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(54) Title: METHOD FOR ENHANCING COMMERCIAL EFFICIENCY OF A FILLING STATION AND FUEL DISPENSING SYSTEM COMPRISING A FILLING STATION

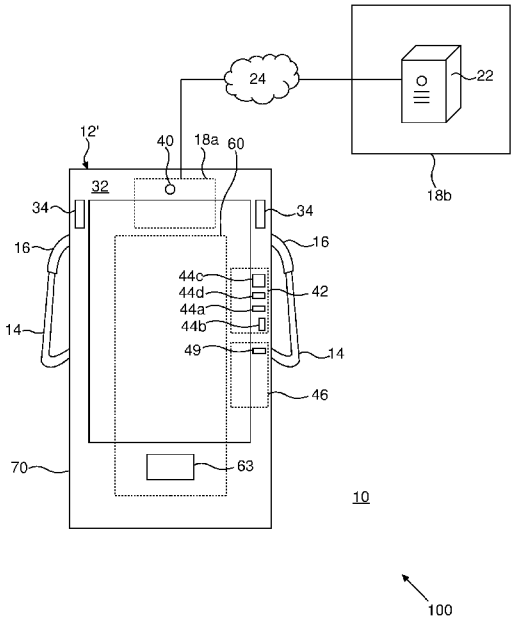


Fig.2

(57) Abstract: The invention relates to a fuel dispensing system comprising at least one fuel dispenser, at least one camera and at least one display device arranged at a filling station, characterised by further comprising a control system operably connected to the at least one fuel dispenser, the at least one camera and the at least one display device, and the control system is configured: - to receive an image of a region of the filling station captured by the camera, - to process the image in order to detect at least one predetermined characteristic associated with a consumer, - to determine information content based on the detected characteristic, and - to display the determined information content on a display screen of the display device.

Method for enhancing commercial efficiency of a filling station and fuel dispensing system comprising a filling station

The present invention relates to a fuel dispensing system comprising at least one fuel dispenser, at least one camera, and at least one display device arranged at a filling station. The invention further relates to a method for enhancing commercial efficiency of a fuel dispensing system comprising at least one fuel dispenser, a display device and at least one camera arranged at a filling station.

With the increasing use of automobiles there is an increasing demand on the retail of fuel, i.e. gasoline (petrol), diesel, other gasoline products and electric energy which are generally retailed in filling stations (also known as fuelling stations, gas pumps, petrol pumps, charging stations). As a consequence, there is also an increasing demand on fuel retail at locations where it would not be economic to set up larger filling stations (e.g. less frequented locations in the countryside or shopping centres where only limited space is available). This problem is solved by Hungarian utility model HU 3969U which discloses a compact filling station that can be installed in the footprint of 3 to 8 parking spaces in a parking lot.

The business potential of such small size filling stations can be increased by keeping down the number of personnel or even eliminating the need of any personnel by setting up self-service fuel dispensers that can be operated by the consumers and by providing payment apparatuses allowing the consumers to purchase the desired amount of fuel. Self-service fuel dispensers

and payment apparatuses accepting various bank cards, or bank notes and coins are well known in the art.

The present invention seeks to provide means of further increasing the commercial efficiency of filling stations in particularly, but not limited to that of compact filling stations.

A known way of increasing commercial efficiency is to display paid advertisements to the consumers visiting the filling station. Advertisements can be displayed in a static way (e.g. wall paintings, billboards, banners, etc.) or in a dynamic way (e.g. displaying a plurality of advertisements alternately, displaying video advertisements on various types of display screens, etc.). The marketing value of advertisements increases if it can be displayed to the appropriate target audience. This phenomenon is extensively exploited e.g. in the field of Internet-based advertising where targeted advertisements can be displayed using information of web sites previously visited by the user, or in the case of web shops where further items can be recommended based on the items selected by the consumer.

It is a first objective of the present invention to enhance commercial efficiency of a filling station by providing targeted advertisements to consumers visiting the filling station. It is a further objective of the present invention to enhance commercial efficiency of a filling station by increasing the convenience of self-service payment. It is yet another objective of the invention to provide a user friendly interface for carrying out the filling and payment operations.

In a first aspect the invention provides a fuel dispensing system according to claim 1.

In a second aspect the invention provides a method according to claim 12 for enhancing commercial efficiency of a fuel dispensing station.

Further advantageous embodiments of the invention are defined in the attached dependent claims.

Further details of the invention will be apparent from the accompanying figures and exemplary embodiments.

Fig. 1 is a schematic diagram of an exemplary embodiment of a fuel dispensing system according to the present invention.

Fig. 2 is a schematic diagram of another exemplary embodiment of a fuel dispensing system according to the present invention.

The term "consumer" as used herein refers to a person visiting the filling station according to the invention regardless of whether or not the person purchases anything and whether or not an automobile belongs to or is in the possession of this person.

The term "advertisement" as a type of information content is understood to include static advertisements such as pictures and dynamic advertisements such as animated picture, films, and the like. The advertisement may be visual only or audio-visual. The advertisement may further contain olfactory effects (scents) and/or light effects for further enhancing the desirability of goods and for effecting the mood of the consumers, respectively. An advertisement may be any kind of commercial information, offer or the like, including sales information, promotional offers, etc..

The term "displaying information content" as used herein includes displaying static information content (e.g. static advertisement) or playing an animated picture, film, or the like.

The term "filling station" as used herein is understand to comprise the site where the fuel is dispensed including the space where an automobile is parking which is being refuelled.

