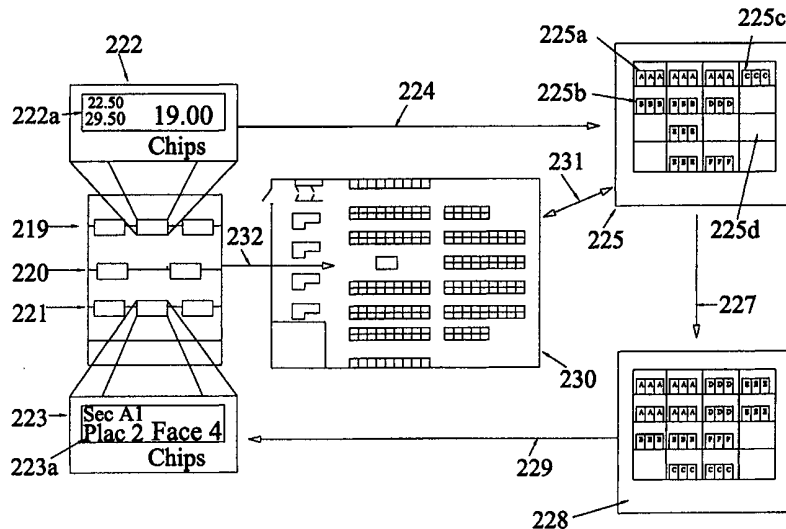




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(54) Title: DEVICE AND APPLICATION FOR FACILITATING, MAKING MORE EFFICIENT AND CONTROLLING THE REPLENISHING AND REMOVAL OF GOODS (ARTICLES) IN PREMISES, PARTICULARLY IN SHOPS



(57) Abstract

For one or more product lines that can be placed on shelves in a shop, a device is used which works with two sub-functions. A first sub-function relates to the exchanging of price information and other information between a computer system and electronic labels positioned on the shelves via wire-based, two-way communication. The second sub-function relates to representations generated in or on the computer system of all or parts of the shelf system showing the shelves with goods completely or partially replenished or removed. The first and second sub-functions work together and provide, at different detection points and different locations of the goods, compilations or indications of the removal of goods caused by the customers of the shop. The compilations or indications are used as the basis for evaluations of the relationship of the removal of goods to the location of the goods or commodities on the shelves.

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## DESIGNATION

Device and application for facilitating, making more efficient and controlling the replenishing and removal of goods (articles) in premises, particularly in shops.

## TECHNICAL AREA

The present invention relates to a device for use in premises, particularly in shops, for facilitating and controlling the replenishing and removal of goods or articles which are placed, preferably in groups, on display or presentation surfaces arranged in sections, here called partial surfaces. The device includes or interacts with a computer system that consists of one or more computers and receives, monitors and processes goods-related information which can consist of the amounts of goods placed on the partial surfaces, brands, prices, locations, etc. The computer system transfers and receives information to and from units located in association with the above-mentioned partial surfaces which can give display information to the customers or users of the premises or shop and also retransmit at least part of the display information to the computer system via a two-way communication system based on a wire connection to the shelves, partial surfaces, etc.

The present invention also relates to a device for a product line that can be placed on, for example, shelves in shops. The device can have two sub-functions, where the first sub-function is related to an exchange of price information and other information between a computer system and electronic labels located on the shelves via wire-based bi-directional communication.

The invention also relates to an installation with computer links, for example between main computer, shop computer, planning system computer, etc, where labels or devices that work with informational signals or data are

arranged in connection with the above-mentioned sections or product lines.

The invention also relates to a strip arrangement for the  
5 above-mentioned devices or labels.

The invention also relates to an application of a device that works with two sub-functions, where the first sub-function relates to the exchange of prices and information via  
10 wire-based two-way communication between a computer system and electronic labels located on the shelves, and the second sub-function relates to representations of all or parts of the shelf system with goods that are completely or partly placed on or removed from the shelves represented in or on the  
15 computer system.

The present invention can also relate to a device for an information system for stores, shops, warehouses or other premises. The device comprises display units arranged on  
20 strips that are located in the store, shop, warehouse or premises in question, whereby the display units are able to work in conjunction with a computer system. In one exemplary embodiment the information system can be used to collect, display and report information in the store, shop or premises  
25 in question, where the display of information is carried out on a number of information display units, on which user-defined information can be displayed and where the system of units is connected to the shop computer system of the shop or store.

30

The display units can consist of units for the display of temperature in freezer cabinets or heated cabinets or of units for the display of price information for goods or product lines. The information on the display units can be changed by  
35 the shop personnel, the customers or other persons concerned. The units can contain or interact with sensors for the required data.

## THE POSITION OF THE TECHNOLOGY

Devices for the first sub-function for pricing and information systems that work with wire-based, two-way  
5 communication between labels/sensors/devices in the shelf systems/product lines and the centrally-located computer are already known and reference can be made here to the 3i system that is installed in shops in Sweden and abroad.

10 There are also known systems that identify and display the locations of shelf systems in the shop that can be used to help the shop's customers so that by interactive use of a computer terminal they can identify the location of the shelf/product line in the shop and the location of the  
15 different goods on the shelf system or the like. Use of computer systems that include shop computers, information computers, planning computers, information-providing equipment at the checkouts, etc, is also known.

20 DESCRIPTION OF THE INVENTION  
TECHNICAL PROBLEM

There is a need to be able to process the current information that is available in shops or chains of shops and  
25 to display the processed information in a simple and clear way and, dependent upon this processed information, control the functions in the handling of goods. The present invention solves this problem.

30 Pricing and information systems normally represent a relatively large investment for the shopkeeper. The system comprises a computer system that is located centrally and peripheral equipment at, for example, the checkout(s) that detects the flow of goods going out with customers and  
35 transfers the information about this to the central computer. Control of, among other things, the product lines displayed and set out in the shop is also obtained by means of the computer system. The price of the goods can also be displayed

and changed in a rational and economical way. However, there is a need for the computerized support systems for the shop's personnel, management, operators and others to be able to be supplemented by additional support functions. The invention is also intended to solve this problem.

There is a need to be able to provide the shopkeeper with a tool (support) with which he/she can optimize or increase the purchase intensity of certain or selected goods. For this, the system must be able to take into account the clientele for the offered goods, the customer intensity, opening hours (special opening hours), wages and pension payment days, etc. The tool must also be useful in connection with new installations of shops and premises that are to accommodate goods, articles, functions, etc. The invention is also intended to solve this problem.

In an extension of the computer support system's function there is also use of adaptive functions where the shop's operator or equivalent can be offered learning functions in the system which can be characterized by various different parts of product lines, customer categories (with regard to age, ability to pay, etc.), location of shop, opening hours, etc. The invention is also intended to solve this problem and proposes that the learning is to be built up gradually upon already-made configurations of product line locations and sales of goods. There is to be a storage function for the storage of experiences gained in the shop and from other shops (for example within the same chain of shops) and also a comparison function or functions with relevant practical instances. The invention also solves this complex problem.

There is also a need for already existing and installed pricing and information-providing systems for goods in shops to be able to be used by supplementing them with the new functions. The invention also solves this problem.

In this connection, it is important that the functions in the respective systems are not made worse or more difficult to handle. The invention solves this problem. So, for example, the display system for the layout of the shop and the location  
5 of the product lines will still be available to the customers while at the same time being able to be used for the above-mentioned improved support function.

It is also important, in connection with the combined  
10 information-handling and communication system of the above-mentioned type, to be able to locate the main computer and the management units from the point of view of function and also labels and devices that work with informational signals or data and thereby be able to determine and monitor functions in  
15 the premises (the warehouse) or shop in an efficient way. The layout of the main computer or computers, the units and the devices is therefore of great importance. In one embodiment it must be possible to carry out ordering and flow functions in an efficient way, while in addition having access to  
20 architectural and fitting out information, planogram information, positioning information for goods or articles, checkout and sales information for the goods or articles, customer throughput information and statistics from optimally functioning shop-fitting layouts and flow patterns for goods  
25 or articles. The invention is also intended to solve this problem.

It is also important to be able to arrange the devices or the labels in an efficient way based on the existing strip  
30 arrangement in connection with the product lines and articles. The construction of the strip is therefore of great importance, among other things for being able to identify the position of the device or the labels on the respective strip. The invention also solves this problem.

## THE SOLUTION

What can principally be considered to be characteristic of a device as claimed in the invention is that the units are  
5 designed to provide first information regarding the commodities on the different partial surfaces and that the computer system is designed, depending upon the first information, to provide a graphical representation of the current location of the commodity on at least one group of  
10 partial surfaces.

In a preferred embodiment, change information already in the computer system or supplied to the computer system concerning the repositioning to other partial surfaces of one  
15 or more commodities arranged in groups is represented by data that is combined in the computer system with data that is used as the basis for the above-mentioned graphical representation or first graphical representation. The computer system can also be designed so that, as a result of the above-mentioned  
20 combination of the above-mentioned data, it displays a second graphical representation that shows the above-mentioned repositioning(s). The above-mentioned second graphical representation can thereby be used as the basis for the actual repositioning of commodities on the partial surfaces. In a  
25 further embodiment, the computer system can extract from the second graphical representation representative control data for the unit or units that are situated at the partial surface(s) to which one or more of the commodities concerned is intended to be moved. The respective unit thereby receives  
30 information about the commodity concerned. The second geographical representation, or the information extracted from this concerning the partial surface(s) to which the repositioning is intended to take place, can be transferred to portable equipment that can be allocated to the people who are  
35 going to carry out the repositioning. The computer system in question can comprise or be connected to information computers. The respective unit is connected or can be connected to the information computer in order to provide



information about the repositioning of commodities within the group of partial surfaces.

In a further embodiment, the computer system includes devices that provide information, for example in the form of a checkout computer or shop computer that shows the actual removal of the commodities from the partial surfaces. The first graphical representation can thereby show the actual stock of goods on the partial surfaces calculated from the most recent replenishing time for the commodity. The above-mentioned information-providing device, for example in the form of a shop computer, can also show the actual replenishing of commodities on the partial surfaces. The graphical representation can thereby show the actual stock of goods on the partial surfaces calculated from the most recent replenishing time for the commodity and before further removal from the partial surfaces.

A device as claimed in the invention can be considered to be characterized by the computer system being designed to combine the information related to the premises or shop, and to the different commodities, with information extracted from the above-mentioned units concerning the commodities, on the different partial surfaces, and as a result of this combination to display graphically or cause to be displayed graphically the location of the commodities on their allocated partial surfaces.

The graphical representation can thereby show the present stocks of goods on the different partial surfaces and in addition can be used as the basis for a change carried out by means of change or supplementary information in the computer system concerning the repositioning of the commodity on the partial surfaces in order to refine the exposure and sales profiles.

The factor that can be principally considered to be characteristic of a device as claimed in the invention is,

among other things, the fact that the second sub-function refers to representations effected in, or on the computer system of, all or parts of the shelf system with the completely or partially replenished or removed goods on the shelves. A further characteristic is that the first and second sub-functions are designed to work together, and from different detection points and different locations of the goods, to compile or describe removals from the shelves caused by the shop's customers with the aim of making possible an evaluation of the removal of goods in relation to the location of the goods/commodities on the shelves.

In embodiments of the invention concept, the device registering the number of customers is designed to detect the number of customers before, during and/or after the respective detection points. The above-mentioned device thereby relates the detection point to the utilization of the different locations of product lines. The results obtained from this are used as parameters for the evaluation of the relation stated above. In a further embodiment, the common functionality of the sub-functions works with or is connected to a storage function. By means of this storage function it is possible to store the compilations or specifications/indications for use in later measurements. Repositioning of the product line or types of product line can be based on information that improves the above-mentioned relation. The improvement information is obtained from stored previous experience. It is possible to use experience gained in the shop concerned or in other shops if the shop is part of a chain of shops. There are also analyses of customers' buying habits and desire to buy that can be used as comparisons in this connection. Further characteristics of the device are to be found in the subsidiary claims below for the device in question.

What can principally be regarded as characteristic of an application as claimed in the invention is that the device in question that works with two sub-functions is used to compile or describe removals from the shelves caused by the shop's

customers with the aim of making possible an evaluation of the relationship of the removal of goods to the location of the goods/commodities on the shelves.

