can be cut to separate it from the pack 42 and allowing it to be ejected.

Having described above the specific operation of the instore console for automatic coupon dispensing, the description now turns to FIG. 8 and the system for producing prerecorded tapes for replacement in consoles distributed in supermarkets. A computer 284 has a digital input from a keyboard 286 into buffer storage 288 within the computer 284 and further includes an audio input from an audio control system 290. The audio control system 290 has a microphone input 292, a level gauge 294, and an elapsed time meter 296 for indicating to the operator the amount of time used in each audio recording. Various controls 298 are normally associated with audio reproduction equipment and provided as well as a keyboard 300 for indicating to the computer 284 the address, position and channel, on tape where the audio information is to be recorded. The keyboard 286 comprises standard character keys necessary for the printing of item description and price information as well as a keyboard for indicating the address for each portion of print data to be recorded. The computer is associated with an intermediate storage unit 302 such as a tape recorder capable of holding the digital and audio information to be recorded on tape. The digital information may of course be recorded in any of the well known recording media including drum and disk files as well as core memory.

The computer 284 provides audio information input on a line 304 to an endless loop of tape in a recorder 306, similar to the tape playback unit indicated above, through a tape positioner system 310, operating in a manner similar to the system indicated in FIG. 6 above. Digital information is provided over line 304 from a buffer 303 in computer 284. A line 308 provides digital address information to the tape positioner 310 as well as control signals causing tape driving to the indicated address. The tape positioner 310 controls the tape recorder system 306 through control lines 312. The data from the computer 284 on the line 304 is applied through the tape positioner system to the appropriate heads in the tape recorder 306 according to the digital address information on line 308.

Detailed operation of the FIG. 8 recording system can be best understood by reference to the flow charts of FIGS. 9 and 10 indicating programming of the computer 284 to accomplish prerecording of tapes.

Referring in particular to FIG. 9 the programming of the computer 284 is indicated for reception of audio and digital information as entered by the operator through the keyboard 286 and audio system 290 in FIG. 8. The start and initialize steps 314 and 316 are typical in the art of computer programming and are used to place the computer in a ready to operate condition from a standby condition and to establish pointers and interrupt routines where appropriate as is understood in the art. A subsequent decision 318 tests for whether an address for the data to be recorded has been entered through appropriate keyboards. If negative decision 318 leaves with initialize step 316 and the address has been entered at which point step 320 establishes an address tag to be associated with the subsequently entered data and inserts it as a control word in the intermediate storage 302. Subsequently routing branches to an audio recording subroutine and enters a step 322 which activates the intermediate storage to receive audio information. A subsequent decision 324 tests whether the operator has begun the production of an audio message by activating a talk button 323 in the system 200. Decision 324 is looped with itself until the button is activated at which point operation 326 commences the process of recording in intermediate storage the audio information. A subsequent decision 328 tests the elapsed time during the audio message and causes branching to an alarm and reset operation 330 if too much time is used up. The reset portion of operation 330 erases the audio data from intermediate storage and returns sequencing to the operation 322 for another try at recording. Decision 328 loops through a decision 332 testing for activation of the talk button 323 during the allowed running time for audio recording. As long as the talk button 323 is activated, decision 332 causes the operation to loop back to decision 328.

When the operator deactivates the talk button 323 sequencing proceeds to the digital recording steps and in particular to decision 334 which tests whether the operator has indicated through the audio system 290 that, for the established address tag, the information recorded is directory information only and will not require print data. If the decision is affirmative, sequencing returns to operation 318. If negative, indicating print data to follow, a subsequent step 336 again enables intermediate storage at an associated digital address tag corresponding to the print data to be entered. A subsequent operation 337 scans the buffer 288 in the computer 284 for the presence of sufficient print data entered from the keyboard 286, for example, a complete word, and extracts that data in either serial or parallel form for recording it in intermediate storage 302. A subsequent decision 338 tests for entry of an end of data indication by the operator through the keyboard 286. If negative decision 338 loops back to operation 337 but if positive returns sequencing to decision 318 whereby a new address can be indicated for recording of audio and digital information associated with a different item.