The fuel dispensing system 100 depicted in Fig. 1 comprises a filling station 10 wherein at least one fuel dispenser 12 is installed which may have a plurality of 14 hoses each terminating in a nozzle 16 for dispensing different grades of fuel. The fuel dispenser 12 may also comprise an electric charger (not shown) for providing electric energy as a special type of fuel. The 12 fuel dispenser may be equipped with a conventional mechanical section comprising an electric motor, pumping unit, meters, pulsers and valves to physically pump and control the fuel flow as known in the art. Prior art fuel dispensers generally have a head part as well, which contains an embedded computer to control the action of the fuel dispenser, drive the fuel dispenser's displays, and communicate with an indoor sales system. In case of the present invention these functions may be taken over by a control system 18 operably connected

to the fuel dispenser 12 and a display device 30 arranged on or in the vicinity of the at least one fuel dispenser 12.

The control system 18 may comprise a local control unit 18a and a remote back office system 18b.

The local control unit 18a may be a computer, a microcontroller or the like, that may be arranged anywhere at the filling station 10 where it can be protected from weather conditions and tampering by unauthorised persons.

The remote back office system 18a may comprise one or more computers or servers 22 or the like, or a combination thereof.

The control system 18 preferably comprises one or more databases 20 that can be included in the local control unit 18a (e.g. in the form of a database 20 stored on or connected to the computer serving as the local control unit 18a) or at the remote back office system 18b (e.g. in the form of a database 20 stored on or accessible to the computer or server 22 being part of the remote back office system 18a).

The local control unit 18a and the remote back office system 18b are connectable via an electronic communication channel 24 established over any type of network suitable for data transmission. Such networks include but are not limited to telephone network, extranet, intranet, Internet, online communications, satellite communications, off-line communications, wireless communications, transponder communications, local area network (LAN), wide area network (WAN), networked or linked devices, etc. The established communication channel 24 is understood to include any electronic communications means incorporating hardware and/or software components that may either be part of the data transmission network or it may be comprised by the fuel dispensing system 100 and in particular by the control system 18.

The fuel dispensing system 100 may comprise a plurality of filling stations each equipped with at least one local control unit 18a, which are preferably all connectable to the remote back office system 18b. It is also possible that the remote back office system 18b comprises a plurality of servers 22 which are located at different geographic locations (cloud servers), in which

case it is sufficient for a local control unit 18a to be connectable to one server 22.

The display device 30 comprises a display screen 32 and may optionally comprise one or more loudspeakers 34 or separate loudspeakers 34 may be provided in order to provide audio-visual advertisements to consumers approaching the display screen 32 either by an automotive vehicle or on foot. The display screen 32 is preferably divided logically into a first region 32a for displaying advertisements and a second region 32b for displaying functional information and commands of the fuel dispenser 12 and any other consumer devices as will be explained later on. For example the advertisement displaying region 32a may occupy the upper two third portions of the display screen 32, while the functional region 32b may occupy the lower one third portion of the display screen 32. It will be appreciated by a skilled person that any proportion of the two regions 32a and 32b are conceivable and that these regions 32a, 32b may be arranged in any way with respect to each other (e.g. side by side, or the functional region 32a may be located above the advertising region 32a), furthermore, the regions 32a, 32b need not be continuous, e.g. the functional region 32b may occupy a central portion of the display screen 32 while the advertising region 32a may comprise two distinct portions on the left and right side of the functional region 32b, or adjacent the upper and lower side of the functional region 32b, etc.

The display screen 32 is preferably a touch screen serving also as a data input interface connected to the control system 18 (and in particular to the local control unit 18a). The control system 18 is configured to receive control commands via the touch screen 32 and to control the operation of at least the fuel dispenser 12 in accordance with the received control commands.

Alternatively, a separate data input interface (not shown) may be provided in which case the display device 30 may rely on any kind of image displaying technology, e.g. cathode ray tube (CRT) display, liquid crystal display (LCD), plasma display, light-emitting diode (LED) display, organic light-emitting diode (OLED) display, surface-conduction electron-emitter display (SED), field emission display (FED), etc. The separate data input interface may be any kind

of user interface allowing the consumer to enter commands including the possibility of choosing from commands displayed in the functional region 32b of the display screen 32. Possible data input interfaces include keyboard, mouse, touchpad, trackball, and the like.

At least one camera 40 is arranged at the filling station 10 which is also connected to the control system 18 and in particular to the local control unit 18a. The camera 40 is directed to a region of the filling station 10 where a predetermined characteristic associated with consumers is likely to be detected. For example such predetermined characteristics may be the age and/or gender and/or mood of a consumer approaching the display device 30 by foot or sitting in a vehicle, in which case the at least one camera 40 is preferably arranged in the vicinity of the display screen 32, e.g. above the display screen 32 substantially adjacent therewith.

The control system 18 is configured to receive an image of the region of the filling station 10 captured by the camera 40 and to process the image in order to detect the at least one predetermined characteristic associated with consumers. For example in the case of the above described embodiment processing the image includes face recognition for detecting the at least one predetermined characteristic such as the age and/or gender and/or mood of the consumer approaching the camera 40 arranged adjacent of the display screen 32.

In another embodiment the characteristic associated with the consumer is the type (e.g. the brand) of the automobile of the consumer. In this case at least one camera 40 is directed to a region of the filling station 10 where the registration plate of the automobile is likely to be found that has been parked at the fuel dispenser 12 for filling. Preferably a separate camera 40 is provided for capturing an image of the front registration plate and another camera 40 for capturing an image of the rear registration plate, whereby the chances of obtaining a recognizable registration plate is increased.

The camera 40 may further be used to detect objects, the brand of clothes, or other brands as characteristics of the consumer.

In yet another embodiment a plurality of cameras 40 are installed so as to image a plurality of consumer characteristics (e.g. the consumer's age and/or gender and/or mood as well as the registration plate of the consumer's vehicle, type and brand of the consumer's vehicle, etc.) and the control system 18 is provided with rules for ordering the plurality of detected characteristics and for determining the order in which to take the detected characteristics into account in further steps of the operation.