5           A device as claimed in the invention can be considered to be characterized by the above-mentioned device or labels that work with informational signals or data being designed to provide the main computer, or any of the other computers if any, with real-time information concerning the actual content  
10 of goods or articles in the different sections combined, for example, with customer visit statistics for the respective sections, for use in the execution of the programs. The execution can be carried out in one or more of the computers.

15           A device for a combined information-handling and communication system for premises, for example a price and/or information system in shops where a main computer is in two-way wire-based communication with labels or devices that are designed in connection with product lines or articles divided  
20 into sections which are arranged or positioned in the premises, can be principally considered to be characterized by the main computer being part, via one or more wire-based connections, of a first function interaction with a number of administration units serving their sections and working with  
25 the computer function. The above-mentioned units also are part of a second function interaction with labels or devices via second wire-based connections. The respective units are allocated a group of labels or devices out of the above-mentioned labels or devices. The second function interaction  
30 is at least partially separated from the first function interaction in the sense that the respective units carry out separate functions that are independent in relation to their function between the main computer and the units and that can for example consist of control monitoring, localization of  
35 labels or devices, identification of goods or articles, positioning attributes for product lines or ranges of articles in the premises or shop, the flow of goods or articles in the shop or premises, space management, customer flow calculations

and/or goods or articles exposure, which it can be of great interest to optimize.

5 In an embodiment, the first wire connection(s) are included in a bus system in which the units are connected preferably to a wire circuit connection or bus together with the main computer so that this and the units carry out a first function interaction via the bus system that can, for example, be of the CAN type. The CAN system itself is well-known. In 10 one embodiment, maximum bit rates are proposed for the transfer of data between the main computer and the units. In addition, it is proposed to have a maximum length for the wire connections. There is also a power unit system to guarantee the power supply connected to the first wire connections/bus 15 connections. The system of units and labels/devices for achieving a very large volume of label or device controls or functions is also described in the following subsidiary claims.

20 The invention is also characterized by a device that includes one or more strips that have printed circuits, in which one or more labels or devices supported by the strip establishes various individual electrical contacts in its applied position on the strip. The strip can be provided with 25 or connected to a sensor device designed to detect contact being established by the individual label or device and to establish the position on the strip of the label or device by means of this.

30 The strip is preferably constructed as a long board with preferably double-sided printed circuits. The board includes circuits for phase and zero/earth, and has contact surfaces for data transfer via the strip to and from the labels or devices. Further characteristics of the strip arrangement are 35 described in the following subsidiary claims.

The factor that can principally be considered to be characteristic of the device is that the strips are designed

with integrated cabling and electronics for displays, identifications and interaction with and between the information system and the computer system.

5 In an embodiment, the display units are designed to display the temperature in freezer cabinets or heated cabinets. Also, the display units can additionally or alternatively display price information for the goods placed in the shelf system, whereby the strips and the units are  
10 associated with shelves in the shelf system(s). The display units can also be designed to be part of the evaluation function or evaluation equipment that shows information about the balance of goods, quantity sold, profit, etc. In a further embodiment, the display units can be designed to be  
15 part of an evaluation or decision-making function for the optimization of the number of goods in a product line and the positioning of the goods or the product line with regard to profitability or the like.

20 In an embodiment, the device can also include sensors, for example for detecting the flow of customers at different places in the shop or premises, and can be positioned on or nearby the same strips that support the display units for prices or temperature. The existing bus connections in the  
25 shop can also be connected to other shop equipment, such as scales. Each individual unit is given an identity that enables the central unit to change (continually) the information displayed upon a command from the shop computer and at the same time to monitor and control the information displayed.  
30 The location in the shop of the individual display units or the sensors can be determined with great precision and is stored in the central unit belonging to the system, by which a movement of individual units or strips with units is automatically recorded by the system.

35

In a further embodiment, the strips with integrated cabling and electronics are designed so that the display units on the strips can be controlled by administration units, which

can in turn be controlled by higher-level units or systems, which can consist of the above-mentioned computer systems. The administration units control the wholly or partially independent display units and the integrated electronics on the strips via communication carried out on the connection. The administration units can be connected to the higher-level units/system via communication carried out on wire-based connections (data communication). The above-mentioned higher-level system/units can comprise power supply units, central units, shop computers, price memory.

A currently proposed embodiment of a device as claimed in the invention will be described below with reference to the attached figures that are in the form of block diagrams, and in principle show an information system for the premises with goods or units that are to be functionally monitored or controlled.

#### ADVANTAGES

The proposals above have a number of advantages. Existing systems with two-way wire-based communication can be integrated for use in programs with existing locating or charting systems for the shop's fittings and goods. The operation of the different systems can be integrated, which makes operation considerably easier for the shop's operators and the management. Clear operating functions can be obtained for the system that in one exemplary embodiment can operate with separate functions for the customers of the shop. Advanced pricing via two-way communication can be retained. There are also financial advantages resulting from the system integration. By means of what is proposed above, efficient systems for combined information handling and communication in premises or shops can also be obtained. In addition to simple price and information displays that are connected to the actual product line or articles, further functions can be incorporated in the system which can efficiently serve the

personnel of the premises or shop from a holistic point of view.

#### LIST OF DIAGRAMS

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A currently proposed embodiment of a device that displays the significant characteristics of the invention will be described below with reference to the enclosed diagrams, where

10 Figure 1 shows in the form of a block diagram the inter-operation between a main computer, administration units and labels,

15 Figure 2 shows in the form of a block diagram and from above a board strip arrangement in the form of strips constructed as boards with printed circuits, whereby an upper row of strips connected in series forms an upper level which is connected to a second row of strips that forms a lower level,

20

Figure 2a shows in the form of a block diagram the connection of an administration unit to the strip arrangement,

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Figure 3 shows in the form of a block diagram the strip arrangement with various extended levels of strips,

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Figure 4 shows in the form of a block diagram the arrangement with communication systems connected to a shop or premises,

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Figure 5 shows in the form of a block diagram the interaction between different computers in the system,

Figure 6 shows in the form of a block diagram the interconnection of three computers used in the system,

Figure 7 shows in the form of a block diagram the interaction between the computers shown in Figure 6,

Figure 8 shows in the form of a block diagram an alternative construction of the system,

5 Figure 9 shows in the form of a block diagram another alternative construction of the system,

Figure 10 shows in the form of a block diagram an embodiment of the system in accordance with Figure 9, and

10 Figures 11, 11a show in horizontal view and cross-section from the side an actual strip arrangement mounted on a shelf.

#### DETAILED EMBODIMENT

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Figure 1 is intended to show the principle for a combined information and communication system 1 as claimed in the invention. The system comprises in principle a computer 2 that acts as the main computer. Computer 2 works with a first CAN bus 4. To the CAN bus are connected a number of power supply units 5, 6 and 7 that can, for example, be 10 in number. The bus 4 can operate with a bit rate of 40 kbit/s. The bus 4 can have a physical length, for example of up to 1000 meters. The CAN bus connections to the power supply units 5, 6 and 7 are indicated by 4'. For each power supply unit, for example for the power supply unit 6, there are a number of administration units 8, 9 connected. The number of administration units can in an embodiment of the invention be approximately 10. The bus connection from the power supply equipment to the units 8, 9 is represented by 4''. The power supply units are equipped with connections 5a, 6a and 7a via which the power supply units can be connected to an external energy source, for example to the national grid (220 volts). The units 8, 9 can also be equipped with connections 8a and 9a respectively to external energy sources, for example to the national grid, in which case the power units PU are omitted. Via the arrangement described above, a first function interaction that is

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indicated by the arrows 10 can be effected between the unit 2 and the units 8, 9.

The administration or control unit 8, 9 is in turn  
5 connected to a number of devices 11, 12 that operate with information or data signals i1 and i2 respectively. Examples of devices are labels that are found generally within price and information systems for shops. Each unit 8 or 9 is connected via wire connections to a number of devices or  
10 labels that can be up to 1,000 in number. In accordance with the above the devices or labels are arranged in connection with sections for the product lines or range of articles. The sections can contain shelves, for example eight shelves. Each group of units 8, 9 that is supplied with power from a power  
15 supply unit, for example unit 6, can in total serve 10,000 devices or labels. In its entirety, the system with ten power supply units 5, 6, 7 with associated maximum number of groups of administration devices 8, 9 can serve 100,000 devices or labels. According to the invention, a second function  
20 interaction is carried out between the units 8, 9 and the devices 11, 12, which second function interaction is indicated by 14. All or parts of the second interaction can thereby be separated from the above-mentioned function interaction 10. This means for example that the units 8, 9 carry out functions  
25 in and with the devices or labels which are independent in relation to the first function interaction. Thus general information can be distributed from the main computer arrangement 2 to the units which, depending upon the received commands, controls and information, can provide separate  
30 information for control, monitoring, calculations, etc., for the devices or the labels. It should be noted here that the communication between the units 8, 9 and the devices 11, 12 is bi-directional and that the units can implement their controls, measures, monitoring, etc., dependent upon the  
35 information obtained from the devices or labels.

According to Figure 2 the above-mentioned devices or labels 15, 16 can be applied on strips in the form of printed

circuit boards. Such a board is represented by 17. Circuits on or in the board include a first cable 18 for connection of one phase of an electrical supply system. A zero or earth for connection of the above-mentioned system is shown by the cable 19. In addition a data cable is joined together with a number of contact surfaces 20a, 20b, 20c, 20d and 20e. Upon the applying or attaching of devices 15, 16 on the board, connection is made partly to the above-mentioned cables 18, 19 via contacts 15a, 15b, and partly to one or more of the above-mentioned contact surfaces 20a-20e. Thus in the case shown in Figure 2 there is connection to the contact surfaces 20b, 20c via the contact points 15c', 15c. One and the same device can make contact with one and the same contact surface 20; compare the case with the device 16 and the contact surface 20d in Figure 2. The board 17 comprises a microprocessor 21 which, via cables 22, is connected to the above-mentioned contact surfaces 20a-20e. The microprocessor is designed to identify the individual positions of the respective devices 15, 16 on the board using the contact function(s) established by the devices 15, 16. The microcomputer 21 can consist of a known circuit. The board also has electrical connections 23', 23'' and 24. A first connection 23' is used for the connection of the printed circuit on an adjacent board 25. The above-mentioned boards 17 and 25 can be included in a row of strips connected in series, in which row the strip 26 in Figure 2 is also included. The connection device 24 is designed for connection of strips 27, 28 at a subordinate level. The strips 17, 25 and 26 form a higher level. The Figure 2a shows that each row of strips 29, 30, etc., is controlled by a shared administration unit 31.

Figure 3 shows the principle for the construction in more detail and in its entirety. The above-mentioned power supply device as claimed in Figure 1 can in itself be implemented in the units 5, 6 and 7, and the units 5, 6 and 7 are connected to the bus. The respective unit, for example unit 6, controls or interacts with devices or labels applied on the series-connected strips, for example 33, 34, which are arranged at

different levels. In Figure 3 a first level is represented by 35 and a lower level than this level is represented by 36. In addition there is a level 37 that is on a par with level 1, etc.

