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(54) **HEALTH BOOTH**

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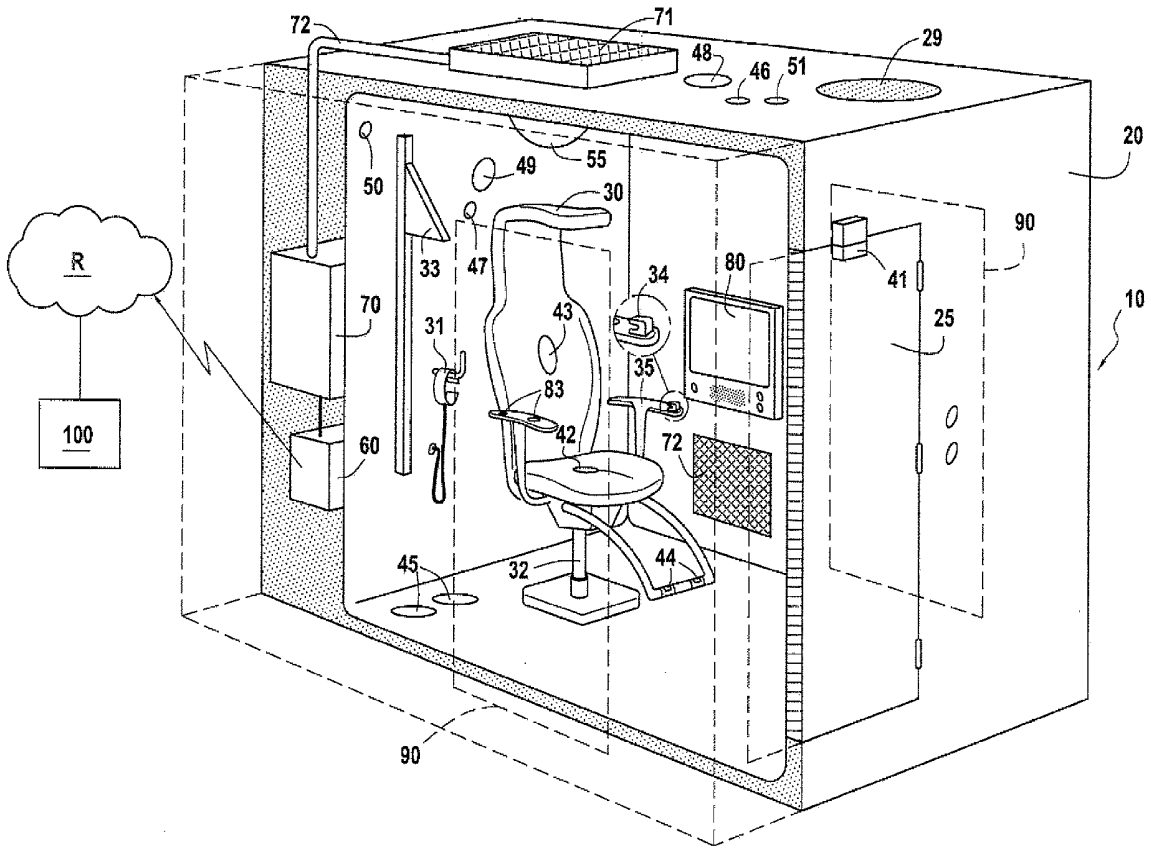
(57) **ABSTRACT**

A health booth (**10**) includes a shell (**20**), at least one chair (**30**), and at least one measurement arrangement (**31**, **32**, **33**, **34**) for measuring data relative to the health of a user. The booth includes: a determination apparatus (**41-50**) for determining, at the time of taking a measurement, at least one condition under which said measurement is taken; and a storage device for storing the measurement results in a data structure together with said condition.