According to the invention the control system 18 is configured to determine an advertisement based on the detected consumer characteristic and to display the determined advertisement at least on the advertisement displaying region 32a of the display screen 32 of the display device 30. It is also conceivable that the advertisement is displayed on the full display screen 32 so long the consumer does not interact with the data input interface, which may be the touch screen 32. After such interaction the full display screen 32 may be occupied by the functional region 32b.

The advertisements are preferably stored in the database 20 either at the local control unit 18a or at the remote back office system 18b, and the control system 18 (either the local control unit 18a or the remote back office system 18b) is equipped with rules and algorithms for defining which advertisement to display from the database 20 to the consumer based on the one or more detected consumer characteristics as will be explained in more detail later on.

The fuel dispensing system preferably allows for complete self-service including both self-service filling and self-service payment. Commonly applied fuel dispensers 12 allow for self-service filling hence this will not be discussed in more detail.

In order to allow for self-service payment the fuel dispensing system 100 further comprises a payment apparatus 42 that is arranged in the vicinity of or incorporated in the fuel dispenser 12. The payment apparatus 42 has a payment instrument interface 44 for reading a payment instrument such as a credit card, debit card, stored value card, gift card, smart card, smart chip incorporated in other devices (e.g. mobile phone), RFID chip based card or

token, and the like. Bank notes and coins are also regarded as payment instruments in the context of the present invention.

The payment instrument interface 44 comprises one or more interface types such as a bank note slot 44a; a coin slot 44b; an NFC interface 44c; a card reader 44d comprising e.g. a magnetic stripe reader or a smart chip reader; RFID reader; bar code reader; two dimensional bar code (QR code) reader; etc. The card reader may also be a reader-writer type device, which is suitable for both reading and writing the given type of card. The NFC interface 44c may also be an NFC reader-writer device.

The payment apparatus 42 is connected to the control system 18 (and in particular to the local control unit 18a), and the control system 18 is preferably configured to allow for payment of a consumer selected quantity of fuel with a payment instrument corresponding to the payment instrument interface 44 and to enable discharge of the purchased fuel by the fuel dispenser 12.

It is also conceivable to allow payment via sms payment or bank transfer in a known way, or using any other online or mobile payment systems, such as Wechat and Alipay systems, in which case the control system 18 is configured to enable discharge of the purchased fuel once the control system 18 is notified of the payment by an external financial institute 50 which can be a bank or the mobile service provider in the case of sms or mobile payment. It is also conceivable to allow payment from a loyalty card.

The fuel dispensing system 100 may further comprise a payment instrument issuing apparatus 46 that is connected to and operated by the control system 18. The control system 18 is preferably configured to issue a payment instrument corresponding to the payment instrument interface 44 of the payment apparatus 42 via the payment instrument issuing apparatus 46. Accordingly, the issued payment instrument may be an NFC card, a magnetic stripe card, a smart chip card, a bar code card, or the like that is readable by the payment instrument interface 44 of the payment apparatus 42. The payment instrument issuing apparatus 46 may comprise a payment instrument carrier storage 48 where payment instrument carriers are stored that are preferably

impersonated by the payment instrument issuing apparatus 46 in accordance with the type of the payment instrument in known ways. The payment instruments issued by the payment instrument issuing apparatus 46 are dispensed at a payment instrument dispenser 49 from where the consumer can take the issued payment instrument.

The control system 18 is preferably configured to issue a payment instrument in case of overpayment of fuel. In this case the payment instrument is issued with a monetary value corresponding to the amount of overpayment. The value may be stored directly on the payment instrument or may be associated with a unique identifier of the impersonated payment instrument, in which case the value may be stored along with the unique identifier in one of the databases 20, preferably at a database located at the remote back office system 18b in order to be accessible by any local control unit 18a.

The fuel dispensing system 100 preferably further comprises a vending machine 60 that is connected to and operable by the control system 18. The vending machine 60 may be any type of machine for dispensing snacks, drinks or other items to consumers. The vending machine 60 preferably has a display area 62 displaying the items offered for purchase and a dispensing compartment 63 which preferably becomes accessible to consumers when an item is purchased and released to fall down there. The vending machine 60 may also have a control panel 64 for selecting an item as well as a payment instrument interface 66 typically comprising a coin slot and optionally a bank note slot for allowing for payment of the selected item. However, according to the invention the vending machine 60 may also be operable from the data input interface, which is preferably the touch screen 32 of the display device 30. Based on the operating commands entered via the touch screen 32 or other type of data input interface the control system 18 (and in particular the local control unit 18a) is configured to allow for payment of an item offered at the vending machine 60 via a payment instrument corresponding to the payment instrument interface 44 of the payment apparatus 42 and to enable discharge of the purchased item by the vending machine 60 at its dispensing compartment 62.

It is also conceivable that the vending machine 60 is only operable via the data input interface, preferably touch screen 32, and the selected item has to be paid for at the payment apparatus 42 provided in the vicinity of the display device 30. In this case the vending machine 60 is not provided with a separate control panel 64 and payment instrument interface 66. The display screen 32 of the display device 30 may also serve as the display area 62 of the vending machine 60.

The advantage of the fuel dispensing system 100 according to Fig 1 that it is possible to convert existing filling stations by supplementing the existing fuel dispensers with the control system 18, the camera 40, the display device 30, the payment apparatus 42, the payment instrument issuing apparatus 46 and the vending machine 60 according to the invention.

