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(54) **Input unit for body fat measuring device**

Eingabeeinheit für Körperfettmessvorrichtung

Unité d'entrée des données pour un dispositif de mesure des graisses corporelles

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- **PATENT ABSTRACTS OF JAPAN vol. 1998, no. 11, 30 September 1998 (1998-09-30) & JP 10 174679 A (OMRON CORP), 30 June 1998 (1998-06-30)**

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Description

Field of the Invention:

[0001] The present invention relates to a measuring apparatus whose arithmetic and control unit can determine a certain characteristic of an object from a plurality of pieces of information inputted. Examples of such measuring apparatus are a healthy indicia measuring apparatus and a body fat percentage gauge.

Prior Art:

[0002] Japanese Utility Model Application Laid-Open No.5-2164 shows a card-like body fat percentage gauge having a display and a console on its front side and four measurement electrodes on its rear side. Two measurement electrodes are arranged on its left side whereas the remaining two measurement electrodes are arranged on its right side. Thus, two fingers of either hand can be put on these electrodes when one's body fat percentage is being measured. A pocket-sized body fat percentage gauge commercially available from NAMCO Ltd., has one electrode each on its front and rear sides. Another pocket-sized body fat percentage gauge commercially available from Yamato Scale Co. Ltd., has two electrodes on the upper part each of its front and rear sides.

[0003] These gauges determine the body fat percentage on the basis of the biological impedance of an individual while he or she holds the gauge with his or her hands putting on paired electrodes, thereby permitting the biological impedance appearing between the selected points of hands to be determined. Body fat is likely to impede the flow of electric current greately compared with muscle, blood and lymph, which conduct electric current well. Therefore, the body fat percentage can be determined in terms of impedance. Calculation of the body fat percentage in terms of the biological impedance must take physical variables of the individual into account, and therefore, the sex, height, weight and other variables are inputted in the body fat percentage gauge prior to measurement. As a matter of fact, some extra pieces of physical information such as human races, athletes, adults or children and ages are inputted in the body fat percentage gauge.

[0004] If the body fat percentage gauge should require the inputting of such variables every time a required measurement is made, the gauge is inconvenient. In the hope of reducing such inconvenience the gauge is equipped with memories for storing such variables once inputted in the gauge, and an individual can have an access to his or her particulars simply by inputting his or her identification number.

[0005] A series of actions taken by the prior art gauge follow in measuring the body fat percentage are shown in the form of flow chart. The series of actions on the left side pertain to registration of the physical variables of an individual whereas those on the right side pertain to the measurement of the body fat percentage. As seen from the left part of the flow chart, the identification number, the sex, the height and the weight are stored in the order named in the memory.

[0006] Usually the body fat percentage gauge is used while an individual is limiting the amount and type of food that the individual eats in order to become thinner or while an individual continues to take good exercise in order to strengthen his muscle, and therefore, the weight varies significantly in a relatively short length of time. A weight scale type of body fat percentage gauge permits automatic measurement of the weight simultaneous with measurement of the body fat percentage, thus making it unnecessary to input the instantaneous or present weight. The hand-holding type of body fat percentage gauge requires the reentering of all variables, that is, the identification number, the sex, the height and finally the weight, preventing the changing of the sole variable of weight, which can be inputted after having inputted all the preceding variables as seen from the left part of Fig. 5. Apparently this is inconvenient in using the body fat percentage gauge.

[0007] US 5 372 141 discloses a body composition analyzer provided with a plurality of keys for entering personal data. After the unit is provided with power the user is automatically prompted to input various information and confirm the inputs by pressing an enter key. After the last necessary data has been input a measurement mode is automatically started.

[0008] US 5 579 782 discloses a device to provide data as a guide to health management.

[0009] It is the object of the invention to provide a measuring apparatus which is easy to operate by a user.

[0010] This object is fulfilled by an apparatus having the features disclosed in claim 1. Preferred embodiments are defined in the dependent subclaims.

[0011] According to the present invention there is provided a measuring apparatus which facilitates alteration of selected variables in measuring a certain characteristic of an object.

[0012] According to the present invention there furthermore is provided application of such measuring apparatus to measurement of healthy indicia.

[0013] Moreover, according to the present invention there is provided application of such measuring apparatus to measurement of body fat percentage.

[0014] To attain these objects a measuring apparatus comprising: an inputting device comprising;

an inputting-and-setting switch for inputting and recording a plurality of pieces of information, data-modifying switches for changing a selected one or ones of the plurality of pieces of information and a measurement starting switch for starting measurement of a certain characteristic of an object;
a measuring device for measuring the certain characteristic of the object;
a memory device for storing the plurality of pieces

of information inputted by the inputting device;
an arithmetic and control unit (ACU) for determining a required indicia from the certain characteristic of the object and from the plurality of pieces of information; and
a display for showing the plurality of pieces of information and the so determined indicia, is improved according to the present invention in that
the arithmetic and control unit is responsive to depression of the data-modifying switches subsequent to depression of the measurement starting switch for putting the measuring apparatus in its inputting state, thereby permitting alteration of a selected one of the plurality of pieces of information.

[0015] The measuring apparatus may comprise a selector switch for selecting a desired piece of information for alteration among the selected ones of the plurality of pieces of information.

[0016] The arithmetic and control unit may be responsive to depression of the measurement starting switch for permitting the display device to show a registered piece of information for alteration in the display prior to and during the measurement of the certain characteristic of the object.

[0017] The arithmetic and control unit may be responsive to appearance of unusual values as representing the certain characteristic of the object for permitting the display device to continue to show the registered piece of information for alteration, for repeating determination of the certain characteristic of the object until the so determined characteristic of the object has been reduced to a normal value, and for obtaining the indicia from the normal value of the characteristic of the object finally determined and selected pieces of information retrieved from the memory, thereby permitting the display to show the required indicia.

[0018] A healthy indicia measuring apparatus comprising:

an inputting device comprising an inputting-and-setting switch for inputting and recording a plurality of pieces of physical information pertaining to each individual, data-modifying switches for changing a selected one or ones of the plurality of pieces of physical information and a measurement starting switch for starting measurement of a certain characteristic of each individual;
sensors for obtaining a selected piece or pieces of biological information;
a memory for storing the plurality of pieces of physical information pertaining to each individual inputted by the inputting device;
an arithmetic and control unit (ACU) for determining a healthy indicia from the stored pieces of physical information and from the measured piece of biological information; and
a display for showing the pieces of physical information and the so determined healthy indicia, is improved according to the present invention in that
the arithmetic and control unit is responsive to depression of the data-modifying switches subsequent to depression of the measurement starting switch for putting the healthy indicia measuring apparatus in its inputting state, thereby permitting alteration of a selected one of the stored pieces of physical information.

[0019] The healthy indicia measuring apparatus may further comprise a selector switch for selecting a desired piece of information among two or more selected ones of the stored pieces of physical information.

[0020] The arithmetic and control unit may be responsive to depression of the measurement starting switch for permitting the display device to show a given piece of physical information for alteration in the display prior to and during the measurement of the biological information.

[0021] The arithmetic and control unit may be responsive to appearance of unusual values as representing the measurement of the piece of biological information for permitting the display device to continue to show the registered piece of physical information for alteration, for repeating determination of the biological information of the individual until the so determined biological information has been reduced to a normal value, and for obtaining the healthy indicia from the normal value of the so determined biological information and selected pieces of physical information retrieved from the memory, thus permitting the display to show the required healthy indicia.

[0022] A body fat percentage measuring apparatus comprising:

an inputting device comprising an inputting-and-setting switch for inputting and recording a plurality of pieces of physical information pertaining to each individual, data-modifying switches for changing the sex, the age, the height, the weight and other pieces of physical information of each individual, and a measurement starting switch for starting the measurement of the body fat percentage for each individual;
a biological impedance sensor having electrodes to be applied to the individual body;
a memory for storing the pieces of physical information pertaining to each individual inputted by the inputting device;
an arithmetic and control unit (ACU) for determining the body fat percentage from the determined biological impedance and from the stored pieces of physical information; and
a display for showing the pieces of physical information and the so determined body fat percentage, is improved according to the present invention in that
the arithmetic and control unit is responsive to depression of the data-modifying switches subsequent

to depression of the measurement starting switch for putting the body fat percentage measuring apparatus in its inputting state, thereby permitting alteration of a selected one of the stored pieces of physical information pertaining to each individual.

[0023] The body fat percentage measuring apparatus may further comprise a selector switch for selecting a desired piece of information among two or more selected ones of the pieces of physical information.

[0024] The arithmetic and control unit may be responsive to depression of the measurement starting switch for permitting the display device to show the registered piece of physical information for alteration in the display prior to and during the measurement of the biological impedance.

[0025] The arithmetic and control unit may be responsive to appearance of unusual values as representing the biological impedance for permitting the display device to continue to show the registered piece of information desired for alteration, for repeating determination of the biological impedance until the so determined biological impedance has been reduced to a normal value, and for obtaining the body fat percentage from the normal value of the biological impedance and selected pieces of information retrieved from the memory, thus permitting the display to show the required body fat percentage.

[0026] One piece of physical information to be selected for alteration may be weight.

[0027] The piece of physical information selected for alteration may be one of the weight and height selected by the selector switch.

[0028] Other objects and advantages of the present invention will be understood from the following description of preferred embodiments of the present invention, which are shown in accompanying drawings:

Fig.1 shows a hand-held type of body fat percentage gauge to which the present invention is applied;

Fig.2 is a block diagram of electric components of the hand-held type of body fat percentage gauge;

Figs.3A, 3B and 3C show a flowchart describing a series of actions taken by the hand-held type of body fat percentage gauge according to one embodiment of the present invention;

Fig.4 illustrates how both hands are used in measuring the body fat percentage;

Fig.5 shows a hand-held type of body fat percentage gauge which is modified according to the present invention;

Fig.6 is a block diagram of electric components of the hand-held type of body fat percentage gauge of Fig.5;

Figs.7A, 7B and 7C show a flowchart describing a series of actions taken by the hand-held type of body fat percentage gauge according to another embodiment of the present invention; and

Figs.8A, 8B and 8C show a flowchart describing a series of actions taken by a conventional body fat rate percentage gauge.

Description of Preferred Embodiments:

[0029] Referring to Fig.1, a hand-held type of body fat percentage gauge 1 according to one preferred embodiment of the present invention has, on its upper and lower longitudinal sides and on its front surface, a pair of current supplying electrodes 2A and 2B, a pair of voltage measuring electrodes 3A and 3B, a display 4 for indicating a measured body fat percentage and pieces of physical information set for each individual, push buttons 5A and 5B for measurement, allotted to two individuals respectively, a push button 6 for registration, and up-scroll and down-scroll push buttons 7 and 8. The push buttons for measurement 5A and 5B can be used in inputting a selected identification number, retrieving the identification number and starting the measurement of body fat percentage. The push button 6 for registration can be used when it is desired that the gauge is put in the individual setting mode in which pieces of physical information pertaining to an individual can be inputted, and when a desired number is registered in place of the corresponding registered number. The up-scroll and down-scroll push buttons 7 and 8 can be used in changing the pieces of physical information pertaining to an individual, such as sex, height and weight. The current supplying electrodes 2A and 2B and voltage measuring electrodes 3A and 3B are biological impedance sensors, which are so arranged that: the thumb of the left hand may be put on the electrode 3A; the index finger of the left hand may be put on the electrode 2A; the thumb of the right hand may be put on the electrode 3B; and the index finger of the right hand may be put on the electrode 2B.

[0030] Referring to Fig.2, the electric circuit arrangement of the hand-held type of body fat percentage gauge comprises a highfrequency constant current supplying circuit 11 for supplying the current supplying electrodes 2A and 2B with electric current, a voltage measuring circuit 12 for measuring the voltage appearing between the voltage measuring electrodes 3A and 3B, an analog-to-digital converter 13 for converting the measured voltage in digital form, an inputting device 14 comprising switches 5 to 8 for entering pieces of physical information for each individual and starting the measurement, a memory device 15 for storing the pieces of physical information pertaining to each individual, a display device 16 including the display 4 for indicating the pieces of physical information pertaining to each individual and the results of calculations, and an arithmetic and control unit (CPU) 17 for calculating a body fat percentage from the measured biological impedance and the pieces of physical information, and for permitting the display to indicate the result of the calculation and permitting the memory to store the same.

[0031] Referring to Figs.3A, 3B and 3C, a series of actions taken by the body fat percentage gauge when

being set up (see Figs.3A and 3B), and another series of actions taken by the gauge when measuring the body fat percentage (see Fig.3C) are described below: at first, the gauge is ready to work in response to depression of one of the individual measurement push buttons 5A and 5B and the registration push button 6, allowing the display, analog circuits, CPU and other circuit components to remain dormant, thus consuming no electric power. Depression of the registration push button 6 will put the gauge in the individual data setting mode. Otherwise, the gauge is still standing by (Step S1).