Referring now to FIG. 10, the programming steps are indicated for extracting audio and print information for intermediate storage 302 and for recording that information on an endless loop of tape applied to tape recorder 306. The start and initialize operations 340 and 342 are provided for the purposes indicated above. The initialize operation 342 establishes an X-pointer at an initial address and also causes the tape recorder 306 to drive the tape loop through one or more complete cycles during which time the control channels 72 and 74 are recorded to generate the tab portions 76 and reset portion 78 indicated in FIGS. 5. The channels 80 are also recorded with the associated index portions 86 and 88. Subsequently an operation 344 causes the tape positioner system 310 to drive the tape to address X with the appropriate position and head selection for that point on tape. A subsequent operation 346 accesses the audio that is recorded in intermediate storage at the address tag X, and operation 328 commences driving of the tape by the recorder 306. A subsequent decision 348 detects, through another head, the existence of an index portion 86. When detection of the index has ceased, an operation 352 begins recording on tape the audio recorded in intermediate storage 302. The timing decision of 354 indicates when the allotted time for
audio has passed then causes operation 356 to stop the tape drive. Subsequently a decision 358 tests for an indication associated with the address X being processed that the information is directory data in which case sequencing leads to an operation 360 which increments X by one digit and proceeds to the recording of the information for the next succeeding address. If there is no indication that the information is directory, a subsequent operation 362 following decision 358 accesses the digital data recorded in intermediate storage 302 at the position associated with the address tag X and leads to an operation 364 which formats the data in core memory of the computer 284 according to the data format indicated in FIG. 5A. A word of data is applied to the output buffer 303 in computer 284 and the tape positioner system 310 is signaled over lines 308 to commence driving of tape by the recorder 306 in operation 366. A subsequent decision 370 tests the termination of the index portion 88 and when detected, an operation 372 signals the tape positioner 310 to commence extracting data from the buffer 303 in appropriate serial form for application to the selected recording heads in the tape recorder 306. Subsequent decision 374 tests for end of data indication initially applied by the operator during the received data operation. Decision 374 if negative loops back to operation 372 but if affirmative branches to the operation 360 incrementing the address pointer X.

The production of a plurality of tapes can be accomplished by the use of several recorders 306 to simultaneously produce several tapes during each computer run as indicated in FIG. 10, or by recording each tape separately. Alternatively the first recorded tape can be used as a master from which the necessary copies are run from a simpler reproducing system.

Having above described the system for automatically providing information and dispensing coupons with appropriate product and discount information as contained on a prerecorded medium and for generating the prerecorded medium in accordance with desired directory and couponing data, it will occur to those skilled in the art that the indicated preferred embodiment for accomplishing these functions can be modified and altered without departing from the spirit of the invention. It is accordingly intended to limit the scope of the invention only as indicated in the following claims.

What is claimed is:

1. An automated information dispensing system selectively operative to provide users with selected information and further operative in response to user selections to provide a ticket indicating desired associated information, said system comprising:
   a record medium;
   means for sensing indicia in said record medium;
   said record medium having one or more positioning control indicia indicating division of said medium into indicia containing message blocks;
   each of said message blocks having first and second portions with first and second signals associated with the message block indicia;
   a terminal having a plurality of selectable actuators operative in response to user actuation of one of said actuators to provide a corresponding unique selection signal;
   each of said message blocks having a corresponding unique selection signal associated therewith;
   means responsive to said selection signals for positioning said record medium in accordance with sensed control indicia to provide sensing of indicia in the selected message block corresponding to that selection signal;
   means for providing information in a transitory form to said user of said ticket dispensing system in response to first electrical signals;
   first data means for applying the indicia sensed in a first portion of the selected message block to said transitory information providing means as said first electrical signals;
   means for providing said tickets to said user with printing representative of second electrical signals; and
   second data means operative in response to user actuation of one of said actuators for applying the indicia sensed in a second portion of the selected message block to said ticket providing means as said second electrical signals whereby said ticket is provided with printing representative of the signals in said second portion.

2. The information dispensing system of claim 1 wherein:
   said second data means is only operative in response to user actuation of a further one of said actuators.

3. The information dispensing system of claim 1 wherein:
   the indicia in the first portion of each said message block indicate the nature of the indicia in the second portion of said message block and the indicia is provided on said tickets in response to the signals in the second portion of the same said message block.

4. The information dispensing system of claim 1 wherein:
   said terminal includes actuators of first and second types; and
   means are provided for responding to selective actuation of actuators of said first type to inhibit operation of said ticket providing means whereby no ticket may be provided.

5. The information dispensing system of claim 1 further including:
   means for generating electrical signals representative of calendar data;
   means responsive to the calendar data signals for causing said tickets to be provided with indicia indicating the calendar data from said calendar data generator.

6. The information dispensing system of claim 5 further including:
   an internal power source for said data generator operative to maintain accurate calendar data in the absence of other normal operating power supplied to said ticket dispensing system.