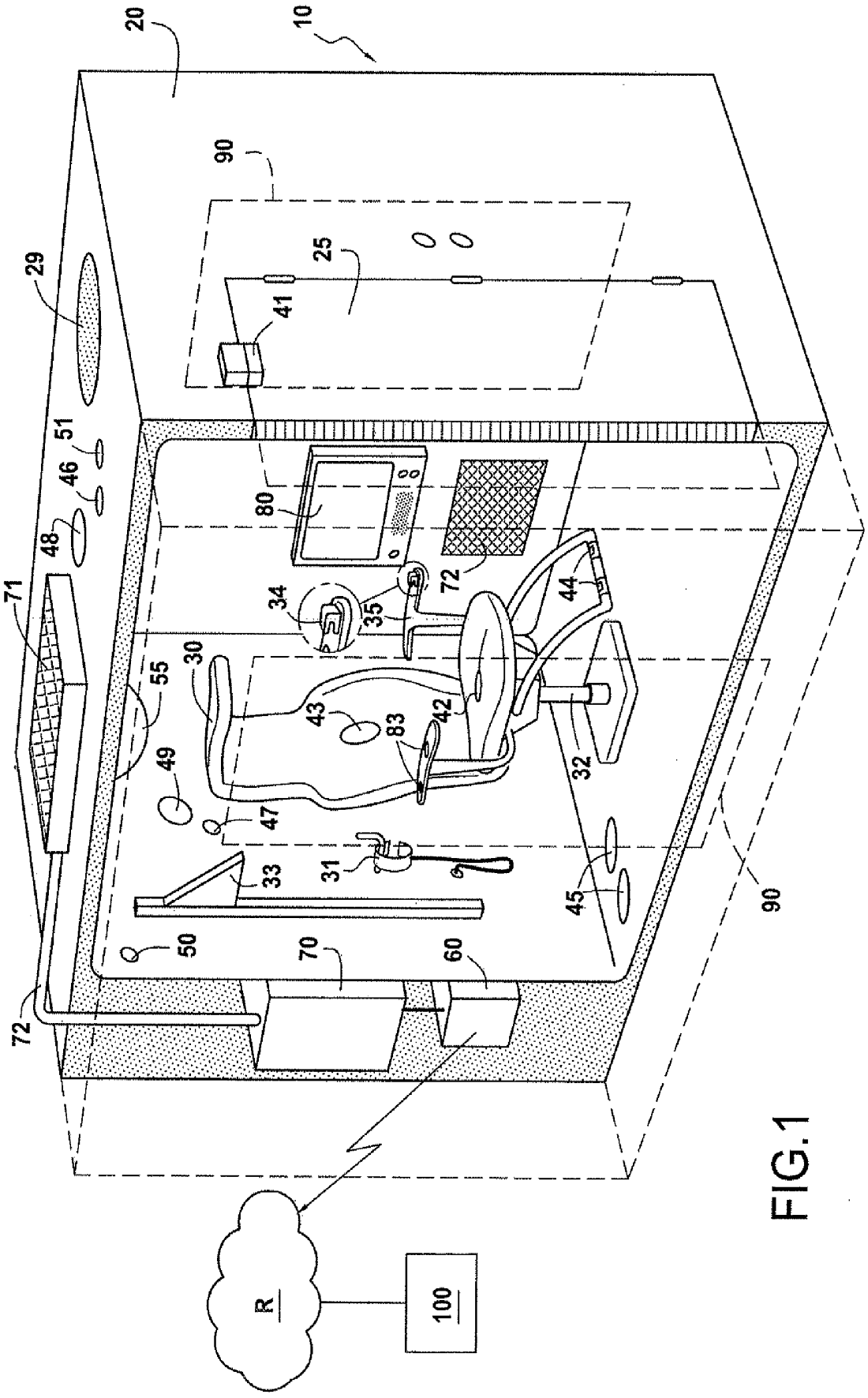

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FIG.1

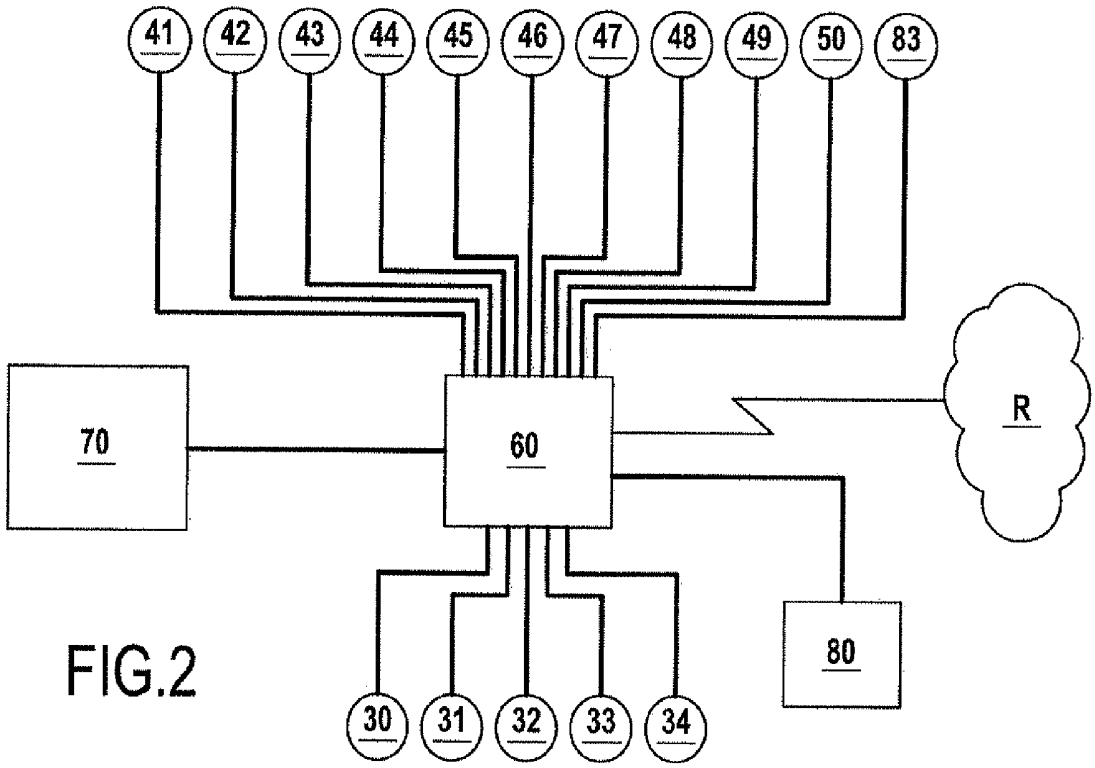