[0032] Depression of the registration push button 6 will set zero to an identification number "n" (Step S2), allowing the display 4 to show 0 as the initial value (Step S3). A check is made again as to whether or not the registration push button 6 has been depressed (Step S4). In the negative case a check is made as to whether or not either of the up- and down-scroll push button has been pushed (Step S5). In the affirmative case the identification number "n" is altered, and then, the proceeding returns to Step 3. (Step S6). If the registration push button 6 is found to have been depressed at Step 4, the number appearing in the display 4 is stored as the identification number in the memory (Step S7), which can store different pieces of physical information for each identification number.

[0033] Selection of the sex follows registration of the identification number, and "female" is set as an initial value (Step S8), allowing the display 4 to show the sex (Step S9). Then, a check is made as to whether or not the registration push button 6 has been depressed (Step S10). In the negative case a check is made as to whether or not either scroll button has been depressed (Step S11). In the affirmative case the indicated sex is changed, and then the proceeding returns to Step S9 (Step S12). If the registration push button 6 is found to have been depressed at Step S10, the sex appearing in the display 4 is stored in the memory (Step S13).

[0034] The entering of the height follows registration of the sex, and 160 cm is set to the height as an initial value (Step S14), allowing the display 4 to show the initial value (Step S15). Then, a check is made as to whether or not the registration push button 6 has been depressed (Step S16). In the negative case a check is made as to whether or not either scroll button has been depressed (Step S17). In the affirmative case the initial value is changed, and then the proceeding returns to Step S15 (Step S18). If the registration push button 6 is found to have been depressed at Step S16, the height appearing in the display 4 is stored in the memory (Step S19).

[0035] The entering of the weight follows registration of the height, and 60.0 kg is set to the weight as an initial value (Step S20), allowing the display 4 to show the initial value (Step S21). Then, a check is made as to whether or not the registration push button 6 has been depressed (Step S22). In the negative case a check is made as to whether or not either scroll button has been depressed (Step S23). In the affirmative case the initial value is changed, and then the proceeding returns to Step S21 (Step S24). If the registration push button 6 is found to have been depressed at Step S22, the weight appearing in the display 4 is stored in the memory (Step S25). Thus, all pieces of physical information pertaining to the individual are registered. Thus, the individual data setting mode is finished (Step S26).

[0036] If the registration push button 6 is not depressed at Step S1, a check is made as to whether or not either push button for measurement 5A or 5B has been depressed (Step S27). In the negative case the proceeding returns to Step S1. The body fat percentage gauge remains dormant until either measurement push button 5A or 5B has been depressed. Contrary, if either push button for measurement 5A or 5B is found to have been depressed at Step S27, the identification number "n" pertaining to the depressed measurement push button is allowed to appear in the display 4 (Step S28), so that the sex, the height and the weight of the individual thus identified in terms of identification number "n" are retrieved from the memory (Step S29). The so retrieved sex, height and weight are allowed to appear one after another in the display 4 (Step S30). Then, the body fat rate gauge 1 is put in the measurement-permitting condition (Step S31), allowing the display 4 to continue to show the value of weight retrieved from the memory at Step 29 (Step S32). This continuous display informs the user of the permissibility of changing the displayed value on demand.

[0037] Here, a check is made as to whether or not either scroll push button 7 or 8 has been depressed (Step S33). In the affirmative case the value of weight is amended (Step S34), and the amended value of weight is shown in the display 4 (Step S35). A check is made as to whether or not the registration push button 6 has been depressed (Step S36). Thus, the user is being asked whether the amended and displayed value is acceptable. In the negative case a check is made as to whether or not either scroll push button 7 or 8 has been depressed (Step S37). If either scroll push button 7 or 8 is depressed, the proceeding is allowed to return to Step S34 for renewal of the displayed value. If not, the proceeding is allowed to return to Step S36 to confirm that the weight has been corrected to the present value of weight, and that the amended value should be registered. Depression of the registration push button 6 at Step 36 allows the memory to store the amended value (Step S38), and then the preceding returns to Step S28.

[0038] If either scroll push button 7 or 8 is not depressed for renewal of values at Step 33, a biological impedance is calculated (Step S39). The calculation is repeated several times within a relatively short time, and a check is made as to whether or not the so determined values of biological impedance remain within a certain range (Step S40). If the so determined values of biological impedance are found to be unstable, increasing or decreasing beyond the certain range, the proceeding returns to Step S32. When the so determined values of biological impedance are found to be stable, it is checked

whether these values remain within the range from 300 to 1,400 Ω (Step S41). The values of biological impedance appearing between both hands of children and adults remain in the range from 300 to 1,400 Ω . If the measurement is effected with both hand skins touched on the electrodes, the values of biological impedance must remain within the range. Stated otherwise, if the values of biological impedance are found to be out of the range, either hand skin is supposed to have been untouched rightly on the electrodes on which it must be put.

[0039] As seen from Fig.4, the user uses his thumbs in changing some pieces of physical information already registered, and then, he must take at least one of both thumbs off from the voltage measuring electrode, resulting in the value of biological impedance departing apart from the prescribed range. Continuous measurement of biological impedance reveals that the user is changing the registered value of his weight, and then, the display device continues to show the registered value of weight. Thus, the user can compare the present weight with the registered one until the value of biological impedance has been stable in measurement. When the measured value of biological impedance is found to be stable at Step S40, and when the measured value is found to remain within the 300-to-1400 ohm range at Step S41, the user is supposed to put his fingers on the electrodes, indicating his desire for measurement of biological impedance. Thus, some words, such as "measurement continued" appear in the display 4.

[0040] The body fat percentage is calculated from the measured value of biological impedance and some pieces of physical information retrieved from the memory, such as the sex, the height and the (amended) weight (Step S42). The body fat percentage thus calculated is shown in the display 4 (Step S43), and it will disappear from the display 4 in a given length of time, thus completing all measurements (Step S44).

[0041] Referring to Fig.5, another hand-held type of body fat percentage gauge 1 which is modified according to the present invention has, on its front surface, a variable selector switch 9 in addition to those appearing in Fig.1. The variable selector switch 9 can be used in selecting the piece of information to be changed while the gauge is standing by for measurement. Conveniently some pieces of information which are required often for renewal, such as weight or height can be readily selected for access.

[0042] Referring to Fig.6, the electric circuit arrangement similar to that shown in Fig.2 has such variable selector switch 9 connected to the arithmetic and control unit (CPU) 17.

[0043] Referring to Figs.7A, 7B and 7C, a series of actions taken by the body fat percentage gauge when being set up appear in Figs.7A and 7B, and are same as in Figs.3A and 3B. The description of the "set up" actions is omitted. As described above, all pieces of physical information pertaining to the individual are registered, and the individual data setting mode is finished. Then, another series of actions taken by the gauge when measuring the body fat percentage (see Fig.7C) start.

[0044] If the registration push button 6 is not depressed at Step S1, a check is made as to whether or not either push button for measurement 5A or 5B has been depressed (Step S27). In the negative case the proceeding returns to Step S1. The body fat percentage gauge remains dormant until either measurement push button 5A or 5B has been depressed. Contrary, if either push button for measurement 5A or 5B is found to have been depressed at Step S27, the identification number "n" pertaining to the depressed measurement push button is allowed to appear in the display 4 (Step S28), so that the sex, the height and the weight of the individual thus identified in terms of identification number "n" are retrieved from the memory (Step S29). The so retrieved sex, height and weight are allowed to appear one after another in the display 4 (Step S30). Here, it is checked on which side the variable selector switch 9 is shifted, "W" or "H" (Step S31). If it is shifted to "W", the display 4 continues to show the weight (Step S32). Contrary if it is shifted to "H", the display 4 continues to show the height (Step S33). Then, the body fat rate gauge 1 is put in the measurement-permitting condition, allowing the display 4 to continue to show the piece of physical information selected at Step S31. This continuous display informs the user of the permissibility of changing the displayed value on demand (Step S34).

[0045] Here, a check is made as to whether or not either scroll push button 7 or 8 has been depressed (Step S35). In the affirmative case the amended value is shown in the display 4 (Step S36). A check is made as to whether or not the registration push button 6 has been depressed (Step S37). Thus, the user is being asked whether the amended and displayed value can be registered. In the negative case a check is made as to whether or not either scroll push button 7 or 8 has been depressed (Step S38). If either scroll push button 7 or 8 is depressed, the proceeding is allowed to return to Step S36 for renewal of the displayed value. Otherwise, the proceeding is allowed to return to Step S37 to confirm that the present value should be registered. Depression of the registration push button 6 at Step 37 allows the memory to store the amended value, and then the preceding returns to Step S28 (Step S39).

[0046] If either scroll push button 7 or 8 is not depressed for renewal of values at Step 35, a biological impedance is calculated (Step S40). The calculation is repeated several times within a relatively short time, and a check is made as to whether or not the so determined values of biological impedance remain within a certain range (Step S41). If the so determined values of biological impedance are found to be unstable, increasing or decreasing beyond the certain range, the proceeding returns to Step S31 where which side the switch 9 is turned is checked. When the so determined values of biological impedance are found to be stable, it is checked whether these values remain within the range from 300 to 1,400

Ω (Step S42). The values of biological impedance appearing between both hands of children and adults remain in the range from 300 to 1,400 Ω . If the measurement is effected with both hand skins touched on the electrodes, the values of biological impedance must remain within the range. Stated otherwise, if the values of biological impedance are found to be out of the range, either hand skin is supposed to have been untouched rightly on the electrodes on which it must be put.

[0047] As described earlier, the user uses his thumbs in changing some pieces of physical information already registered, and then, he must take at least one of both thumbs off from the voltage measuring electrode, resulting in the value of biological impedance departing apart from the prescribed range. Continuous measurement of biological impedance reveals that the user is changing the registered value of his weight, and then, the display device continues to show the registered value of weight. Thus, the user can compare the present weight with the registered one until the value of biological impedance has been stable in measurement. When the measured value of biological impedance is found to be stable at Step S41, and when the measured value is found to remain within the 300-to-1400 ohm range at Step S42, the user is supposed to put his fingers on the electrodes, indicating his desire for measurement of biological impedance. Thus, some words, such as "measurement continued" appear in the display 4.

[0048] The body fat percentage is calculated from the measured value of biological impedance and some pieces of physical information retrieved from the memory, such as the sex, the height and the (amended) weight (Step S43). The body fat percentage thus calculated is shown in the display 4 (Step S44), and it will disappear from the display 4 in a given length of time, thus completing all measurements (Step S45).

[0049] The biological impedance appearing between both hands is described as remaining in the range from 300 to 1400 Ω, but such range should not be understood to be limitative.

[0050] The body fat percentage determined from the biological impedance and some pieces of physical information as described above is the rate of the fat volume to the whole volume of the individual body. The body fat percentage may be given in terms of percentage by weight.

[0051] Some push switch buttons 5 to 8 are used to perform different functions allotted thereto, but cross-shaped switches may be used without substantially altering the circuit structure of the body fat percentage gauge.

[0052] The body fat percentage gauge is described as permitting pieces of physical information to be registered for two persons. Specifically it has two push buttons for measurement allotted to two persons. Of course, the number of the push buttons for measurement can be three or more.

[0053] The variable selector switch 9 is described as being capable of making a selection between two pieces of physical information, that is, height and weight. This should not be understood as limitative, and a desired selection can be made among three or more pieces of information.

[0054] The present invention is described as being applied to a hand-held type of body fat percentage gauge, but it can be equally applied to a weight scale-like body fat percentage gauge, which is so designed as to measure the body fat percentage from the biological impedance appearing between both feet. While a user is changing a selected piece of physical information already registered, he must change his posture, as for instance follows: he crouches down or sits down to handle the console or he raise the whole gauge up. In any event his feet are taken away or displaced from the electrodes on the weight scale-like object, thus causing the value of biological impedance to be unstable. Such unstable condition can be detected as being indicative of the user's changing some selected variables such as age or height stored in the memory if the weight scale type of body fat percentage gauge is modified according to the present invention.

[0055] Apparatuses for measuring blood pressure, pulsation or heartbeat as indicative of health include sensors to be applied to individual bodies for measurement. Such and other apparatuses performing required measurements by applying their sensors to the skin of the individual can be so modified according to the present invention that the unstable condition may be detected as being indicative of the user's changing some selected variables, and that some selected pieces of physical information may be changed exclusively with ease.

[0056] The object whose characteristic value is measured need not be limited to human beings. In measuring some characteristics of a non-living object a decision as to whether or not the measurement is continued can be made from appearance of unusual values of such characteristics according to the present invention. Thus, the present invention can be applied to not only the health indicators but also a variety of measuring apparatuses.

[0057] As may be understood from the above, a measuring apparatus according to the present invention facilitates the changing of any selected pieces of information already registered in the memory without the necessity of repeating the recording of the other registered pieces of information. Accordingly the operability of the measuring apparatus is improved.

[0058] A health indicator to which the present invention is applied facilitates renewal of any pieces of physical information without the necessity of repeating the recording of the other registered pieces of physical information. Exclusive renewal of selected variables, which are registered in the memory, and are often required to be renewed, is permitted, and accordingly the operability of the gauge is improved.

