

managing assembly of a multi-part product in a production environment.

In one example, a system for managing assembly of a multi-part product in a production environment includes at least one wearable sensor disposed on or about a user's body; at least one point of assembly sensor disposed in at least one predetermined location within the production environment; at least one part sensor disposed on at least one of the parts of the product; a device; and at least one computer. The at least one wearable sensor, the at least one point of assembly sensor, the at least one part sensor, the device, and the at least one computer are connected via a network. The at least one computer includes at least one central processing unit (CPU) and at least one memory having computer readable program code portions stored therein that when executed by the at least one processing unit, cause the computer to at least: authenticate the user's location within the production environment based on data from the wearable sensor and product assembly information; authenticate where the product is assembled based on data from the point of assembly sensor; authenticate whether the product is properly assembled based on data from the part sensor and the product assembly information; and transmit instructional data regarding assembly of the product to the device when the user's location is authenticated by the at least one computer.

In another example, a method for managing assembly of a multi-part product in a production environment includes a computer authenticating a user's location within the production environment based on data from at least one wearable sensor disposed on or about the user's body. The computer authenticates where the product is assembled based on data from at least one point of assembly sensor disposed in at least one predetermined location within the production environment. The computer also authenticates proper assembly of the product based on data from at least one part sensor disposed on at least one of the parts of the product. The computer further transmits instructional images pertaining to assembly of the product to a wearable device having a hands-free display when the user's location is authenticated by the computer. The instructional images are prohibited from being displayed on the device when the user's location is not authenticated by the computer. The wearable sensor, the at least one point of assembly sensor, the at least one part sensor, the computer, and the device are connected via a network.

In another example, there is provided a computer-readable storage medium for managing assembly of a multi-part product in a production environment. The computer-readable storage medium is non-transitory and has computer readable program code portions stored therein that, in response to execution by one or more central processing units (CPUs) and or more additional CPUs, cause a computer system to at least authenticate

a user's location within a production environment based on data from at least one wearable sensor disposed on or about the user's body, wherein the at least one wearable sensor comprises a hands-free display; transmit, to a wearable device for display thereon, instructional images pertaining to instructions for assembly of the product when the user's location is authenticated; authenticate a location within the production environment where the product is assembled based on data from at least one point of assembly sensor disposed in at least one predetermined location within the production environment; and authenticate proper assembly of the product based on data from at least one part sensor disposed on at least one of the parts of the product. The computer system, the at least one wearable sensor, the wearable device, the at least one point of assembly sensor, the at least one part sensor are connected via a network.

In this regard, example implementations may include a point of use wearable device that provides a hands-free display to a user who assembles the product within the production environment, at least one wearable sensor disposed on or about the user's body, at least one point of assembly sensor disposed in at least one predetermined location within the production environment, and at least one part sensor disposed on at least one of the parts of the product. The system further includes at least one computer having at least one central processing unit (CPU) and at least one memory, the memory including product assembly information such as instructional images pertaining to assembly of the product, information regarding where the product should be assembled in the production environment, information regarding verification of whether the product has been properly assembled, and product assembly records. The point of use wearable device, wearable sensor, point of assembly sensor, part sensor, and computer are connected via a network such as of the Internet, a wireless local area network, and Ethernet network, or an intranet.

[0005] In some examples, the computer authenticates the user's location within the production environment based on data from the wearable sensor and the product assembly information, and the computer transmits the instructional images to the point of use wearable device. The user is able to view the instructional images in the point of use wearable device while assembling the product. The computer also authenticates where the product is assembled based on data from the point of assembly sensor and authenticates whether the product is properly assembled based on data from the part sensor and the product assembly information.

[0006] In some examples, a 3D printer is connected to the network for making part or a prototype of a part for the product. The wearable sensor may be disposed on the user's clothing or is a part of the point of use wearable device. The instructional images may include technical drawings, three dimensional drawings, photographs, videos, and text. The point of use wearable device may be glasses or a headset. Additionally, the point of use wearable device may include a camera for recording photographs and video of assembly of the product.

