

[54] SEMI AUTOMATED RETAIL STORE

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[22] Filed: Mar. 3, 1971

[21] Appl. No.: 120,465

[52] U.S. Cl. 186/1 R, 214/16.4 A

[51] Int. Cl. E04h 3/04

[58] Field of Search 186/1 R, 1.2 AC,
186/1 B, 16.4 R, 16.4 A

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[57] ABSTRACT

Retail store equipped for both self-service and order service wherein the order service portion displays coded samples of goods, supplies of which are stored in coded areas of a storeroom with signal lights for each area of the storeroom which is traversed by a truck for order filling. A store control station includes a computer for comparing with its memory a customer filled-out order for activating in the storeroom goods-signal lights, a lit set of which relate to a customer's order for goods. The truck is equipped with a computing device to read a plurality of order cards. Goods are delivered from the truck terminis by conveyor to final check out and the customer is notified by a call board when her order is ready. A storage conveyor is provided for holding goods at their final check out adjacent an auto pick-up zone.

4 Claims, 8 Drawing Figures

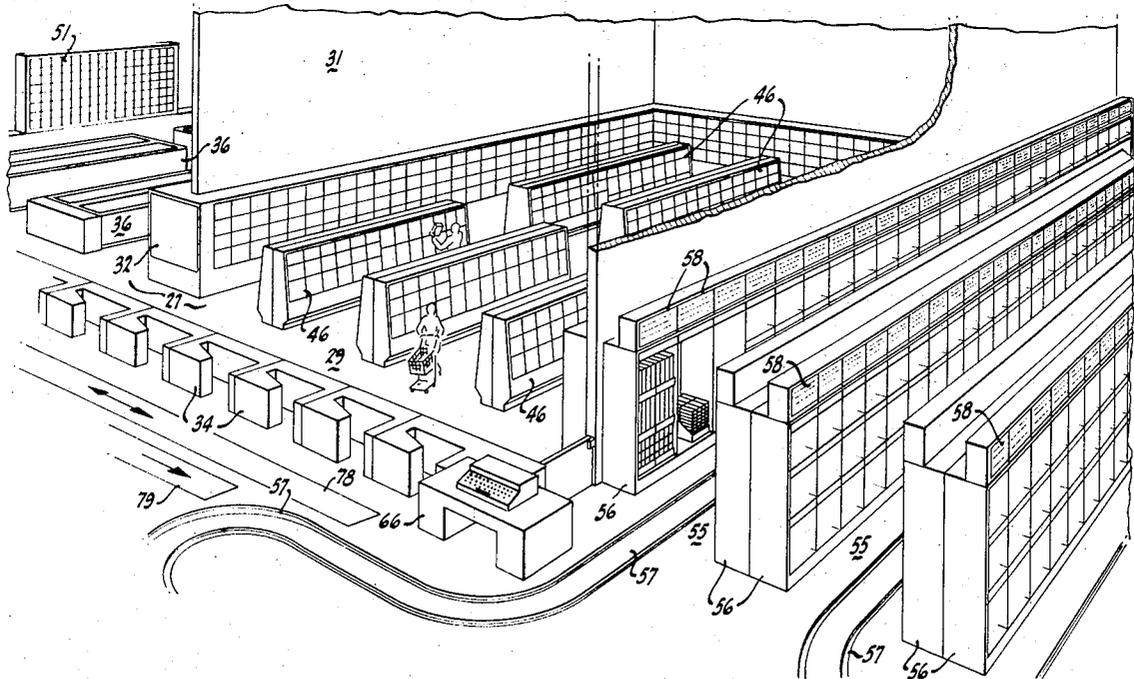
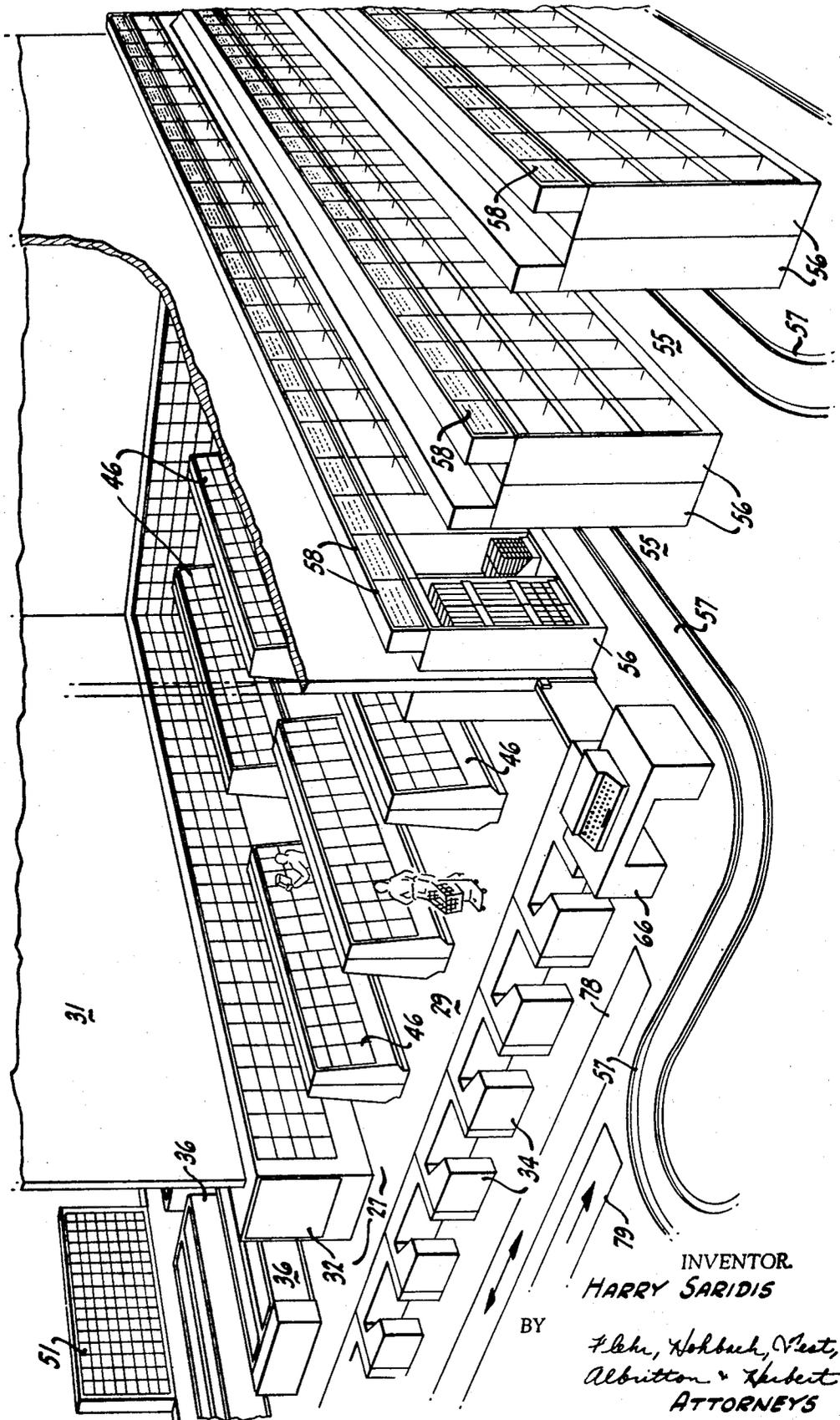


