Claims

1. A buried electrical cable error-preventing excavation alert device, comprising:

an optical fiber vibration sensor having a mode recognition function, wherein an output of the optical fiber vibration sensor varies with the vibration intensity and frequency;

a signal processing unit;

a wireless communication unit; and

a power supply unit;

wherein the signal processing unit is connected to the optical fiber vibration sensor, the wireless communication unit and the power supply unit,

the signal processing unit is configured to provide an alarm based on the output of the optical fiber vibration sensor,

the optical fiber vibration sensor is installed within a set range of a cable and is configured to monitor vibration signals around the cable, and

the optical fiber vibration sensor comprises a photoelectric transmitter LD, a photoelectric receiver PD, a mono-mode optical fiber, a multi-mode optical fiber and a reflector, the mono-mode optical fiber has an end connected to the photoelectric transmitter LD and the photoelectric receiver PD and an end connected to one end of the multi-mode optical fiber, and the multi-mode optical fiber has an end connected to the reflector.

2. The buried electrical cable error-preventing excavation alert device according to claim 1, wherein the optical fiber vibration sensor having the mode recognition function is a mode-conversion optical fiber vibration sensor.

3. The buried electrical cable error-preventing excavation alert device according to claim 1, wherein the photoelectric transmitter LD and the photoelectric receiver PD are connected to the mono-mode optical fiber via a coupler.

4. The buried electrical cable error-preventing excavation alert device

according to claim 1, wherein the mono-mode optical fiber and the multi-mode optical fiber are connected by welding.

5. The buried electrical cable error-preventing excavation alert device according to claim 1, wherein a light entering the multi-mode optical fiber from the mono-mode optical fiber is emitted in a fundamental mode; however, when the multi-mode optical fiber bends, the light turns into a high-order mode to be transmitted in the multi-mode optical fiber from the fundamental mode; when transmitted to a tail end of the multi-mode optical fiber, the light is reflected back by the reflector and is transmitted still in the high-order mode; when transmitted to the mono-mode optical fiber, the light is no longer in the fundamental mode and does not reach the photoelectric receiver PD via the mono-mode optical fiber; in a case where multi-mode optical fiber is disturbed, the light in the high-order mode turns into the fundamental mode when transmitted to the mono-mode optical fiber, so that a light signal is detected by the photoelectric receiver PD, and the light detected by the photoelectric receiver PD varies with vibration of the multi-mode optical fiber; and when the multi-mode optical fiber stops vibrating, a straight line is output by the photoelectric receiver PD.