In another preferred embodiment the fuel dispenser 12, the control system 18, the camera 40, the display device 30, the payment apparatus 42, the payment instrument issuing apparatus 46 and the vending machine 60 are integrated into a multifunctional fuel dispenser 12' as illustrated in Fig. 2. According to the illustrated embodiment the filler nozzles 16 are arranged on both sides of a common housing 70, however, the nozzles 16 could be arranged elsewhere, e.g. on the front of the housing 70 on one or two sides of the display screen 32. It is also possible to provide the same interfaces (display screen 32, loudspeakers 34, camera 40, payment instrument interfaces 44, payment instrument dispenser 49, dispensing compartment 63) and nozzles 16 on the back of the housing 70 as well in order to allow consumers to conveniently fuel vehicles and enjoy other services at both sides of the multifunctional fuel dispenser 12'.

The housing 70 may be provided with a special cover containing LEDs, whereby the colour of the cover may be changed constantly in order to permit different light effects. For example the colour of the cover of the housing 70 may be set with the help of the built-in LEDs to harmonise with an advertisement displayed on the display screen 32.

By way of example the method according to the invention will now be described with reference to the fuel dispensing system 100 depicted in Fig. 1.

When a consumer enters the filling station 10 and parks his or her automobile beside the at least one fuel dispenser 12 the one or more cameras 40 directed at the region of the filling station where the registration plate of a parking automobile is likely to be found captures an image of the registration plate of the consumer's automobile which is transmitted to the local control unit 18a of the control system 18. The local control unit 18a preferably processes the image in order to detect and determine the registration sign (which may comprise numbers and letters as well as other signs) displayed on the registration plate. The determined registration sign is preferably transmitted to the remote back office system 18b over the communication channel 24 established over the applied communication network between the local control unit 18a and the remote back office system 18b. The database 20 comprised by the remote back office system 18b preferably contains information of automobiles linked to their registration sign or the remote back office system 18b comprises a server 22 or other computer that has access to an external database containing information based on the registration sign of automobiles. Such information may include certain characteristics of the consumer's automobile such as its type, and in particular the brand of the automobile, the registration number or other sign on the registration plate of the automobile, the insurance number of the automobile, the expiry date of the insurance, and other associated data.

Some or all of the information relating to the characteristics of the consumer's automobile is preferably sent back from the remote back office system 18b to the local control unit 18a over the communication channel 24. The database 20 comprised by the local control unit 18a preferably stores various advertisements which may be labelled or associated in any other way to a target market of the given advertisement. The local control unit 18a preferably also comprises rules and algorithms to determine an advertisement based on the returned characteristics and the advertisements (e.g. based on the labels of the advertisements). Alternatively, the rules and algorithms may be stored in the remote back office system 18b.

For example if the characteristic includes the brand of the automobile and some of the stored advertisements are labelled with that brand the rules and algorithms may cause the local control unit 18a to display such an advertisement on the advertisement displaying region 32a of the display screen 32 of the display device 30.

According to another advantageous embodiment the information relating to the characteristics of the consumer's automobile contains the expiry date of the automobile's insurance or licence. The rules and algorithms of the local control unit 18a may be such as to display advertisements which are, e.g. according to their labelling, associated with automobile insurance or licence promotions if the expiry date of the automobile's insurance or licence falls within a predetermined time period, e.g. three months from the current date. It is also conceivable that the local control unit 18a is connectable to an insurance company or an agency for renewing vehicle licence either directly or via the remote back office system 18b and the consumer is allowed - via the data input interface with is preferably the touch screen 32 of the display device 30 - to renew an existing insurance at his or her insurance company or place an order for an automobile insurance with a different insurance company or to book and appointment at such an agency for renewing the vehicle licence.

In a second embodiment at least one camera 40 is directed at a region of the filling station 10 where the consumer's face is likely to appear, e.g. behind the front screen glass of the automobile parked beside the fuel dispenser 12 at a height where the driver's and passengers' heads are normally visible. Alternatively, or in addition the camera 40 may be directed at the vicinity of the display device 30 so as to capture an image of a consumer approaching the display device 30 when wishing to use the fuel dispenser 12 (or the vending machine 60). In this case the control system 18 may use face recognition techniques for determining certain characteristics of the consumer, e.g. age, gender, presence of glasses, etc.. For example if the control system 18 determines via face recognition that the consumer who's image has been captured with one of the camera's 40 is a middle aged women, the rules and algorithms may indicate one or more advertisements associated with a target

market corresponding to middle aged women. If more than one advertisements are associated with the detected consumer characteristics these can be displayed at a predetermined order or in a random order or only one of such advertisements are displayed based on rules (e.g. which advertisement has not been displayed recently, which advertiser offered to pay more for displaying the advertisement, etc.).

The advertisement may be a visual advertisement or an audio-visual advertisement in which case the loud speakers 34 of the display device 30 can be used to produce the sound of the advertisement.

The control system 18 may include rules and algorithms for ordering a plurality of detected characteristics and determine an advertisement based on the ordered characteristics. Detection of a plurality of characteristics may occur e.g. when one or more of the cameras 40 capture the image of the registration plate of the consumer's automobile while one or more of the cameras 40 capture the image of the face of the consumer, or a plurality of faces are detected by one or more cameras 40. The rules and algorithms may include rules that facial characteristics have priority over characteristics derived from the registration plate or the other way around. A rule may be provided to give precedence to the characteristics derived from face recognition of the consumer nearest to the display device 30. A rule may be provided to give precedence to the majority characteristics, e.g. if two women and a man are detected the control system 18 may determine an advertisement of which the associated target market consists of women. It should be appreciated that any number of rules and algorithms are conceivable.

In a further aspect of the method according to the invention the control system 18 comprises algorithms that use the detected and determined characteristics to create statistics associated with consumers using the filling station. The statistics can relate to a single characteristic (e.g. relationship between brand of the automobiles and fuel purchase) or the statistics can be created based on a plurality of characteristics (e.g. relationship between age and gender of consumer, brand of their automobiles and amount and/or grade of fuel purchased).