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In Figure 4 a premises or shop is represented by 39. The main computer in accordance with the above is represented by 40 and a unit by 41. In addition there is a strip arrangement 42 with associated device 43. The shop computer is represented by 44 and a computer for planning the shop is represented by 10 45. In addition there are architectural information functions that can be connected to a library or memory 46. The memory space or library for shop fittings is represented by 47. Instructions for positioning the goods for optimal sales 15 function within the premises or shop 39 can be stored in the unit or the library 48. In addition, planogram functions are included that can be stored in the unit 49. Checkout functions, that is receipts and flow of goods that are removed via the checkouts, can be indicated in the units 50, 51. In 20 addition customer counting arrangements are included, with equipment 52, 53 that counts people who pass by, for example through the entrance. The above-mentioned computers and units, library, etc., can be connected in principle by means of a wire-based cable arrangement 54 that can consist wholly or 25 partially of a LAN. This wire-based function with the units 41 and the devices 43 is represented by 55. By means of the above-mentioned arrangement, support functions can be established in connection with premises or shop installations 56 or 57. The architect or the like can receive support for 30 the positioning of shelf systems, shelves, display cabinets, etc., that are to house the product line or range of articles in question 58. The position and appearance of the shop fittings and the division into sections of the above-mentioned goods or articles can be determined with the help of 35 experience and statistics. The optimal location for the different product lines for optimal exposure and sales to the customers can be implemented. In addition, information can be used concerning where the goods are to be positioned in order

to bring about an effective flow of goods to and from the shop via personnel and customers respectively. The checkout functions can be connected to the system. When it is a question of the application of different product lines (bread, dairy produce, etc.), relevant statistics and experience are used in accordance with the above. Customer throughput counting devices can be installed and throughput calculations can be carried out, and the visits by customers to the different sections and product lines can be read off. The goods must be able to be housed in the correct environment with respect to low humidity, cold, etc. There can be warning systems with alarms for exceeding different limits. The information and/or pricing system and/or the communication system 40, 41, 42, 43 constitutes an important part of the total arrangement as the system as such recalculates the actual location of the goods and articles in real time, that is to say a real-time picture is created the whole time and can be re-entered into the total system so that this can be optimized in its entirety.

20

In Figure 5 the main computer is represented by 2 and the shop computer by 1. The units are represented by 60, 61, 62 and 63 and the bus by 65. The bus constitutes a LAN of the Ethernet type and interconnects the computers and units so that they can use each other's capacity and memory for storage of the above-mentioned statistics, experience, alarm functions, planogram functions, flow of goods functions, real-time information, etc. The shop computer has a terminal 1a for interaction between a member of staff and the system. The other computers can also be provided with similar terminals. The figure also shows a connection to the outside world, shown as a bridge 64, and a connection function 66 which can consist of a bus connection function of the WAN type. The connection 66 can also represent tele- or data communication connections or tele-data communication networks, of the Internet type. Thus for example further computer functions 67 that are located outside the premises, see above, can be connected via an external network or external connections 66. The above-

mentioned computer 67 can thereby carry out certain functions in the whole system in accordance with Figure 4. Common software for the computers 1, 2, 3 can therefore be used and executed in order to establish the overall picture in accordance with Figure 4.

In Figure 6 the main computer is represented by 2, the shop computer by 1 and the planning computer by 3. The connections between the computers can be carried out via bus connection 70, and signal and message information and also command information, etc., are represented by the arrows 75 and 76.

In Figure 7 the interaction between the different computers 1', 2' and 3' is shown in greater detail. Price information and various data information can be exchanged between the computers 2' and 3' via a connection 77. The main computer is, in accordance with the above, connected to a number of units 78 which in turn are connected to labels or devices 79. The main computer 2' indicates the geographical location of the labels, issues commands, etc., to the respective unit 78 via the connection (the CAN connection) 80. The units 78 exchange information with their associated labels or devices 79 on the connections 81. The computer 3' consists of a space-management computer of a known type and this computer communicates with the other computers 1' and 2' via the connection functions represented by 77 and 84. One or more memory systems 85 are designed to keep statistics, information, etc., available for the above-mentioned computers 1', 2' and 3', and this is represented by the broken arrows 86, 87 and 88.

In Figure 8 a central unit is represented by 101. The central unit is in bi-directional connection with a shop computer 102. The shop computer can contain or be connected to a price memory 103. A power supply unit is represented by 104 and the central unit and the unit 104 are connected to each other by a bus connection 95. The unit 104 is also connected

to a number of administration units 105, 106, 107, 108 and 109. These administration units can be called gondola administration units in accordance with accepted practice in the line of business. The unit 104" is connected to the administration units 105 to 109 via one or more bus connections 110. These latter bus connections are of the type that can provide high-speed communication, and in an exemplary embodiment data communication is exchanged on the above-mentioned connection. Certain types of equipment that are to be monitored, provide information, etc., can be connected to the higher-level units 101, 104 via a separate bus connection 111. In the actual case, weighing equipment 112 is connected via the bus connection 111 to the unit 104''. So-called gondolas with shelf sections are connected to the above-mentioned administrator's units 105-109, and a similar gondola with shelf sections is represented by 113. The gondola 113 is connected to the administrator's unit 108 and other administrator's units are connected to similar or corresponding gondolas with shelf sections in accordance with 113. The above-mentioned connections to the gondolas are represented by 105a, 106a, 107a, 108a and 109a. There are shelf labels and sensors 128 in the respective gondolas. Strips in the different shelf sections are connected in series and can be at higher or subordinate levels. Thus the strips 115, 116, 117 and 118 are connected in series as are the strips 119, 120, 121 and 122. A strip 123 constitutes the subordinate level for the strips 119, 120, 121 and 122. The connection between the strips 119 and 123 is indicated by 124. The strips 125, 126 and 127 are connected together in series. The series-connected strip arrangements are each connected to the administrator's unit 108 via separate bus connections 108a', 108a'' and 108a'''. It is characteristic of the connections between the administrator's units and the gondolas with shelf sections that they transfer the communication at a relatively low speed. The speed of the connections 110 can be 40 kbit/s, while the speed of the connections 105a, 106a, 107a, 108a, 109a, etc., can be lower than ten kbit/s.

The strips 115-123 and 125-127 support shelf labels and sensors 128, of which for example the sensors 128a and 128b are shown on the strip 115, the shelf label or sensor 128c is shown on strip 119 and the shelf label or sensor 128d is shown on strip 123, etc.

A computer system for shops can be constructed in accordance with Figure 5 above. The system comprises an information computer and a planning computer. There is no technical obstacle to integrating all the computer functions in a single computer system (shop computer) that contains the three programs that are represented by computers in Figure 5.

Each shop requires locally the Shop Computer and Information Computer functions, whereas the planning computer can be a resource that is kept elsewhere, possibly at a head office or at the offices of a consultant. There can be several reasons for this, but the work using the planning computer is probably not of a kind that needs to be carried out every day, particularly not the Shop Layout and Shop Fitting functions.

The Localization and Optimization functions also require practice and experience in the operator, something that the individual shopkeeper can find it difficult to acquire. In a future system, self-learning characteristics can reduce the need for specialist skills.

The operator's workstation can be connected to any computer. In Figure 5 it is connected to the shop computer. It can be connected to the Head Office computer if this is required and there can also be more operators' workstations if required.

The WAN that is drawn outside the shop can advantageously be the Internet, but also other, private networks can be used if the requirement for security is paramount.

**Software**

The functions, data and programs that are used in the system are listed in the tables below.

5

The localization functions and the options for reconnection that exist between the information computer and the planning computer are shown in points 2.1-2.4 and 3.1, 3.5, 3.6, 3.8, 3.9 and 3.11-3.14.

10

When a new shop is planned the sequence of the planning and localization functions can be as follows:

Depending upon the rules for shop planning and optimization that apply for the shop in question, the layout of the shop is worked out in the planning computer and the goods are placed on the shelves. Each kind of goods has its own place and the number of "faces" is determined. The proposed layout of the shop can be studied on the monitor.

20

Gondolas are numbered, as are sections and shelves. Each shelf edge is defined longitudinally. With the rule that the labels (units) are laid out aligned from the left, the system calculates the location of each label in the shop.

25

The labels can store internally a number of sets of data and, in connection with new labels being recorded in the information computer, information about the location and number of "faces" is entered in one of the cells. As soon as a recorded label is provided with a power supply, which can be from a device that is used when preparing labels, and when it is inserted in a shelf-edge strip, the label will display where it is to be positioned.

30

If it is positioned correctly the light diodes will flash briefly; if it is positioned incorrectly the diodes will flash until it is placed in the correct location. If both the diodes flash the label is on an incorrect shelf. If only the left diode flashes the label is to be moved to the left on the

35



shelf edge; if the right diode flashes it is to be moved to the right.

5 Labels can be set up in the correct places in a shop that is empty of goods. Thereafter the goods can be put in position.

10 In old shops the following course of events takes place. The information system continuously monitors repositioning, introductions and removals that take place in the shop and reports these to the Planning System. In a corresponding way the Planning System is used to assist the shop personnel to make changes and optimizations with regard to the shop's rules for the location of goods in the shop by sending new  
15 localization data to the labels concerned. Thereafter the procedure is the same as for the "new shop" (see above). In this way the electronic shop circuit is used to position and control the shop dynamically.

20 Because the actual location of goods is always known, the Information System can calculate the flow of customers through the shop using goods data from each individual receipt. The result can then be displayed on the shop map that the Planning System contains. It can also be compared with the result of  
25 counting customer throughput at particular places in the shop that is carried out in the Information System. It is possible to study the result of changes and learn from these when making future changes. In an extension of the system, there can also be a self-learning, adaptive system for shop  
30 management.

35 So-called "pick-out lists" can be used in connection with the new system. Based on a shopping list from a customer (perhaps sent via the Internet) the system can generate a pick-out list to minimize the route through the shop (or warehouse) and if required can draw a map of the route.

This could just as easily be done for customers in the shop, for example via the customer guide.

Privileged customers can be provided with a card (for example the ICA card, MedMera card, etc.) and the Customer Guide can be equipped with a card reader. It will thereby be possible to give special offers to these customers. The offers are shown on the Customer Guide and can be varied in the required way according for example to the time, and also as claimed in the individual customer or customer category. As payment at the checkout is made with the card the customer will pay the correct price.

It is also possible to deal with the customers individually, based on their previous buying habits. Pensioners can be given discounts on certain goods during certain periods of time, etc. The number of customers can be increased, but it will still be possible to keep crowding and hence comfort at an appropriate level.

20

Tables

Software (functions, data, programs, etc)

25 Grouped in the computers in accordance with the figure "Computer system in shop"

**1. Shop computer**

30 Commercial data

1. Goods
  2. Suppliers
  3. Stocks
  - 35 4. Purchases
  5. Sales
  6. Activities
- "Special price" type

- "Happy hour" type
- 7. Prices
- 8. Margins
- 9. Income
- 5 10. Individual purchases/receipts
- 11. Customers
- 12. Periodization
- 13. Other statistics
- 14. Data for Customer Guide

10

## 2. Information Computer

Data to/from the electronic shop circuit

- 15 1. Location of goods/labels
- 2. Display changes or incorrect location
  - On the labels
  - On monitor
- 3. Data to/from the shop:
  - 20 • Customer throughput counting
  - Temperature in for example freezer
  - Various
- 4. Calculating of customer flow in shop with analysis of receipts
- 25 5. Display prices, change prices on the labels in the shop
- 6. Display other data
- 7. Monitor displayed prices and data

## 3. Planning Computer

30

Data for planning and optimizing the shop

- 1. Layout of shop
- 2. Shop fittings
- 35 3. List of materials for shop fittings
- 4. Rules for shop planning and optimization
- 5. Planning of location of goods
- 6. Display actual location of goods

7. Store historical statistics
8. Optimization
9. Adaptive functions
10. Forecasts
- 5 11. Display customer flows in the shop
12. Generate pick-out lists/maps
13. Data for Customer Guide
14. Display effective and ineffective surfaces in the shop  
with measurements and trends

10

Figure 9 shows a number of partial surfaces 201, 202, 203 and 204, for which units 205, 206, 207 and 208 are set up. The units are connected by cables 209 providing wire-based two-way communication with an adaptation unit 210. The units 205-208  
15 can provide information i10, i11 to the unit 210 concerning the type(s) of commodities on the different partial surfaces 201-204. This information can be transferred to a computer unit 212 in a computer system that is equipped with a display device 213. The information between the unit 210 and the  
20 computer system is represented by i10', i11'. The computer system converts the information to first data i10'', i11'' that is used as the basis for a first representation in the display unit 213, which first representation is a real representation of the partial surfaces 201-204 and the types  
25 of commodities 211 located on these. This first representation can consist of graphical images of the partial surfaces in question and the types of commodities put on or in these. The computer unit 212 has a terminal 214 via or upon which additional information or change information i12, i13 can be  
30 entered into the computer system which can thereby be combined with the data generated from the information i12', i13' to create second data to be used as the basis for a second graphical representation that shows a required or optimized representation of the location of the types of commodities on  
35 the partial surfaces 201-204, which required representation can differ from the first representation and therefore necessitate the repositioning of the commodities on the partial surfaces. At least the second representation acts as

an aid for the personnel who are to carry out the repositioning. This aid can mean that the computer 212 generates control information i14, i15 and i14', i15' for the units 205-208, that in their respective print-out field can tell the personnel what commodities the respective partial surfaces are to hold. In addition or alternatively, control information i14'', i15'' can be sent to portable equipment 215 that can be connected via a connection (for example a wireless connection) 216. Alternatively a print-out of the second representation can be used. The second representation can also be sent to the portable equipment 215. The actual stock of commodities on the partial surfaces 201-204 can be determined for each stage and for different stages by the information-providing device at the checkout function that detects the outgoing flow of goods and the replenishing function that effects the replenishing of the commodities on the partial surfaces. An information computer and/or planning computer 218 receives information i16, i17 from the units 205-208 and/or the computer 212 via the adaptation unit 210 and/or the units direct via the cable connection 219.