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FIG.2

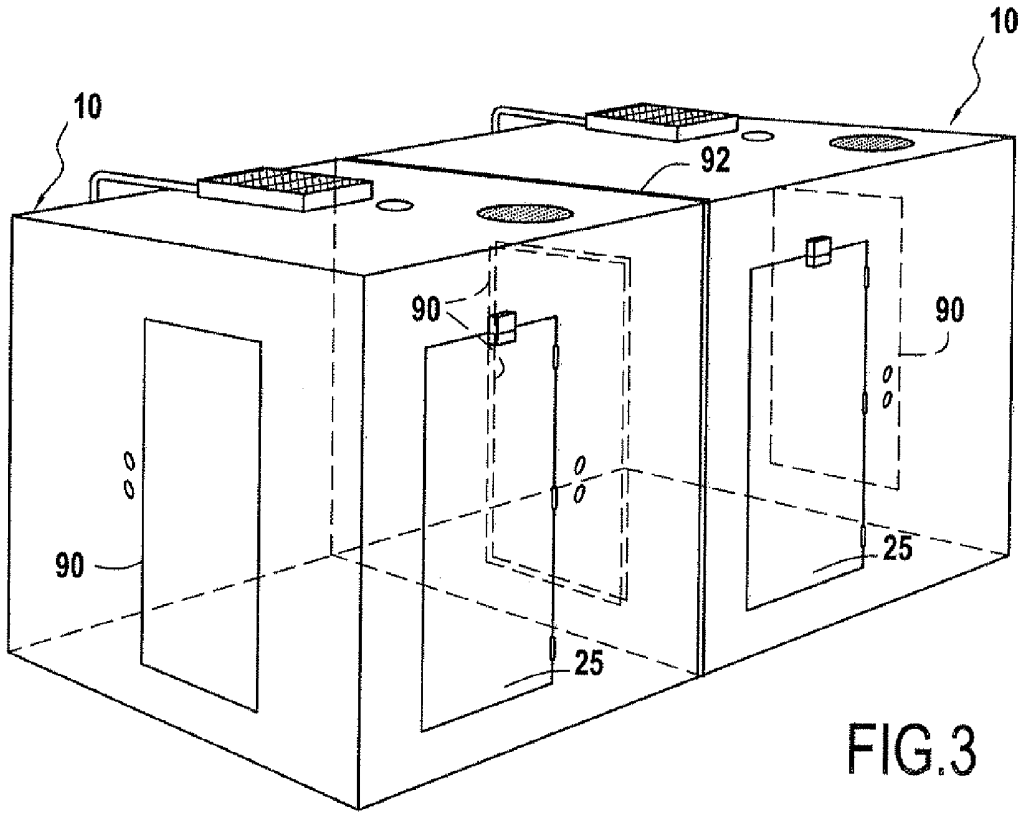
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FIG.3