[0059] Specifically a body fat percentage measuring apparatus to which the present invention is applied per-

mits exclusive renewal of weight without the necessity of repeating the recording of the other registered pieces of unchangeable or least changeable information, such as sex or age. This faculty provides a significant convenience in dieting or physically training; one's weight is likely to vary almost every day.

[0060] Different pieces of information which are supposed to be often required for renewal are selected beforehand among those registered in the memory, and one of the so selected variables can be selected for renewal to meet the demand while the gauge is put in condition for measurement. This improves the operability of the gauge in case that two or more variables are equally often changeable and that only one variable is required for renewal for each measurement.

Claims

1. A measuring apparatus comprising:

an inputting device (14) comprising;an inputting-and-setting switch (6) for putting the measuring apparatus into a setting mode for inputting and recording a plurality of pieces of information, data-modifying switches (7, 8) for changing a selected one or selected ones of the plurality of pieces of information said data-modifying switches (7,8) being up-scroll and down-scroll push buttons, and a measurement starting switch (5A, 5B) for starting measurement of a certain characteristic of an object;
a measuring device (3A, 3B, 12) for measuring the certain characteristic of the object;
a memory device (15) for storing the plurality of pieces of information inputted by the inputting device (14);
an arithmetic and control unit (17) for determining a required indicia from the certain characteristic of the object and from the plurality of pieces of information; and
a display (4) for showing the plurality of pieces of information and the so determined indicia, wherein
the arithmetic and control unit (17) is responsive to depression of the data-modifying switches (7, 8) subsequent to depression of the measurement starting switch (5A, 5B) for putting the measuring apparatus in its inputting mode, thereby permitting alteration of a selected one of the plurality of pieces of information.

2. A measuring apparatus according to claim 1 wherein it further comprises a selector switch (9) for selecting a desired piece of information for alteration among the selected ones of the plurality of pieces of information.

3. A measuring apparatus according to claim 1 wherein the arithmetic and control unit (17) is responsive to depression of the measurement starting switch (5A, 5B) for permitting the display device to show a registered piece of information for alteration in the display prior to or during the measurement of the certain characteristic of the object.

4. A measuring apparatus according to claim 3 wherein the arithmetic and control unit (17) is responsive to appearance of unusual values as representing the certain characteristic of the object for permitting the display device to continue to show the registered piece of information for alteration, for repeating determination of the certain characteristic of the object until the so determined characteristic of the object has been reduced to a normal value, and for obtaining the indicia from the normal value of the characteristic of the object finally determined and selected pieces of information retrieved from the memory, thereby permitting the display to show the required indicia.

5. A measuring apparatus according to claim 1 wherein the plurality of pieces of information inputted by the inputting-and-setting switch (6) of the inputting device (14) are a plurality of pieces of physical information pertaining to each object beeing an individual, the data-modifying switches (7, 8) changes a selected one or ones of the plurality of pieces of physical information, the measurement starting switch (5A, 5B) starts measurement of biological information of each individual, the measuring device (3A, 3B, 12) comprises sensors for obtaining a selected piece or pieces of biological information, the plurality of pieces of information stored in the memory device (15) are a plurality of pieces of physical information pertaining to each individual, the indicia determined by the arithmetic and control unit (17) is a healthy indicia determined from the stored pieces of physical information and from the measured piece of biological information, said selected one of the plurality of pieces of information for alteration is one of the plurality of pieces of physical information, and the display shows the pieces of physical information and the so determined healthy indicia.

6. A measuring apparatus according to claim 5 wherein it further comprises a selector switch (9) for selecting a desired piece of information for alteration among the selected ones of the stored pieces of physical information.

7. A measuring apparatus according to claim 5 wherein the arithmetic and control unit (17) is responsive to depression of the measurement starting switch (5A, 5B) for permitting the display device to show a given piece of physical information for alteration in the dis-

play prior to or during the measurement of the biological information.

8. A measuring apparatus according to claim 7 wherein the arithmetic and control unit (17) may be responsive to appearance of unusual values as representing the measurement of the piece of biological information for permitting the display device to continue to show the registered piece of physical information for alteration, for repeating determination of the biological information of the individual until the so determined biological information has been reduced to a normal value, and for obtaining the healthy indicia from the normal value of the so determined biological information and selected pieces of physical information retrieved from the memory, thus permitting the display to show the required healthy indicia.

9. A measuring apparatus according to claim 5 wherein the plurality of pieces of physical information inputted by the inputting-and-setting switch (6) of the inputting device (14) are the sex, the height, the weight and other pieces of physical information of each individual, said data-modifying switches (7, 8) change the sex, the age, the weight, and other pieces of physical information of each individual, the measurement starting switch (5A, 5B) starts the measurement of the body fat percentage for each individual, the sensors comprise a biological impedance sensor having electrodes to be applied to the individual body, the plurality of pieces of physical information pertaining to each individual stored in the memory device (15) are the sex, the height, the weight and other pieces of physical information of each individual, the healthy indicia determined by the arithmetic and control unit (17) is a body fat percentage, and the display shows the pieces of physical information and the so determined body fat percentage.

10. A measuring apparatus according to claim 9 wherein it further comprises a selector switch (9) for selecting a desired piece of information for alteration among the selected ones of the stored pieces of physical information.

11. A measuring apparatus according to claim 9 wherein the arithmetic and control unit (17) is responsive to depression of the measurement starting switch (5A, 5B) for permitting the display device to show the registered piece of physical information for alteration in the display prior to or during the measurement of the biological impedance.

12. A measuring apparatus according to claim 11 wherein the arithmetic and control unit (17) is responsive to appearance of unusual value as representing the biological impedance for permitting the display device to continue to show the registered piece of information desired for alteration, for repeating determination of the biological impedance until the so determined biological impedance has been reduced to a normal value, and for obtaining the body fat percentage from the normal value of the biological impedance and selected pieces of information retrieved from the memory, thus permitting the display to show the required body fat percentage.

13. A measuring apparatus according to claim 9 wherein one piece of physical information to be selected for alteration is weight.

14. A measuring apparatus according to claim 10 wherein the piece of physical information selected for alteration is one of the weight and height selected by the selector switch (9).

Patentansprüche

1. Meßvorrichtung, umfassend:

eine Eingabevorrichtung (14), umfassend einen Eingabe- und Festlegungsschalter (6) zum Bringen der Meßvorrichtung in einen Einstell- bzw. Festlegungsmodus zum Eingeben und Aufzeichnen einer Mehrzahl von Informationsstükken, Datenmodifizierschalter (7, 8) zum Ändern eines gewählten oder von mehreren gewählten aus der Mehrzahl von Informationsstücken, wobei die Datenmodifikations- bzw. - modifizierschalter (7, 8) Aufroll- und Abrolldruckknöpfe sind, und einen Meßstartschalter (5A, 5B), um eine Messung eines bestimmten Merkmals eines Objekts zu starten;
eine Meßvorrichtung (3A, 3B, 12) zum Messen des bestimmten Merkmals des Objekts;
eine Speichervorrichtung (15) zum Speichern der Mehrzahl von Informationsstücken, die durch die Eingabevorrichtung (14) eingegeben sind;
eine arithmetische und Steuer- bzw. Regeleinheit (17) zum Bestimmen von erforderlichen Indizes bzw. Hinweisen aus dem bestimmten Merkmal des Objekts und aus der Mehrzahl von Stücken von Information; und
eine Anzeige (4) zum Zeigen der Mehrzahl von Informationsstücken und der so bestimmten Indizes, wobei
die arithmetische und Steuer- bzw. Regeleinrichtung (17) auf ein Drücken des Datenmodifizierschalters (7, 8) nach einem Drücken des Meßstartschalters (5A, 5B) anspricht, um die Meßvorrichtung in ihren Eingabemodus zu bringen, wodurch eine Änderung eines gewählten aus der Mehrzahl von Informationsstücken erlaubt ist.

2. Meßvorrichtung nach Anspruch 1, wobei sie weiterhin einen Auswahlschalter (9) umfaßt, um ein gewünschtes Informationsstück zur Änderung unter den gewählten aus der Mehrzahl von Informationsstücken auszuwählen.

3. Meßvorrichtung nach Anspruch 1, wobei die arithmetische und Steuer- bzw. Regeleinrichtung (17) auf ein Drücken des Meßstartschalters (5A, 5B) anspricht, um der Anzeigevorrichtung zu ermöglichen, ein registriertes Informationsstück zur Änderung in der Anzeige vor oder während der Messung des bestimmten Merkmals des Objekts zu zeigen.

4. Meßvorrichtung nach Anspruch 3, wobei die arithmetische und Steuer- bzw. Regeleinrichtung (17) auf ein Aufscheinen von nicht üblichen Werten anspricht, wie sie das bestimmte Merkmal des Objekts darstellen, um der Anzeigevorrichtung zu ermöglichen, mit dem Zeigen des registrierten Stücks an Information zur Veränderung fortzusetzen, um eine Bestimmung des bestimmten Merkmals des Objekts zu wiederholen, bis das so bestimmte Merkmal des Objekts auf einen normalen bzw. Normalwert reduziert wurde, und um die Indizes von dem Normalwert des Merkmals des Objekts, das zum Schluß bestimmt wurde, und den gewählten Stücken von Information zu erhalten, die aus dem Speicher entnommen sind, wodurch es der Anzeige ermöglicht wird, die erforderlichen Indizes zu zeigen.

5. Meßvorrichtung nach Anspruch 1, wobei die Mehrzahl von Informationsstücken, die durch den Eingabe- und Festlegungsschalter (6) in der Eingabevorrichtung (14) eingegeben sind, eine Mehrzahl von Stücken von physischer Information sind, die sich auf jedes Objekt beziehen, das ein Individuum ist, wobei die Datenmodifizierschalter (7, 8) ein gewähltes oder mehrere aus der Mehrzahl von Stücken von physischer Information verändern, der Meßstartschalter (5A, 5B) eine Messung von biologischer Information von jedem Individuum beginnt, die Meßvorrichtung (3A, 3B, 12) Sensoren zum Erhalten eines gewählten Stücks oder von Stücken von biologischer Information umfaßt, die Mehrzahl von Stücken von Information, die in der Speichervorrichtung (15) gespeichert sind, eine Mehrzahl von Stükken von physischer Information sind, die sich auf jedes Individuum beziehen, die Indizes, die durch die arithmetische und Steuer- bzw. Regeleinrichtung (17) bestimmt sind, Gesundheitsindizes sind, die aus den gespeicherten Stücken von physischer Information und aus dem gemessenen Stück einer biologischen Information bestimmt sind, das gewählte eine aus der Mehrzahl von Informationsstücken für eine Änderung eines aus der Mehrzahl von Stücken von physischer Information ist, und die Anzeige die Stücke von physischer Information und die so bestimmten Gesundheitsindizes anzeigt.

6. Meßvorrichtung nach Anspruch 5, wobei sie weiterhin einen Auswahlschalter (9) umfaßt, um ein gewünschtes Informationsstück zur Änderung aus den gewählten der gespeicherten Informationsstücke auszuwählen.

7. Meßvorrichtung nach Anspruch 5, wobei die arithmetische und Steuer- bzw. Regeleinrichtung (17) auf ein Drücken des Meßstartschalters (5A, 5B) anspricht, um es der Anzeigevorrichtung zu ermöglichen, ein gegebenes Stück an physischer Information zur Änderung in der Anzeige vor oder während der Messung der biologischen Information anzuzeigen.

8. Meßvorrichtung nach Anspruch 7, wobei die arithmetische und Steuer- bzw. Regeleinrichtung (17) auf ein Auftreten von nicht-üblichen Werten ansprechen kann, wie sie die Messung des Stücks von biologischer Information darstellen, um es der Anzeigevorrichtung zu ermöglichen, mit dem Zeigen des registrierten Stücks an physischer Information zur Änderung fortzufahren, um eine Bestimmung der biologischen Information des Individuums zu wiederholen, bis die so bestimmte biologische Information auf einen Normalwert reduziert wurde, und um die Gesundheitsindizes aus dem Normalwert der so bestimmten biologischen Information und gewählten Stücken der physischen Information zu erhalten, die aus dem Speicher entnommen sind, wodurch es der Anzeige ermöglicht ist bzw. wird, die erforderlichen Gesundheitsindizes zu zeigen.

9. Meßvorrichtung nach Anspruch 5, wobei die Mehrzahl von Stücken von physischer Information, die durch den Eingabe- und Festlegungsschalter (6) der Eingabevorrichtung (14) eingegeben sind, das Geschlecht, die Größe, das Gewicht und andere Stücke von physischer Information von jedem Individuum sind, die Datenmodifizierungsschalter (7, 8) das Geschlecht, das Alter, das Gewicht und andere Stücke von physischer Information von jedem Individuum verändern, der Meßstartschalter (5A, 5B) die Messung des Körperfettprozentsatzes für jedes Individuum startet, die Sensoren einen Sensor einer bioelektrischen Impedanz umfassen, der Elektroden aufweist, die an dem individuellen Körper aufzubringen bzw. anzulegen sind, die Mehrzahl von Stücken von physischer Information, die zu jedem Individuum gehören, die in der Speichervorrichtung (15) gespeichert sind, das Geschlecht, die Größe, das Gewicht und andere Stücke von physischer Information von jedem Individuum sind, die Gesundheitsindizes, die durch die arithmetische und Steuer- bzw. Regeleinheit (17) bestimmt sind, ein Körperfettprozentsatz sind, und die Anzeige die Stücke von physischer In-

formation und den so bestimmten Körperfettprozentsatz zeigen.