The advertisement may be displayed in the advertisement displaying region 32a of the display screen 32 or on the whole display screen 32. In the latter case the functional region 32b may appear upon certain interaction of the consumer (e.g. when the consumer touches the touch screen 32).

When the functional region 32b of the display screen 32 is active the consumer may choose from various services such as purchasing and filling fuel from the fuel dispenser 12, purchasing an item form the vending machine 60, ordering an automobile insurance or other services, ordering a payment instrument that can be issued by the payment instrument issuing apparatus 46 or loading credits onto such a payment instrument. It is further noted that credits maybe loaded onto the payment instrument in any other conventional ways as well, e.g. from a dedicated webpage, or via mobile payment, or via sms payment, or by bank transfer, etc.

If the consumer chooses to purchase a certain quantity and grade of fuel, the consumer is preferably prompted to select a mode of payment. If the consumer selects a mode of payment using a payment instrument that is accepted by the payment instrument interface 44 of the payment apparatus 42 then the consumer is preferably prompted to use the payment instrument. The fuel dispensing system 100 may require advance payment in which case only the paid amount and type of fuel will be dispensed. Alternatively, the payment may follow the fuelling process in which cases the dispensed fuel is paid posteriorly. The payment settings of the fuel dispensing system 100 may depend on the country where it is installed.

If the selected payment mode is cash payment the consumer inserts bank notes and/or coins in the amount of the selected quantity of fuel to be purchased upon which the control system 18, and in particular the local control unit 18a sends control signals to the fuel dispenser 12 to dispense the selected grade of fuel in the purchased amount. In case of overpayment (e.g. the tank fills up before having dispensed all of the purchased quantity of fuel) the overpayment is preferably reimbursed in the form of loading a payment instrument of the fuel dispensing system 100 with a monetary value corresponding to (e.g. equal to) the overpayment. The payment instrument of

the fuel dispensing system 100 is a payment instrument that is issued by the payment instrument issuing apparatus 46 located at the filling station 10 or which has been previously issued by a payment instrument issuing apparatus 46 of the same filling station 10 or a different filling station 10 belonging to the fuel dispensing system 100. The payment instrument of the fuel dispensing system 100 is preferable a rechargeable value-stored card or a prepaid card known in the art.

If the consumer chooses to pay with the payment instrument of the fuel dispensing system 100 he or she must allow the corresponding payment instrument interface 44 to read the payment instrument. In the case of NFC cards as payment instruments it is sufficient to hold the NFC card in the vicinity of the NFC reader, in other instances the payment instrument generally needs to be inserted into a card slot (e.g. for reading a magnetic stripe or a chip).

Credits corresponding to the value of the selected quantity and grade of fuel may be secured by the control system 18 in a first step after which the fuel dispenser 12 is activated, and after termination of the filling operation the credits corresponding to the value of the quantity and grade of fuel dispensed are deleted from the payment instrument by the control system 18, which value may be equal to or less than the previously secured credit value (depending on whether or not the filling operation was terminated prior to dispensing the whole quantity of fuel selected by the consumer). The credits associated with the payment instrument of the fuel dispensing system 100 are preferably administered by the remote back office system 18b whereby the credit balance can be queried by all the local control units 18a located at different filling stations 10.

If the consumer chooses to pay with the payment instrument of an external financial institute 50 the procedure is carried out similarly with the exception that settlement of the payment and optionally fund securing is carried out by the financial institute 50 as known in the art. In case of overpayment the overpayment is preferably reimbursed in the form of loading a payment instrument of the fuel dispensing system 100 with a corresponding monetary value. If the consumer does not have such a payment instrument it will be

issued to him or her by the payment instrument issuing apparatus 46 in a way to be explained later.

The fuel dispensing system 100 may allow for sms or mobile payment or bank transfer payment in which case the fuel dispenser 12 is activated by the control system 18 and in particular by the local control unit 18a upon receipt of confirmation of the payment from the mobile service provider or the financial institute 50 (e.g. bank) responsible for transferring the payment. In case of overpayment the overpayment is preferably reimbursed by loading a payment instrument of the fuel dispensing system 100 with a corresponding monetary value. If the consumer does not have such a payment instrument it will be issued to him or her by the payment instrument issuing apparatus 46.

If the consumer wishes to purchase an item (e.g. snack, drink, etc.) from the vending machine 60 he or she can do so by selecting this service on the functional region 32b of the touch screen 32. The item can be identified for example by the number, letter or other symbol associated with the item which is visible in the display area 62 of the vending machine 60 or alternatively the consumer may choose from a list of items by selecting the item on the touch screen 32. Payment for the selected item can be carried out in the same way as described in connection with fuel purchase. Furthermore payment for the selected item can be carried out separately or together with the payment for the selected quantity and grade of fuel. Once the item has been paid for the control system 18, and in particular the local control unit 18a, sends operation commands to the vending machine 60 to release the item which then drops down to the dispensing compartment 63 in a known way from where it can be collected by the consumer. It will be appreciated that any other known vending machine 60 construction can be applied as well.

Preferable the fuel dispensing system 100 has its own payment instrument, which is preferably a stored-value card, which is a payment card with a monetary value stored on the card itself or a prepaid card, wherein the monetary value is maintained on the remote back office system's 18b computers.

If the consumer wishes to order such a payment instrument of the fuel dispensing system 100 he or she may do so by selecting this service on the functional region 32b of the touch screen 32. The consumer may than be prompted to enter certain data which will be used for the impersonation of the payment instrument and/or for sending an electronic confirmation message (e.g. e-mail, sms) of the issued payment instrument to the consumer.