HEALTH BOOTH

BACKGROUND OF THE INVENTION

[0001] The invention relates to a health booth for obtaining measurements establishing the health of a user or of a population.

[0002] Establishing a person's health requires a number of measurements (weight, heart rate, temperature, etc.) to be taken under the supervision of medical personnel.

[0003] These measurements must sometimes be repeated at regular intervals to track how they change over time.

[0004] The obligatory presence of health personnel causes a number of problems.

[0005] First of all, it is clear that in developing countries, where the density of health personnel is low, it is difficult to conduct a health campaign, especially in an emergency, where there is an epidemiological risk present.

[0006] In other regions, the main impediment to health screening individually or collectively on a large scale is the relatively high cost of the presence of the above-mentioned health personnel.

[0007] To limit the above-mentioned problems, there are known, in particular from the document U.S. Pat. No. 5,554,649, "telemedicine" methods in which patients communicate with a doctor or other health personnel remotely, via a telecommunications network, the patients themselves effecting a number of measurements that are sent to the doctor via the network.

[0008] It should be noted that those solutions are not really satisfactory since they require the presence of health personnel when the measurements are taken, even though at a remote location.

[0009] One solution that springs naturally to mind would be to have patients take the measurements themselves, for example at home, with no contact with medical personnel, and then send the measurements to a remote center for subsequent processing.

[0010] However, it is difficult to envisage such a procedure since it is known that medical measurements are strongly linked to the conditions under which they are taken, in particular the patient's stress or fatigue and the meteorological, sound, and light environment at the time of taking the measurements.

[0011] In other words, if this information is not known, the measurements cannot be used by a doctor with sufficient reliability.

OBJECT AND SUMMARY OF THE INVENTION

[0012] The present invention mainly aims to solve the above drawbacks.

[0013] To this end, the invention relates to a health booth including a shell, at least one chair, and at least one measurement means for measuring data relative to the health of a user. This booth includes:

[0014] determination means for determining, at the time of taking a measurement, at least one condition under which the measurement is taken; and

[0015] storage means for storing the measurement results in a data structure together with said condition.

[0016] In the context of the invention, the expression "health booth" must be interpreted broadly, and designates any space defined by a shell in which users can themselves make a number of measurements relating to their health without the presence of medical personnel being necessary, even at a remote location.

[0017] A health booth in the sense of the invention can be transportable, for example, so that it can be installed temporarily at a given location. Health booths in the context of the invention can in particular consist of mobile homes or vehicles of the type used for collecting blood from donors.

[0018] A health booth in the context of the invention can also consist of a fixed structure intended to be installed in places through which people pass, for example airports or hotels.

[0019] The difference between the health booths of the invention and the previously-known installations lies in the fact that the environmental conditions, at the time of taking a measurement, are stored in a data structure together with the measurement results.

[0020] Thus, when health personnel is informed of the measurement results, said personnel is fully aware of the conditions under which said measurements were taken, thus making said data fully useable.

[0021] In an embodiment of the invention, said determination means are suitable for measuring at least one data item from among the following:

[0022] a position of the user;

[0023] the temperature inside and/or outside the shell;

[0024] a sound level inside and/or outside the shell;

[0025] a humidity content inside and/or outside the shell; and

[0026] a brightness level inside and/or outside the shell.

[0027] Indeed, it is known that the following data items are necessary for good interpretation of at least one medical measurement.

[0028] In particular, the position of the user greatly influences the measured blood pressure. It is recommended that blood pressure is measured in a seated position, the arm resting on a table and the inflatable cuff positioned on that arm at the same level as the heart.

[0029] It is also known that the measured blood pressure is greatly influenced by events liable to increase it, in particular cold, noise, and physical effort.

[0030] It is also known that environmental stress and hyperthermia greatly influence the heart rate.

