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(54) Title: APPARATUS FOR PROCESSING FOODSTUFFS WITH AN ELECTRONIC CONTROL DEVICE

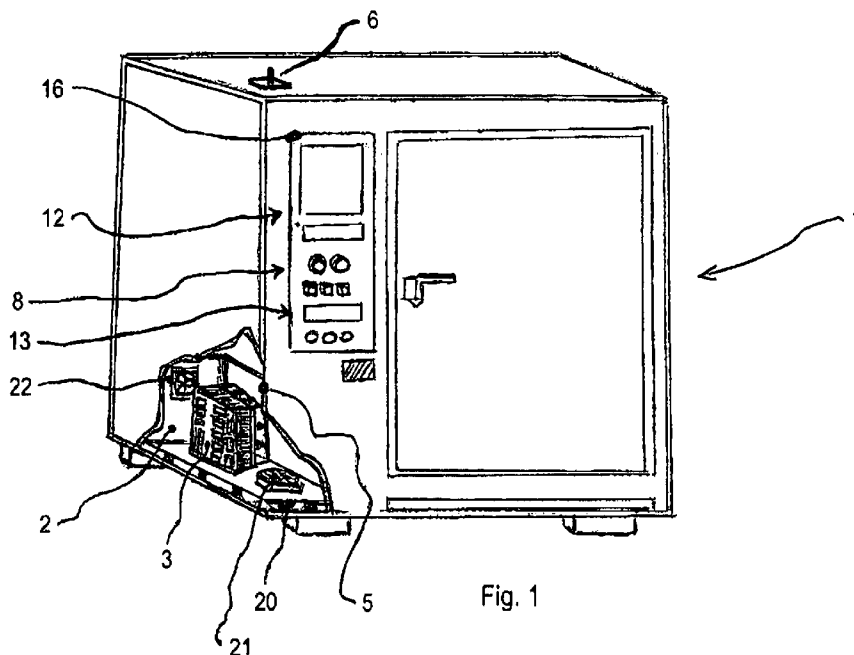


Fig. 1

(57) Abstract: An apparatus (1) for cooking and/or refrigerating and/or conserving foodstuffs, comprising an electronic control device (3) for controlling said apparatus (1), characterised in that said electronic control device (3) is suitable for controlling at least one further apparatus (4) for cooking and/or refrigerating and/or conserving foodstuffs.

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**Apparatus for processing foodstuffs with an electronic
control device**

The invention relates to a professional apparatus for cooking, refrigerating and conserving foodstuffs, in particular a professional apparatus for cooking, refrigerating or cooking foodstuffs provided with a centralised electronic control device.

In professional kitchens and preparation and cooking centres where large quantities of foodstuffs are treated, all the food cooking, refrigerating and conserving functions are always performed by the entrusted personnel under the control and supervision of highly qualified personnel who continuously check and must guarantee the appropriacy of the procedures and the correct execution thereof. The larger the complexity of the kitchen the greater the number of apparatuses installed and the tasks performed, the meals prepared, the apparatuses used and the persons working there, the greater are the advantages that may be derived from using electronic control devices and installing more complex and automated apparatuses with more structured processes. These advantages are even clearer in a kitchen organised in a professional manner to prepare and cook a large number of meals. It is known that using electronic devices to control kitchen apparatuses for treating foodstuffs brings significant advantages, for example the greater precision that is obtainable in measuring the operating temperatures and heat adjustment, leading to wider use of electronic control devices on the best apparatuses for cooking, preparing, refrigerating and conserving foodstuffs. Using electronic devices that are ever more sophisticated and capable of automating the functions of the kitchen apparatuses enables the functions of the kitchen to be increasingly easier for operators to use and enables repetitively and constant quality of the processes and desired results to be obtained. In some countries there also exist legal standards that impose the registration of

information and the storage of documents that attest to the correctness of the critical processes from the point of view of the healthiness and food hygiene of all the foodstuffs and of all the heating processes carried out on all the treated
5 foodstuffs. It is known that this work of monitoring and recording the activities conducted in the kitchen draws utility and advantages from the support of electronic instruments integrated into the kitchen apparatuses.

For these reasons the specialised personnel responsible for
10 the kitchen increasingly uses apparatuses for cooking, refrigerating and conserving food that are each provided with electronic controls for managing the functions of each apparatus. Such electronic controls are useful for ensuring the precision of the processes and may contribute to
15 documenting the control activities of products, procedures and activities of employees.

In professional kitchens personal computers are widely used to store and conserve documents drawn up to control cooking and the other food treatment processes, making use of
20 computer programs to register and maintain in the memory the data relating to the procedures and treatments to which all the foodstuffs used are subjected.

Apparatuses are further known for cooking and refrigerating foodstuffs that can be used in association with a personal
25 computer that is connected thereto by a physical means and a communication protocol. In these cases it is, for example, possible to use said computer to store and document the tasks performed by the connected apparatus, to modify the settings of an electronic control contained in the cooking or
30 refrigeration apparatus or to transfer to the apparatus cooking programs or work cycles processed on the computer with the help of a specific software. Nevertheless, owing to the high cost and greater complexity thereof, apparatuses for cooking and/or refrigerating foodstuffs are not very
35 widespread that can be connected to a personal computer.

Using components and electronic apparatuses inside kitchens has numerous drawbacks. We shall describe below some of these drawbacks and shall describe how the present invention enables many of these problems to be overcome in an economically cheap manner.

The first drawback that the present invention intends to solve is that of the difficulties of installation and correct operation of electronic apparatuses inside a kitchen. A kitchen is generally a particularly hostile environment for the correct operation and reliability of electronic control devices. For example, the presence of flour or fat substances used in the preparation of food or the presence of cooking steams may damage the circuits and the electronic components if they are able to penetrate inside the casings that protect the circuits and the electronic components. Further, many premises of larger kitchens are frequently subjected to cleaning and hygienisation processes that make abundant use of water, foam and/or vapour that are often associated with hygienising additives that are chemically corrosive and hazardous for all the electric and electronic components. As a result, it is necessary to achieve a high degree of protection of all the apparatuses installed in the kitchen against the penetration of water and powders, in particular inside the electric apparatuses. Further, these difficult environmental conditions make the installation of personal computers in the immediate vicinities of cooking apparatuses difficult, where they would be particularly useful for kitchen personnel for automating, controlling and/or recording the operation of the apparatuses connected, providing a useful service for the work activities performed in the kitchen.

A further drawback that the present invention intends to overcome consists of the growing complexity of kitchen apparatuses due to the increase of the functions that are added to all the single apparatuses. The new functions are currently implemented inside the electronic control devices

positioned directly inside the individual apparatuses. This entails a significant increase in the cost and complexity of the single kitchen apparatuses, each of which has to be provided not only with electronic devices that are adequate
5 to the desired functions but also with displays and expensive interfaces for managing, displaying, selecting and adjusting the various functions.