Once all the necessary data has been entered the control system 18, and in particular the local control unit 18a, transmits operation commands to the payment instrument issuing apparatus 46 for taking a payment instrument carrier from the payment instrument carrier storage 48 and impersonating it with the appropriate data provided by the consumer. Alternatively, the payment instrument need not be impersonated if there is other data that may be relied on later on by the control system 18 during the use of the payment instrument, e.g. a unique identifier associated with the payment instrument. Once the payment instrument is ready for handing out (e.g. following the optional impersonation) the payment instrument is handed out via the payment instrument dispenser 49 which may be in the form of a dispensing slot for dispensing cards or in the form of a dispensing compartment similar to the one described in connection with the vending machine 60.

It is also possible to not apply any impersonation, instead a payment instrument carrier already comprising a unique identifier is released from the payment instrument carrier storage 48 and is dispensed via the payment instrument dispenser 49. The payment instrument is then brought in communication with the appropriate payment instrument interface 44 (e.g. an NFC card as payment instrument is held in the vicinity of an NFC reader being the corresponding payment instrument interface 44), whereby the interface 44 reads the unique identifier which is transmitted to the local control unit 18b, and from there to the remote back office system 18b where an account is created for and registered to the payment instrument based on its unique identifier. The account may be registered to the registration sign of the automobile being parked at the fuel dispenser 12 and having been detected and determined via the camera 40 and the control system 18. Alternatively, the consumer may

determine the identifying parameters of the account to be created (e.g. the consumers name, other user name, etc.)

The newly issued payment instrument may be loaded with a monetary value by booking the value in an account opened for the payment instrument by the control system 18 and in particular by the remote back office system 18b or by loading the data signifying the monetary value on the payment instrument itself as is known in case of stored-value cards. This can be the standard procedure to reimburse overpayment for fuel purchase in which case the loaded monetary value correspond to the amount of overpayment.

Preferably the newly issued payment instrument needs to be activated over the Internet at which occasion the consumer may be assigned a PIN (personal identification number) or allowed to define a PIN. In order to make the payment more secure the PIN may be requested from the consumer when wishing to pay with the payment instrument. The PIN maybe requested at every payment or only at payments when an automobile is parking at the fuel dispenser 12 that has a registration sign different from the registration sign originally registered with the payment instrument.

The above-described embodiments are intended only as illustrating examples and are not to be considered as limiting the invention. Various modifications will be apparent to a person skilled in the art without departing from the scope of protection determined by the attached claims.

CLAIMS

1. A fuel dispensing system comprising at least one fuel dispenser, at least one camera and at least one display device arranged at a filling station, **characterised** by further comprising a control system operably connected to the at least one fuel dispenser, the at least one camera and the at least one display device, and the control system is configured:

- to receive an image of a region of the filling station captured by the camera,

- to process the image in order to detect at least one predetermined characteristic associated with a consumer,

- to determine information content based on the detected characteristic, and

- to display the determined information content on a display screen of the display device.

2. The fuel dispensing system according to claim 1, characterised by that the control system comprises a local control unit and a remote back office system and the local control unit and the remote back office system are connectable via a communication channel.

3. The fuel dispensing system according to claims 1 or 2, characterised by further comprising a data input interface connected to the control system and the control system is configured to receive control commands via the data input interface and to control the operation of the at least one fuel dispenser in accordance with the received control commands.

4. The fuel dispensing system according to claim 3, characterised by that the data input interface and a display screen of the display device are integrated in the form of a touch screen.

5. The fuel dispensing system according to claims 3 or 4, characterised by further comprising a vending machine that is connected to the control system and the control system is configured to control the operation of the vending machine in accordance with control commands received via the data input interface.

6. The fuel dispensing system according to any one of claims 1 to 4, characterised by further comprising a payment apparatus having a payment instrument interface, which payment apparatus is connected to the control system, and the control system is configured:

- to allow for payment of a quantity of fuel with a payment instrument corresponding to the payment instrument interface.

7. The fuel dispensing system according to claim 6, characterised by that the payment instrument interface comprises at least one element chosen from a group consisting of NFC interface, magnetic stripe reader/writer, smart chip reader/writer, RFID reader/writer, bar code reader/writer, two dimensional bar code (QR code) reader/writer, bank note slot, coin slot.

8. The fuel dispensing system according to claims 6 or 7, characterised by the control system is configured to allow for payment via at least one of the means chosen from a group consisting of sms payment, bank transfer, online payment system, mobile payment system.

9. The fuel dispensing system according to any one of claims 6 to 8, characterised by comprising a payment instrument issuing apparatus that is operably connected to the control system and the control system is configured to issue a payment instrument corresponding to the payment instrument interface via the payment instrument issuing apparatus.

10. The fuel dispensing system according to claim 9, characterised by that in case of overpayment the control system is configured to issue the payment instrument loaded with monetary value corresponding to the overpayment.

11. The fuel dispensing system according to any one of claims 6 to 10, characterised by comprising a vending machine that is connected to the control system and the control system is configured:

- to allow for payment of an item offered at the vending machine with a payment instrument corresponding to the payment instrument interface and
- to enable discharge of the purchased item by the vending machine.

12. Method for enhancing commercial efficiency of a fuel dispensing station comprising at least one fuel dispenser, a display device and at least one camera arranged at a filling station **characterised** by

- directing the at least one camera at a region of the filling station and capturing an image therewith,
- processing the image in order to detect at least one predetermined characteristic associated with a consumer,
- determining information content based on the detected characteristic, and
- displaying the determined information content on a display screen of the display device.

13. The method according to claim 12, characterised by processing the image includes face recognition for detecting at least one of the predetermined characteristics chosen from a group consisting of age, gender, presence of glasses.

