system capable of ensuring safety, workability and convenience, as well as alerting a worker to life-threatening dangers such as heatstroke.

[Solution to Problem]

[0007]

The present invention has been made in order to overcome the above drawbacks and problems, and provides a protective equipment with an alarm system capable of ensuring safety, workability and convenience, as well as alerting a worker to a life-threatening danger such as a heatstroke.

[Solution to Problem]

[0008]

As a result of earnest study and investigation, the present inventors have found that by using a protective equipment with an alarm system and through communication between these alarm systems, it is possible to ensure safety, workability and convenience, as well as to alert a worker to a risk of a heatstroke or the like. The present invention has been completed through further earnest study and investigation on the basis of the above finding.

[0009]

In one aspect, the present invention provides a protective equipment with an alarm system. The alarm system has (i) a sensor for detecting biometric information of a wearer of the protective equipment; (ii) a determination means for determining if the biometric information detected by (i) the sensor reaches a threshold value; (iii) an alarming means for alerting to an elevated risk based on instructions from (ii) the determination means; (iv) a transmitting means for transmitting an alarm when (iii) the alarming means is activated; (v) a controlling means for controlling (iii) the alarming means and (iv) the transmitting means; and a display means, wherein at least one of (i) the sensor, (ii) the determination means, (iii) the alarming means, and (iv) the transmitting means has at least one self-diagnosis function means, wherein the display

means displays that at least one of (i) the sensor, (ii) the determination means, (iii) the alarming means, and (iv) the transmitting means is operating normally based on a result diagnosed by the self-diagnosis function means.

[0010]

(i) The sensor may be a temperature sensor for detecting an inner temperature of the protective equipment.

[0011]

In another aspect, the present invention provides a protective equipment with an alarm system. The alarm system has (A) a receiving means for receiving an alarm which is transmitted by (iv) the transmitting means as recited in claim 1; (B) an alarming means; and (C) a controlling means for controlling (A) the receiving means and (B) the alarming means.

[0012]

In afore-mentioned aspects of the present invention, the alarming means (i.e., means (iii) and/or means (B)) may be based on a sound. A display means for displaying that at least one of (i) the sensor, (ii) the determination means, (iii) the alarming means, (iv) the transmitting means, (A) the receiving means and (B) the alarming means is operating normally is further provided. The protective equipment may be formed of a multi-layer fabric. (i) The sensor may be disposed on a skin-side surface of an innermost layer or between layers of the multi-layer fabric. A heat shielding property Heat-Transfer Index 24 (HTI24) of a fabric constituting the protective equipment may be 13 seconds or more as measured in accordance with International Organization for Standardization (ISO) 9151. A water repellency of an outermost surface of a fabric constituting the protective equipment may be Grade 3 or above as measured by a spray method defined in Japanese Industrial Standard: Category L (JIS L) 1092. A fabric constituting the protective equipment may have a shrinkage ratio of 5% or below according to International Organization for Standardization (ISO) 11613-1999. The protective equipment may be a protective suit for a firefighting use. A fabric constituting the protective equipment may contain aramid fibers.

[Advantages of Invention]

[0013]

The present invention provides protective equipment with an alarm system capable of ensuring safety, workability and convenience, as well as alerting a worker to life-threatening danger such as heatstroke.

[Brief Description of Drawings]

[CLAIMS]

1. A protective equipment with an alarm system, the alarm system comprising:

(i) a sensor for detecting data which can be used to analyze biometric information of a wearer of the protective equipment;

(ii) a determination means for determining if the biometric information detected by (i) the sensor reaches a threshold value;

(iii) an alarming means for alerting to an elevated risk based on instructions from (ii) the determination means;

(iv) a transmitting means for transmitting an alarm when (iii) the alarming means is activated;

(v) a controlling means for controlling (iii) the alarming means and (iv) the transmitting means; and

a display means,

wherein at least one of (i) the sensor, (ii) the determination means, (iii) the alarming means, and (iv) the transmitting means has at least one self-diagnosis function means,

wherein the display means displays that at least one of (i) the sensor, (ii) the determination means, (iii) the alarming means, and (iv) the transmitting means is operating normally based on a result diagnosed by the self-diagnosis function means.

2. The protective equipment according to claim 1, wherein (i) the sensor is a temperature sensor for detecting an inner temperature of the protective equipment.

3. A protective equipment with an alarm system, the alarm system comprising:

(A) a receiving means for receiving an alarm which is transmitted by (iv) the transmitting means as recited in claim 1;

(B) an alarming means; and

(C) a controlling means for controlling (A) the receiving means and (B) the alarming means.

4. The protective equipment according to claim 1 or 3, wherein the alarming means is based on a sound.

5. The protective equipment according to claim 1 or 3, wherein the protective equipment is formed of a multi-layer fabric.

6. The protective equipment according to claim 5, wherein (i) the sensor is disposed on a skin-side surface of an innermost layer or between layers of the multi-layer fabric.

7. The protective equipment according to claim 1 or 3, wherein a heat shielding property Heat-Transfer Index 24 (HTI24) of a fabric constituting the protective equipment is 13 seconds or more as measured in accordance with International Organization for Standardization (ISO) 9151.

8. The protective equipment according to claim 1 or 3, wherein a water repellency of an outermost surface of a fabric constituting the protective equipment is Grade 3 or above as measured by a spray method defined in Japanese Industrial Standard: Category L (JIS L) 1092.

9. The protective equipment according to claim 1 or 3, wherein a fabric constituting the protective equipment has a shrinkage ratio of 5% or below according to International Organization for Standardization (ISO) 11613-1999.

10. The protective equipment according to claim 1 or 3, wherein the protective equipment is a protective suit for a firefighting use.

11. The protective equipment according to claim 1 or 3, wherein a fabric constituting the protective equipment comprises aramid fibers.