A further drawback that the present invention intends to overcome is that each single kitchen apparatus provided with
10 sophisticated electronic devices requires to be provided with protection casings that are more complex and specially designed for the electronic devices contained inside the apparatus not to be able to come into contact with steam, dirt, dust or other external volatile substances that might
15 damage the electronic devices.

A further drawback that the present invention intends to overcome consists of the fact that an apparatus provided with sophisticated controls often needs, for the convenience of the user, to be provided with a programming and control
20 interface that can consist of a keyboard provided with keys and/or selecting and control pushbuttons and/or knobs and/or slides for adjustment and/or selectors for selecting the desired settings and adjustments. In the case of solutions that involve complex electronic cards and more evolved
25 functions integrated directly into each of the apparatuses of the kitchen it is necessary for each apparatus to be provided also with the interface thereof facing the user and the keys, knobs, displays and other control and/or display tools. Nevertheless, in professional kitchens, where various
30 professionals have to move and work and the dimensions of the apparatuses have to be particularly modest, limiting themselves to occupying the space that is indispensable for performing the specific function to which the machine is destined, not all apparatuses can have sufficient dimensions
35 to house a programming and control interface in a convenient

and accessible position for the users, who often have to move in cramped spaces and in close contact with other workers.

Another still further drawback that the present invention enables to solve consists of the fact that the high
5 temperature together with necessarily compact dimensions limits the use of electronic components and devices that are more sophisticated in certain types of cooking apparatuses that, in order to perform their function, are equipped with heating elements that have to reach and maintain high
10 operating temperatures.

A major problem that the present invention enables to be resolved consists of the fact that the user has to be able to monitor the apparatuses that he intends to use with immediacy, without equivocations and without the danger of
15 becoming confused in identifying the apparatuses used and the functions active on each apparatus.

An object of the invention is to provide all the personnel of a modern kitchen with all the most advanced electronic functions that may be useful for managing each apparatus for
20 preparing, refrigerating and/or cooking foodstuffs.

Another object is to facilitate the installation and correct operation of sophisticated electronic devices at the service of many apparatuses used inside a kitchen.

Another further object is to reduce the costs and the
25 complexity of the single kitchen apparatuses without reducing the functions and performance available for each apparatus.

Still another object is to permit the electronic control of an increasingly great number of kitchen apparatuses without increasing the dimensions of the apparatuses and without
30 negatively affecting the work spaces necessary for users.

Another object of the present invention is to enable the various preparation, cooking, refrigerating, conservation and regeneration paths of one or more foodstuffs subjected to more than one processing and/or cooking and/or refrigeration
35 cycle that occurs in different and successive moments with the use of various apparatuses inside the same kitchen to be

traced, controlled and stored in a simple, automatic and error-free manner. .

According to the invention, there is provided an apparatus for cooking and/or refrigerating and/or conserving
5 foodstuffs, comprising an electronic control device for controlling said apparatus, characterised in that said electronic control device further controls the operation of at least one further apparatus for cooking and/or refrigerating and/or conserving foodstuffs.

10 Owing to the invention it is possible, in a simple and cheap manner, to enable all the personnel of a modern kitchen to have all the most advanced electronic functions fully available that may be useful in the management of each apparatus for preparing, refrigerating and/or cooking
15 foodstuffs.

The invention can be better understood with reference to the attached drawings that illustrate an embodiment thereof by way of non-limiting example, in which:

Figure 1 is a partially fragmentary perspective view of an
20 apparatus for cooking and/or refrigerating and/or conserving foodstuffs according to the invention;

Figure 2 is a perspective view of a further apparatus for cooking and/or refrigerating and/or conserving foodstuffs that is controllable by the apparatus in Figure 1;

25 Figure 3 is a perspective view of an apparatus for cooking and/or refrigerating and/or conserving foodstuffs according to the invention and of a further apparatus for cooking and/or refrigerating and/or conserving foodstuffs that is controllable by said apparatus, with a connection highlighted
30 for the exchange of data and controls between said apparatus and said further apparatus;

Figure 4 is a block diagram of a control program of an electronic device, associated with an apparatus for cooking and/or refrigerating and/or conserving foodstuffs according
35 to the invention, suitable for adjusting, managing and monitoring the operating status, the working conditions

and/or the settings of at least one further apparatus for cooking and/or refrigerating and/or conserving foodstuffs.

In Figure 1 there is shown an apparatus 1 according to the invention for cooking and/or refrigerating and/or conserving foodstuffs, i.e. a kitchen apparatus that is suitable for cooking, refrigerating or conserving foodstuffs.

The apparatus 1 comprises a housing 2 in which an electronic device 3 is housed that is suitable for adjusting, managing and supervising the operation of the apparatus 1. The

electronic device 3 is further suitable for adjusting, managing, supervising, storing and displaying in a manner that is unequivocal and unmistakable for a user the operating status, the working conditions and/or the settings of at least one further apparatus 4 (Figure 2), that is suitable

for performing functions of cooking, refrigerating and conserving foodstuffs. The apparatus 1 further comprises a protective casing 5 of the housing 2 provided with thermal insulation and suitable for maintaining in the housing 2 a temperature that is suitable for the correct operation of the

electronic control device 3 and of further protection means for protecting the housing 2 from penetration from the exterior of solid, liquid or gaseous substances that could damage the electronic control device, such as, for example, liquids, vapours, dust, dirt. In a particular constructional

form, the protective casing 5 and the housing 2 may be provided with vibration dampers, such as, for example, joints and elastic supports 20 for protecting the electronic device 3 from vibrations that could be transmitted thereto by the apparatus 1 during operation.

In a further particular constructional shape, the protective casing 5 and the housing 2 can be further provided with heat exchanger means 21 or with ventilation means 22, to extract heat from the housing 2 or to introduce into the housing 2 air at a lower temperature than that contained in the

housing 2.

The further apparatus 4 in turn comprises suitable communication means including, by way of non-exclusive example, one or more cabling terminals and/or one or more antennas 6 and one or more control means 19, for example further electronic control means, of which at least one is suitable for communicating with said electronic device 3 placed inside said apparatus 1.

The transfer of the data for monitoring, controlling and/or adjusting the operation between the electronic device 3 housed inside the apparatus 1 and at least one further apparatus 4 occurs by means of a communication protocol and the use of one or more communication means. It is in fact known that by making use of suitable electronic devices it is possible to transfer data and information between various apparatuses placed between one another at a distance.