FIG. 2



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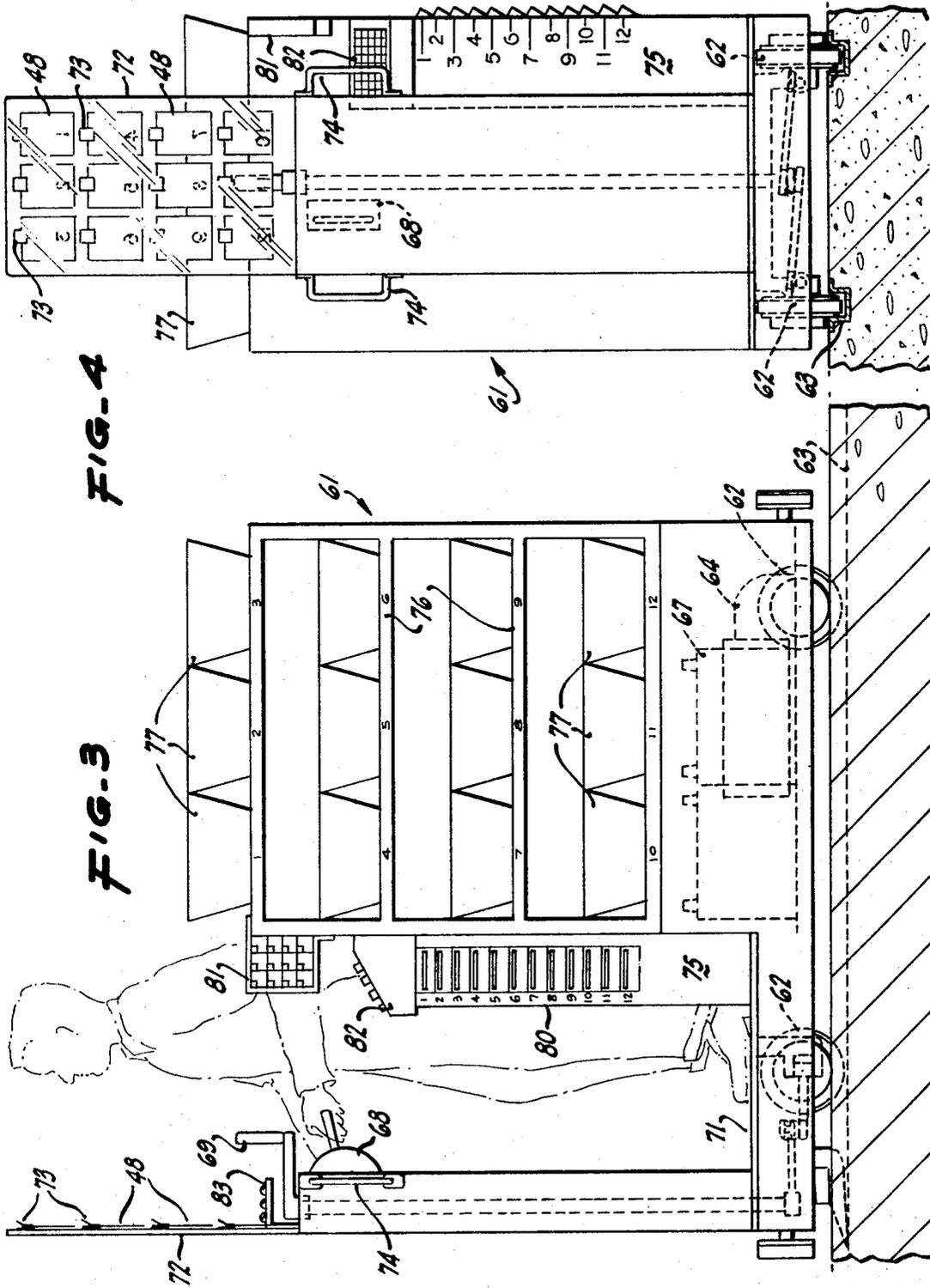