Figure 10 shows the units 219, 220, 221 at different height levels in the shelf system. The respective units 222, 223 are equipped with for example a 3-field window 222a, 223a. The field in question can display various information, for example different price and commodities information. The respective units represent a commodity that can be represented in the field by the bar code which is information that is to be found in the shop system. The commodity (the article) is in this way localized in the shop the whole time and in accordance with Figure 10 the information 224 can be collected from the shop's different partial surfaces in a particular group or sections and transferred to the computer system used that provides a first graphical representation 225 of the group of partial surfaces concerned (for example a particular shelf section) with associated stock of commodities. In the figure the different commodities have been represented by

225a, 225b and 225c. Empty partial surfaces are represented by 225d.

For reasons connected with sales or for other reasons it  
5 can be necessary to reposition the commodities 225a, 225b and  
225c, etc., to other partial surfaces in the group of partial  
surfaces or to other groups of partial surfaces within the  
shop, for example to spread these out or collect together the  
same type of commodities onto certain partial surfaces and/or  
10 pair these with yet other commodities, etc. This repositioning  
can be carried out with an optimizing aim of some kind, which  
optimization has been represented in the figure by the arrow  
227. As claimed in Figure 10, by means of the changed  
information a second graphical representation 228 is produced,  
15 in which the required repositioning has been implemented in  
relation to the location in the first graphical  
representation. This second representation, or rather its  
content, can form the basis for the change information 229 to  
the units. Thus information is given in the field 233a of the  
20 respective unit concerning the second representation that  
corresponds to the type of commodity that is to be put on or  
in the partial surface represented in the unit. This  
constitutes an effective aid for personnel who are carrying  
out the repositioning. Information and/or planning function(s)  
25 can be designed to reproduce a third graphical representation  
230 of all or large parts of the shop. This graphical  
representation can be updated using information from, among  
other things, the actual stocks of commodities on the  
different partial surfaces 232 or the groups of partial  
30 surfaces 231 in the shop.

Figures 11, 11a show part of a strip 311 mounted on a  
shelf 312. The strip is constructed as a long board 313 in a  
plastic material with double-sided printed circuits, which  
have a phase 314, zero/earth 315 and data connection 316. The  
35 circuit is connected from the front to the back via holes  
going through the board. Electrical components 318 can be  
positioned and connected on the back of the board.

The invention is not restricted to the embodiments described above as examples but can be subject to modifications within the framework of the following patent claims and invention concept.

## PATENT CLAIMS

1. A device for use in premises, particularly in shops, for facilitating, making more efficient and/or controlling the replenishing and removal of goods or articles which are located in the premises, preferably in groups, on display surfaces arranged in sections, here called partial surfaces, whereby the device comprises or interacts with a computer system comprising one or more computers which receives, monitors and processes goods-related information, for example the amounts of goods placed on the partial surfaces, brands, prices, locations, etc., and which transfers and receives information to and from units located in association with the above-mentioned partial surfaces which can provide display information to the customers or users of the premises and also retransmit at least part of the display information to the computer system via a two-way communication system using wire-based connections in the shelves, **wherein** the units are designed to provide first information concerning the commodities placed on the different partial surfaces and the computer system is designed to produce a graphical representation of the present location of the commodities on at least one group of partial surfaces based on the first information.

25

2. The device as claimed in Patent claim 1, **wherein** change information already existing in the computer system or supplied to the computer system concerning the repositioning to other partial surfaces of one or more of the commodities in the group is represented by data that can be processed in the computer system together with data that is used as the basis for the above-mentioned graphical representation, here called the first graphical representation, and the computer system is designed so that as a result of the above-mentioned processing of the above-mentioned data it can produce a second graphical representation that shows the above-mentioned repositioning(s).

35



3. The device as claimed in Patent claim 2, **wherein** the second graphical representation forms the basis for the actual repositioning of the commodities on the partial surfaces.

5 4. The device as claimed in Patent claim 2 or 3, **wherein**  
the computer system extracts from the second graphical  
representation representative control data for the unit(s)  
that are associated with the partial surface(s) to which the  
commodity or commodities concerned are intended to be moved,  
10 and the unit in question thereby receives information  
concerning the relevant type(s) of goods or commodities.

5. The device as claimed in any of the preceding claims,  
**wherein** the second graphical representation or information  
15 extracted from this concerning partial surface(s) to which the  
repositioning(s) are intended to be carried out can be  
transferred to portable equipment that can be allocated to the  
person who is going to carry out the repositioning.

20 6. The device as claimed in any of the preceding claims,  
**wherein** the computer system comprises or is connected to an  
Information Computer and in that the respective units are  
connected or can be connected to the Information Computer in  
order to provide information about the repositioning(s) of  
25 commodities with the group of partial surfaces.

7. The device as claimed in any of the preceding claims,  
**wherein** the computer system comprises information-providing  
devices, for example checkout or shop computers that show the  
30 actual removal of commodities from the partial surfaces, and  
the first graphical representation shows the actual stocks of  
commodities on the partial surfaces calculated from the most  
recent time of replenishing for the commodity.

35 8. The device as claimed in Patent claim 7, **wherein** the  
information-providing device, for example comprising a shop  
computer, also shows the actual replenishing of commodities on  
the partial surfaces, and the graphical representation shows

the actual stock of commodities on the partial surfaces in connection with the most recent time of replenishing for the commodity.

5 9. A device for use in premises, particularly in shops, for  
facilitating and controlling the replenishing and removal of  
goods (articles) which are located in the premises, preferably  
in groups, on display surfaces arranged in sections, here  
called partial surfaces, which device comprises or interacts  
10 with a computer system comprising one or more computers which  
receives, monitors and processes goods-related information,  
for example the amounts of goods placed on the partial  
surfaces, brands, prices, locations, etc., and which transfers  
and receives information to and from units located in  
15 association with the above-mentioned partial surfaces which  
can provide display information to the customers or users of  
the premises and also retransmit at least part of the display  
information to the computer system via a two-way communication  
system based on a wire-based connection to the shelves,  
20 **wherein** the computer system is designed to process the  
information relating to the premises or shop and associated  
with the different commodities together with information  
obtained from the above-mentioned units about the commodities  
on the different partial surfaces and as a result of this  
25 processing to represent graphically or cause to be represented  
graphically the locations of the commodities on their  
allocated partial surfaces.

10. The device as claimed in Patent claim 9, **wherein** the  
30 graphical representation shows the current stocks of  
commodities on the different partial surfaces.

11. The device as claimed in Patent claim 9 or 10, **wherein** the  
graphical representation is used as the basis for a change  
35 implemented by means of the change or supplementary  
information in the computer system concerning the  
repositioning of commodities on partial surfaces in order to  
increase their exposure and/or sales profiles.

12. The device as claimed in Patent claim 11, **wherein** the computer system provides control information to the units or to portable equipment by means of the implemented change in order to facilitate the repositioning of commodities to other partial surface(s).

13. A device for a product line that can be located in sections (of shelves) in a shop or premises that works with two sub-functions, where the first sub-function, relates to the exchange of price information and other information via wire-based two-way communication between a computer system and electronic labels located at the sections or with informational signals (data), **wherein** the second sub-function is related to representations effected in or on the computer system of all or parts of the section system with the goods completely or partially replenished or removed, and the first and second sub-functions work together to compile or describe from different detection points and different locations of the goods removals from the sections caused by the shop's customers with the aim of making possible an evaluation of the relationship of the removal of goods to the position/location of the goods/commodities in the sections.

14. The device as claimed in Patent claim 13, **wherein** the devices measuring the numbers of customers are designed to detect the number of customers before, during and/or after the respective detection points and at the above-mentioned locations, and the information about the customer detection can be used as parameters for the above-mentioned evaluation.

15. The device as claimed in Patent claim 13 or 14, **wherein** the common functionality of the sub-functions works with or is connected to a storage function that stores the compilations or specifications/indications.

16. The device as claimed in Patent claim 13, 14 or 15, **wherein** the respective repositioning of the product line or types of product line concerned is based on existing

improvement information that shows in what direction the repositioning is to be made in order to improve the above-mentioned relationship, which improvement information is obtained from previous experience (stored) in the shop  
5 concerned or, if the shop is part of a chain of shops, from the other shops in the chain, general statistics, etc.

17. The device as claimed in any of the preceding claims, **wherein** devices are designed to detect and measure the buying  
10 habits of the customers and users of the shop(s) and in that the measurements, possibly together with the storage of previous evaluations, form the basis for optimal positioning of the respective type of product line in the shelf or shelf section.

15  
18. The device as claimed in any of the preceding claims, **wherein** one or more comparative functions are designed to compare the removed and replenished amounts of goods and product line/type with an ideal value or a value gained from  
20 experience.

19. The device as claimed in any of the preceding claims, **wherein** it works with an adaptive adjustment function that specifies for the respective type of product line an optimal  
25 location in the shelves or shelf sections for the stock of goods.

20. The device as claimed in any of the preceding claims, **wherein** the second sub-function generates on or in the  
30 computer system horizontal views of all or parts of the shelf system with the current product line or part of product line at the time.

21. The device as claimed in any of the preceding claims, **wherein** as a result of comparing the detection points with the  
35 location of the goods, there is an indication that the goods are to be repositioned to another location that is calculated

using the comparison function in a storage function, a library, etc.

22. The use of a device that works with two sub-functions, where the first sub-function is related to an exchange of price information and/or other information between a computer system and electronic labels located on the sections or a device working with signals containing information (data) via wire-based two-way communication and the second sub-function is related to representations of the whole or parts of the section system with completely or partially replenished or removed goods in the sections generated in or on the computer system, **wherein** the device is used to compile or specify removals from the sections by the customers of the shop or premises at different detection points and different locations of the goods with the aim of enabling an evaluation to be carried out of the relationship of the removal of goods to the location of the goods/commodities on the shelves/sections.

23. A device for determining the shop fittings and the flow of goods or articles in the premises by means of a combined information-handling and communication system in the premises, for example a price and information system which includes a main computer that can be connected via wire-based two-way communication to devices in association with goods or articles positioned in sections that work with informational signals (data), where the determining and flow functions are effected by means of computer programs executable in the main computer that has access to architectural and shop-fittings information, planogram information, positioning information for the goods or articles, checkout and sales information for the goods or articles, customer throughput information and statistics for optimally functioning shop-fittings and flow of goods or articles arrangements **wherein** the above-mentioned devices that work with informational signals (data) are designed to provide the main computer with real-time information concerning the actual content of goods or articles in the different sections combined for example with customer

visit statistics for the respective section in connection with the program execution.

24. A device to generate in or at a product line or range of  
5 functions divided into sections the position indication for  
labels or devices that work with informational signals or data  
where the labels or devices are positioned on strips fitted  
for product lines or ranges of articles, for example in  
connection with shelf systems holding the range, **wherein** one  
10 or more strips of the above-mentioned strips are fitted with  
printed circuits boards (PCB) or the like, in which one or  
more of the labels or devices on the strips makes different  
individual electrical contacts in its applied position(s) on  
the strip, and a detection device fitted on the strip or  
15 connected to the strip is designed to detect the individual  
establishing of contact by the label or device that works with  
the above-mentioned signals or data and by means of this to  
determine the position of the label or device on the strip.