Said data and information transfer occurs via a physical means that acts as a connection between the various apparatuses. The physical means may be constituted by a conductor of electric signals, such as for example in the case of communications that occur via cable, or the physical means can be the ether such as in the case of communications that occur via radio or via light signals. Examples of this type are the communications that occur on a radio frequency or in the field of frequencies commonly defined as infrared.

In the illustrated cases the communication devices may comprise, for example, but not exclusively, one or more antenna means 6 for radio frequency communications or another means that is suitable for the transmission and reception of communications that occur by electromagnetic waves, characterised by one or more preset frequencies and assigned to the telecommunications systems.

In another embodiment, shown in figure 3, the transfer of the data for controlling, monitoring and/or adjusting the operation of the at least one further apparatus 4 occurs via a communication protocol and the use of cable means 7 suitable for transferring coded signals. The cable means 7

can be cable means suitable for transferring coded electric signals or optic fibre means for transferring coded optic fibre signals.

In an embodiment that is not shown, the transfer of data
5 between the apparatus 1 and the further apparatus 4 occurs
via infrared rays transmitting and receiving means installed
both on the apparatus 1 and on at least one further apparatus
4. Via the means 6 and 7 shown by way of example in figures
1, 2 and 3, the information is transferred and shared between
10 transmitting and receiving devices on the basis of an
interpretation code based on analogue quantities or on
digital signals that enable the receiving device to decode
the meaning of the data and the information transferred by
the transmitting device. The coding and decoding system of
15 the information is known as a communication protocol. The
operating principle of a communication system will
subsequently be illustrated that can be conveniently adopted
for the practical embodiment of the present invention.

The communication protocol can easily be of the master/slave
20 type, in which the electronic control device 3 placed inside
said apparatus 1 performs the function of network master and
any other further apparatus 4 connected thereto by said means
6 and 7 that the control device 3 is able to control performs
the function of slave.

25 The electronic control device 3 acting as a master will have
to interrogate periodically each slave device, represented
in our case by the further electronic device 19 located in
the further controlled apparatus 4, said further electronic
device 19 being connected to said electronic device 3 via
30 the means 6 or 7, for detecting the status in which the
further controlled apparatus 4 finds itself or for imposing
on it an operating status, such as, for example, start
status, stop status, standby status, energy-saving mode or
other possible operating settings for the further controlled
35 apparatus 4.

In an advantageous embodiment, the further slave electronic

device 19 located on the further controlled apparatus 4, must therefore always be able to receive and run both remote commands (from the control device 3) and local commands, i.e. with the intervention of the user that sets the operation thereof by acting directly on the further controlled apparatus 4. The further received commands will be those that are run on the further controlled apparatus 4. In an advantageous embodiment each slave device 19 located on said further apparatus 4 can operate in stand-alone mode if the communication with the master control device is lost. The type of communication protocol can be chosen with great liberty, from the available known ones and those used in the data transmission and industrial automation sectors. Examples of these protocols are disclosed by the international standards dedicated to these applications, of which we list by way of non-exhaustive example the standards IEEE 1118, DIN 19245, or also IEC 1158. Examples of networks of the type disclosed above that support multipoint communication are available and known by different names deriving from commercial trademarks and or from international standards such as, for example: Fieldbus, Modbus, CAN-bus, DeviceNet, BITBUS, PROFIBUS.

In figure 4 there is shown a block diagram of the control program of an electronic device 3 suitable for adjusting, managing and monitoring the operating status, the working conditions and/or the settings of at least one further apparatus 4.

In an advantageous embodiment, the main apparatus 1 is appropriately provided with a interface 16 towards the user comprising command means 8, display means 12 and other possible control means 13.

Said command means 8 is suitable for setting and commanding the functions of the apparatus 1 and is further suitable for setting, commanding and/or controlling at least some of the functions of at least one further apparatus 4.

The command means 8 may comprise, for example, pushbuttons 9, knobs 10, keys 11, and/or any other command system for setting and commanding the functions of the apparatus 1 and for setting and commanding at least one further apparatus 4.

5 The user interface 16 of said main apparatus 1 further comprises display means 12 that is particularly important for reaching the objects of the present invention. Said display means 12 may comprise, for example but not exclusively, displays 14, 17, monitors 15.

10 The control means 13 may comprise, for example, LEDs, acoustic alarms, loudspeakers 18 and possibly other visual and acoustic message means.

Via said display means 12, said user interface 16 in said apparatus 1 is suitable for displaying the settings and/or
15 the operating status of the apparatus 1 and is further suitable for representing in an univocal and unequivocal manner on at least one part of said display means 12 and control means 13 at least some settings, adjustments and/or the operating status of the at least one further apparatus 4.

20 In particular, the aforesaid display means 12 facilitates the identification, reading, measuring, reception, display and/or storage of significant operating parameters of the at least one further apparatus 4, for example the operating and adjusting temperature, and mean that said at least one
25 further apparatus 4 to which said settings, statuses, measurements or operating parameters refer is immediately identifiable without equivocation, with immediacy and without the danger that the user may become confused in identifying the further apparatuses 4 used and the functions active on
30 each further apparatus 4.

The display means 12 and control means 13 indicate with particular emphasis when at least one part of the displayed information or of the set actions refer to at least further apparatus 4, for example by switching on a light or changing
35 the colour of at least one part of the illumination. According to the present invention the display means 12

comprises at least one control and display panel provided with an alphanumeric display (17) or with at least one monitor graphic display (15). The alphanumeric display 17 is arranged for displaying an alphanumeric description and/or a code that unequivocally identify the at least further apparatus 4 when at least one part of the information displayed on said panel refers to said further apparatus 4. The graphic display 15 is arranged for displaying an image and/or a graphic representation of said at least one further apparatus 4. Said graphic display 15 is further arranged for displaying a photographic representation of the at least further apparatus 4, or a photographic representation of a foodstuff or a series of static images, or a film, such as to illustrate a food preparation and/or a use procedure referring to said at least one further apparatus 4.

The display means 12 and control means 13 comprising at least one said alphanumeric display 17, or at least one said monitor graphic display 15, have to be arranged and adapted for being configured for displaying more than one code or more than one alphanumeric description or more than one static icon or more than one photographic image, or more than one sequence of images, or more than one film so that it is possible to connect and control more than a further apparatus 4 on the same main apparatus 1 by identifying in an univocal and unequivocal manner each connected further apparatus 4 without it being possible for the user to become confused in identifying further apparatuses 4 used and the functions active on each further apparatus 4.

In a particular embodiment, the user interface 16 of the apparatus 1 is arranged for generating a particular sound or for reproducing via the loudspeaker means 18, an audiofrequency file such that can be used to recognise in an unequivocal manner at least one food preparation, or a product, or a process or at least one further apparatus 4 when it is necessary to attract the attention of an operator

or transmit to the operator information relating to said at least one further apparatus 4.