FIG. 4

FIG. 3

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NAME		123	
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QUANTITY	ITEM NUMBER	QUANTITY	ITEM NUMBER
1	A250	2	S 22
1	A253	1	T 2
1	A285	1	w 20
1	A281	1	ix 38
1	4 A 34	1	2x 12
1	5 A 22	1	3x 9
2	B 10	1	4x 26
1	C 6	1	5x 62
1	D 2 R	1	6x 88
1	E 7 W		
1	F 12		
1	G 17		
1	H 19		
2	K 34		
1	L 95		
1	M 135		
3	N 285		
1	O 105		
1	P 15		
1	R 16		

FIG-5

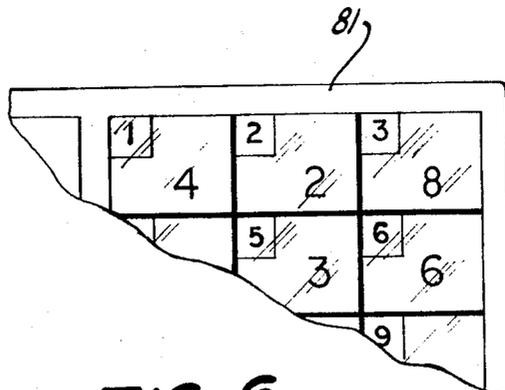


FIG-6

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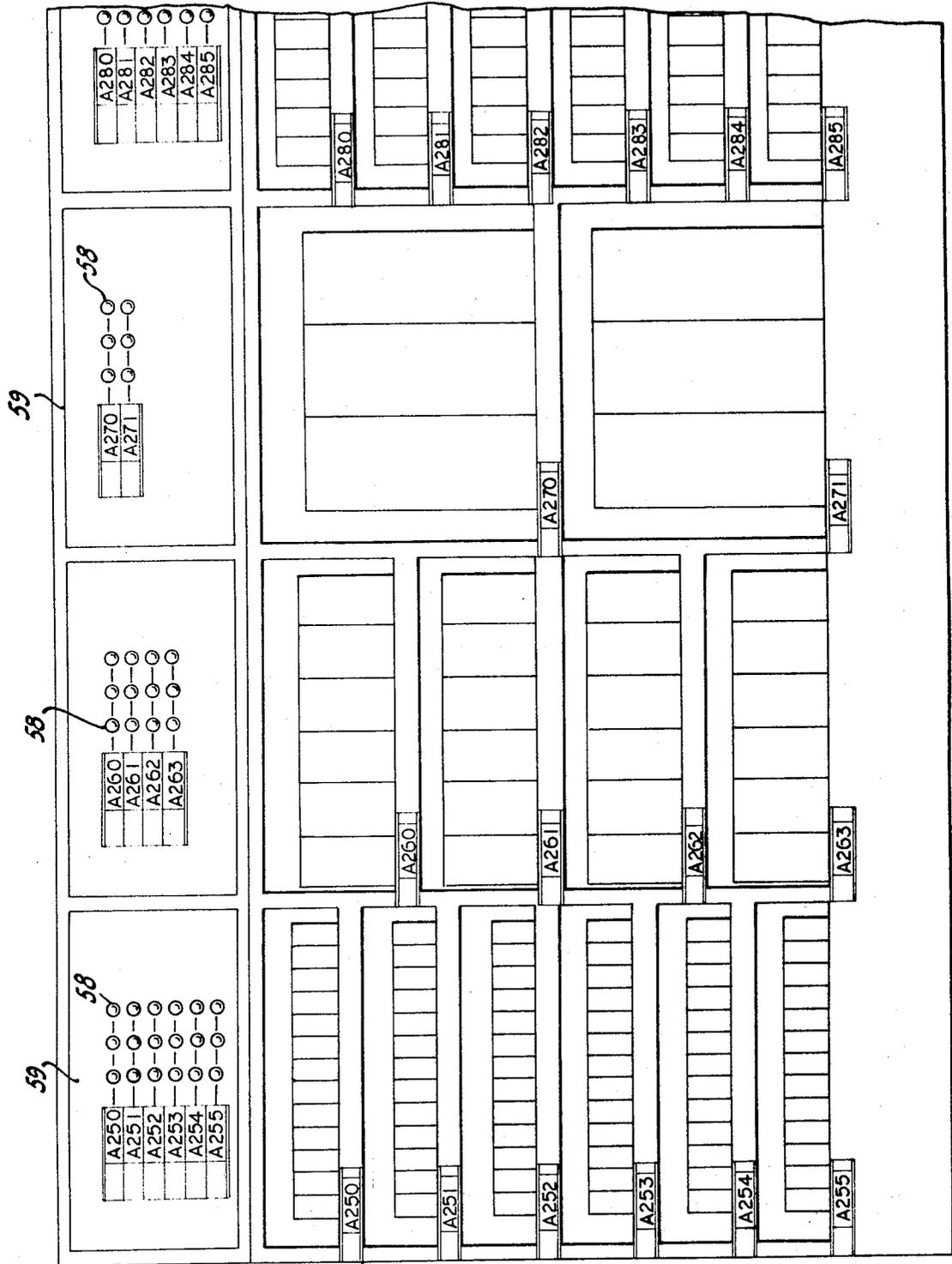