20 25. The device as claimed in Patent claim 24, **wherein** the  
strip is constructed as a long strip with printed circuits.

26. The device as claimed in Patent claim 24 or 25, **wherein**  
the strip or board is fitted with circuits for phase and  
25 zero/earth and with a number of separated data circuit  
surfaces that can be detected by the detection device that  
consists of a microcomputer mounted on or in the strip or  
board.

30 27. The device as claimed in Patent claim 26, **wherein** the  
label or device that works with the above-mentioned signals or  
data is spring-fixed to the strip and in that electrical  
contacts are established by the spring fixing between the  
label and the device and the above-mentioned phase and earth  
35 circuits and the data contact surfaces.

28. The device as claimed in any of the Patent claims 24-27,  
**wherein** the strip or board contains connection elements for

the connection of the board to other boards and/or to one or more bus connections in an information and/or communication system serving product lines or ranges of articles, where the above-mentioned boards can be considered to be connected in series.

29. The device as claimed in any of the Patent claims 24-28, **wherein** the respective board has an additional connection element for the connection of additional strips or boards for connection to the product line or range of articles concerned, which additional boards or strips can be considered to be part of a subgroup to the existing higher-level strips, which subgroup can in itself comprise strips or boards connected in series.

15

30. The device as claimed in any of the Patent claims 24-29, **wherein** the respective strip/board in a subgroup with its additional detection element is connected to a further subgroup subordinate to the subgroup.

20

31. A device for combined information-handling and communication systems for premises, for example price and/or information systems in shops, which include a main computer that has two-way wire-based communication connections with labels or devices that are set up in association with product lines or ranges of articles divided into sections that are arranged or positioned in the premises or shop, **wherein** the main computer via one or more first wire-based connections participates in a first function interaction with a number of administration units that serve their sections and work with the computer function, the units via second wire-based connections participate in a second function interaction with the labels or devices, the respective units are allocated a group of labels or devices out of the above-mentioned labels or devices, a second function interaction is at least partially separated from the first function interaction in the sense that the respective units operate independent separate functions in relation to the first function interaction

between the main computer and the units, for example control, monitoring, label positioning, goods and articles identification, determining locations for product lines or ranges of articles in the premises/shop, flow of goods or articles in the shop or premises, space management, customer flow calculations, and/or exposure of goods or articles, and also optimal exposure of goods or articles.

32. The device as claimed in Patent claim 31, **wherein** the first cable connection(s) are part of a CAN system function, in which the units are connected preferably in a cable connection circuit together with the main computer so that the main computer and the units carry out the first function interaction via the CAN system.

15

33. The device as claimed in Patent claim 31 or 32, **wherein** the bus connection of the CAN system operates at up to approx. 40 kbit/s, and in addition the bus connection has a length of at most approx. 1000 meters, between the main computer and the units there is a power unit arrangement in the first bus connection with a number of power supply systems, the respective power supply system consists of a group of units, for example a maximum of 10 units, the respective units serve a maximum of 1000 labels or devices, which are arranged in a maximum of 40 sections that comprise a maximum of 8 shelves, the respective groups of units serve a maximum of 10,000 labels or devices, and the units connected to the power supply system together serve at most 100,000 labels or devices.

34. The device as claimed in any of the Patent claims 19-33, **wherein** the respective units control devices arranged or placed on a strip arrangement in sections for product lines or ranges of articles, where the units determine the position of the labels/devices on the strip.

35

35. The device as claimed in any of the Patent claims 19-34, **wherein** the strip arrangement includes a first number of strips arranged in series of the printed circuit board type



where the respective strips are equipped with microcomputers that are part of the label or device position determination function.

5 36. The device as claimed in any of the Patent claims 19-35, **wherein** the strip arrangement includes a number of groups of strips connected in series arranged in higher and subordinate levels, for example in a number of supergroup levels with one or more associated subgroup levels.

10

37. A device for an information system for stores, shops, warehouse premises and the like comprising display units fitted on strips that are installed in the store, shop, warehouse, etc., with the display units connected to a  
15 computer system, **wherein** the strips are fitted with integrated cables and electronics for display, identification and cooperation in and between the information system and the computer system with executed functions.

20 38. The device as claimed in Patent claim 37, **wherein** the display units are designed to display temperature in freezer cabinets and/or heated cabinets and/or price information for goods positioned in the shelf system, for which strips and units are installed in connection with shelves in the shelf  
25 system(s) or in connection with freezer cabinets or heated cabinets.

39. The device as claimed in Patent claims 37 or 38, **wherein** the display unit is designed to participate in the evaluation  
30 function or the evaluation equipment that displays information about the balance of goods, quantities sold, profits, etc.

40. The device as claimed in Patent claims 37, 38 or 39, **wherein** the display unit is designed to participate in the  
35 evaluation and determination function for optimizing the number of goods/product line and the location of these/this with regard to profitability.

41. The device as claimed in any of the preceding claims, **wherein** it includes sensors, for example for detecting the flow of customers at different locations in the shop or premises, which are positioned on or in the same strips that support the display units for prices, temperature, etc.

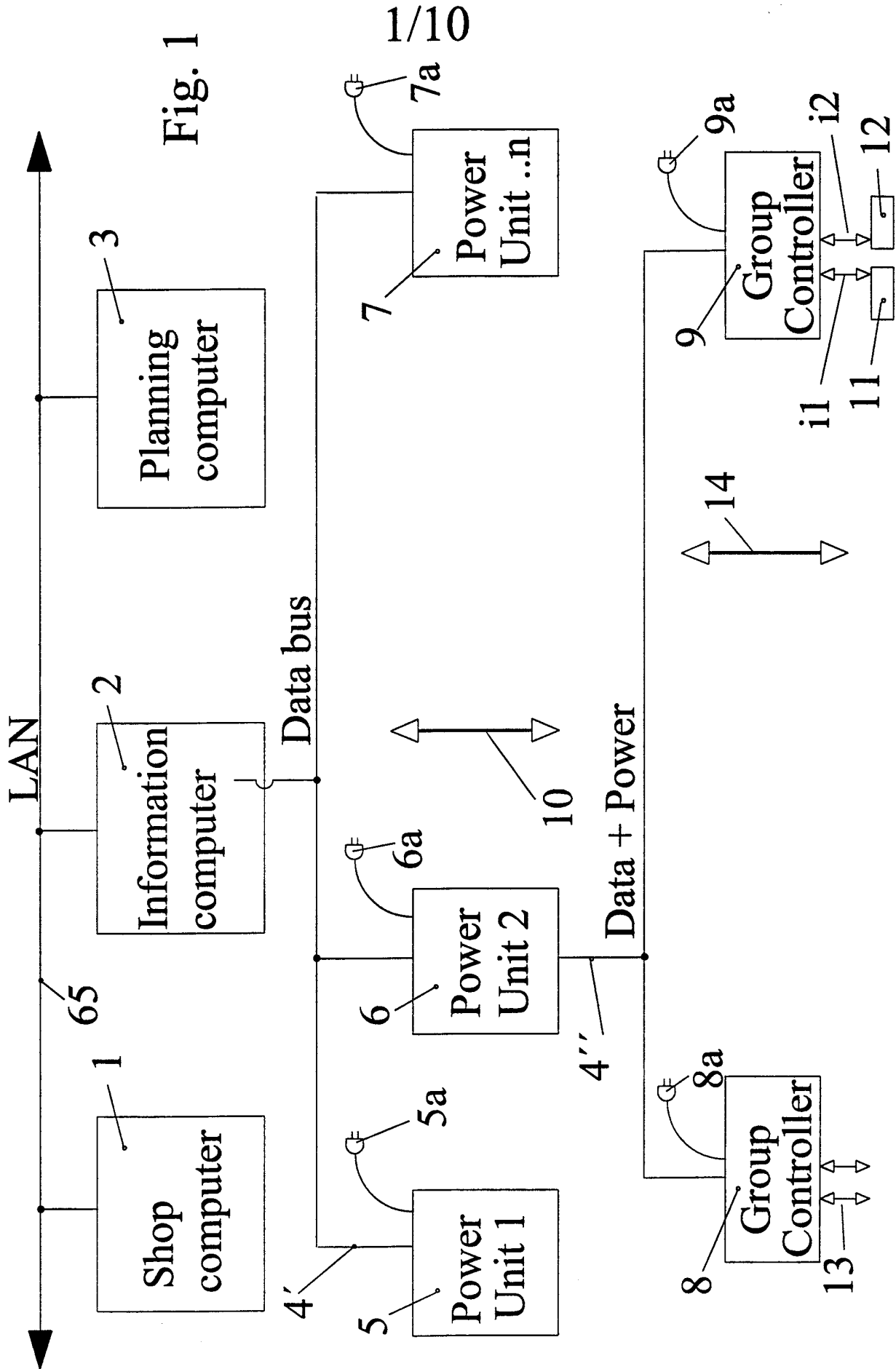
42. The device as claimed in any of the preceding claims, **wherein** the existing bus connections in the shop or the premises can be used to connect other shop equipment, for example scales.

43. The device as claimed in any of the preceding claims, **wherein** the respective display units are given an identity, which enables the central unit on command from the shop computer to change the displayed information at the same time as monitoring and controlling the displayed information.

44. The device as claimed in any of the preceding claims, **wherein** the locations in the shop or premises of the individual display units and/or sensors are known with great accuracy and stored in the central unit belonging to the system and in that a movement of an individual unit or an individual strip with units can be recorded by the system.

45. The device as claimed in any of the preceding claims, **wherein** the respective strips with integrated cables and electronics are designed so that display units mounted upon them can be controlled by means of administration units, which in turn can be controlled by higher-level units or systems, that can consist of the above-mentioned computer system, in which the administration units completely or partly control the display units/electronics in the strips via preferably wire-based connections, and are connected with higher-level units/systems via connection(s) for high speed communication/data communication.

46. The device as claimed in any of the preceding claims, **wherein** the higher-level system/units comprise central unit, shop computer and price memory.