In a particular other embodiment the user interface 16 of the apparatus 1 is arranged for modifying at least one colour of
5 at least one part of said control means 13 to identify in an unequivocal manner at least one food preparation, or a product, or a process, or at least one further apparatus 4, when it is necessary to attract the attention of an operator or transmit to the operator information relating to said at
10 least one further apparatus 4.

In a particular other further embodiment the user interface 16 is provided with backlight command means, such as, for example, keys 11, or mechanical pushbuttons 9 located directly behind a transparent protection made of plastics, or
15 touch keys 11 located behind a glass transparent protection and is arranged for modifying at least one colour of said backlighting to identify in an unequivocal manner at least one further apparatus 4 or a command that can be implemented on said at least one further apparatus 4.

20 In a particular other still further embodiment the user interface 16 is arranged for modifying at least one colour and/or a background on said display means 14, 17 to identify in an unequivocal manner at least one food preparation, or a product, or a process, or at least one further apparatus 4,
25 when it is necessary to attract the attention of an operator or transmit to the operator information relating to said at least one further apparatus 4.

In a particular other embodiment the user interface 16 is arranged for modifying at least one colour and/or a
30 background and/or a graphic image and/or a photograph and/or a film displayed on said monitor display means 15 to identify in an unequivocal manner at least one food preparation, or a product or a process, or at least one further apparatus 4, when it is necessary to attract the attention of an operator
35 or transmit to the operator information relating to said at least one further apparatus 4.

In a particular other embodiment said display means 12 is arranged for displaying the installation instructions and/or the operating description and/or instructions on use and advices for maintenance of the at least one further apparatus

5 4.

In use, an important advantage due to the apparatus 1 that is the object of the invention is that of being able to detect, receive, display and/or store at least one item of information relating to an alarm and/or an error message in
10 the operation of at least one further apparatus 4.

In an advantageous embodiment said electronic control device 3 enables the information relating to cooking and/or refrigeration data and operating conditions and alarms and malfunctions of all the multiple further apparatuses 4 for
15 cooking, refrigerating, preparing and/or conserving foodstuffs that are connected to said apparatus 1 to be stored, processed and conserved inside said apparatus 1. In this manner said storing, processing and/or conserving of data and information are possible without any said further
20 apparatus 4 having the capacity of said storing, processing and conserving and without any personal computer being installed near or in the kitchen.

In a further advantageous embodiment according to the invention the electronic device 3 located inside the
25 apparatus 1 is suitable for transmitting to an external assistance centre and/or to a remote control station an alarm and/or a signal error relating to the operation of the at least one further apparatus 4.

In a particular other embodiment the electronic device 3
30 located inside the apparatus 1 is provided with a remote communication system that enables images, data or other information on the operation of the apparatus 1 or on the operation of the at least one further apparatus 4 to be sent to a remote terminal. The remote communication system also
35 enables settings and/or commands to be received from a remote

terminal that can be actuated on the apparatus 1 or on the at least one further apparatus 4.

In a particular other embodiment the display means 12, control means 13 and command means 8 can be movable, i.e. suitable for being oriented in different directions so as to optimise the accessibility and the visibility of said display means 12, control means 13 and command means 8 by an operator depending on the accessibility of the space surrounding the apparatus 1, on the natural tendency of the operator to use preferably the right or the left hand, on the light conditions and on the work positions of the operator.

In a further embodiment that is not shown the display means 12, control means 13 and command means 8 can be made separable from the apparatus 1 to be able to be positioned at a defined distance from the apparatus 1, nevertheless remaining connected to the latter via communication means, for example connecting cables.

In an advantageous embodiment of the present invention, said apparatus 1 provided with said electronic device 3 manages the entire kitchen in a centralised manner. In this case a particular function can be achieved that requires the simultaneous control of multiple further apparatuses 4 for the cooking, refrigeration, preparation or storage of foodstuffs. In a particular case of said last suitable embodiment, the function that requires the centralised management of the further apparatuses 4 of a kitchen by a single apparatus 1 is the control and limitation of energy consumption.

In a particular case the function performed by said apparatus 1 provided with said electronic device 3 comprises the assignment of an order of importance and priority of use to all the further apparatuses 4 connected to the apparatus 1.

For example between the further apparatuses 4 there will be some apparatuses classified as high-priority apparatuses and other apparatuses classified as low-priority apparatuses.

In this case the limitation of the maximum power-absorption loads from the electric supply network can be suitably implemented by said electronic device 3 contained in said main apparatus 1.

- 5 In a simple mode said electronic device 3 contained in said apparatus 1 can send the command to switch off or reduce energy consumption to one or more of said further controlled apparatuses 4 classified amongst the low-priority apparatuses when others of said further controlled apparatuses 4
10 classified higher priority are simultaneously working at the maximum power.

- In a particular different constructional type the electronic device 3 contained in the main apparatus 1 is arranged for controlling the working conditions of the further apparatuses
15 4 connected to the main apparatus 1 and is further arranged for measuring the energy absorption from the electric supply network in order to reduce energy consumption and/or the maximum electric power absorption loads. In this particular embodiment the electronic device 3 contained in the main
20 apparatus 1 is arranged for recognising by means of suitable sensors the energy absorption from an external electric supply system that supplies energy to at least one part of the further apparatuses 4 of the kitchen. In another different embodiment the electronic device 3 contained in the
25 main apparatus 1 is arranged for receiving from an external measuring system the data and information relating to electric absorption and/or to the energy consumption of an electric system that supplies at least one part of the further apparatuses 4 of the kitchen.

- 30 In another different embodiment, the energy-saving objective is achieved on all the main apparatus 1: in fact the display means 12, for example the display 14, 17 and/or the monitor 15 can be made suitable for operating according to an automatic switching-off mode when the apparatus 1 is not used.
35 for a preset time and/or according to an energy-saving mode when the apparatus 1 remains switched off or unused for a

preset period of time. This does not limit centralised management of the further apparatuses 4 of the kitchen: in fact the electronic device 3 contained in the main apparatus 1 can be provided with at least one communication function and/or control means that remains active in relation to at least one further apparatus 4 and is supervised even when the apparatus 1 is in off and/or energy-saving status.

The electronic device 3 housed in the main apparatus 1 is in this case provided with a reactivation and/or automatic switching-on function of at least one said display 14, 17 or of another display means of said control means 13 when a preset event is achieved on at least one further apparatus 4: for example the switching-on, the switching-off, the start of a work cycle, the end of a work cycle, the recording of a malfunction, the intervention of an alarm, the reaching of a preset temperature provided by a cooking or refrigerating cycle of a foodstuff.