FIG. 7

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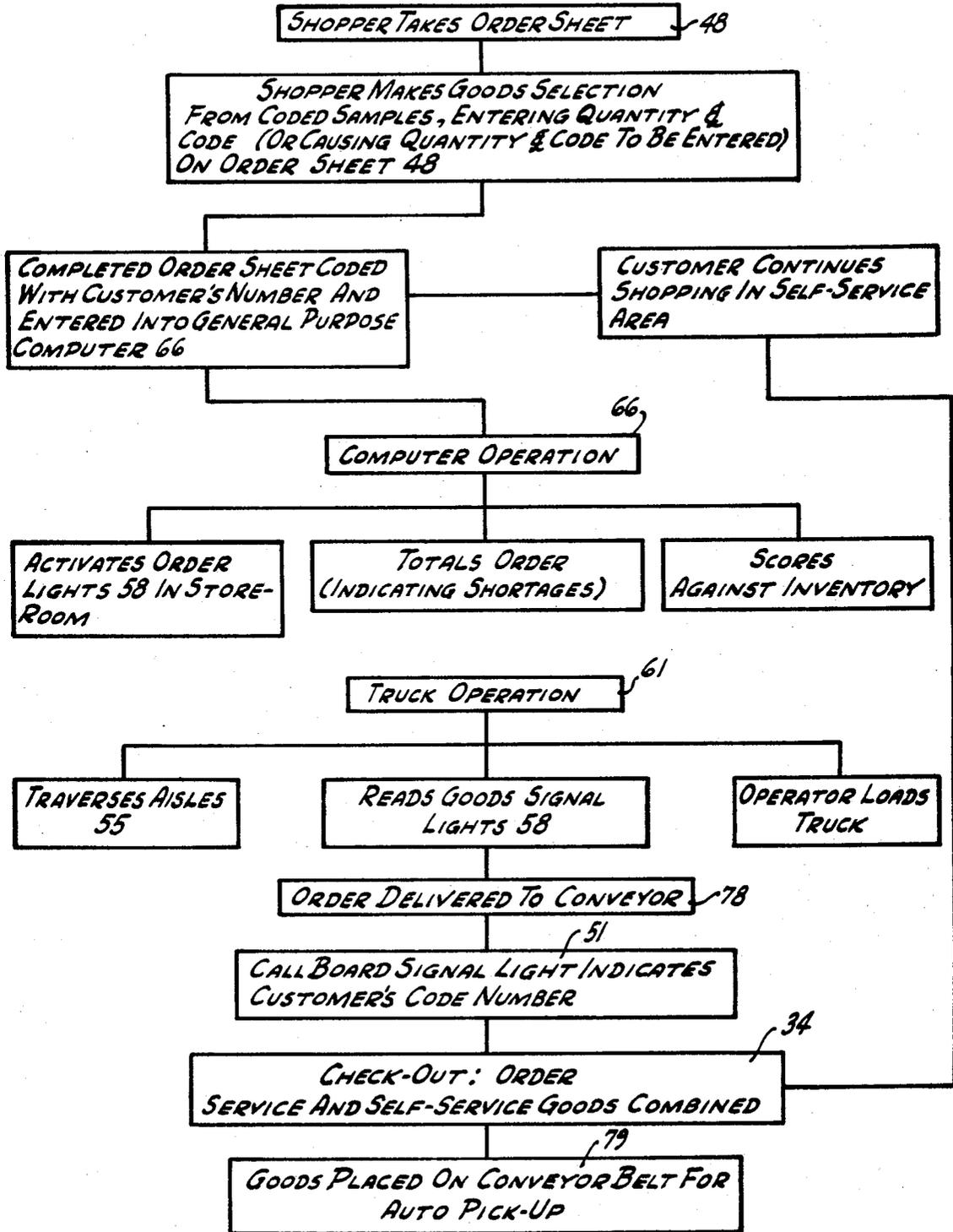


FIG-8

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SEMI AUTOMATED RETAIL STORE**BACKGROUND**

This invention relates to retail store constructions including supermarkets, and particularly concerns stores wherein the storeroom is efficiently organized for order filling.