[0031] It is also known that the blood oxygen saturation level is greatly influenced by the ambient light level and by the relative humidity to which the skin is exposed.

[0032] Generally speaking, the means for measuring the above data can consist of appropriate sensors combined with calculation means.

[0033] For example, to be sure that a user is seated comfortably when taking blood pressure, it can be envisaged to use pressure sensors placed on the seat and on the backrest of the chair in the health booth.

[0034] To be sure that the user's arm is resting in an appropriate position, sensors can be placed on an armrest of the chair in the health booth.

[0035] A thermometer, a microphone, a hygrometer, and a photo-electric cell can be used to measure the temperature, sound level, relative humidity and brightness inside or outside the shell.

[0036] In a preferred embodiment, the health booth includes means for verifying that health measurements are taken when a given condition satisfies at least one predetermined criterion.

[0037] This feature means that health measurements can be effected under optimum conditions.

[0038] For example, it can be decided not to measure blood pressure until the patient has been seated for at least five minutes.

[0039] In one embodiment of the invention, these control means are optional because it can be important, especially after a natural disaster, to take large numbers of health measurements, in order to implement emergency measures, even though the measurement conditions are below optimum.

[0040] In other embodiments, the control means can be used systematically.

[0041] In a preferred embodiment, the shell of the health booth of the invention includes at least one opening for linking the health booth to at least one other health booth.

[0042] This forms a "hospital" consisting of interconnected health booths.

[0043] This feature proves particularly advantageous for guaranteeing certain predetermined conditions in a number of health booths installed in the same area.

[0044] For example, in a particularly hot region, it is easier to reduce the temperature in a number of health booths that communicate with each other than in the same number of individual health booths.

[0045] The health booth according to the invention includes means for sending the data structure to a remote center.

[0046] Advantageously, this feature makes it easier to collect the data structures as recorded in a plurality of health booths or in a hospital within the meaning of the invention.

[0047] In a particular embodiment, the health booth of the invention includes power supply means.

[0048] These power supply means can use solar energy, for example, or open and/or closed thermodynamic cycles. They are used to supply the health booth with electricity and to regulate the temperature inside the health booth.

[0049] For more details of such power supply means, the person skilled in the art can refer to the patent documents FR 2 462 584 and FR 2 588 645.

BRIEF DESCRIPTION OF THE DRAWINGS

[0050] Other features and advantages of the present invention emerge from the following description with reference to the drawings, which show a non-limiting embodiment of the invention, and from appendix **1**. In the figures:

[0051] FIG. **1** represents a health booth conforming to one particular embodiment of the invention;

[0052] FIG. **2** shows the connections of a computer used in the FIG. **1** health booth;

[0053] FIG. **3** shows a number of health booths of the invention interconnected to form a hospital; and

[0054] Appendix 1 gives one example of a data structure generated by the FIG. **1** health booth.

DETAILED DESCRIPTION OF ONE EMBODIMENT

[0055] FIG. **1** represents a health booth **10** conforming to one particular embodiment of the invention.

[0056] The main components of the health booth **10** are a shell **20** and a chair **30**.

[0057] In a different embodiment of the invention, the health booth **10** can contain a number of chairs **30**. The health booth **10** includes a number of means for measuring data related to a user's health.

[0058] In the embodiment described here, these measuring means comprise:

- **[0059]** an inflatable cuff **31** placed on the user's arm to measure their blood pressure, this cuff further including heart rate sensors, not shown;
- **[0060]** scales **32** for measuring the user's weight when seated on the chair **30**;
- **[0061]** a height gauge **33** for measuring the user's height in a standing position; and
- **[0062]** an oximeter **34** for measuring the user's blood oxygen saturation level.

[0063] In the embodiment described here, the oximeter **34** is fixed to the end of one armrest **35** of the chair **30**.

[0064] According to the invention, the health booth **10** includes a number of sensors for determining the conditions under which the health measurements are taken.