14. The method according to claims 12 or 13, characterised by providing rules for determining an advertisement based on a plurality of detected characteristics.

15. The method according to any one of claims 12 to 14, characterised by that processing the image includes detecting a registration plate on an automobile of a consumer, recognising a registration sign thereon and determining, as a characteristic associated with the consumer, a characteristic of the automobile of the consumer based on the detected registration sign, and determining and displaying information content corresponding to the determined characteristic of the automobile.

16. The method according to any one of claims 12 to 15, characterised by using the at least one predetermined characteristics to create statistics associated with consumers using the filling station.

17. The method according to any one of claims 12 to 16, characterised by dividing the display screen into at least a first portion and a second portion and displaying an advertisement as the determined information content on the first portion and displaying information content related to the fuelling on the second portion.

18. The method according to any one of claims 12 to 17, characterised by providing a touch screen as the display screen, and allowing inputting operation commands for the fuel dispenser therewith.

19. The method according to any one of claims 12 to 18, characterised by providing a payment apparatus having a payment instrument interface and allowing for payment of purchased fuel with a payment instrument corresponding to the payment instrument interface.

20. The method according to claim 19, characterised by that the payment instrument interface comprises at least one element chosen from a group consisting of NFC interface, magnetic stripe reader/writer, smart chip

reader/writer, RFID reader/writer, bar code reader/writer, two dimensional bar code (QR code) reader/writer, bank note slot, coin slot.

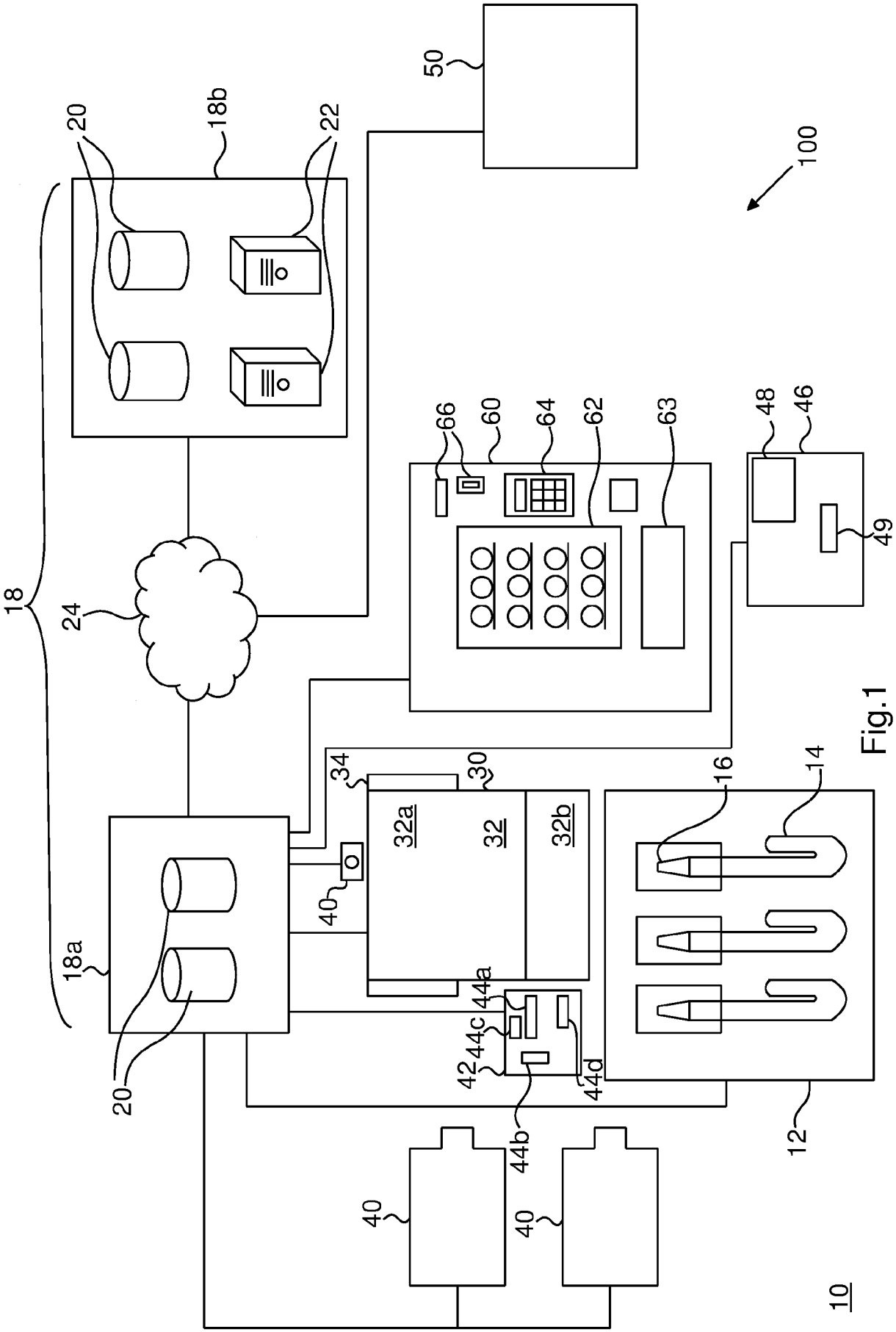
21. The method according to claims 19 or 20, characterised by allowing for payment of a quantity of fuel via at least one of the means chosen from a group consisting of sms payment, bank transfer, online payment system, mobile payment system.

22. The method according to any one of claims 19 to 21, characterised by providing a vending machine and allowing for payment of an item offered at the vending machine via the payment instrument interface.

23. The method according to any one of claims 19 to 22, characterised by providing a payment instrument issuing apparatus for issuing a payment instrument corresponding to the payment instrument interface.