In a further advantageous embodiment said apparatus 1 provided with said electronic device 3 and with said display means 12 is able to store and simultaneously display all the cooking process data, the cooling processes and the subsequent conservation processes that affect a given foodstuff that has undergone, even at different times that are subsequent to one another, more than a cooking, refrigerating, conservation and/or regeneration process via the use of one or more different apparatuses comprised between said further apparatuses 4 connected to said main apparatus 1.

This function of displaying and consulting stored data relating to the heat treatment undergone by the various foods and foodstuffs by the various further apparatuses 4 can be suitably made available amongst the functions of the user interface 16 of the apparatus 1 in order to be used at the moment in which it is useful for the kitchen personnel and/or for the control authorities.

CLAIMS

1. Apparatus (1) for cooking and/or refrigerating and/or conserving foodstuffs, comprising an electronic control device (3) for controlling said apparatus (1),
5 characterised in that said electronic control device (3) is suitable for controlling at least one further apparatus (4) for cooking and/or refrigerating and/or conserving foodstuffs.
- 10 2. Apparatus (1) according to claim 1, wherein said at least one further apparatus (4) comprises a plurality of further apparatuses (4) for cooking and/or refrigerating and/or conserving foodstuffs.
- 15 3. Apparatus (1) according to claim 1, or 2, further comprising a housing (2) for said electronic control device (3), said housing being obtained inside a protective casing (5).
- 20 4. Apparatus (1) according to claim 3, wherein said protective casing (5) is provided with thermal insulation.
- 25 5. Apparatus (1) according to claim 3, or 4, wherein said protective casing (5) is provided with protection means suitable for preventing a penetration from the exterior into said housing (2) of solid substances, of liquid substances and/or of steam.
- 30 6. Apparatus (1) according to claims 3 to 5, wherein said protective casing (5) is provided with vibration damping means (20).
- 35 7. Apparatus (1) according to claims 3 to 6, wherein said housing (2) is provided with heat exchanger means (21)

suitable for refrigerating the environment surrounding said electronic device (3).

- 5 8. Apparatus (1) according to claims 3 to 6, wherein said housing (2) is provided with ventilation means (22) suitable for extracting hot air from the housing (2) and/or delivering to said housing (2) colder air than the air contained therein.
- 10 9. Apparatus (1) according to any preceding claim, further comprising communication means (6; 7) suitable for transferring data between said apparatus (1) and said at least one further apparatus (4) and vice versa.
- 15 10. Apparatus (1) according to claim 9, wherein said communication means comprises cable means (7) suitable for transferring coded electric signals according to a communication protocol for transferring data.
- 20 11. Apparatus (1) according to claim 9, wherein said communication means comprises cable means (7) suitable for transferring optical signals coded according to a communication protocol for transferring data.
- 25 12. Apparatus (1) according to claim 9, wherein said communication means comprises antenna means (6) suitable for transferring coded electromagnetic signals according to a communication protocol for transferring data.
- 30 13. Apparatus (1) according to claim 12, wherein said electromagnetic signals are radiofrequency electromagnetic signals.
- 35 14. Apparatus (1) according to claim 12, wherein said electromagnetic signals are electromagnetic signals at a

permitted frequency and assigned to telecommunication systems.

- 5 15. Apparatus according to claim 9, wherein said communication means comprises means for transmitting and receiving coded infrared rays optical signals according to a communication protocol for transferring data.
- 10 16. Apparatus (1) according to any preceding claim, further comprising display means (12) and/or interface means (16) towards the user that is suitable for displaying information on the settings and/or the operating status of the apparatus (1).
- 15 17. Apparatus (1) according to claim 16, wherein said display means (12) and/or interface means (16) towards the user are suitable for displaying information on settings and/or operating status of said at least one further apparatus (4).
- 20 18. Apparatus (1) according to claim 16, or 17, wherein said display means (12) and/or interface means (16) towards the user comprises display means (14; 15; 17) for displaying said information.
- 25 19. Apparatus (1) according to claim 18, wherein said information relating to said apparatus (1) is displayed on said display means (14; 15; 17) in other ways compared with said information relating to said at least one further apparatus (4).
- 30 20. Apparatus (1) according to claims 16 to 19 wherein said display means (12) comprises an alphanumeric display (17) suitable for displaying an alphanumeric description and/or a code that identifies said at least one further apparatus (4).
- 35

21. Apparatus (1) according to claims 16 to 20, wherein said display means (12) comprises a graphic display (15) suitable for displaying an image and/or a graphic representation of said at least one further apparatus (4).
22. Apparatus (1) according to claim 21, wherein said graphic display (15) is suitable for displaying a photographic representation of said at least one further apparatus (4).
23. Apparatus (1) according to any one of claims 21 or 22, wherein said graphic display (15) is suitable for displaying a film that illustrates a food preparation and/or recipe and/or a procedure for using said at least one further apparatus (4) for cooking, refrigerating and/or conserving foodstuffs.
24. Apparatus (1) according to claims 21 to 23 wherein said graphic display (15) is suitable for displaying a photographic representation of a foodstuff or a series of static images or a film suitable for illustrating a food preparation and/or a recipe and/or a use procedure referring to said at least one further apparatus (4).
25. Apparatus (1) according to claims 9 to 19, wherein said data, said information, said settings, comprise at least one piece of information or a setting relating to said at least one further apparatus (4).
26. Apparatus (1) according to claim 25, wherein said data, said information and said settings relate to at least one setting temperature or operating temperature of said at least one further apparatus (4).

27. Apparatus (1) according to claim 25 or 26, wherein said data, said information, said settings, relate to any activity and/or an operating cycle of said at least one further apparatus (4).

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28. Apparatus (1) according to claims 25 to 27, wherein said information relates to at least one alarm and/or an error condition relating to the operation of said at least one further apparatus (4).

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29. Apparatus (1) according to claim 28, wherein said information relating to an alarm and/or to an error condition is transmitted by said apparatus (1) to a remote assistance centre and/or to a remote control station.

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30. Apparatus (1) according to claims 16 to 29, provided with at least one acoustic device or loudspeaker (18) suitable for generating sounds of various types, a particular type of sound being suitable for being used for recognising and distinguishing at least one process or operating status when said process or said operating status are referable to said at least one further apparatus (4).

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31. Apparatus (1) according to claim 30, wherein said at least one acoustic or loudspeaker device (18) is suitable for generating sounds of various types, a particular type of sound being suitable for being used for recognising and distinguishing at least one food preparation or a product for food use, when said preparation is carried out, or said product for food use is treated in said at least one further apparatus (4).

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32. Apparatus (1) according to any one of claims 30 or 31, wherein said at least one acoustic or loudspeaker device

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(18) is suitable for generating sounds of different type, a particular type of sound being suitable for being used to recognise at least one alarm and/or an error condition when said alarm and/or said error are referable to said at least one further apparatus (4) or to a foodstuff that is treated in said at least one further apparatus (4).