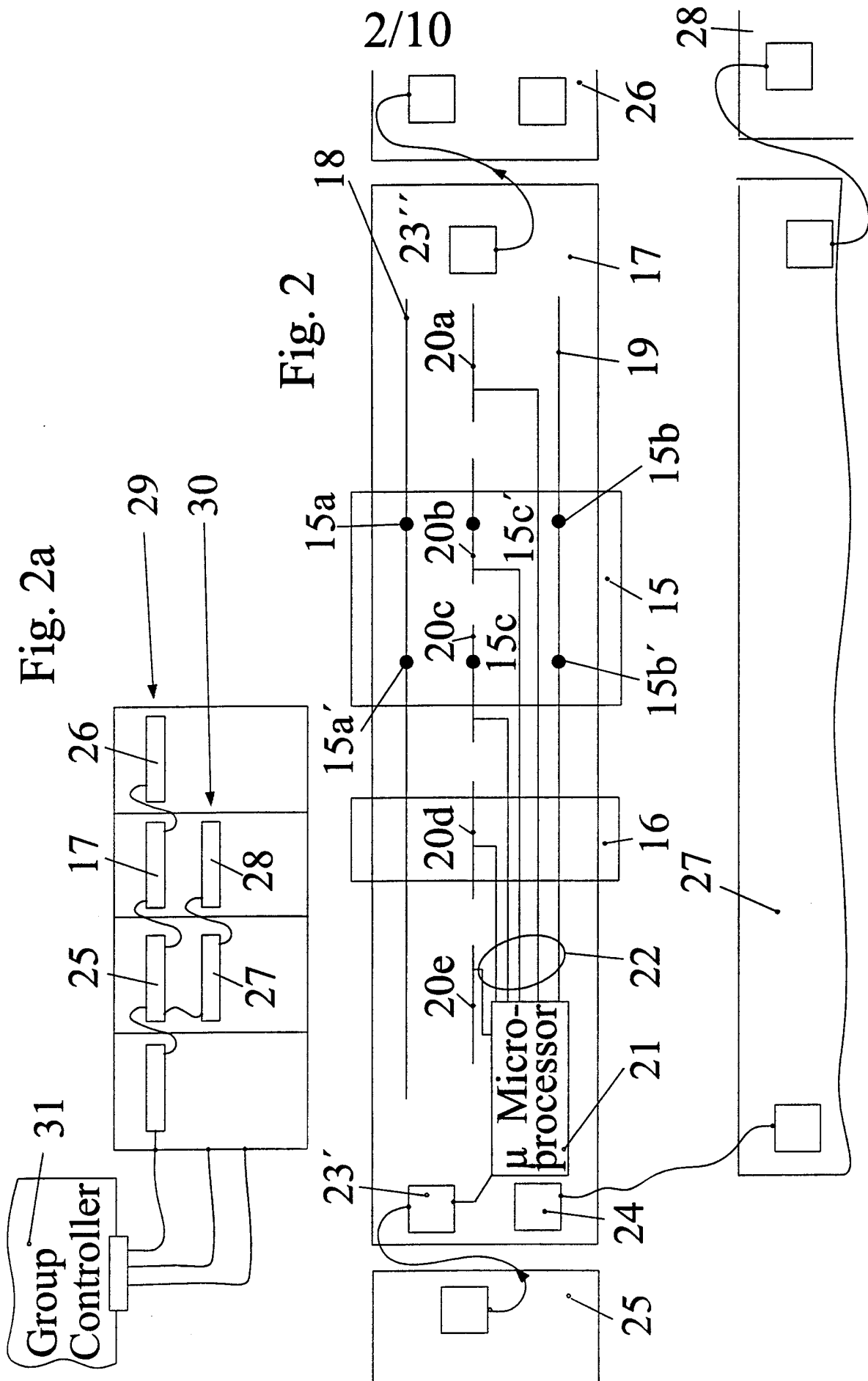


Fig. 3

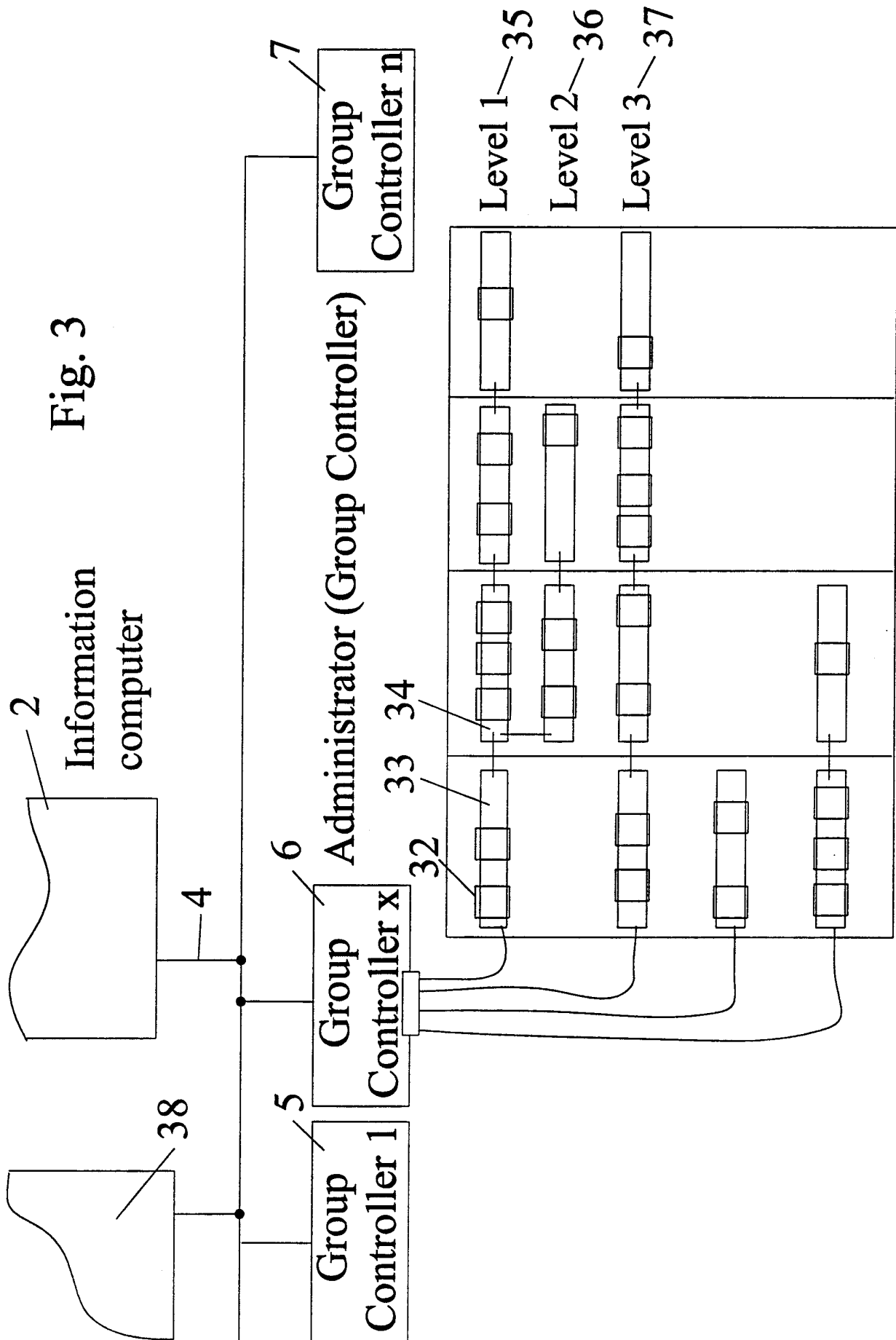
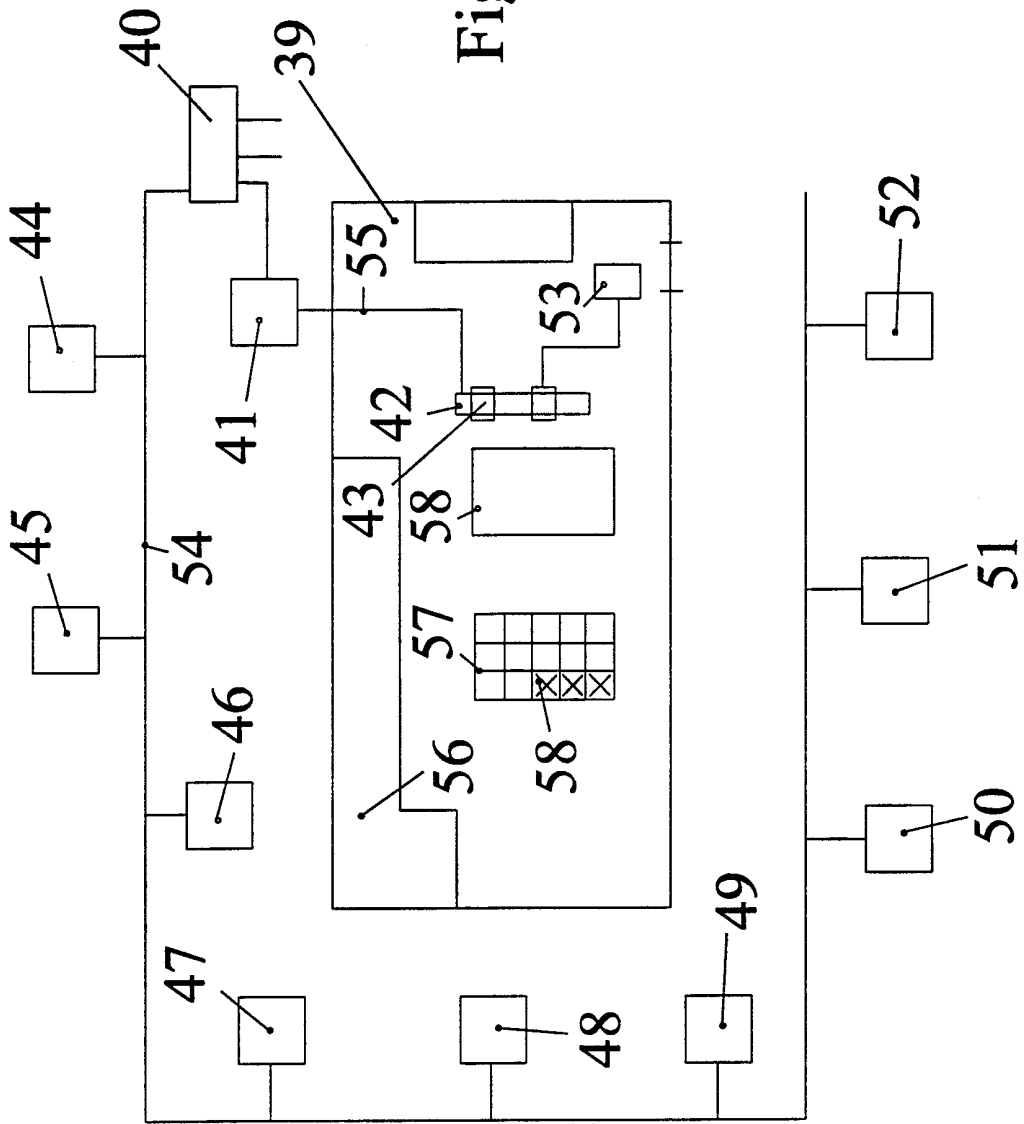


