As further illustrated in figures 5 and 6, one or more optical fibers **3** are entwined with at least some of the wire ropes, in such a manner that the one or more optical fibers **3** are contacting at least some of the wire ropes in the cable. In the illustrated embodiment, the optical fiber **3** is arranged between and contacting the core rope **20** and two of the outer ropes **30**. With reference to figure 8, an alternative arrangement of the optical fibers and wire ropes is illustrated. Here, two optical fibers **3** are each independently wrapped around an outer rope **30** and also contacting at least the core rope **20**. This configuration would be expected to result in the optical fiber contacting the wound outer rope, the two adjacent outer ropes that abut the wound rope, as well as the core rope; thus, four ropes would directly contact the optical fiber. The pitch and winding patterns of the optical fibers around the wire ropes may be varied depending on the actual usage and environment. Other linear or helical arrangements of the one or more optical fibers may be used as long as the reinforcing cable includes at least one optical fiber contacting at least one wire rope.

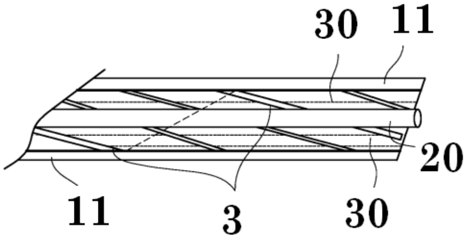

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Figure 8: Exposed side view of an embodiment of a reinforcing cable showing optical fibers wound around wire ropes within the cable.

The optical fibers can be individual fibers. Alternatively, an optical fiber cable which contains one or more individual optical fiber elements can be employed. The one or more optical fiber elements are typically individually coated with plastic layers and contained in a protective tube. Each optical fiber has a transparent core which transmits an optical signal and a transparent cladding around the core. The core and the cladding of each optical fiber can be made of glass or plastic.

In some embodiments, glass optical fibers are typically made of silica. Alternatively, glass optical fibers may contain some other materials, such as fluorozirconate, fluoroaluminate, and chalcogenide glasses, crystalline materials like sapphire for other special purposes. Silica and fluoride glasses usually have refractive indices of about 1.5, but some materials such as the chalcogenides can have indices as high as 3. Typically the index difference between core and cladding is less than one percent. Plastic optical fibers (POF) are typically step-index multi-mode fibers with a core having the diameter of 0.5 millimeters or larger. POF typically have higher attenuation coefficients than glass fibers, 1 dB/m or higher, and this high attenuation limits the range of POF-based systems.

In order to detect slight changes in cable integrity over time, a glass fiber may be preferred for its excellent long-term reliability. Additionally, a single-mode fiber may be desired in some embodiments, due to its smaller transmission loss over long distances and higher sensitivity to lateral pressure applied to the optical fiber, e.g., from the ropes **20** and **30** between which the optical fiber 3 may be sandwiched

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