CLAIMS

1. A system for managing assembly of a multi-part product in a production environment comprising:

at least one wearable sensor disposed on or about a user's body;

at least one point of assembly sensor disposed in at least one predetermined location within the production environment;

at least one part sensor disposed on at least one of the parts of the product;

a device; and

at least one computer, wherein the at least one wearable sensor, the at least one point of assembly sensor, the at least one part sensor, the device, and the at least one computer are connected via a network, and wherein the at least one computer comprises at least one central processing unit (CPU) and at least one memory having computer readable program code portions stored therein that when executed by the at least one processing unit, cause the computer to at least:

authenticate the user's location within the production environment based on data from the wearable sensor and product assembly information;

authenticate where the product is assembled based on data from the point of assembly sensor;

authenticate whether the product is properly assembled based on data from the part sensor and the product assembly information; and

transmit instructional data regarding assembly of the product to the device when the user's location is authenticated by the at least one computer.

2. The system of claim 1 wherein the device comprises a wearable device comprising a hands-free display and wherein the instructional data comprises instructional images regarding assembly of the product.

3. The system of claim 2 wherein the wearable sensor is disposed on the user's clothing or is a part of the wearable device.

4. The system of claim 2 wherein the wearable device is a device selected from the group consisting of glasses and headsets.

5. The system of claim 2 wherein the wearable device comprises a camera for recording photographs and video of assembly of the product.
6. The system of claim 2 wherein if the user's location is not authenticated by the at least one computer, the instructional images are not transmitted to the wearable device for display to the user.
7. The system of claim 1 further comprising a 3D printer that is connected to the network for making a part or a prototype of a part for the product.
8. The system of claim 1 wherein the network is selected from the group consisting of the Internet, a wireless local area network, an Ethernet network, and an intranet.
9. A method for managing assembly of a multi-part product in a production environment comprising the steps of:
 - a computer authenticating a user's location within the production environment based on data from at least one wearable sensor disposed on or about the user's body;
 - the computer authenticating where the product is assembled based on data from at least one point of assembly sensor disposed in at least one predetermined location within the production environment;
 - the computer authenticating proper assembly of the product based on data from at least one part sensor disposed on at least one of the parts of the product;
 - the computer transmitting instructional images pertaining to assembly of the product to a wearable device comprising a hands-free display when the user's location is authenticated by the computer, wherein the instructional images are prohibited from being displayed on the device when the user's location is not authenticated by the computer,
 - wherein the wearable sensor, the at least one point of assembly sensor, the at least one part sensor, the computer, and the device are connected via a network.
10. The method of claim 9 further comprising the step of the computer providing instructions to a 3D printer for making a part or a prototype of a part for the product.
11. The method of claim 9 wherein the instructional images are selected from the group consisting of technical drawings, three dimensional drawings, photographs, videos, and text.

12. The method of claim 9 further comprising the step of the wearable device recording photographs and video of assembly of the product.
13. The method of claim 9 further comprising the step of the computer generating an alert if the product is assembled at a location other than the predetermined location.
14. The method of claim 9 further comprising the step of the computer generating an alert if product is improperly assembled.
15. A computer-readable storage medium for managing assembly of a multi-part product in a production environment, the computer-readable storage medium being non-transitory and having computer readable program code portions stored therein that, in response to execution by one or more central processing units (CPUs) and or more additional CPUs, cause a computer system to at least:
- authenticate a user's location within a production environment based on data from at least one wearable sensor disposed on or about the user's body, wherein the at least one wearable sensor comprises a hands-free display;
 - transmit, to a wearable device for display thereon, instructional images pertaining to instructions for assembly of the product when the user's location is authenticated;
 - authenticate a location within the production environment where the product is assembled based on data from at least one point of assembly sensor disposed in at least one predetermined location within the production environment; and
 - authenticate proper assembly of the product based on data from at least one part sensor disposed on at least one of the parts of the product,
- wherein the computer system, the at least one wearable sensor, the wearable device, the at least one point of assembly sensor, the at least one part sensor are connected via a network.