Fig. 4



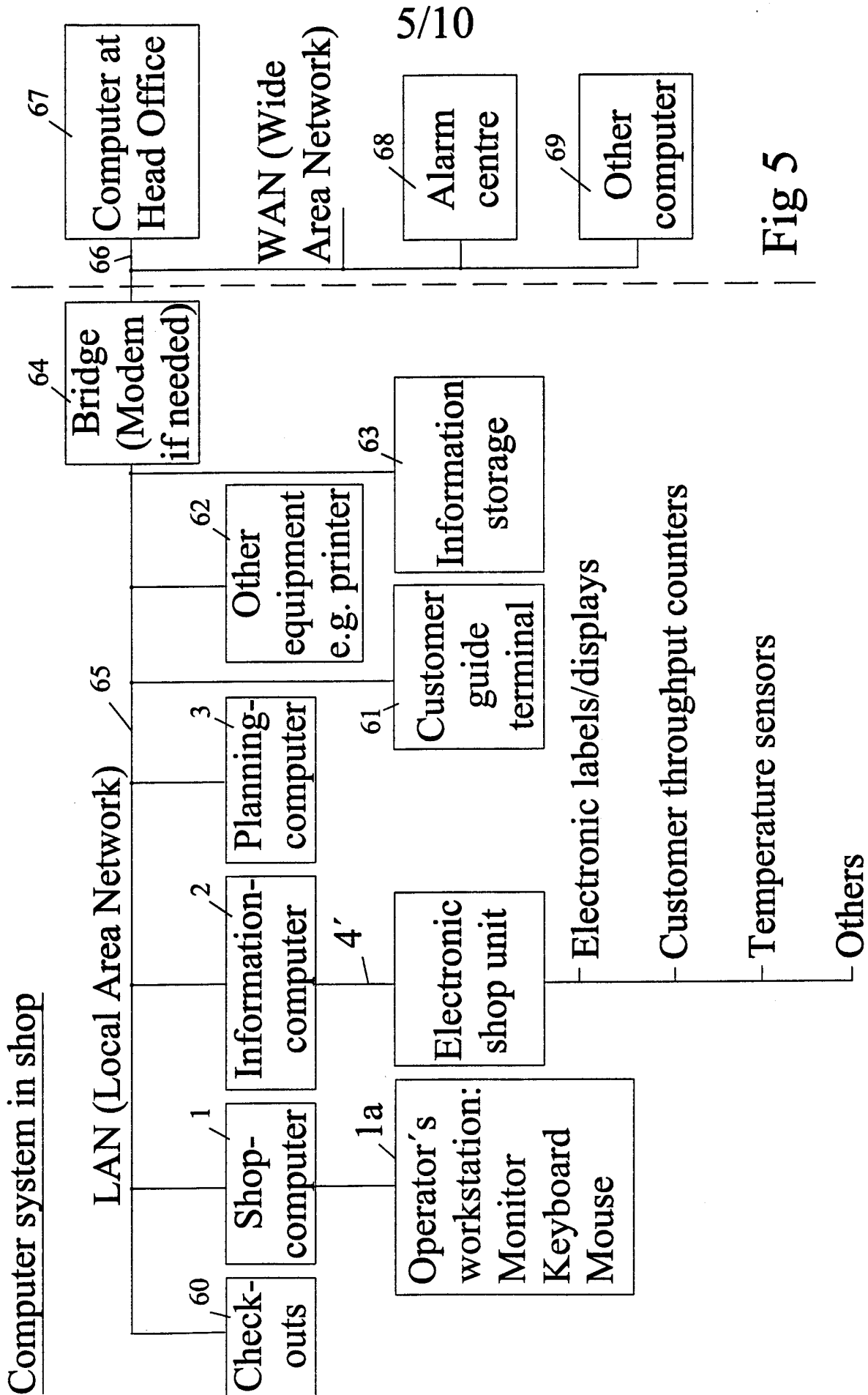


Fig 5



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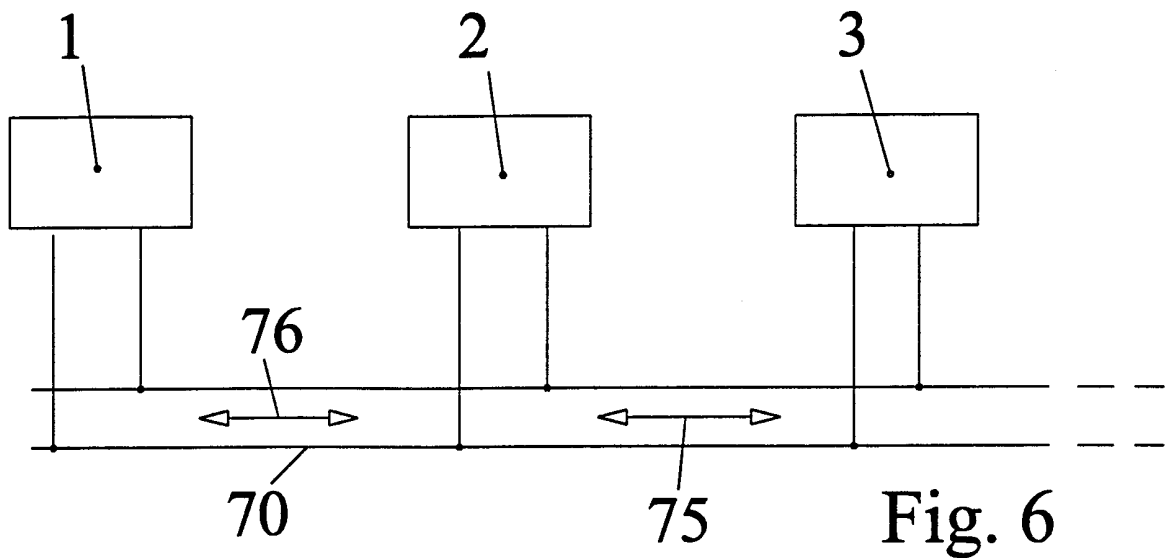


Fig. 6

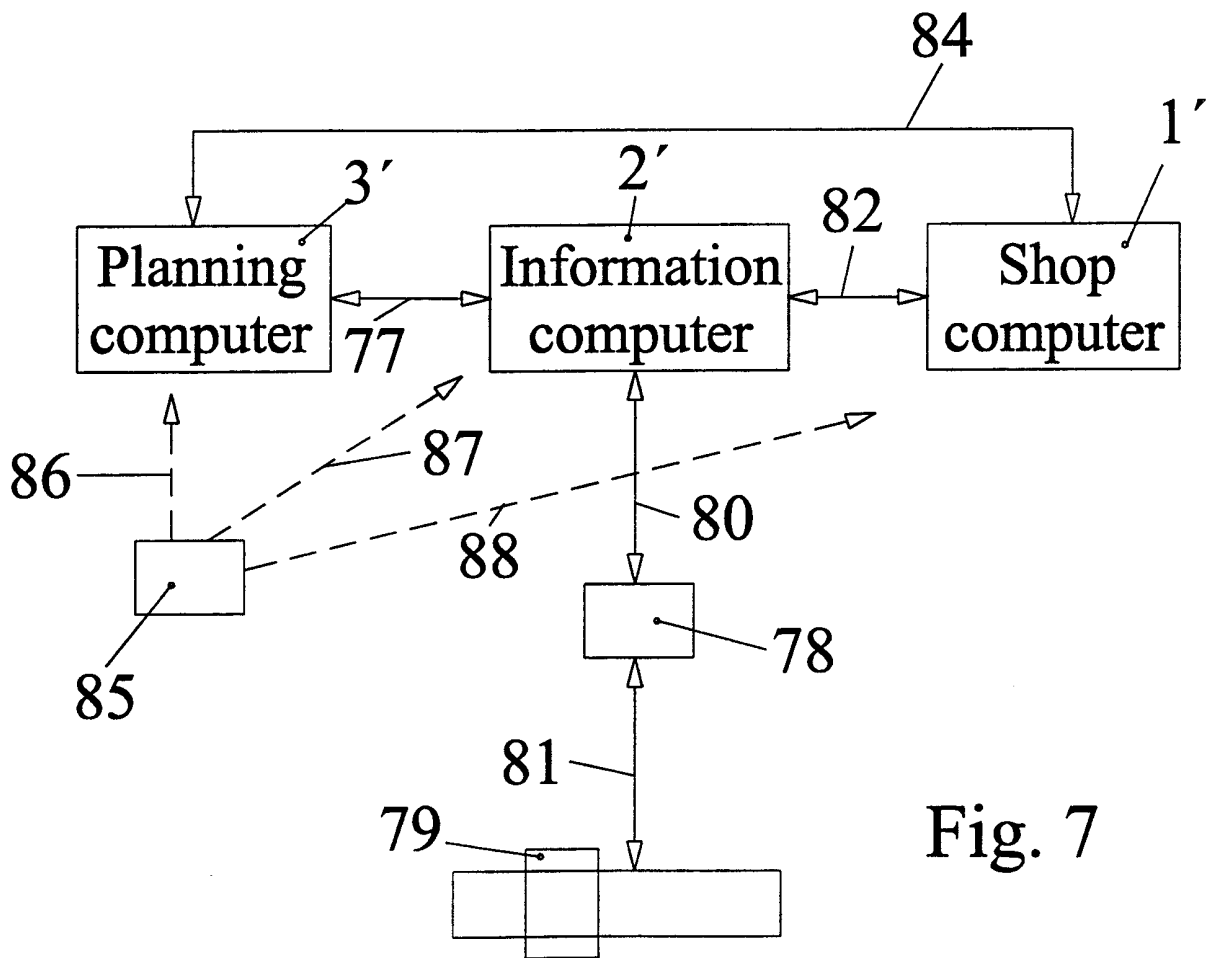
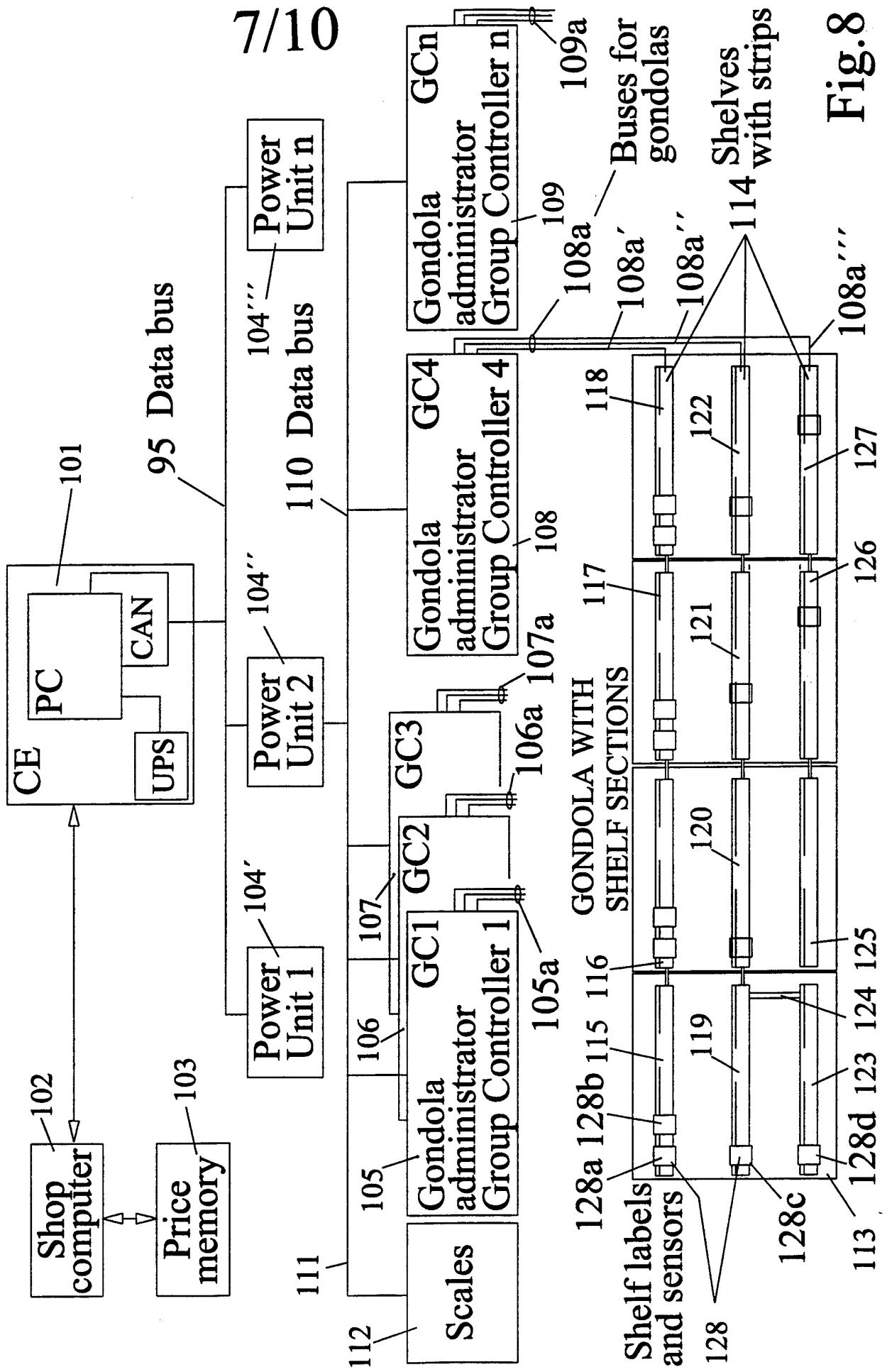