33. Apparatus (1) according to claims 30 to 32 wherein said loudspeaker is arranged for reproducing a particular audiofrequency file, and/or a vocal message and/or a particular musical file suitable for being used to disclose at least one foodstuff and/or an operating condition and/or an alarm that are referable to at least said further apparatus (4) or to said foodstuff that is treated in said at least one further apparatus (4).

34. Apparatus (1) according to any preceding claim, further comprising command means (8) suitable for modifying a setting and/or an operating status of said apparatus (1).

35. Apparatus (1) according to claim 34, wherein said command means (8) is suitable for modifying a setting and/or an operating status of said at least one further apparatus (4) for cooking and/or refrigerating and/or conserving foodstuffs.

36. Apparatus (1) according to any one of claims 34 or 35 wherein said command means comprises touch keys (11) protected by a surface made of transparent plastic material.

37. Apparatus (1) according to any one of claims 34 or 35 wherein said command means comprises touch keys (11) protected by a transparent glass surface.
- 5 38. Apparatus (1) according to any one of claims 36 or 37 wherein said command means comprises touch keys (11) provided with backlighting.
- 10 39. Apparatus (1) according to claim 38 wherein said backlighting can have a different luminous intensity.
40. Apparatus (1) according to claim 38 wherein said backlighting can have different illuminating colours.
- 15 41. Apparatus (1) according to any one of claims 39 or 40 wherein a luminous intensity and/or a colour of said backlighting is modified to highlight and distinguish at least one setting and/or an operating status when said keys enable said setting or said operating status of
- 20 said at least one further apparatus (4) to be modified.
42. Apparatus (1) according to any one of claims 39 or 40 wherein a luminous intensity and/or a colour of said backlighting is modified to highlight and distinguish at
- 25 least one foodstuff treated in at least one further apparatus (4) when said keys enable a setting of the treatment of said foodstuff to be modified in said at least one further apparatus (4).
- 30 43. Apparatus (1) according to claims 9 to 19 wherein said data, said information and/or said settings comprise information on a foodstuff that is subjected to a treatment performed by said at least one further apparatus (4).

44. Apparatus (1) according to claim 43 wherein said data and said information comprise information that is useful for univocally identifying said foodstuff, said useful information comprising the commercial name of said foodstuff and/or the date of production thereof and/or the purchase date thereof and/or the delivery date thereof and/or the expiry date thereof and/or the batch thereof and/or the date and time of at least one of the treatments performed by said at least one apparatus (4) on said foodstuff.
45. Apparatus (1) according to any one of claims 43 or 44, wherein at least one of said treatments of said foodstuff is a cooking process that is performed in said at least one apparatus (4).
46. Apparatus (1) according to any one of claims 43 or 44, wherein at least one of said treatments of said food is a refrigerating process that is performed in said at least one further apparatus (4).
47. Apparatus (1) according to any one of claims 43 or 44, wherein at least one of said treatments of said foodstuff is a conservation process that is performed in said at least one further apparatus (4).
48. Apparatus (1) according to claims 43 to 47, wherein said information on the treatment of said foodstuff comprises a temperature measured on a surface in contact with said foodstuff that is subjected to said treatment in said at least one further apparatus (4).
49. Apparatus (1) according to claims 43 to 47, wherein said information on the treatment of said foodstuff comprises a temperature measured inside said foodstuff that is

subjected to said treatment in said at least one further apparatus (4).

50. Apparatus (1) according to claims 43 to 47, wherein said
5 information on the treatment of said foodstuff comprises the measurement of a time regarding the duration of said treatment of the foodstuff in said at least one further apparatus (4).
- 10 51. Apparatus (1) according to claims 43 to 50, wherein said information on the treatment of said foodstuff is stored inside said electronic device (3) placed inside said apparatus (1).
- 15 52. Apparatus (1) according to claim 51 wherein said information stored inside said electronic device (3) can be reordered and displayed on said at least one said display (14; 15; 17) comprised in said apparatus (1).
- 20 53. Apparatus (1) according to claims 21 to 24 and 43 to 52 wherein said information is displayed on said graphic display (15) and is associated with a photographic image and/or with a graphical representation and/or with a film that shows or represents the foodstuff to which
25 said information refers.
54. Apparatus (1) according to claims 43 to 53, wherein said information on the treatment of said foodstuff comprises all the cooking processes, refrigerating processes and
30 conserving processes that said foodstuff has undergone, also at different and subsequent moments, by means of a plurality of said further apparatuses (4).
55. Apparatus (1) according to claims 16 to 29 and from 43
35 to 54 wherein said display (14) or said graphic display (15) are suitable for modifying the intensity of the

lighting thereof or the colour of the lighting thereof to highlight and distinguish at least one foodstuff, or an operating type when said product or said operation are referable to said at least one further apparatus (4) or to a foodstuff treated in said at least one further apparatus (4).

56. Apparatus (1) according to any preceding claim, further comprising control means for controlling the energy absorption and the operating conditions of said at least one further apparatus (4).

57. Apparatus (1) according to claim 56, wherein said control means comprises energy absorption sensor means absorbing energy from an electric supply system that supplies said at least one further apparatus (4).

58. Apparatus (1) according to claim 56, wherein said control means comprises fuel consumption sensor means from a supply system that supplies said at least one further apparatus (4).

59. Apparatus (1) according to claim 56, wherein said control means comprises receiving means suitable for receiving from an external measuring system data relating to the electric absorption and/or fuel consumption of a system that supplies said at least one further apparatus (4).

60. Apparatus (1) according to claims 56 to 59 suitable for commanding the switching-off or the reduction of the energy absorption of said at least one further apparatus (4).

61. Apparatus (1) according to claim 60 wherein said switching-off or said reduction of the energy absorption

is controlled in turn on a plurality of said further apparatuses (4).

- 5 62. Apparatus (1) according to claim 60 wherein said switching-off or said reduction of the energy absorption is commanded on a plurality of said further apparatuses (4) on the basis of a hierarchy of set priorities in function of the operating conditions of at least said further apparatuses (4).
- 10 63. Apparatus (1) according to claims 16 to 24, wherein said display means (12) and/or interface means (16) towards the user is arranged for operating according to an automatic switching-off mode when said apparatus (1) remains unused for a preset period of time and/or
- 15 according to an energy-saving mode when said apparatus (1) is switched off or remains unused for a further preset period of time.
- 20 64. Apparatus (1) according to claim 63 and claims 9 to 15, wherein said electronic control device (3) and said communication means remain active with respect to said at least one further apparatus (4) when said apparatus (1) is in switching-off or energy-saving mode.
- 25 65. Apparatus (1) according to claim 63 or 64, wherein said display means (12) and/or said interface means (16) towards the user is arranged for being automatically reactivated if said apparatus (1) is in switching-on mode or in energy-saving mode, when a preset event
- 30 occurs on said at least one further apparatus (4).
- 35 66. Apparatus (1) according to claim 65, wherein said preset event comprises at least one of the following events: switching-on, switching-off, start of a work cycle, end of a work cycle, recording a malfunction, activating an

alarm, reaching a preset temperature provided by a cooking or refrigerating cycle of a foodstuff being run.