[0065] In the embodiment described here, these sensors comprise:

- **[0066]** a sensor **41** for determining whether the door **25** of the health booth is open or closed;
- **[0067]** a pressure sensor **42** on the seat of the chair **30** for detecting whether the user is seated on the chair;
- **[0068]** a pressure sensor **43** in the back rest of the chair **30** for determining whether the user is sitting back in the chair **30**;
- **[0069]** two sensors **44** on a footrest attached to the chair **30** for detecting whether the user has both feet resting on the footrest;
- **[0070]** two sensors **45** disposed under the height gauge **33** to determine whether the user is correctly placed when measuring their height with the height gauge **33** or measuring their blood pressure in the standing position using the inflatable cuff **31**;
- **[0071]** a thermometer **46** for measuring the temperature outside the shell **20**;
- **[0072]** a thermometer **47** for measuring the temperature inside the shell **20**;
- **[0073]** a hygrometer **48** for measuring the relative humidity outside the shell **20**;
- **[0074]** a hygrometer **53** for measuring the relative humidity inside the shell **20**;
- **[0075]** a microphone **50** for measuring the sound level inside the health booth **10**; and
- **[0076]** a photo-electric cell **54** for measuring the brightness level outside the shell **20**.

[0077] In the embodiment described here, the health booth **10** includes a lamp **55** for producing a predetermined brightness inside the health booth **10** so that the brightness inside the shell **20** is the optimum for taking health measurements with the door **25** closed.

[0078] In accordance with the invention, when a health measurement is taken, the conditions under which it was taken are stored in a data structure together with the measurement results.

[0079] In the example described here, this data structure is a computer file.

[0080] The health booth **10** includes a computer **60** to which each of the sensors and measuring instruments referred to above is connected, as shown in FIG. **2**.

[0081] This computer **60** is adapted to generate a file as shown in Appendix 1 and to send that file to a remote center **100** via a telecommunications network R.

[0082] In the example described here, the computer **100** is installed within the thickness of the shell **20**.

[0083] In the particular embodiment described here, the computer **60** and all the electrical equipment of the health booth **10** are supplied with power by a motor **20** placed within the thickness of the shell **20** and connected to a solar panel **71**.

[0084] The solar panel **71** heats a fluid injected into the motor **70** via a pipe **72**, the motor using this heat energy to generate the electrical power supply necessary for the electric instruments of the health booth **10** to operate and to effect cooling by compressing another fluid.

[0085] The motor **70** is therefore adapted in particular to regulate the temperature inside the health booth **20** by injecting warm air into it via a grille **72**.

[0086] The health booth **10** described here also includes a ventilation grille **29** and a touch-sensitive screen **80** for interaction with the user.

[0087] There is described below a scenario for use of the health booth **10** to establish a health file for a user in the form shown in Appendix 1.

[0088] The user enters the health booth **10** via the door **25**, leaving the door open behind them, which is detected by the sensor **41**.

[0089] The touch-sensitive screen **80** shows a message prompting the user to enter their age. In this embodiment the health measurements cannot begin until this data item is entered. The age is then stored in the Appendix 1 file.

[0090] Once the age of the user has been entered, a message on the touch-sensitive screen prompts the user to measure their height using the height gauge **33**.

[0091] Until the user places their feet correctly on the marks aligned with the sensors **45**, a message prompts them to assume a new position.

[0092] The height is then stored in the Appendix 1 file.

[0093] Once their height has been measured, the user is prompted to remain standing on the above-mentioned marks to measure their blood pressure in the standing position. Sensors in the cuff **31** detect that it is positioned correctly.

[0094] When this has been detected, the computer **60** starts a counter and takes two blood pressure measurements, after one minute and after five minutes, respectively, and the respective results **11.8** and **11.6** of these measurements are stored in the Appendix 1 file.

[0095] The user is then prompted to sit on the chair **30**.

[0096] Before measuring their weight, it is verified that the user is seated (sensor **42** activated) with both feet placed on the footrest (position of the feet detected by the sensors **44**).

[0097] If so, the weight is measured by the scales **32** and stored in the Appendix 1 file (81 kg).

[0098] A message on the touch-sensitive screen **80** then prompts the user to put the blood pressure cuff **31** on again to measure their blood pressure in the seated position.

[0099] In the embodiment described here, to optimize the blood pressure measurement, the user is required to be seated (this is detected by the sensor **42**) and sitting back in the chair **30** (this is detected by the sensor **43**) with their arm resting on the armrest **35** (this is detected by two position sensors **83**).

[0100] When the computer **60** registers this position, it requests the user to wait for five minutes.

[0101] In this example, when the five minute delay expires, the user has unfortunately removed their arm from the armrest **35**.