Fig. 7



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Fig.8

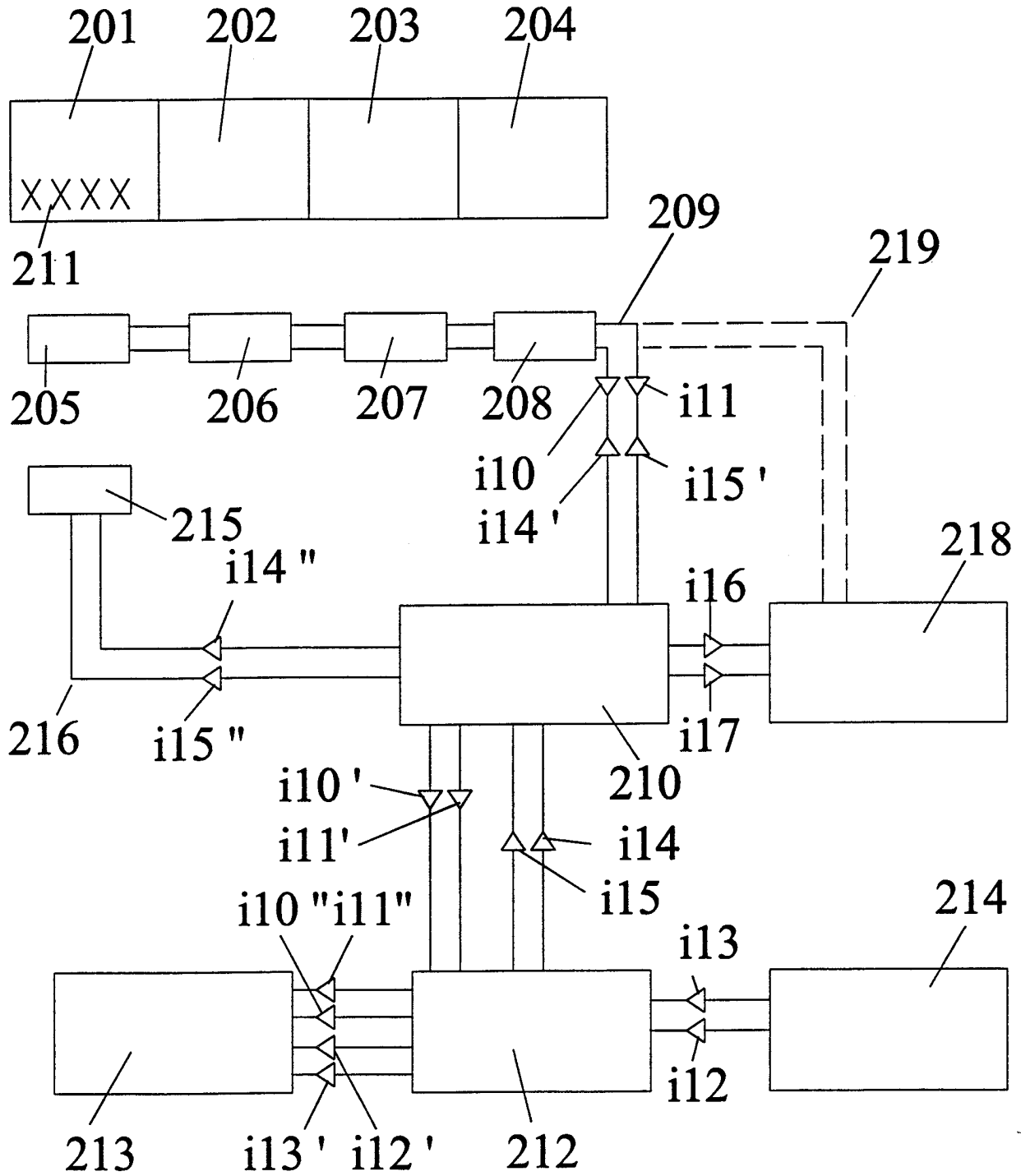


Fig 9

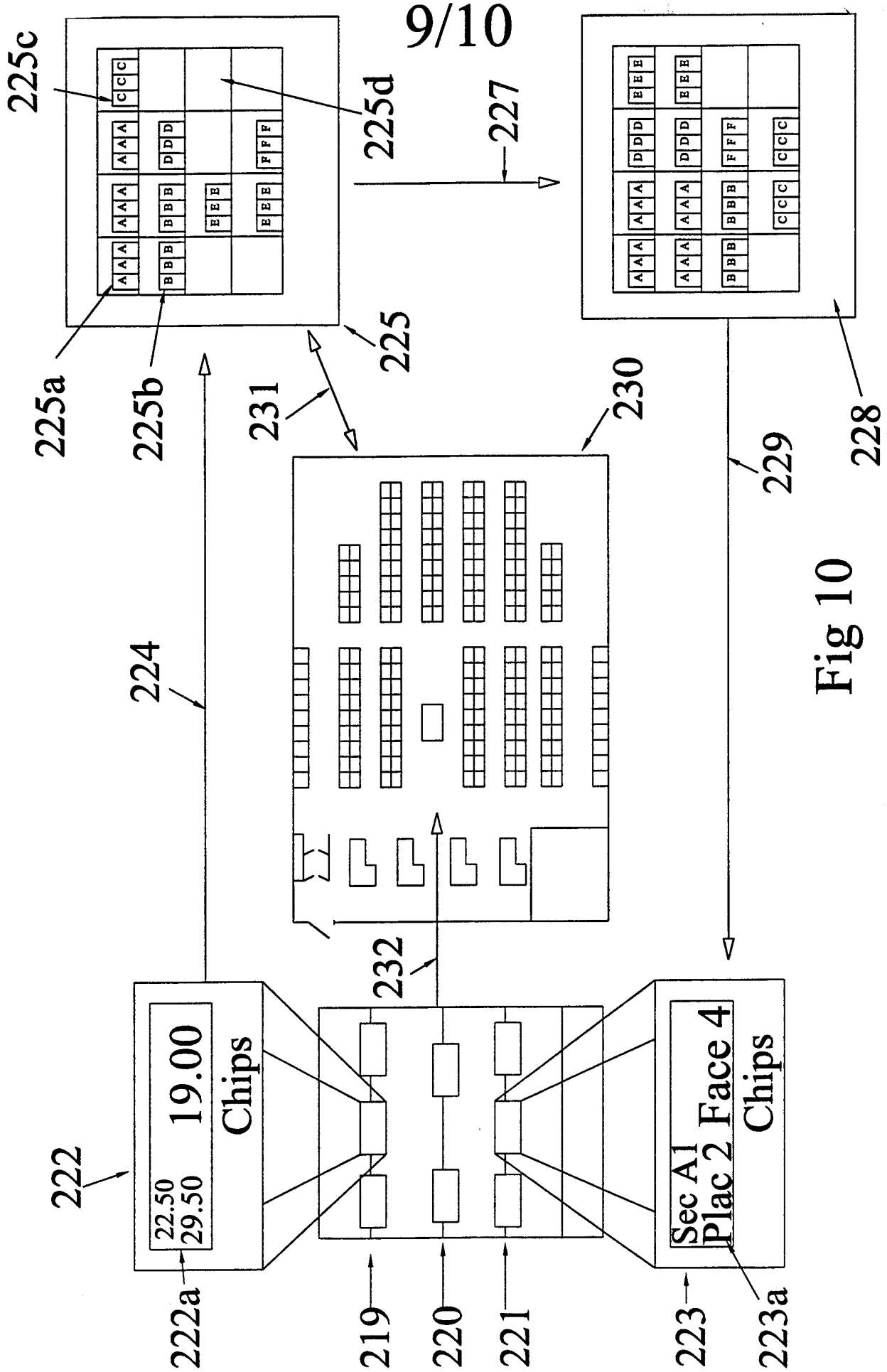


Fig 10

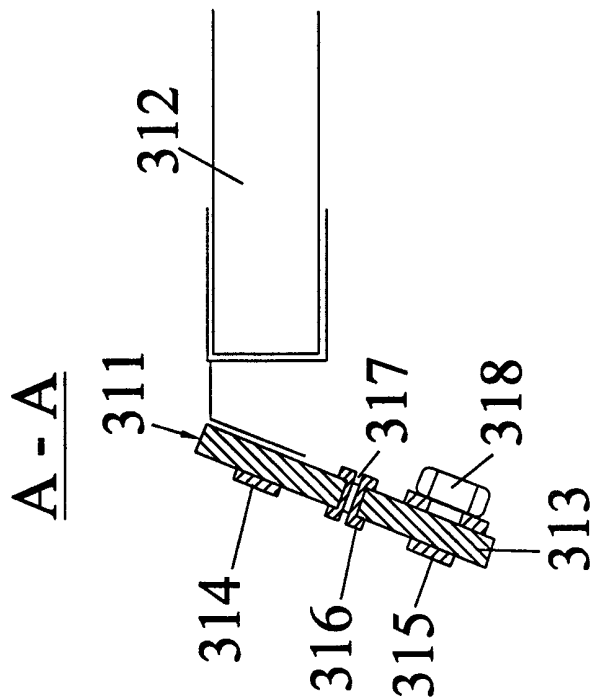


Fig 11a

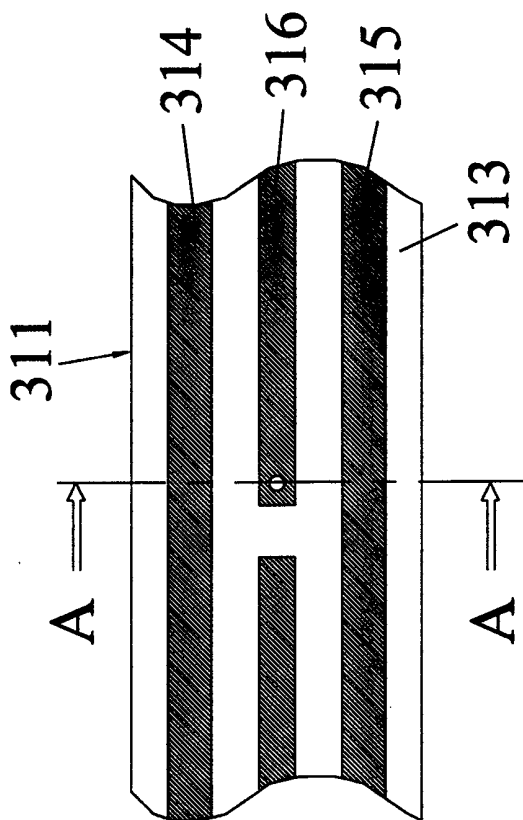


Fig 11

# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/SE 98/00504**

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
<b>IPC6: G06F 17/60</b> According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
<b>IPC6: G06F</b>		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
<b>SE,DK,FI,NO classes as above</b>		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>WPI</b>		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9705556 A1 (INTELLEDGE, CORPORATION), 13 February 1997 (13.02.97), page 9, line 5 - page 12, line 2; page 48, line 9 - line 16  --	1-40,42-46
A	US 5465085 A (MICHAEL W. CALDWELL ET AL), 7 November 1995 (07.11.95), column 1, line 55 - column 3, line 6  --	1-23,31-36
A	NL 9300916 A (ELBICON N.V.), 16 December 1994 (16.12.94), claims 1-17  --	1-23,31-36
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
Date of the actual completion of the international search	Date of mailing of the international search report	
<b>18 January 1999</b>	<b>02 -02- 1999</b>	
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer  <b>Göran Magnusson</b> Telephone No. +46 8 782 25 00	

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/00504

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5241467 A (BRUCE F. FAILING ET AL), 31 August 1993 (31.08.93), column 2, line 36 - column 3, line 42  --	24-30
A	US 5374815 A (PAUL WATERHOUSE ET AL), 20 December 1994 (20.12.94), column 1, line 54 - column 2, line 3  --	24-30
A	US 5473146 A (JOHN C. GOODWIN III), 5 December 1995 (05.12.95), column 1, line 44 - column 2, line 9  -- -----	24-30

# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/SE98/00504**

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

**See next page**

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.



# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/SE98/00504**

- I. Claims 1-23, 31-36
- II. Claims 24-30
- III. Claims 37-46

The special technical features in (I) relates to a device for use in premises, particularly in shops for collecting and presenting goods related information about commodities placed on different sections or surfaces. The information can be locations of the goods, prices, brands and amount of goods placed on the different shelves. It produces a graphical representation of the present location of the commodities.

The special technical features in (II) relates to a design and means of attachment of strips and printed circuit boards or the like for e.g. shelves. It also relates to a detection device to determine the position of the label or display device on the strip.

The special technical features in (III) relates to a device for use in stores, shops or the like, where display units, comprising strips fitted with integrated cables and electronics, are connected to the store's computer system. The display units can be designed to display prices and/or temperatures in e.g. freezer cabinets and heated cabinets.

Therefore, these groups I-III of inventions are not so linked as to form a single general inventive concept (PCT Rule 13.1). There is no technical relationship among those inventions involving one or more of the same or corresponding special technical features (the contribution which each of the inventions, considered as a whole, makes over the prior art) (PCT Rule 13.2).

# INTERNATIONAL SEARCH REPORT

Information on patent family members

01/12/98

International application No.

PCT/SE 98/00504

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9705556 A1	13/02/97	AU 6686096 A CA 2228423 A EP 0842481 A	26/02/97 13/02/97 20/05/98
US 5465085 A	07/11/95	NONE	
NL 9300916 A	16/12/94	NONE	
US 5241467 A	31/08/93	CA 2081861 A EP 0568180 A US 5812985 A	31/10/93 03/11/93 22/09/98
US 5374815 A	20/12/94	US 5532465 A WO 9422095 A	02/07/96 29/09/94
US 5473146 A	05/12/95	EP 0676708 A JP 8006531 A	11/10/95 12/01/96