7. An in-store dispensing system operative to provide audio information for generating shopper interest and further operative to provide item discount coupons in response to a shopper coupon request, said coupon dispensing system comprising:
   a record medium having registered thereon indicia in a plurality of message blocks positionally identified by control indicia, each message block containing indicia representative of predetermined audio information and indicia representative of predetermined discount coupon data;
means for sensing the indicia in message blocks in said record medium;
shopper actuateable means for selecting audio information and discount coupon data and operative to provide a selection signal indicating a corresponding message block containing that information and data;
means responsive to said selection signal and operative in association with said sensing means for positioning said record medium in correspondence with said control indicia for sensing of indicia in the selected message block;
an audio signaling system operative to provide sound reproduction of audio signals;
a coupon printing system operative to print said discount coupons with discount information in response to digital signals;
means for applying the sensed indicia representative of said audio information to said audio signaling system as said audio signals; and
means for applying the sensed indicia representative of coupon discount data to said printing system as said digital signals.
8. The in-store dispensing system of claim 7 wherein:
said indicia sensing means is automatically operative to sense said audio information representing indicia in response to shopper actuation of said selecting means; and
print request means are provided for shopper actuation to cause sensing of said discount indicia and printing of a corresponding coupon in response to actuation thereof.
9. The in-store dispensing system of claim 8 further including:
a plurality of further shopper actuable means for selecting audio information only; and
means responsive to actuation of one of said further shopper actuable means for inhibiting printing of a discount coupon.
10. The in-store dispensing system of claim 7 further including:
means for inhibiting said shopper actuateable means from further selections during sensing of said audio information indicia.
11. The in-store dispensing system of claim 7 further including:
means for generating calendar and store data to indicate time and date and store of purchase;
said means for applying said coupon discount data being operative to apply both said calendar and store data and said sensed discount indicia to said printing means to provide printing of information in predetermined locations on said coupon indicating coupon item purchased, time of purchase and store of purchase.
12. The in-store dispensing system of claim 7 wherein:
said printing means is operative to provide said printed information indicating coupon item, time and store in a machine readable print format.
13. The in-store dispensing system of claim 12 further including:
means for machine reading of said machine readable print format to provide item, time and store signals for a plurality of redeemed coupons; and
means for machine analyzing said item, time and store signal to provide an output indication of use of said dispensing system.
14. The in-store dispensing system of claim 7 wherein:
said record medium is interchangeably applied to said dispensing system for sensing and positioning by said respective sensing and positioning means.
15. The in-store dispensing system of claim 14 wherein:
said record medium is an endless loop of magnetic tape having recorded thereon said message blocks in a plurality of parallel information channels and said control indicia in one or more parallel control channels.
16. The in-store dispensing system of claim 15 further including:
means for recording audio information and discount coupon data representing indicia on said magnetic tape in selected message blocks associated with control indicia in response to audio and digital inputs.
17. A system for distribution of information proximate to points of use for said information and operative on demand to provide requested predetermined information in a transitory form and to provide associated data on a printed ticket, said system comprising:
a plurality of record mediums;
means for registering indicia in said record mediums to represent predetermined information further including:
input means for receiving signals representative of said transitory form information and said associated data;
means for recording control indicia in said record mediums to define a plurality of message block portions in each of said record mediums;
means for arranging said received signals in a predetermined sequence of successive groups each containing different transitory information and associated data;
means for recording indicia in said record mediums representative of said groups of information and data and operative to record a group in each message block portion with a predetermined correspondence between the position of each of said message block portions and the position in said predetermined sequence of the groups recorded in said message blocks;
a plurality of information distribution consoles, each console including:
means for interchangeably receiving and variably positioning one of said plurality of record mediums;
means for sensing indicia in said received record medium;
selector means for presenting an indication of predetermined information available from said console and operative in response to an operator selection of a portion of said available information to generate an address signal representative of the selected portion of information;
means responsive to said address signal for causing said positioning means to position said received record medium for sensing of indicia by said sensing means in message block portions corresponding to said address signal;
means for providing information in said transitory form in response to indicia in a first part of the sensed message block portion;
means operative in response to sensed indicia in a second part of said sensed message block portion for providing said printed ticket with data thereon representing the sensed indicia in said second part.

18. The system for distribution of information of claim 17 wherein:
said selector means is operative to provide a print signal in response to predetermined operator activation thereof; and
said printed ticket providing means is further operative in response to said print signal in providing said printed ticket.

19. The system for distribution of information of claim 17 wherein:
said printed ticket providing means is operative to provide a portion of said data thereon in a machine readable form; and
means are provided for receiving a plurality of returned printed tickets for sensing the indicia in said machine readable form to provide signals representative thereof.

20. A method of distributing information proximate to points of use for said information and responding to a use demand for pro-viding requested predetermined information in a transitory form and for providing associated data on a printed ticket, said method comprising the steps of:
registering in a record medium indicia to represent information and including the steps of:
recording control indicia in said record medium to define a plurality of message block portions in each of said record mediums;
recording in the message block portions of said record medium indicia representative of said prede-termined information and associated data;
providing at locations proximate to said points of use an indication of information and associated data being distributed in accordance with an associated, interchangeable record medium;
enabling selection by a user of desired information from the information and associated data being distributed;
responding to a selection of desired information for sensing predetermined information indicia in a corresponding message block portion of said associated record medium;
providing transitory distribution of information represented by said sensed indicia;
enabling a request by said user for said printed ticket containing associated data;
responding to one of said requests to cause sensing of the associated data in said corresponding message block portion; and
providing said printed ticket containing data representa-tive of said sensed associated data.

21. The method of distributing information of claim 20 further including the step of printing on said printed ticket machine readable data indicating the time and location of providing said ticket.