24. The method according to claim 23, characterised by that in case of overpayment issuing the payment instrument loaded with a monetary value corresponding to the overpayment.

1/2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44d
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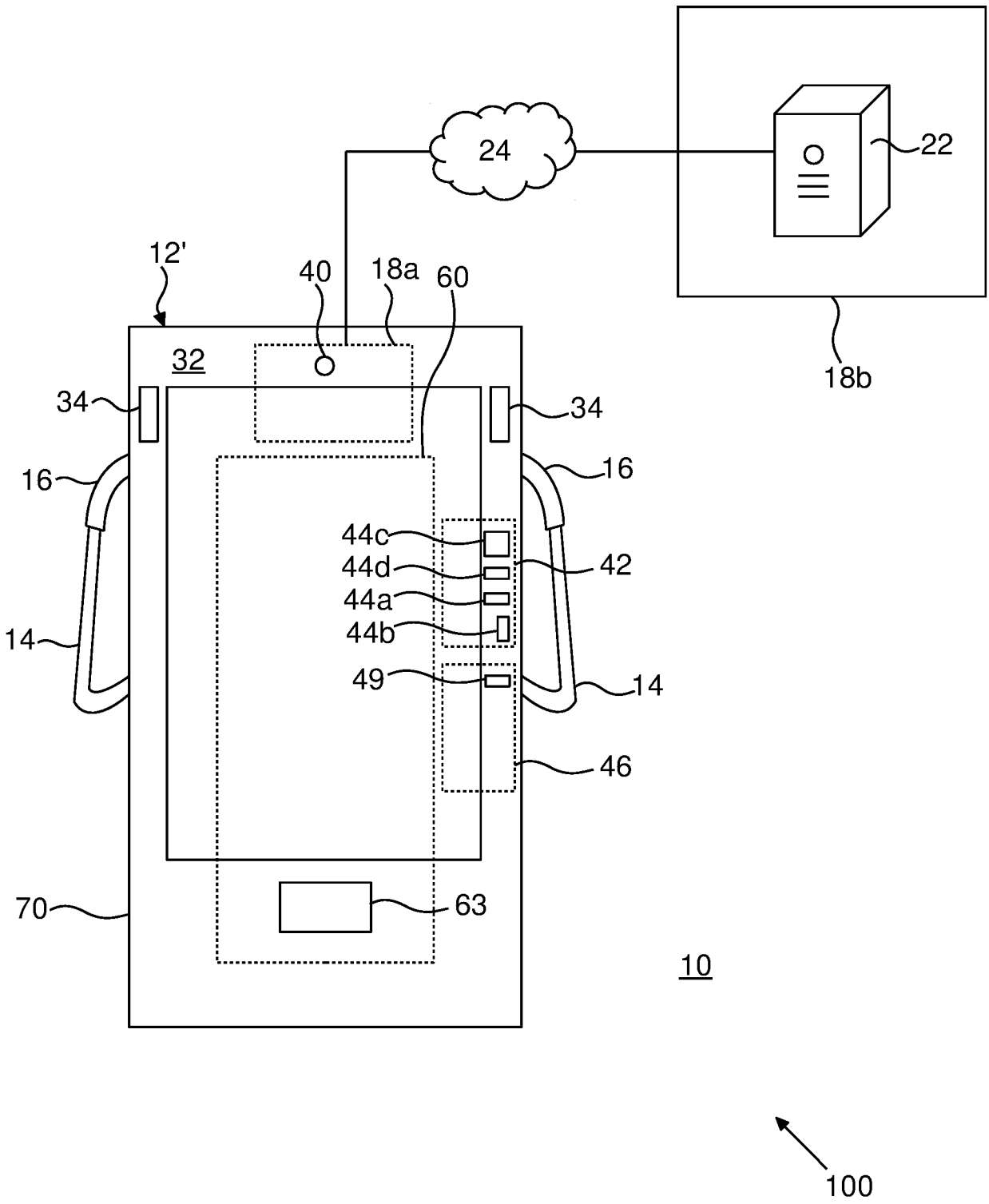
Fig.1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100

Fig.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/HU 2015/050021

A. CLASSIFICATION OF SUBJECT MATTER

B60S 5/02 *(2006.01)*
B67D 7/04 *(2010.01)*
G07F 13/00 *(2006.01)*
G06Q 30/02 *(2012.01)*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60S 5/00-5/02, B67D 7/00-7/04, G07F 13/00-13/08, 15/00-15/04, G06Q 20/00, 30/00-30/02, 50/00-50/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Espacenet, PatSearch (RUPTO internal), RUPTO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 8284053 B2 (GILBARCO INC.) 09.10.2012, col. 4, line 65 - col. 13, line 67, fig. 1-12	1-4, 12 13-14
X Y	US 9053503 B2 (GILBARCO INC.) 09.06.2015, col. 3, line 26 - col. 21, line 26, fig. 1-7	1-4, 12 13-14
Y	US 8924267 B1 (GILBARCO INC.) 30.12.2014, col. 4, line 1 - col. 11, line 18, fig. 1-9	13-14
A	US 6078896 A (MARCONI COMMERCE SYSTEMS INC.) 20.06.2000, col. 3, line 11 - col. 6, line 62, fig. 1-6	1-4, 12-14
A	RU 127012 U1 (КАМЫШЕВ МИХАИЛ АНАТОЛЬЕВИЧ и др.) 20.04.2013, claims, fig. 1	1-4, 12-14

☐ Further documents are listed in the continuation of Box C.

☐ 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
20 June 2016 (20.06.2016)	11 August 2016 (11.08.2016)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/HU 2015/050021

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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.: **5-11, 15-24**
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

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 additional fees, this Authority did not invite payment of additional fees.

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 and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.