5 67. Apparatus (1) according to claims 16 to 24 and 34 to 42, wherein said display means (12) and/or said command means (8) are orientable.

10 68. Apparatus (1) according to claim 67, wherein said display means (12) and/or said command means (8) are removable and positionable in a remote position with respect to said apparatus (1) and connectable to said apparatus (1) via connecting means.

15 69. Apparatus (1) according to claims 9 to 66, further comprising further communication means suitable for sending to a remote terminal images, data or other information on the operation of the apparatus (1) or on the operation of said at least one further apparatus (4).

20 70. Apparatus (1) according to claims 9 to 66, further comprising further communication means suitable for sending to a remote terminal images, data or other information relating to said foodstuff.

25 71. Apparatus (1) according to any one of claims 69 or 70, wherein said further communication means is suitable for receiving from said remote terminal settings and/or commands that can be implemented on said apparatus (1) or on said at least one further apparatus (4).

30

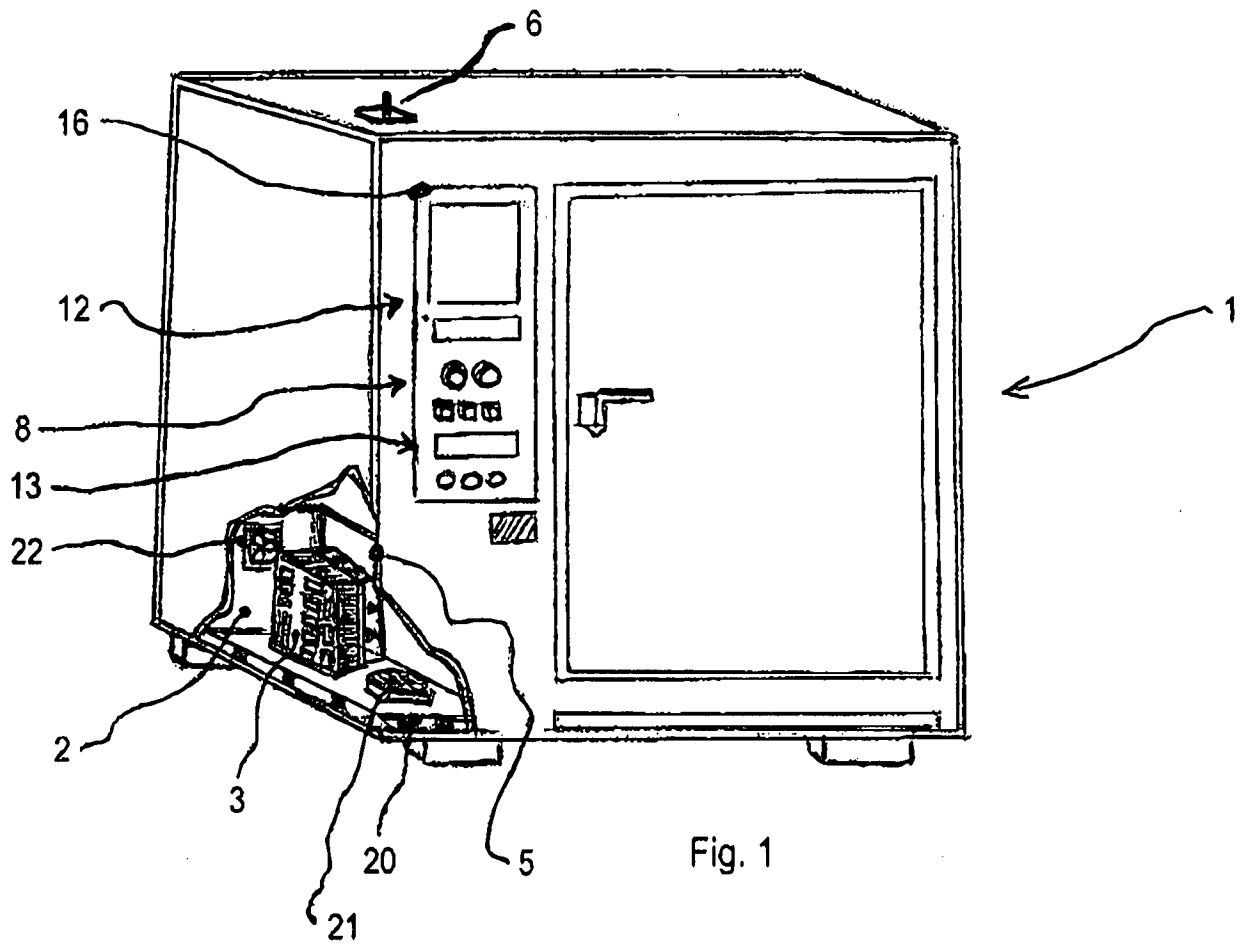


Fig. 1

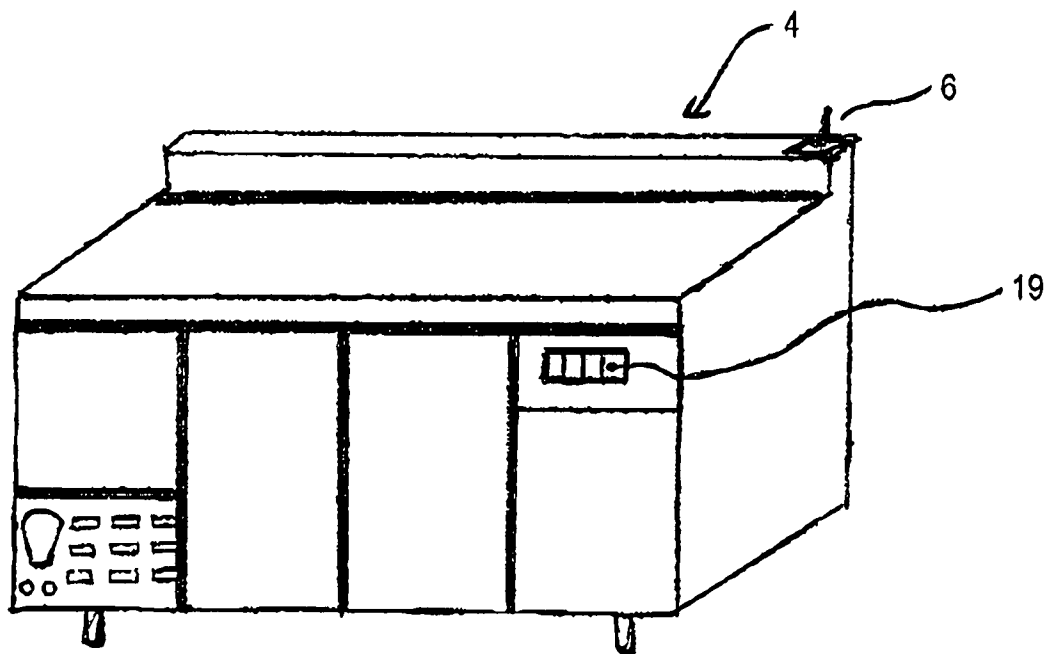


Fig. 2

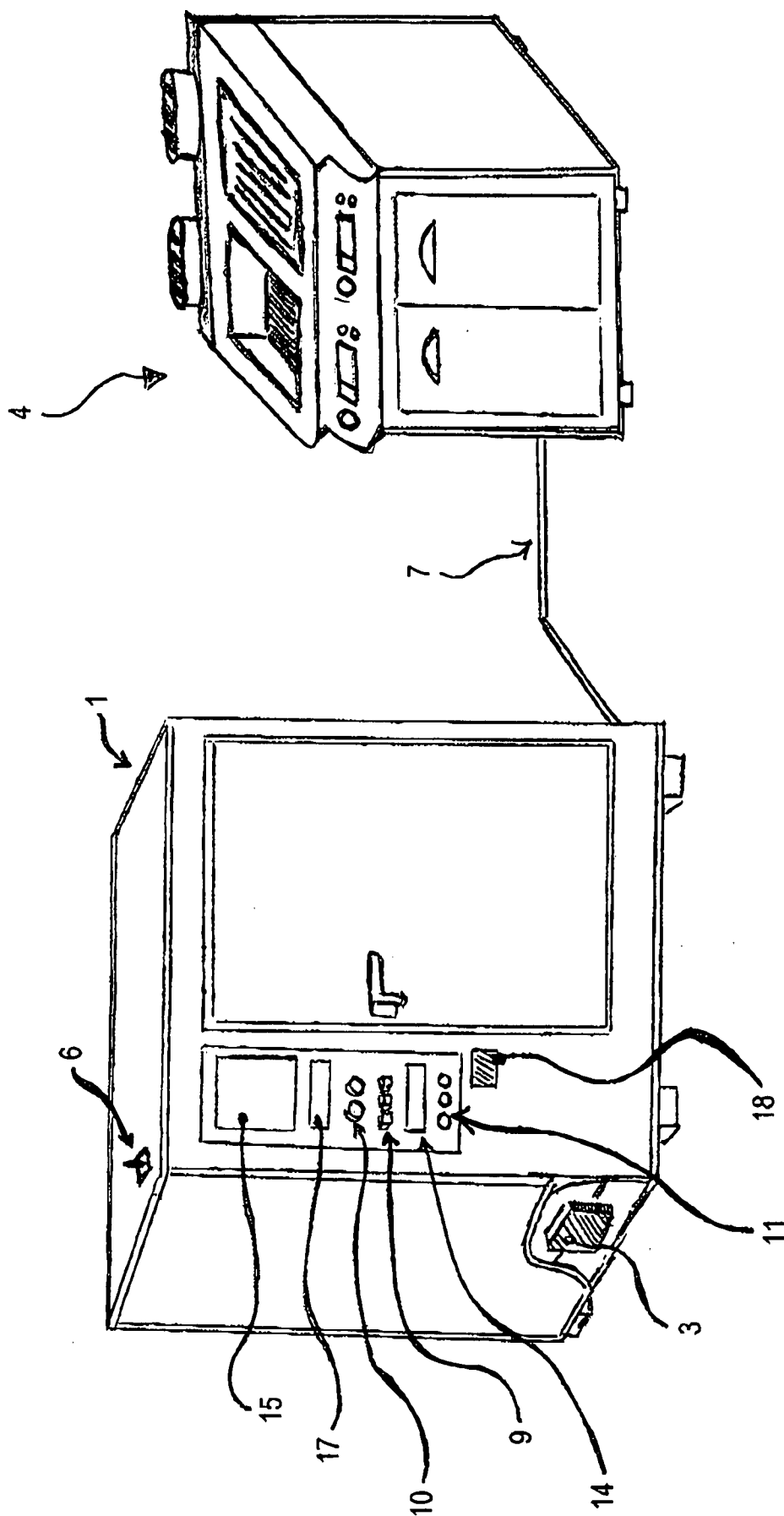


Fig. 3

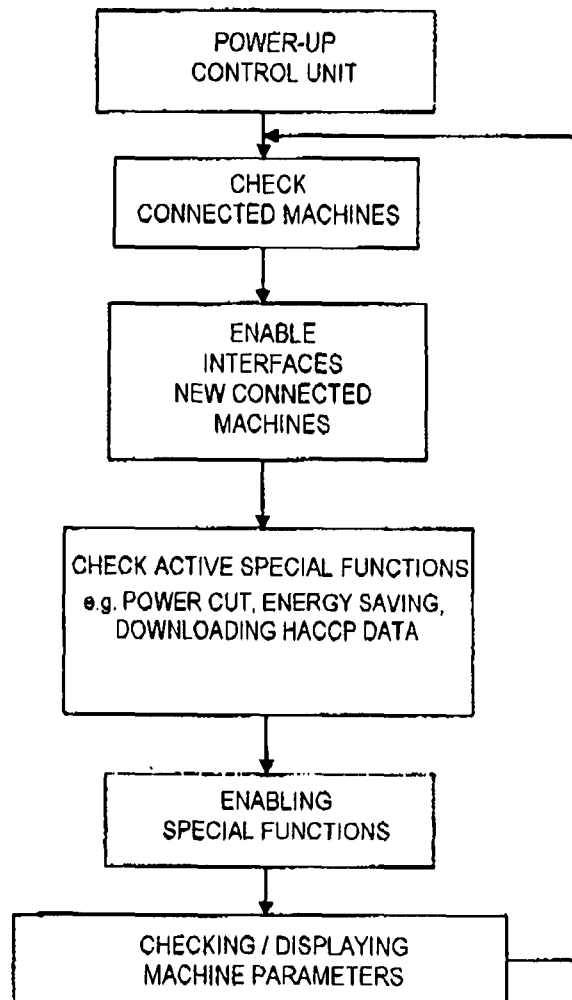


Fig. 4