10. Meßvorrichtung nach Anspruch 9, wobei sie weiterhin einen Auswahlschalter (9) zum Auswählen eines gewünschten Stücks von Information zur Änderung unter den gewählten der gespeicherten Stücke von physischer Information umfaßt.

11. Meßvorrichtung nach Anspruch 9, wobei die arithmetische und Steuer- bzw. Regeleinheit (17) auf ein Drücken des Meßstartschalters (5A, 5B) anspricht, um es der Anzeigevorrichtung zu ermöglichen, das registrierte Stück von physischer Information zur Änderung in der Anzeige vor oder während der Messung der biologischen Impedanz anzuzeigen.

12. Meßvorrichtung nach Anspruch 11, wobei die arithmetische und Steuer- bzw. Regeleinheit (17) auf ein Auftreten eines unüblichen Werts anspricht, wie es die biologische Impedanz darstellt, um der Anzeigevorrichtung zu ermöglichen, mit dem Zeigen des registrierten Stücks an Information, das zur Änderung gewünscht ist, fortzufahren, um eine Bestimmung der biologischen Impedanz zu wiederholen, bis die so bestimmte biologische Impedanz auf einen Normalwert reduziert wurde, und um den Körperfettprozentsatz aus dem Normalwert der biologischen Impedanz und gewählten Informationsstücken zu erhalten, die aus dem Speicher entnommen sind, wodurch es der Anzeige ermöglicht wird, den erforderlichen Körperfettprozentsatz anzuzeigen.

13. Meßvorrichtung nach Anspruch 9, wobei ein Stück an physischer Information, was zur Änderung auszuwählen ist, das Gewicht ist.

14. Meßvorrichtung nach Anspruch 10, wobei das Stück an physischer Information, das zur Änderung ausgewählt ist, eines aus dem Gewicht und der Größe ist, die durch den Auswahlschalter (9) gewählt sind.

Revendications

1. Dispositif de mesure comprenant :

un dispositif d'entrée (14) comprenant un commutateur d'entrée et de réglage (6) pour introduire le dispositif de mesure dans un mode de réglage pour l'introduction et l'enregistrement d'une pluralité d'éléments d'information, des commutateurs (7,8) de modification de données pour modifier l'un sélectionné d'éléments sélectionnés de la pluralité d'éléments d'information, lesdits commutateurs (7,8) de modification de données étant des boutons-poussoirs de déplacement vers le haut et de déplacement vers le bas et un commutateur de démarrage de mesure (5A,5B) pour faire démarrer la mesure d'une certaine caractéristique d'un objet;
un dispositif de mesure (3A,3B,12) pour mesurer la certaine caractéristique de l'objet;
un dispositif de mémoire (15) pour mémoriser la pluralité d'éléments d'information introduits par le dispositif d'entrée (14);
une unité arithmétique et de commande (17) pour déterminer des indices requis à partir de la certaine caractéristique de l'objet et à partir de la pluralité d'éléments d'informations; et
un dispositif d'affichage (4) pour présenter la pluralité d'éléments d'information et les indices ainsi déterminés, dans lequel
l'unité arithmétique et de commande (17) est apte à répondre à l'enfoncement des commutateurs (7,8) de modification de données à la suite de l'enfoncement du commutateur de démarrage de mesure (5A,5B) pour placer le dispositif de mesure dans un état d'introduction, ce qui permet une modification de l'un sélectionné de la pluralité d'éléments d'information

2. Dispositif de mesure selon la revendication 1, dans lequel il est en outre prévu un commutateur de sélection (9) pour sélectionner un élément d'information désiré pour une modification parmi les éléments sélectionnés de la pluralité d'éléments d'information.

3. Dispositif de mesure selon la revendication 1, dans lequel l'unité arithmétique et de commande (17) est sensible à un enfoncement du commutateur de démarrage de mesure (5A,5B) pour permettre au dispositif d'affichage d'afficher un élément enregistré d'information pour une modification dans l'affichage avant ou pendant la mesure de la certaine caractéristique de l'objet.

4. Dispositif de mesure selon la revendication 3, dans lequel l'unité arithmétique et de commande (17) est sensible à un aspect de valeurs inhabituelles comme représentant la certaine caractéristique de l'objet pour permettre au dispositif d'affichage de poursuivre la visualisation de l'élément enregistré d'information de modification, pour répéter la détermination de la certaine caractéristique de l'objet jusqu'à ce que la caractéristique ainsi déterminée de l'objet ait été réduite à une valeur normale, et pour obtenir des indices à partir de la valeur normale de la caractéristique de l'objet finalement déterminé et des éléments sélectionnés de l'information récupérés à partir de la mémoire, ce qui permet au dispositif d'affichage de présenter les indices requis.

5. Dispositif de mesure selon la revendication 1, dans lequel la pluralité d'éléments d'informations intro-

duits au moyen du commutateur d'entrée et de réglage (6) du dispositif d'entrée (14) comportent une pluralité d'éléments d'information physique appartenant à chaque objet qui est un individu, les commutateurs (7,8) de modification de données modifient un élément sélectionné ou des éléments sélectionnés parmi la pluralité d'éléments d'informations physiques, le commutateur de démarrage de mesure (5A,5B) faisant démarrer la mesure de l'information biologique de chaque individu, le dispositif de mesure (3A,3B,12) comprend des capteurs pour l'obtention d'un élément sélectionné ou d'éléments sélectionnés d'information biologique, la pluralité d'éléments d'information mémorisés dans le dispositif de mémoire (15) sont une pluralité d'éléments d'information physique associés à chaque individu, les indices déterminés par l'unité automatique et de commande (17) sont des indices de santé déterminés à partir des éléments mémorisés d'information physique et à partir de l'élément mesuré d'information biologique, ledit élément sélectionné parmi la pluralité d'éléments d'information pour une modification étant l'un de la pluralité d'éléments d'information physique, et le dispositif d'affichage représente les éléments d'information physique et les indices de santé ainsi déterminés.

6. Dispositif de mesure selon la revendication 5, dans lequel il comporte en outre un commutateur de sélection (9) pour sélectionner un élément désiré d'information pour une modification parmi les éléments sélectionnés des éléments mémorisés d'information physique.

7. Dispositif de mesure selon la revendication 1, dans lequel l'unité arithmétique et de commande (11) est apte à répondre à un enfoncement du commutateur de démarrage de mesure (5A,5B) pour permettre au dispositif d'affichage de présenter un élément donné d'information physique à des fins de modification dans l'affichage avant ou pendant la mesure de l'information biologique.

8. Dispositif de mesure selon la revendication 7, dans lequel l'unité arithmétique et de commande (17) peut être sensible à l'apparition de valeurs inhabituelles comme représentant la certaine caractéristique de l'objet pour permettre au dispositif d'affichage de poursuivre la visualisation de l'élément enregistré d'information de modification, pour répéter la détermination de la certaine caractéristique de l'objet jusqu'à ce que la caractéristique ainsi déterminée de l'objet ait été réduite à une valeur normale, et pour obtenir les indices de santé à partir de la valeur normale de la caractéristique de l'objet finalement déterminé et des éléments sélectionnés de l'information récupérés à partir de la mémoire, ce qui permet au dispositif d'affichage de présenter les indices de santé requis.

9. Dispositif de mesure selon la revendication 5, dans lequel la pluralité d'éléments d'information physique introduits par le commutateur d'entrée et de réglage (6) du dispositif d'entrée (14) sont le sexe, la taille, le poids et d'autres éléments d'information physique de chaque individu, lesdits commutateurs (7,8) de modification de données modifient le sexe, l'âge, le poids et d'autres éléments d'information physique de chaque individu, le commutateur de démarrage de mesure (5A,5B) fait démarrer la mesure du pourcentage de graisse corporelle pour chaque individu, les capteurs comprennent un capteur d'impédance biologique comportant des électrodes destinées à être appliquées sur le corps de l'individu, la pluralité d'éléments d'information physique associés à chaque individu étant mémorisés dans le dispositif de mémoire (15) sont le sexe, la taille, le poids et d'autres éléments d'information physique de chaque individu, des indices de santé déterminés par l'unité arithmétique et de commande (17) sont un pourcentage de graisse corporelle, et le dispositif d'affichage fournit les éléments d'information physique et le pourcentage de graisse corporelle ainsi déterminé.

10. Dispositif de mesure selon la revendication 9, dans lequel il est en outre prévu un commutateur de sélection (9) pour sélectionner un élément désiré d'information pour une modification parmi les éléments sélectionnés des éléments mémorisés d'information physique.

11. Dispositif de mesure selon la revendication 9, dans lequel l'unité arithmétique et de commande (17) est sensible à un enfoncement du commutateur de démarrage de mesure (5A,5B) pour permettre au dispositif d'affichage de représenter l'élément enregistré d'information physique à des fins de modification dans le dispositif d'affichage avant ou pendant la mesure de l'information biologique.

12. Dispositif de mesure selon la revendication 11, dans lequel l'unité arithmétique et de commande (17) est apte à répondre à l'apparition de valeurs inhabituelles comme représentant l'impédance biologique de l'objet pour permettre au dispositif d'affichage de poursuivre la visualisation de l'élément enregistré d'information désirée de modification, pour répéter la détermination de l'impédance biologique de l'objet jusqu'à ce que l'impédance biologique ainsi déterminée de l'objet ait été réduite à une valeur normale, et pour obtenir le pourcentage de graisse corporelle à partir de la valeur normale de l'impédance biologique et des éléments sélectionnés d'information récupérés à partir de la mémoire, ce qui permet au dispositif d'affichage de présenter le pourcentage de graisse corporelle requis.

13. Dispositif de mesure selon la revendication 9, dans lequel un élément d'information physique devant être sélectionné pour la modification est le poids.

14. Dispositif de mesure selon la revendication 10, dans lequel l'élément d'information physique sélectionné pour la modification est l'un du poids et de la taille sélectionnés par le commutateur de sélection (9).