[0102] The measured blood pressure **12.7** is stored in the data structure, with information representing the fact that the user was seated and sitting back but that their arm was not positioned on the armrest.

[0103] At the time of measuring the user's heart rate using the blood pressure cuff **31**, the microphone detects a very high noise level, namely a noise level of 120 dB caused by a jackhammer.

[0104] It is known that noise level strongly impacts on the heart rate.

[0105] Consequently, the touch-sensitive screen **80** prompts the user to close the door **25**, which is detected automatically by the sensor **41**.

[0106] A noise level of 50 dB is then measured inside the health booth **10**.

[0107] When the door **25** is closed, the lamp **55** produces an optimum brightness level of 120 cd.

[0108] When the measurement is taken the temperature inside the health booth is 19° C.

[0109] The touch-sensitive screen **80** prompts the user to wait for one minute and a heart rate of 60 bpm is then stored in the Appendix 1 file.

[0110] Finally, a message prompts the user to measure their blood oxygen saturation by placing their index finger in the oximeter **34** positioned at the end of the armrest **35**.

[0111] The measured brightness (120 cd) and relative humidity (4%) are stored with the result of this SpO_2 blood oxygen saturation measurement: 95%.

[0112] The computer **60** then sends the file automatically to a remote center **100** via a telecommunications network R.

[0113] In the embodiment described here, the health booth **10** has two facing removable doors **90**.

[0114] As shown in FIG. **3**, these doors enable a "hospital" to be produced by positioning two health booths side by side and removing the removable doors **90** to create an airlock passage between the two health booths.

[0115] In a preferred embodiment, the health booths **10** in this particular arrangement are connected together by an airtight seal **92**.

APPENDIX 1

Age:		30 years
	Blood pressure	
Seated:	☑	12.7
Sitting back:	☑	
Arm on armrest:	☐	
Duration:	5 min	
	STANDING:	
1 min:		11.8
5 min:		11.6
	Weight	
Seated:	☑	81 kg
Feet on footrest:	☑	
Height:		178 cm
	Heart rate:	
T:	19° C.	60 bpm
Brightness:	120 cd	
Noise level:	50 dB	
1 min	☑	
	Blood oxygen saturation	
Brightness:	120 cd	SpO_2 95%
Relative humidity:	4%	

1-6. (canceled)

7. A health booth, comprising:

a shell;

at least one chair;

at least one measurement means for measuring data relative to the health of a user;

determination means for determining, at the time of taking a measurement, at least one condition under which said measurement is taken; and

storage means for storing the measurement results in a data structure together with said condition.

8. The health booth according to claim **7**, wherein said determination means are suitable for measuring at least one data item from among the following:

a position of said user;

the temperature inside and/or outside said shell;

a sound level inside and/or outside said shell;

a humidity contents inside and/or outside said shell; and

a brightness level inside and/or outside said shell.

9. The health booth according to claim **7**, including means for checking that said measurement is taken when said condition complies with at least one predetermined criterion.

10. The health booth according claim **7**, wherein said shell includes at least one opening for connecting said health booth to at least one other health booth.

11. The health booth according to claim **7**, including means for sending said data structure to a remote center.

12. The health booth according to claim **7**, including a power supply means.

* * * * *

专利名称(译)	健康展示		
公开(公告)号	US20100286492A1	公开(公告)日	2010-11-11
申请号	US12/677351	申请日	2007-09-11
[标]申请(专利权)人(译)	BAUDINO FRANCK BAUDINO LAURENT		
申请(专利权)人(译)	BAUDINO FRANCK BAUDINO LAURENT		
当前申请(专利权)人(译)	BAUDINO FRANCK BAUDINO LAURENT		
[标]发明人	BAUDINO FRANCK BAUDINO LAURENT		
发明人	BAUDINO, FRANCK BAUDINO, LAURENT		
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其他公开文献	US10445463		
外部链接	Espacenet USPTO		

摘要(译)

健康间隔（10）包括壳体（20），至少一个椅子（30）和至少一个测量装置（31,32,33,34），用于测量与使用者健康有关的数据。该展位包括：确定装置（41-50），用于在进行测量时确定进行所述测量的至少一个条件;以及存储装置，用于将测量结果与所述条件一起存储在数据结构中。