The modern large retail store represents a substantial investment in land and building, and a sizeable operation expense including employees salaries. The size of the investment in land and building may be appreciated from the fact that, for example, supermarkets commonly have from 20,000 to 30,000 feet of floor space area available for their display and sales of goods as well as an outside parking lot with spaces for 100 or more automobiles. The high cost and scarcity of desirable sites for supermarkets and similar retail stores discourage investors from investing in this area.

Especially in the large contemporary supermarkets substantial quantities of goods are stored on the display floors so that the customer may select the products she needs, placing them in the shopping cart or personally carrying the goods in packages. Store employees visually monitor the quantity of goods on the floor and replenish stocks as needed. Thus a substantial amount of store space is invested in shelving which is canvassed by the shopper as the store is traversed. Being that much of the merchandise in the supermarket is pre-packaged and thus has an identical exterior appearance (as contrasted to produce, delicatessen, and meat products) a substantial amount of floor space may be conserved if only one or two of each item were displayed in the sample area. Moreover, goods which are not pre-ticketed must be individually price marked by a store employee prior to shelving the goods in the display area and this operation absorbs significant store operating manpower.

Shoplifting nowadays accounts for as much as 5 percent of a store's operating expenses and its elimination or substantial reduction is a long sought goal of store operation.

"Storeless" shopping systems have been proposed to take advantage of modern concepts in communications and data processing. Certain of these systems substitute for the displays in a store, catalogs and newspaper advertisements with telephone communication from the customer to the store. These systems have not achieved their potential for a number of reasons including lack of an efficiently organized and operated stockroom wherein the customer's order can be quickly identified, filled, totalled and delivered to the desired location.

SUMMARY OF THE INVENTION AND OBJECTS

In summary, the invention concerns a semi automated store arranged in a building and having a customer entrance and exit. The store is compartmented to define a merchandise stockroom and a merchandise display room, the latter being arranged into a shoppers' self-service area and a goods sample display area wherein the goods are coded. Stocks of goods are segregated in the stockroom according to codes corresponding to those of the samples in the display room and indicator means are located proximate the stocks of goods which are arranged along aisles which may be traversed by a self-propelled truck for filling customer orders. A control station in the store includes a computer device having in its memory a catalogue of goods

code numbers and the location of each product, the computer being coupled to the indicator means so that an operator may receive and tabulate the customers' orders and actuate the corresponding indicating means in the stockroom. A second operator receives the customer order card while the customer shops in the self-service area of the display room. The apparent to persons acquainted with the act upon reading the following specification in view of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

operator-filled order for goods is placed with the tabulated order card on a first conveyor for movement to a check-out station and a customer call board is positioned in the display area indicating to the customer that her order has been filled.

An object of the invention is to provide an improved retail store construction where goods are sold to the customer through two systems: self-service and customer order.

Another object of the invention is to provide for a store, a stockroom organized and equipped for rapid and efficient filling of a plurality of orders in substantially the same order-filling operation.

Another object of the invention is to provide a supermarket wherein there is eliminated price marking and storage of goods in the display room area.

Another object is to provide a store of the type described wherein it will be unnecessary for the customer to push a cart heavily loaded with goods or carry the items throughout the store while shopping therein.

Another object of the invention is to provide a supermarket wherein the customer may pass more quickly through the check stand area, having her order more quickly totalled and packaged than was possible heretofore.

Another object of the invention is to provide a retail store arranged to substantially reduce the incidence and cost of shoplifting.

Other objects and purposes of this invention will be FIG. 1 is a plan view for a retail store, including a storeroom, constructed according to the invention;

FIG. 2 is a fragmentary perspective view of the store shown in FIG. 1;

FIG. 3 is a side elevation view of a self-propelled truck employed in the stockroom of the present store;

FIG. 4 is a front view of the truck of FIG. 3;

FIG. 5 shows one form of a customer order sheet used in the store of the present invention;

FIG. 6 is an enlarged fragmentary view of a readout display for order filling on the truck of FIGS. 3 and 4;

FIG. 7 is an enlarged, fragmentary elevation view of the stockroom goods storage facility along the side of one aisle; and

FIG. 8 is a flow diagram for the combined self-service and order service store.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Considering FIGS. 1 and 2 of the drawings there is shown a semi automated store arranged in a building 10 having a customer entrance 11, a customer exit 12 and a goods exit 13 arranged along an exterior auto pick-up zone 14 adjacent to the store's parking lot 16.

The building 10 includes a floor 17, although it may be a two-story structure, and perimeter walls 18 having

a rear entrance 19 arranged adjacent to a truck unloading dock 21. At the opposite side of the building, a second truck unloading dock 22 is provided.

The floor of the store is functionally partitioned into a merchandise stockroom area 26 and a merchandise display room 27, the latter being arranged into a shoppers' self-service area 28 and a goods sample display area 29. Although a floor to ceiling partition 31 is satisfactory to separate the self-service from the goods sample display area, the boundary between the two areas may be visually open and established simply by the arrangement of the goods showcases 32. Where a partition wall 31 is employed, however, it may serve to contain advertisements of goods offered in the store.

In the merchandise display room 27 proximate the customer entry-exit portion, there is disposed a facility 33 to contain shoppers' carts (not shown) and adjacent to which there extends an array of check stands 34 which may be of conventional arrangement with the exception that the shopper does not follow the shoppers' cart through the check stand.