FIG.1

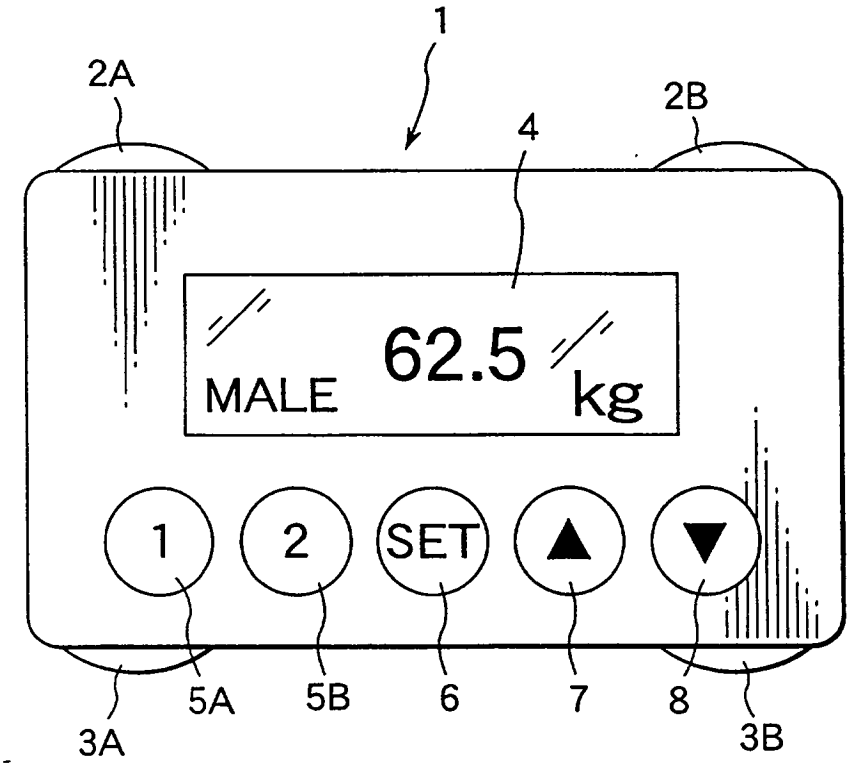


FIG.2

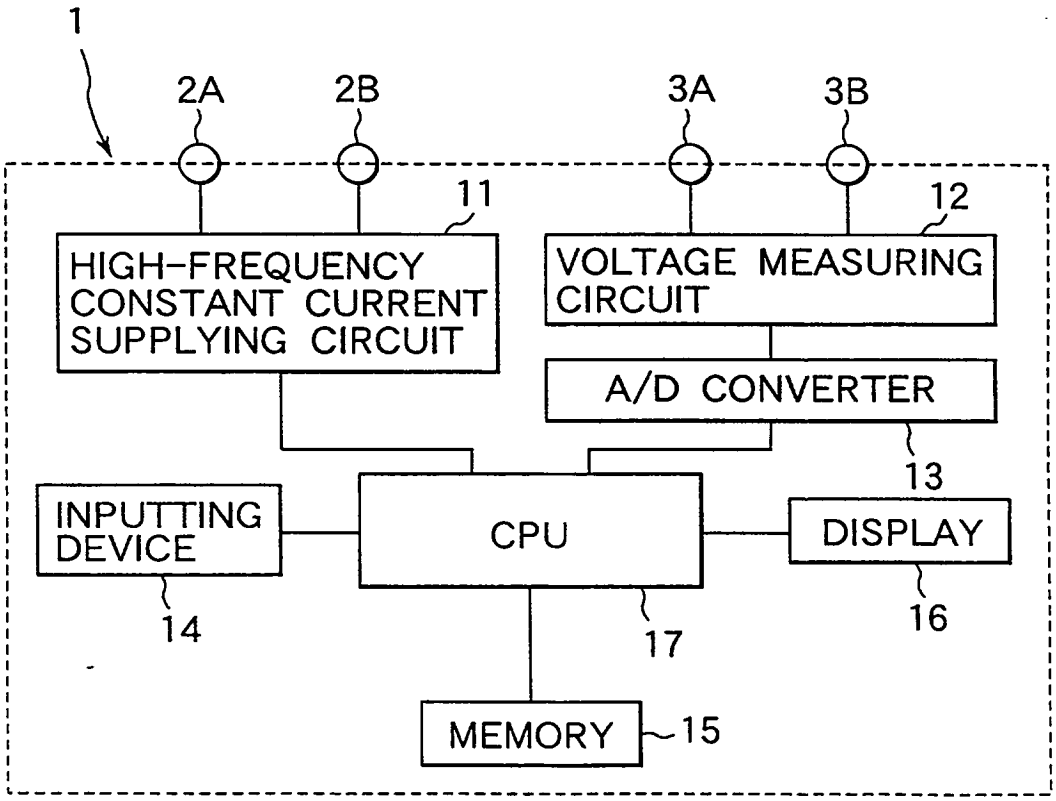

1
2A
2B
3A
3B
11
12
HIGH-FREQUENCY CONSTANT CURRENT SUPPLYING CIRCUIT
VOLTAGE MEASURING CIRCUIT
A/D CONVERTER
13
INPUTTING DEVICE
CPU
DISPLAY
14
17
16
MEMORY
15

FIG.3A

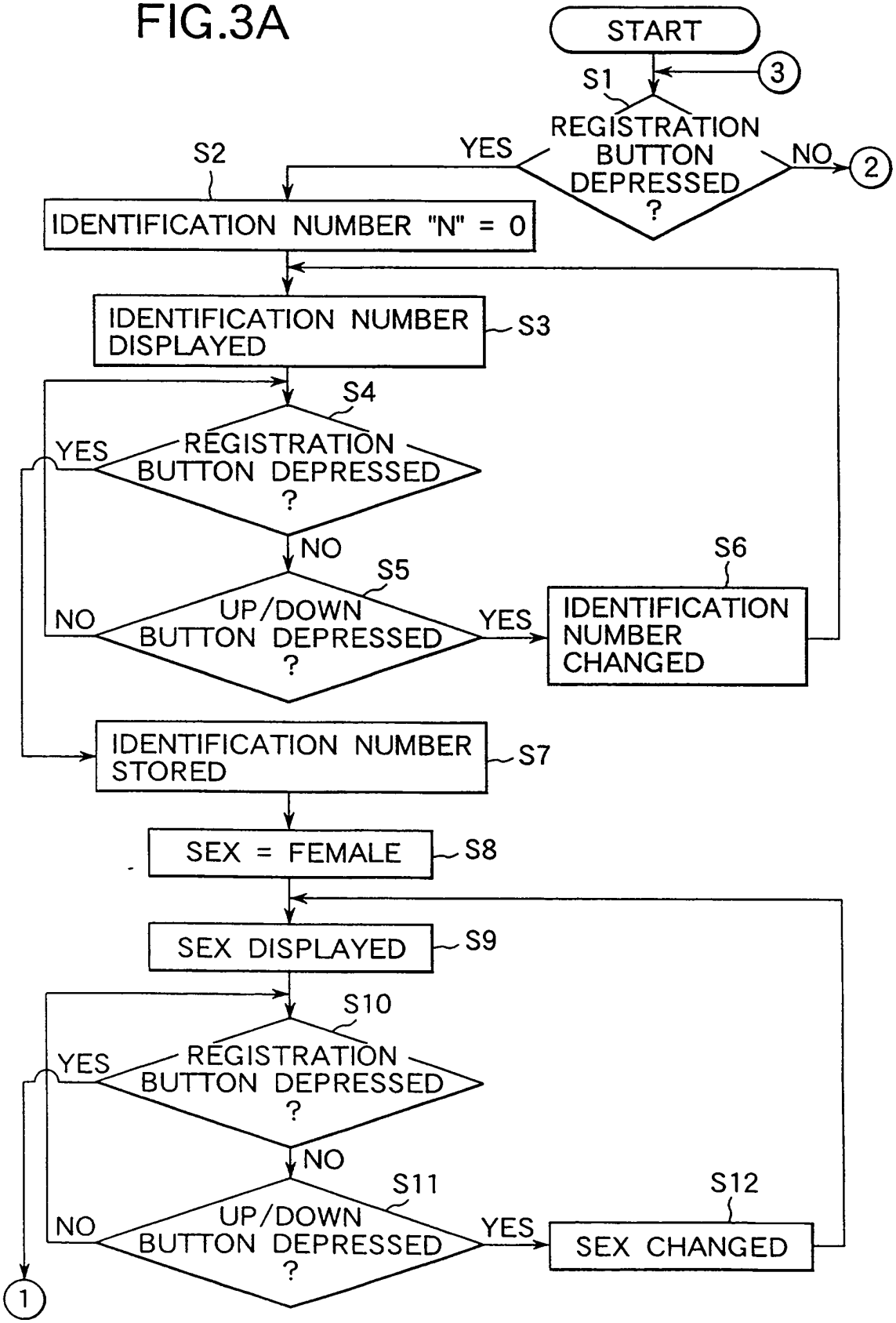

START
S1
REGISTRATION BUTTON DEPRESSED ?
YES
NO
2
3
S2
IDENTIFICATION NUMBER "N" = 0
IDENTIFICATION NUMBER DISPLAYED
S3
S4
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S5
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S6
IDENTIFICATION NUMBER CHANGED
IDENTIFICATION NUMBER STORED
S7
SEX = FEMALE
S8
SEX DISPLAYED
S9
S10
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S11
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S12
SEX CHANGED
1

FIG.3B

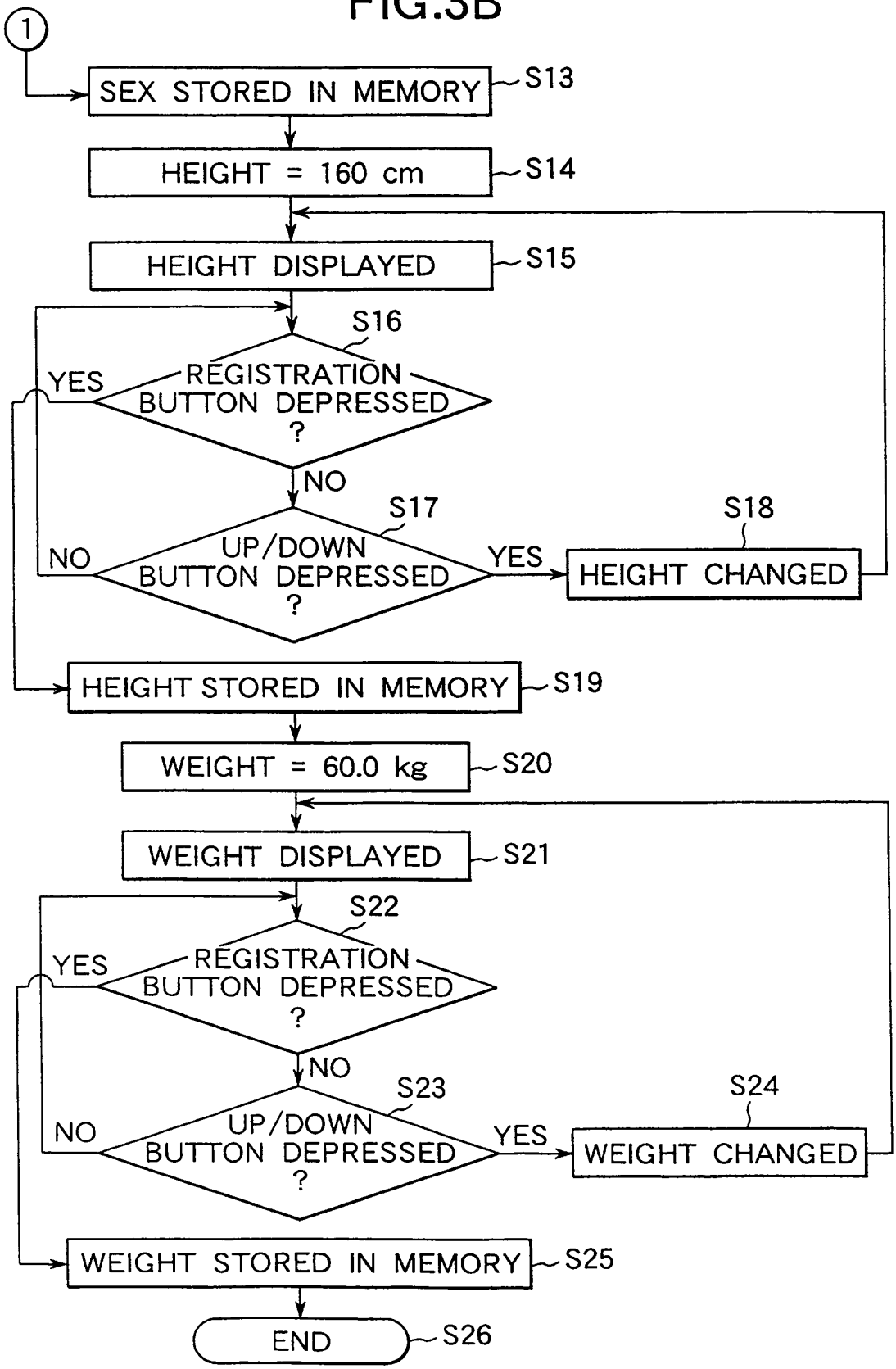

1
SEX STORED IN MEMORY
S13
HEIGHT = 160 cm
S14
HEIGHT DISPLAYED
S15
S16
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S17
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S18
HEIGHT CHANGED
HEIGHT STORED IN MEMORY
S19
WEIGHT = 60.0 kg
S20
WEIGHT DISPLAYED
S21
S22
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S23
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S24
WEIGHT CHANGED
WEIGHT STORED IN MEMORY
S25
END
S26

FIG.3C

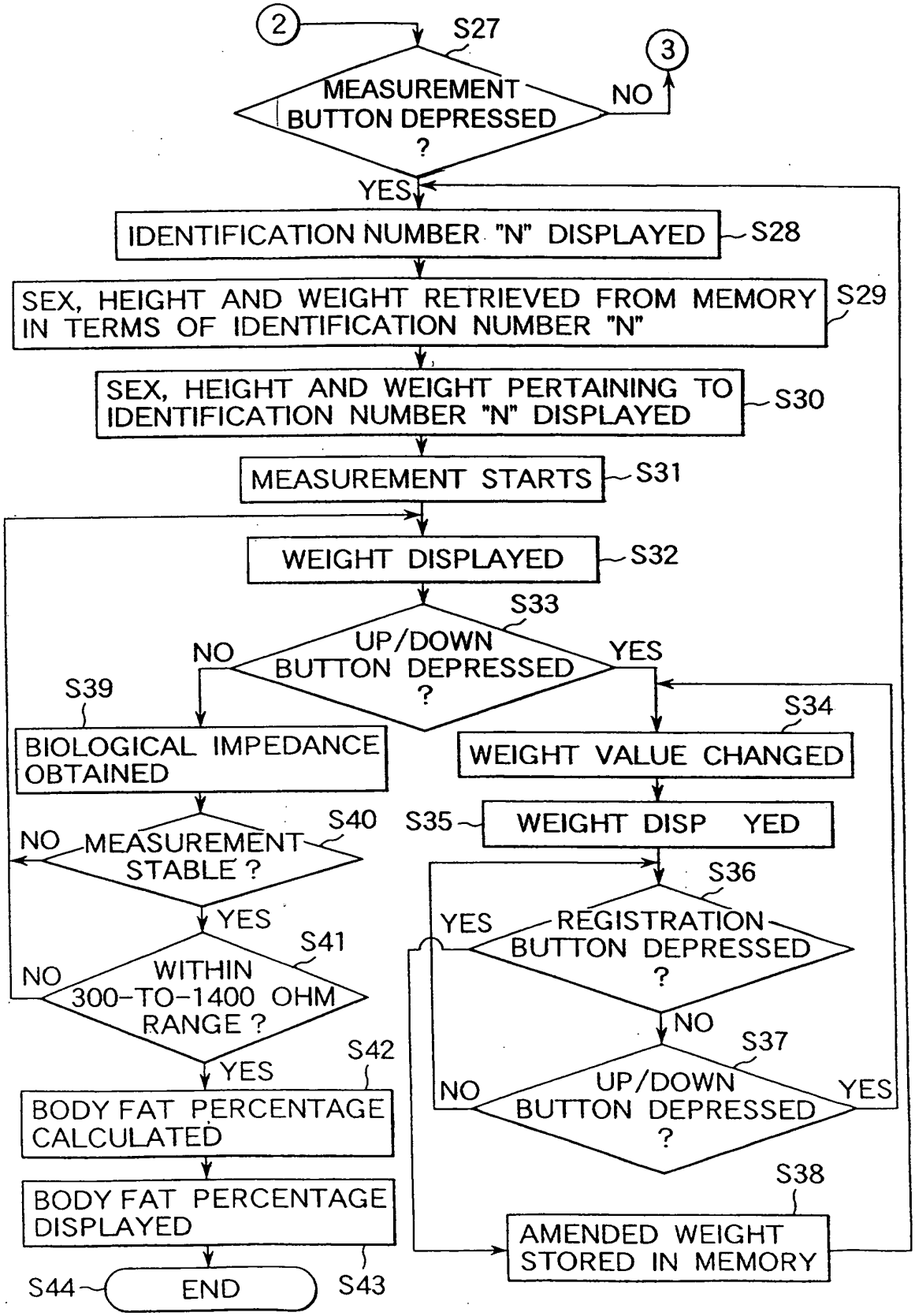

2
S27
MEASUREMENT BUTTON DEPRESSED ?
NO
3
YES
IDENTIFICATION NUMBER "N" DISPLAYED
S28
SEX, HEIGHT AND WEIGHT RETRIEVED FROM MEMORY IN TERMS OF IDENTIFICATION NUMBER "N"
S29
SEX, HEIGHT AND WEIGHT PERTAINING TO IDENTIFICATION NUMBER "N" DISPLAYED
S30
MEASUREMENT STARTS
S31
WEIGHT DISPLAYED
S32
S33
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S39
BIOLOGICAL IMPEDANCE OBTAINED
S34
WEIGHT VALUE CHANGED
S35
WEIGHT DISP YED
S40
NO
MEASUREMENT STABLE ?
YES
S41
NO
WITHIN 300-TO-1400 OHM RANGE ?
YES
S42
BODY FAT PERCENTAGE CALCULATED
BODY FAT PERCENTAGE DISPLAYED
S44
END
S43
S36
YES
REGISTRATION BUTTON DEPRESSED ?
NO
S37
NO
UP/DOWN BUTTON DEPRESSED ?
YES
S38
AMENDED WEIGHT STORED IN MEMORY

FIG.4

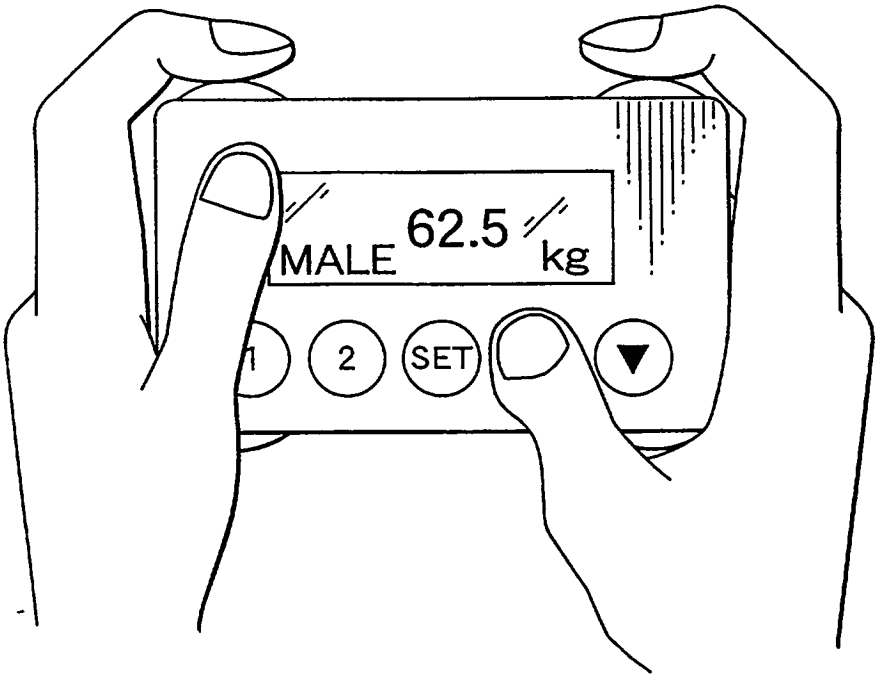


FIG.5

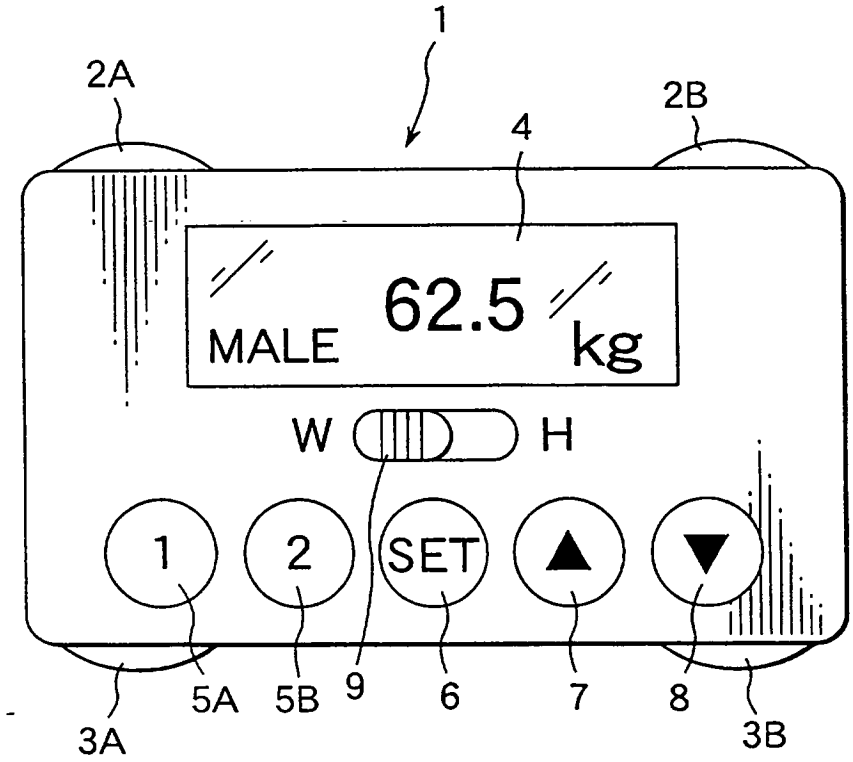


FIG.6

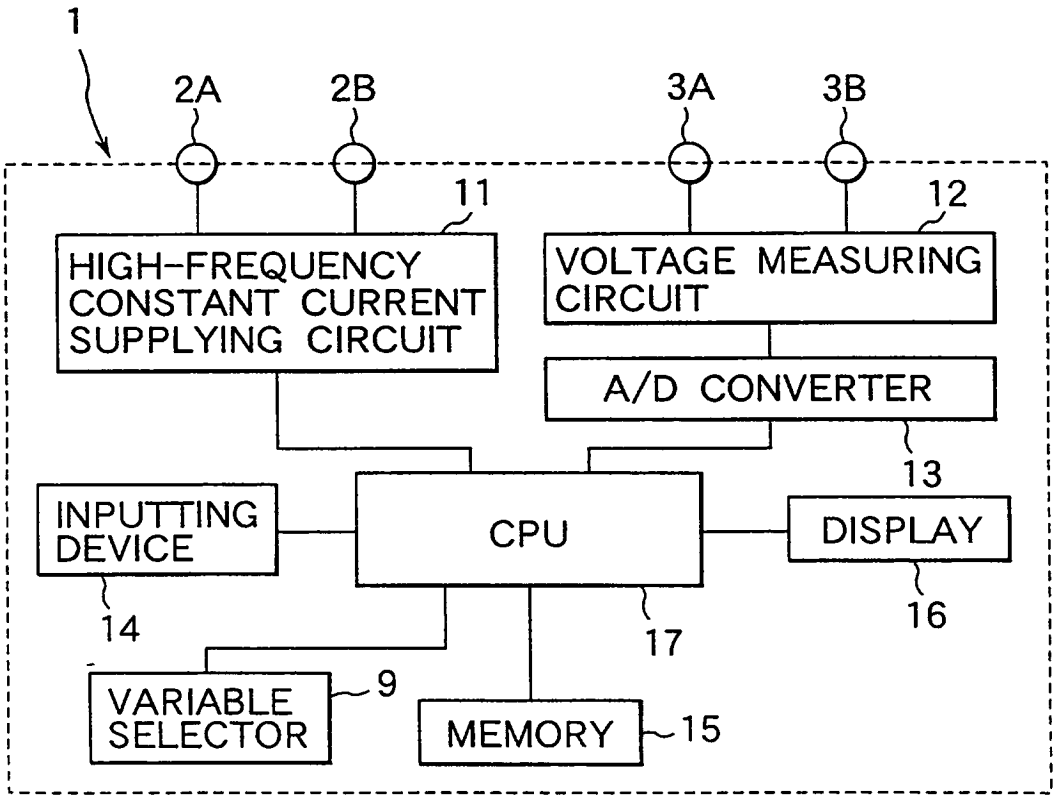

1
2A
2B
3A
3B
11
12
HIGH-FREQUENCY CONSTANT CURRENT SUPPLYING CIRCUIT
VOLTAGE MEASURING CIRCUIT
A/D CONVERTER
13
INPUTTING DEVICE
CPU
DISPLAY
14
17
16
VARIABLE SELECTOR
9
MEMORY
15

FIG.7A

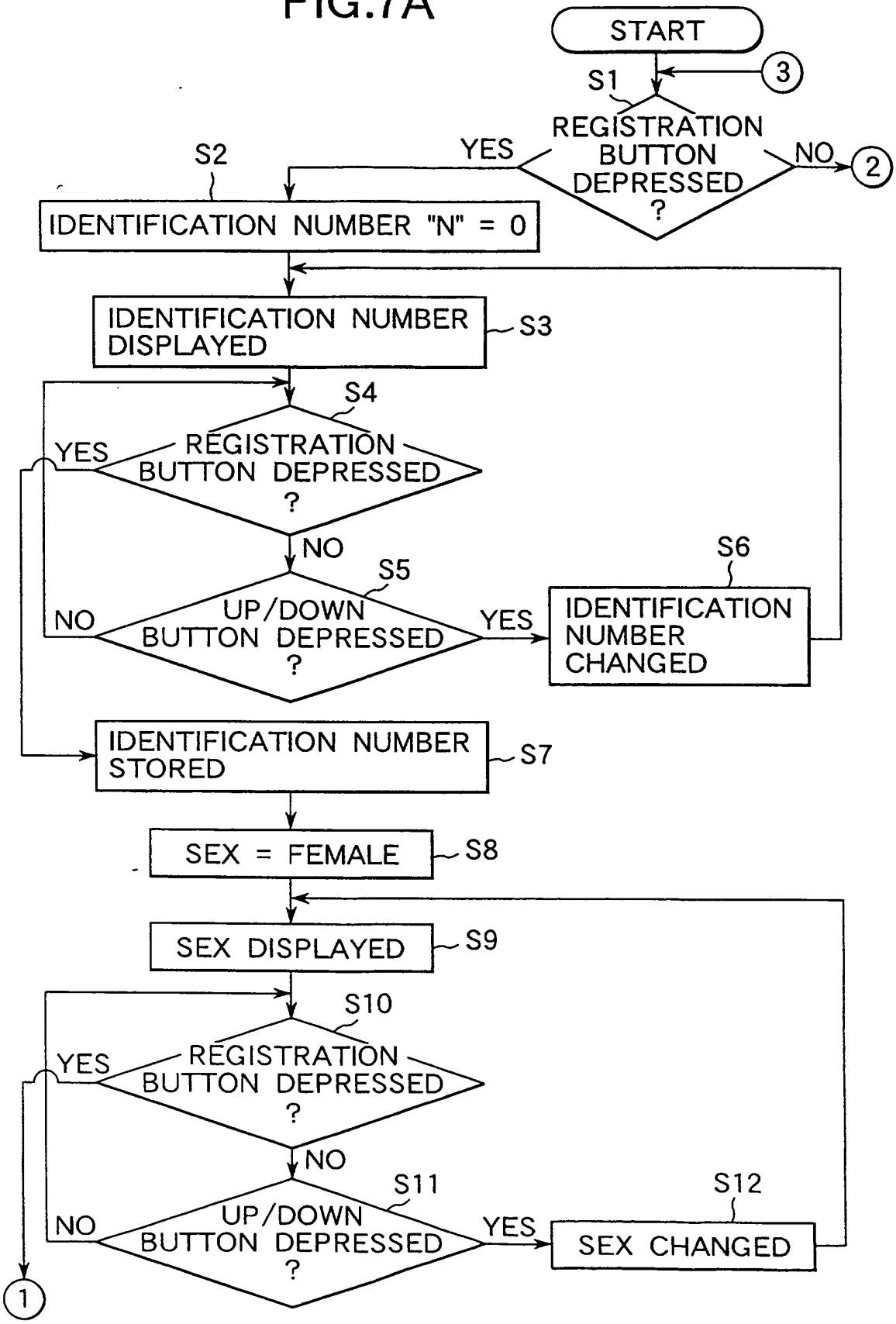

START
S1
REGISTRATION BUTTON DEPRESSED ?
YES
NO
2
3
S2
IDENTIFICATION NUMBER "N" = 0
IDENTIFICATION NUMBER DISPLAYED
S3
S4
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S5
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S6
IDENTIFICATION NUMBER CHANGED
IDENTIFICATION NUMBER STORED
S7
SEX = FEMALE
S8
SEX DISPLAYED
S9
S10
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S11
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S12
SEX CHANGED
1