In the self-service area of the merchandise display room, there may be arranged a plurality of display counters 36, 37 for goods such as produce, meats, bread, sode pop, delicatessen, etc. as to which there is marked customer preference for individual selection. A meat counter 38 may be arranged along one side of the area and may be supplied from the meat processing area 39 will access to a back room area 41 which may contain refrigerators and the like.

In the goods sample display area 29 there is arranged a plurality of goods display cabinets or stands 46 wherein one or two samples of each item of goods sold from this store facility is displayed in an individual compartment or zone in a matter whereby the customer may closely examine the product, inspect its label, and price but may not remove the sample from the cabinet. Adjacent each specimen or sample of merchandise there is arranged in the stand 46 a code pertaining to that sample. For example, the code A250 may relate to a 16 oz. can of DelMonte cling peaches; the code number A251 may relates to a 16 oz. can of DelMonte pears; and the code number A252 may pertain to a 24 oz. can of V-8 juice. The prices of the respective products are indicated on the displays adjacent to the product and the product code. Thus each item on display in the sample display area 29 has an individual item number or code number.

The product may be selected by the customer by placing the code number on an order sheet 48. One example of an order sheet 48 is shown in FIG. 5. The exemplary code numbers may be placed on the order sheet manually by the customer either by using a pen or pencil. Thus in FIG. 5 the customer has written on the order sheet in the quantity column 1 item pertaining to coded product A250 which signifies one 16 oz. can of DelMonte cling peaches; one of product A253; one of product A285; and one of product A281.

An alternate form of order sheet may comprise a punch card or tab card compatible with data processing equipment and wherein the goods sample display facility is equipped, as for each variety of merchandise, with a card indicator such as a magnetic ink marker or punch and a numerical selector for the quantity desired. With the use of such a card, the customer would necessarily select the desired quantity prior to causing the card to be marked or punched for the number of

goods desired. The card would be inserted in the card marking apparatus as is well-known in the art.

As the customer traverses the sample display area 29, she carries an order sheet 48, for example, shown in FIG. 5, upon which she may fill in the quantities and the item numbers desired. The order sheets 48 are obtained by the customer from an information booth or store operator's station 66. The order sheet 48 is also provided with a space 49 for a customer code number. A customer call board 51 can be activated to call the customer's code number when her order is ready for handling at the check stand. The customer call board 51 is equipped with variable indicators for registering a plurality of different numbers simultaneously so as to signify to customers that their respective orders are ready. Typical indicators are "Nixie" tubes (trademark of the Burroughs Corporation) and their functions are well-known.

Referring to FIGS. 2 and 7, within the merchandise stockroom 26, the goods are arranged in compartments or shelves 56 in their original packing cases, insofar as possible, for easy access. The goods are not price marked, thus saving substantial labor costs.

The shelves 56 are arranged along parallel aisles 55 through which extends a trackway 57 which is traversed by a self-propelled truck 61, FIGS. 3 and 4. Each of the compartments or shelves 56 carries a code number relating to the product disposed on the respective shelf. For example, a supply of 16 oz. cans of DelMonte cling peaches, code number A250, is stored on shelf A250; a supply of 16 oz. cans of DelMonte pears, code number A251, is stored on shelf A251; etc., all in their original packing cases, and all without price marking.

The shelves are arranged in tiers and may extend upwardly to a height conveniently reached by a worker, for example, 5 feet, 6 inches. Atop each tier of shelves there is disposed an indicator array 58, FIG. 7. Each indicator array is provided with the codes for the goods shelved there below and a plurality of indicator lights 59, three being shown herein by way of an example. The lights 59 should desirably be of different colors, for example, a first vertical row of lights could be colored red, the second, blue, and the third, yellow. The number of colored lights should be in direct relation to the number of trucks 61 used at one time in the storeroom so that each of the trucks may track a single colored light system.

The array of indicator lights 59 are switched between the illuminated and the non-illuminated conditions in response to signals received from a general purpose computer 66. The computer 66 may be arranged at any easily accessible position in the store and, as shown in FIG. 2, one such position is adjacent to the check stand area. The computer 66 is provided with a program containing a catalogue of all the goods code numbers, their quantity, selling price and location in the storeroom as represented by the individual indicator lights 59. A reader is coupled to the computer to scan the order sheets or cards such as by optical scanning, magnetic scanning or similar methods known in the art. The computer 66 serves to process the order sheets or order blanks 48 through the reader by making a comparison with its memory. The computer is programmed to perform the arithmetic function of totalling the dollar amount involved in the order, to post deficits against inventory corresponding to the number of goods listed

on the order blank, and to switch on to the illuminated condition the corresponding indicator lights 59 relating to the goods signified on the order sheet. The computer 66 and its functions as specified herein are known and understood in the art.

Referring to FIGS. 3 and 4, the self-propelled truck 61 is equipped with rubber-tired wheels 62 permitting it to operate both in the open channel track members 63 of the trackway 57 and upon a conventional floor surface. One pair of the wheels 62 may be driven by an electric motor 64 powered by storage batteries 67 arranged in circuit with a rheostat control 68 disposed at the operator's station. Alternatively, electric power may be drawn from an external source such as from an overhead wire system for the motor 64. An auxiliary steering tiller 69 is mounted at the operator station 71 for use when the truck is driven outside of the trackway 57. As may be appreciated, when operated on the trackway 57, the truck 61 is self-steering. On opposite sides of the operator's station, hand rails 74 are provided to enable the operator to quickly regain his position on the vehicle after leaving it to reach for goods from one of the compartments on the shelves 56.