FIG.7B

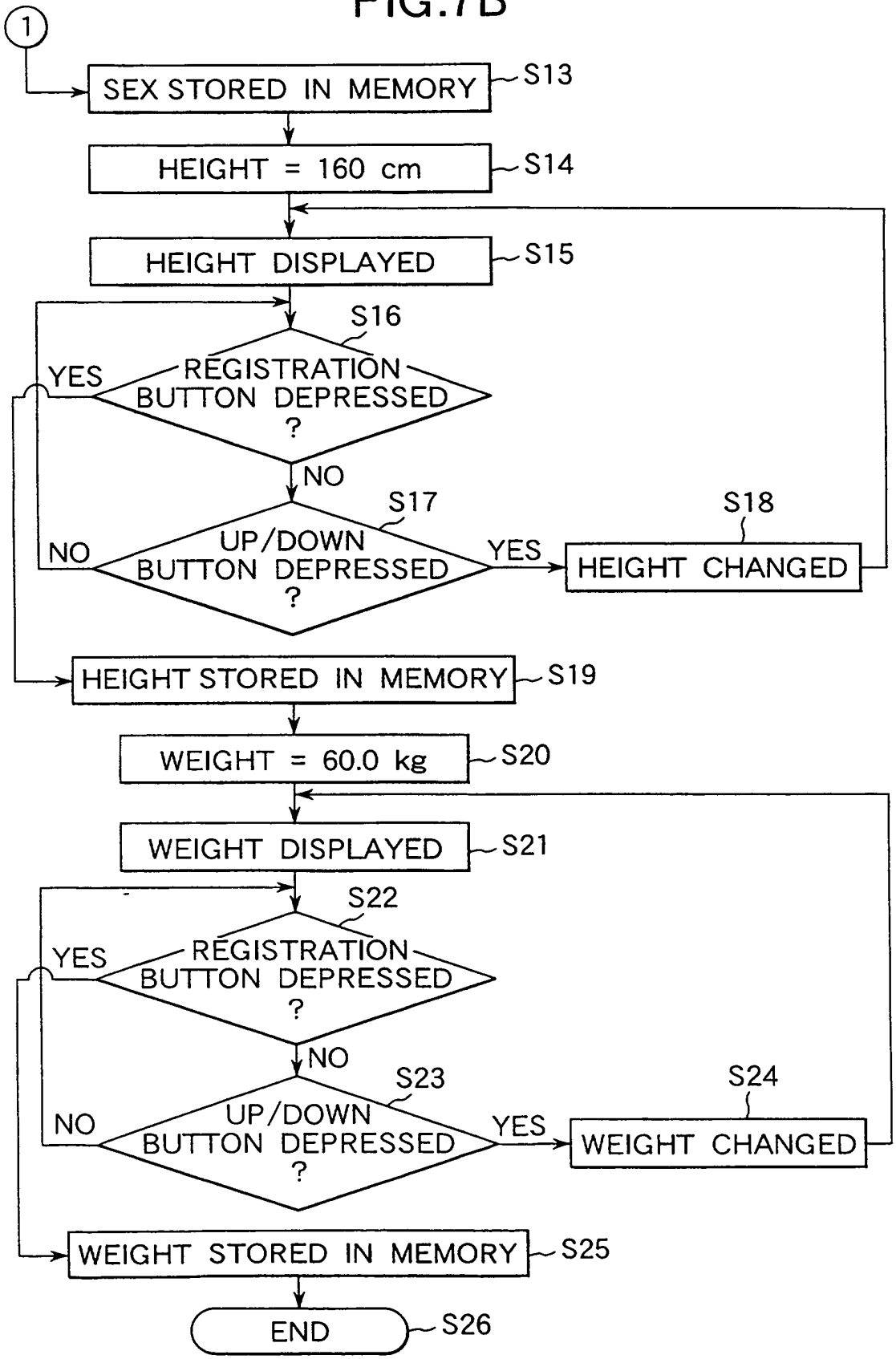

1
SEX STORED IN MEMORY
S13
HEIGHT = 160 cm
S14
HEIGHT DISPLAYED
S15
S16
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S17
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S18
HEIGHT CHANGED
HEIGHT STORED IN MEMORY
S19
WEIGHT = 60.0 kg
S20
WEIGHT DISPLAYED
S21
S22
REGISTRATION BUTTON DEPRESSED ?
YES
NO
S23
UP/DOWN BUTTON DEPRESSED ?
NO
YES
S24
WEIGHT CHANGED
WEIGHT STORED IN MEMORY
S25
END
S26

FIG.7C

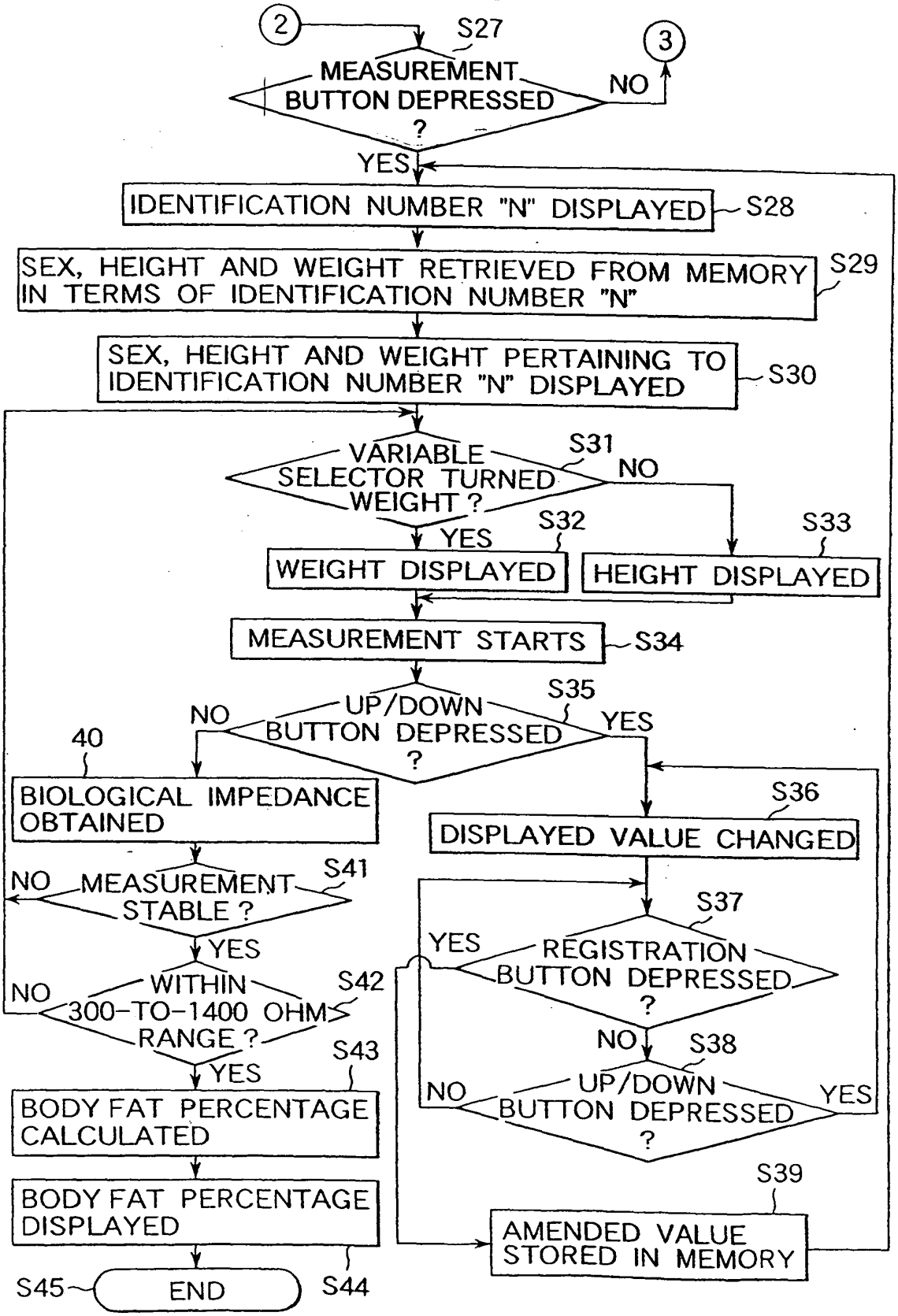

2
S27
MEASUREMENT BUTTON DEPRESSED ?
NO
3
YES
IDENTIFICATION NUMBER "N" DISPLAYED
S28
SEX, HEIGHT AND WEIGHT RETRIEVED FROM MEMORY IN TERMS OF IDENTIFICATION NUMBER "N"
S29
SEX, HEIGHT AND WEIGHT PERTAINING TO IDENTIFICATION NUMBER "N" DISPLAYED
S30
VARIABLE SELECTOR TURNED WEIGHT ?
S31
NO
YES
S32
WEIGHT DISPLAYED
S33
HEIGHT DISPLAYED
MEASUREMENT STARTS
S34
UP/DOWN BUTTON DEPRESSED ?
S35
NO
YES
40
BIOLOGICAL IMPEDANCE OBTAINED
S36
DISPLAYED VALUE CHANGED
NO
MEASUREMENT STABLE ?
S41
YES
S37
YES
REGISTRATION BUTTON DEPRESSED ?
NO
WITHIN 300-TO-1400 OHM RANGE ?
S42
NO
YES
S43
S38
NO
UP/DOWN BUTTON DEPRESSED ?
YES
BODY FAT PERCENTAGE CALCULATED
S39
AMENDED VALUE STORED IN MEMORY
BODY FAT PERCENTAGE DISPLAYED
S45
END
S44

FIG.8A

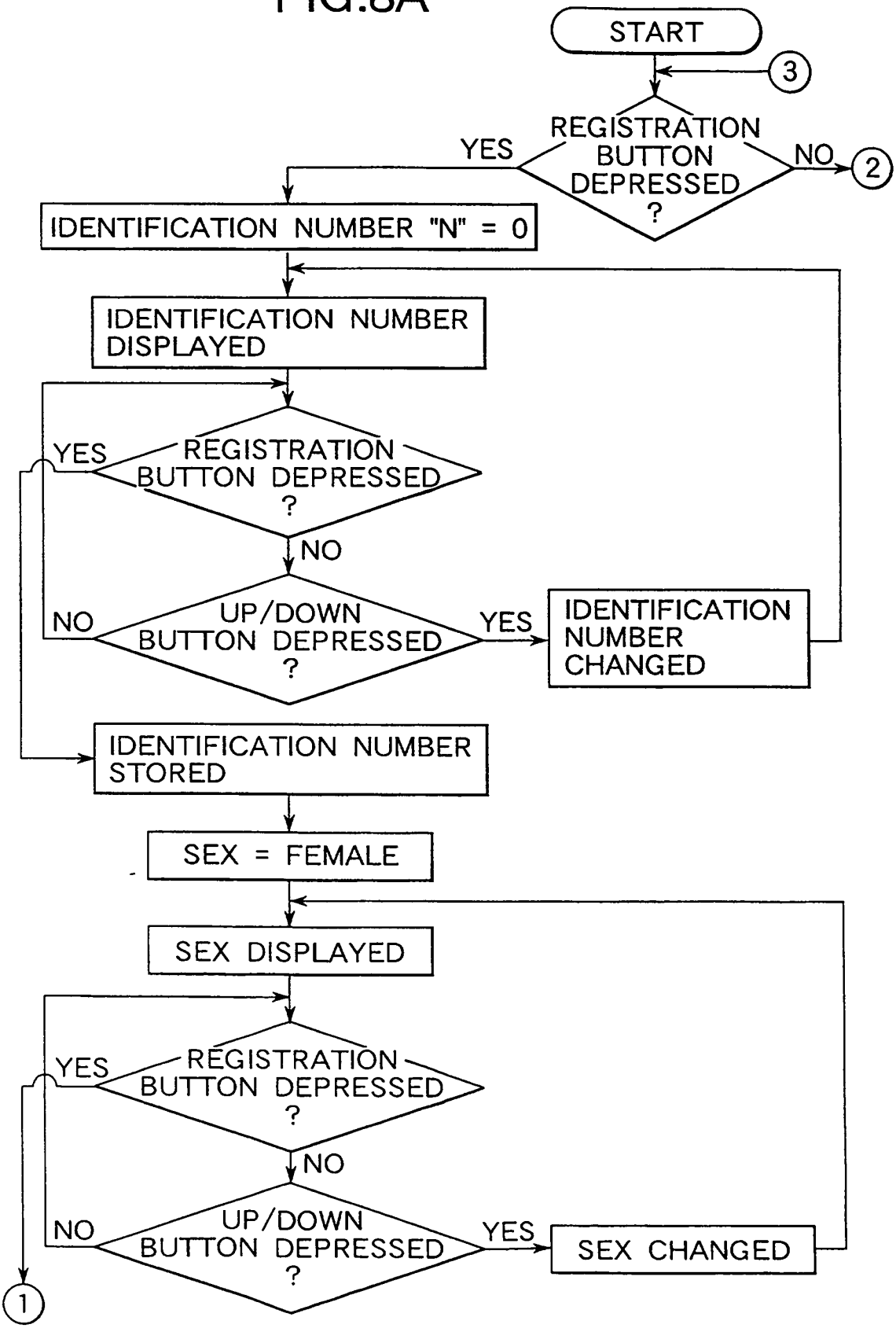

START
3
REGISTRATION BUTTON DEPRESSED ?
YES
NO
2
IDENTIFICATION NUMBER "N" = 0
IDENTIFICATION NUMBER DISPLAYED
YES
REGISTRATION BUTTON DEPRESSED ?
NO
NO
UP/DOWN BUTTON DEPRESSED ?
YES
IDENTIFICATION NUMBER CHANGED
IDENTIFICATION NUMBER STORED
SEX = FEMALE
SEX DISPLAYED
YES
REGISTRATION BUTTON DEPRESSED ?
NO
NO
UP/DOWN BUTTON DEPRESSED ?
YES
SEX CHANGED
1

FIG.8B

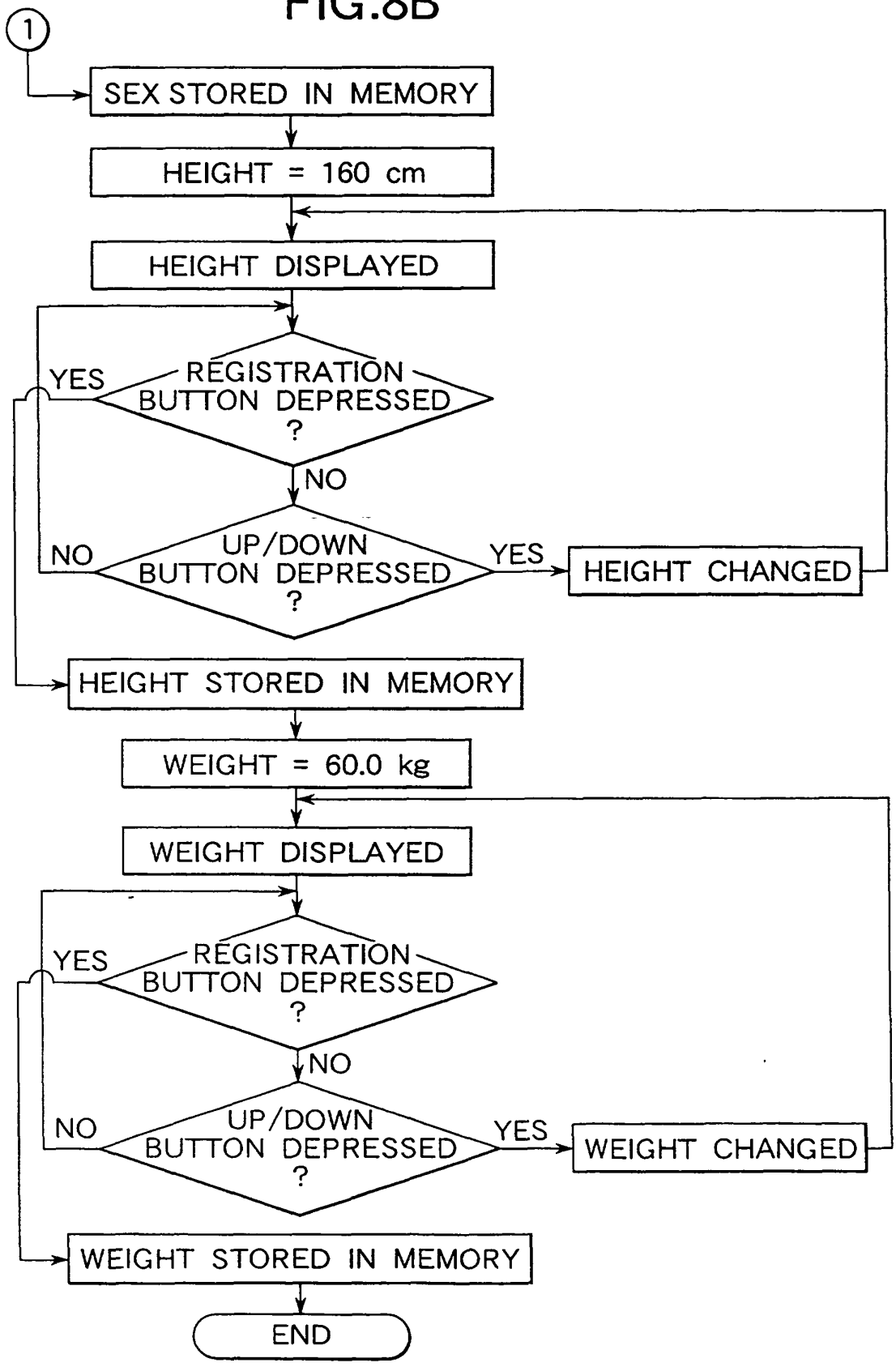
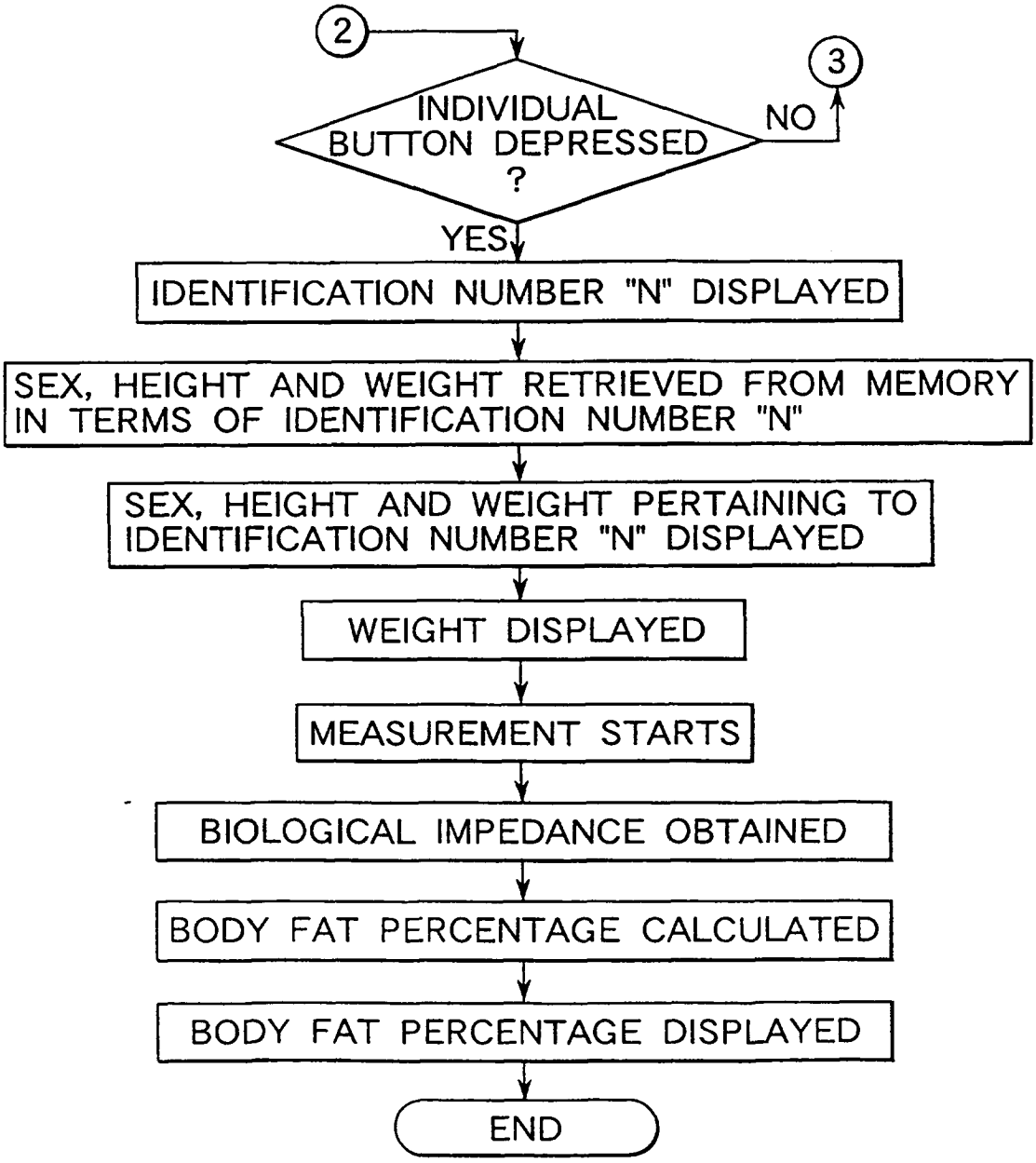

1
SEX STORED IN MEMORY
HEIGHT = 160 cm
HEIGHT DISPLAYED
YES
REGISTRATION BUTTON DEPRESSED ?
NO
NO
UP/DOWN BUTTON DEPRESSED ?
YES
HEIGHT CHANGED
HEIGHT STORED IN MEMORY
WEIGHT = 60.0 kg
WEIGHT DISPLAYED
YES
REGISTRATION BUTTON DEPRESSED ?
NO
NO
UP/DOWN BUTTON DEPRESSED ?
YES
WEIGHT CHANGED
WEIGHT STORED IN MEMORY
END

FIG.8C


2
INDIVIDUAL BUTTON DEPRESSED ?
NO
3
YES
IDENTIFICATION NUMBER "N" DISPLAYED
SEX, HEIGHT AND WEIGHT RETRIEVED FROM MEMORY IN TERMS OF IDENTIFICATION NUMBER "N"
SEX, HEIGHT AND WEIGHT PERTAINING TO IDENTIFICATION NUMBER "N" DISPLAYED
WEIGHT DISPLAYED
MEASUREMENT STARTS
BIOLOGICAL IMPEDANCE OBTAINED
BODY FAT PERCENTAGE CALCULATED
BODY FAT PERCENTAGE DISPLAYED
END

专利名称(译)	体脂测量装置的输入单元		
公开(公告)号	EP1086650B1	公开(公告)日	2006-06-21
申请号	EP2000120678	申请日	2000-09-21
[标]申请(专利权)人(译)	株式会社百利达		
申请(专利权)人(译)	TANITA CORPORATION		
当前申请(专利权)人(译)	TANITA CORPORATION		
发明人	OGUMA, KOJI, TANITA CORPORATION		
IPC分类号	A61B5/053 A61B5/05 A61B5/00		
CPC分类号	A61B5/4869 A61B5/0537		
优先权	2000208882 2000-07-10 JP 1999268229 1999-09-22 JP		
其他公开文献	EP1086650A1		
外部链接	Espacenet		

摘要(译)

本发明公开了一种测量装置的改进，包括：输入装置，包括用于输入和记录多条信息的输入和设定开关，用于改变多条信息中所选择的一条或多条信息的数据修改开关。测量启动开关，用于开始测量物体的某个特征;用于测量物体的某些特性的测量装置;存储装置，用于存储由输入装置输入的多条信息;算术和控制单元（ACU），用于根据物体的特定特征和多条信息确定所需的标记;和显示器，用于显示多条信息和如此确定的标记。算术和控制单元响应于在按下测量启动开关之后按下数据修改开关，以使测量装置处于其输入状态，从而允许改变多条信息中的所选信息。允许更新存储在存储器中的变量中经常变化的变量，而不必重复输入和记录其他数据。这种独特的更新显着改善了这种测量装置的可操作性。

FIG.1