A plurality of shelves 76, for example, four, are provided on the truck with each shelf having a plurality of positions or stations thereon so that, as shown in FIG. 3, the truck provides 12 positions on four shelves. In each of the 12 positions there is arranged a box 77 which will serve to contain one of the orders to be filled as the truck traverses the aisles of the storeroom. Preferably, the boxes 77 are trapezoidal in cross section so that they may be stacked one upon the other.

To assure efficient use of the truck and of the operator's time, the truck 61 is equipped so that the operator may rapidly perceive the information on the order sheets and apply the required goods to the orders. More particularly, there is shown in FIGS. 3 and 4 two systems for reading the order sheets, a visual system and a machine system. Referring to the visual system, it will be seen that a transparent panel 72 is arranged at the operator's station 71 and is equipped with 12 clips 73 for holding order sheets in full view of the vehicle operator. Each clip is numbered to correspond to one of the 12 positions for the boxes 77 on the shelves 76. Thus as the operator of the truck arrives at goods storage bin having a light 59, illuminated of a color he is tracking, he must scan the 12 order sheets to learn the quantity of the product required for the order or orders. He then steps from the truck, retrieves from the shelf or bin the quantity of the product required for the order and places this in the box 77 corresponding to the order sheet. In this manner, each of the 12 orders may be filled by a single operator by making one traverse of the stockroom.

A second system for scanning the order sheets involves a computing device 75, including a keyboard arranged to receive the codes selected by the store for its goods and a numerical display unit 81, FIGS. 3 and 6. The computing device 75 includes a reader 80 for scanning a number of cards equal to the stations on the shelves 76. Thus each of the 12 reader positions, shown in FIGS. 3, is adapted to receive one of the order cards and reads the cards by optical scanning or the like.

The keyboard or console 79 is equipped so that when the truck operator approaches a shelf wherein one of the lights 59 is illuminated having a color which he is tracking, he may enter the associated code number in

the console or keyboard, for example, A250, and the reader 80 will read each of the 12 cards and indicate on the numerical display unit readout 81 the station upon the shelves which is to be filled, as well as the quantity required. It will be recognized from FIG. 6 that the numerical display board readout will indicate a similar number of stations as there are stations on the shelves 76 and that each of the 12 stations on the readout carries a corresponding fixed number or other designator. The display unit is equipped with variable indicators for registering the number or quantity of goods required for each station. Typical indicators are "Nixie" tubes (trademark of the Burroughs Corporation) and their functions are well-known. As shown in FIG. 6, position number 1 on the shelf requires four items; position number 2, two items; and position number 3 requires eight items of the product entered into the keyboard 79.

So that the operator may have in mind which of the three system lights 59 he is tracking, there is provided at the operator's station three remainder lights 83 corresponding in colors to those on the light array. Only one of the three lights 83 is illuminated by conventional switch means so as to serve as a reference. Thus the operator may track red, blue or yellow and be reminded of such by the reference 83.

When the truck operator has completed an order-filling trip through the storeroom, he stops the truck adjacent the terminus 84 adjacent the computer 66, and there cancels or switches off all the indicator lights 58 he tracked on the passage through the storeroom. To indicate to the customer that her order is ready, the operator causes the call board 51 in the goods display room to register the individual customer's order number.

OPERATION (FIGS. 1, 2, AND 8)

In one phase of the invention which pertains to a semi automated store, the customer plays a goods selecting role while the store personnel play a goods supplying role. As the customer enters through the store entrance 11 she may chose a shopping cart from the facility 33 and obtain an order sheet 48. If she chooses, the customer may write her name at the appropriate spot on the order sheet and should then proceed directly to the goods sample display area 29 where packaged goods, canned goods, and the like are displayed along with their respective code numbers. The customer writes in the code numbers of the selected products and the number of packages desired. In this way the order sheet 48 is completed by the customer as to the quantity and the items desired.

After the customer has finished her shopping in the sample display area 29, she submits her completed order sheet 48 to an operator of the computer 66 and obtains a customer code number so that the order may be filled from the merchandise stockroom 26. While the order is being filled from the stockroom, the customer may continue shopping in the self-service area 28 for meats, bakery goods, fruits, vegetables, delicatessen, etc.

As the customer continues her shopping, the operator of the computer 66 enters the order from the sheet 48 into the computer. The computer performs its programmed functions of actuating the indicator 58 over the individual bins of canned goods, packaged goods, frozen foods, dairy products, non-foods, etc. corre-

sponding to the good code on the order sheet. Further, the order is totalled to indicate the monetary sum involved which is printed out on the outer sheet 48. The store's inventory is reevaluated in view of the quantity subtracted from the inventory for filling the order.

After the order sheet has been processed, it is taken up by the operator of the truck 61, together with a collection of other order sheets, for example, 12, which may be serviced in the same trip along the trackway 57. The operator with the truck 61 then traverses the trackway 57 through the merchandise stockroom, tracking only one of the light systems, e. g., red, blue or yellow, as shown by the remainder light 82 on the truck. The operator stops the truck adjacent each activated indicator and visually reviews the order sheets 48 in front of him on the panel 72 and places the goods in the appropriate boxes 77.

Upon completing his run at the terminus 84 (FIG. 1), the truck operator turns off the indicator lights over the bins he has contacted.

Alternatively, the truck operator places the order sheets into the reader 80 upon the commencing of his trip to the stockroom, the reader being able to accommodate in the exemplified embodiment 12 orders. When the truck reaches an area of the stockroom having an illuminated indicator being tracked by that particular truck, the operator stops the truck, visually inspects the light illuminated to detect the code number associated with it. He then places the indicated code number into the keyboard 79 of the reader and takes the readout on the display board 81 which will indicate to him the quantity of a coded product required and the location where that such quantity is to be placed in the 12 positions on the truck shelves. Any deletions or omissions are reconciled by the vehicle operator upon completion of this trip and the dollar total of the individual order sheet 48 is adjusted accordingly. The operator then cancels or extinguishes the indicator lights he was tracking. The box 77, or a plastic bag setting in box 77 containing the goods ordered from the storeroom, is placed upon a cart and wheeled onto the storage conveyor 78 adjacent to the check stands 34. At this time, the truck operator causes the call board 51 to indicate the customer's code number signaling that the order is ready for handling at the check stands. If the customer has completed her shopping in other parts of the store at this time, she may visit the check stands for final checkout.

The check stand operator actuates the bi-directional conveyor 78 to bring the cart with the customer's box 77 so that she may retrieve the order sheet totalled thereon. The total of this order sheet is added to that total of goods the customer herself has selected. Should the customer desire auto pickup, the entire supply of goods is placed upon the cart which is wheeled onto a second floor level conveyor 79 proximate to the goods discharge exit 13. The customer may drive her automobile down the auto pickup driveway 14 and stop adjacent to the auto pickup zone adjacent one of the openings of the goods exit whereupon a store clerk will load the goods from the cart or move the cart from the conveyor, load the goods from the cart onto the automobile and the customer may be on her way, empty carts are put on the conveyor 79 to be re-used.

The above described store arrangement eliminates a substantial amount of labor in transferring the goods from the warehouse area onto the shelves in the goods display area. In this arrangement the goods are retained

in their original packing cases in the store storage area and the orders are filled therein. This store may operate consequently with fewer personnel. By reason of the reduction in floor space devoted to shelving of goods, a much more economical store may be realized. The store may be arranged on two levels with the merchandise stockroom on one level and the display room or rooms on another. Moreover, the present store row arrangement may be operated as an adjunct to catalogs, goods display or newspaper advertisement display or description of goods.

From the above description of a preferred embodiment of the invention, it will be appreciated that variations may be made in the structure without departing from the spirit or scope of the invention, and that the scope of the invention is to be determined by the scope of the accompanying claims.

I claim:

1. In a semi automated store arranged in a building and having therein a customer entrance and exit, the improvement comprising a first area of the store serving as a stockroom, a second area serving as a goods display area, said display area being arranged into a shopper, self-service area and a goods sample display area, samples of goods therein having individual identifying codes associated therewith, a supply of order cards for filling in by the shopper as to requirements of the goods in the sample display area, said goods stockroom containing along aisles stocks of merchandise corresponding to the samples in the display room, a first computing device equipped to read the customer order cards and including a program containing a catalogue of goods in the stockroom, their quantity, price, and location in the stockroom, signifying means in the stockroom operatively coupled to said first computing device serving to indicate goods listed on said order card processed by said computing device, a self-propelled truck operative through said stockroom serving to permit an operator thereof to transverse the aisles therein for filling the customer's order listed on the order card, a plurality of order stations on said truck, a second computing device associated with said truck and equipped to read a plurality of order cards equal to the number of order stations on said truck, and to signify which, if any, ones of said truck order stations require goods, and their respective quantity, listed on said order card, and means for placing said signifying means in the non-signifying condition following completion of the order-filling operation from said stockroom.

2. The combination of claim 1 and including an array of check-out stations, a first bidirectional, goods holding conveyor extending between said check-out station and the terminus of said storeroom truck, a goods exit arranged in a wall adjacent to said check-out stations, an auto pickup zone outside said goods exit, and a second conveyor extending along said goods exit.

3. The combination of claim 2 and further including means in said store for notifying the customer that the order has been completed.

4. In a store having means for displaying a variety of products, each of which has an individual identifying code and having order cards to carry indicia of the customer's order for the goods displayed, the improvement comprising a stockroom having therein arranged along aisles stocks of products corresponding to those displayed, a first computing device

equipped to read the customer order card and including a program containing a catalogue of goods in the stockroom, their quantity, price and location in the stockroom, signifying means operatively coupled to said first computing device serving to indicate goods listed on said order card processed by said computing device, a self-propelled truck operative through said stockroom serving to permit an operator to traverse said aisles therein for filling customers' orders listed on the order cards, a plurality of order stations on

said truck, a second computing device associated with said truck and equipped to read a plurality of order cards equal to the number of order stations on said truck, and to signify which, if any, ones of said truck order stations require goods, and their respective quantity, listed on said order card, and means for placing said signifying means in a non-signifying condition upon completion of the order-filling operation.

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