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(54) CABLE HANGER

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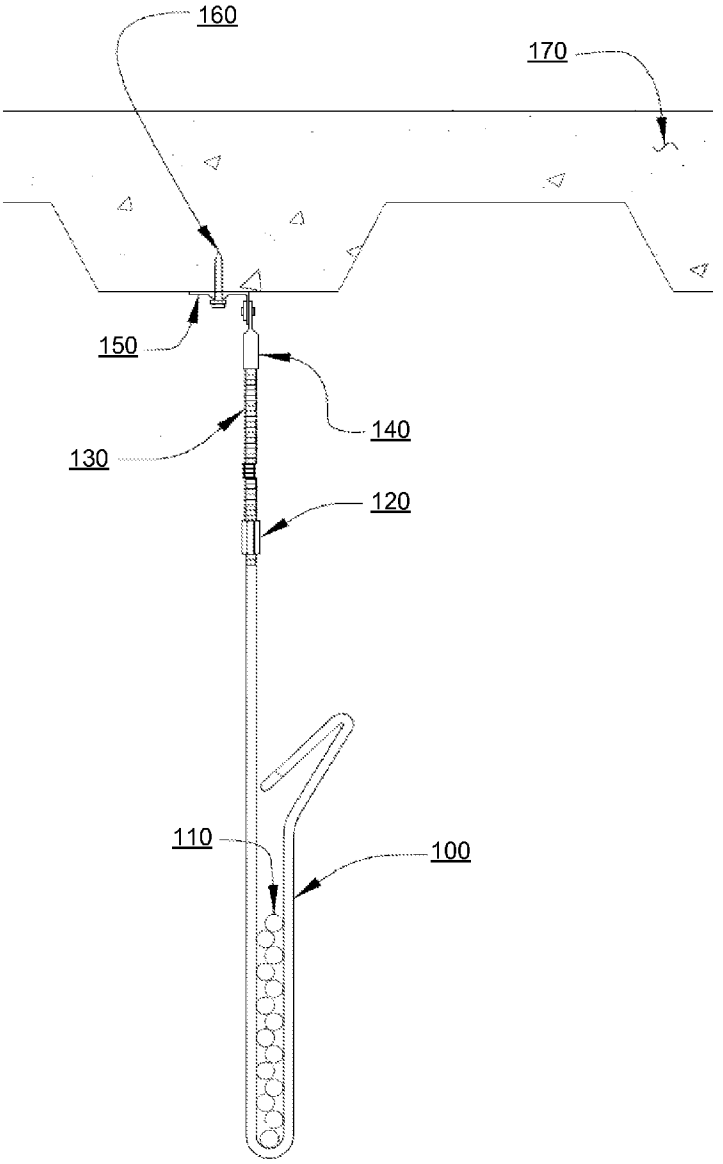
(57) **ABSTRACT**

A cable hanger hangs cables in a linear vertical position. The cable hanger includes a bent resilient rod with two elongated sections (legs) and a base section that form a U-shape design for holding cables. The bent resilient rod has a curved section and a downturn section extending from one of the two elongated sections (the first leg). The downturn section has a hook end. When the two elongated sections are pressed toward each other, the hook end can connect with the other elongated section (the second leg), thereby positively retaining (or locking) the cables in the U-shape design.



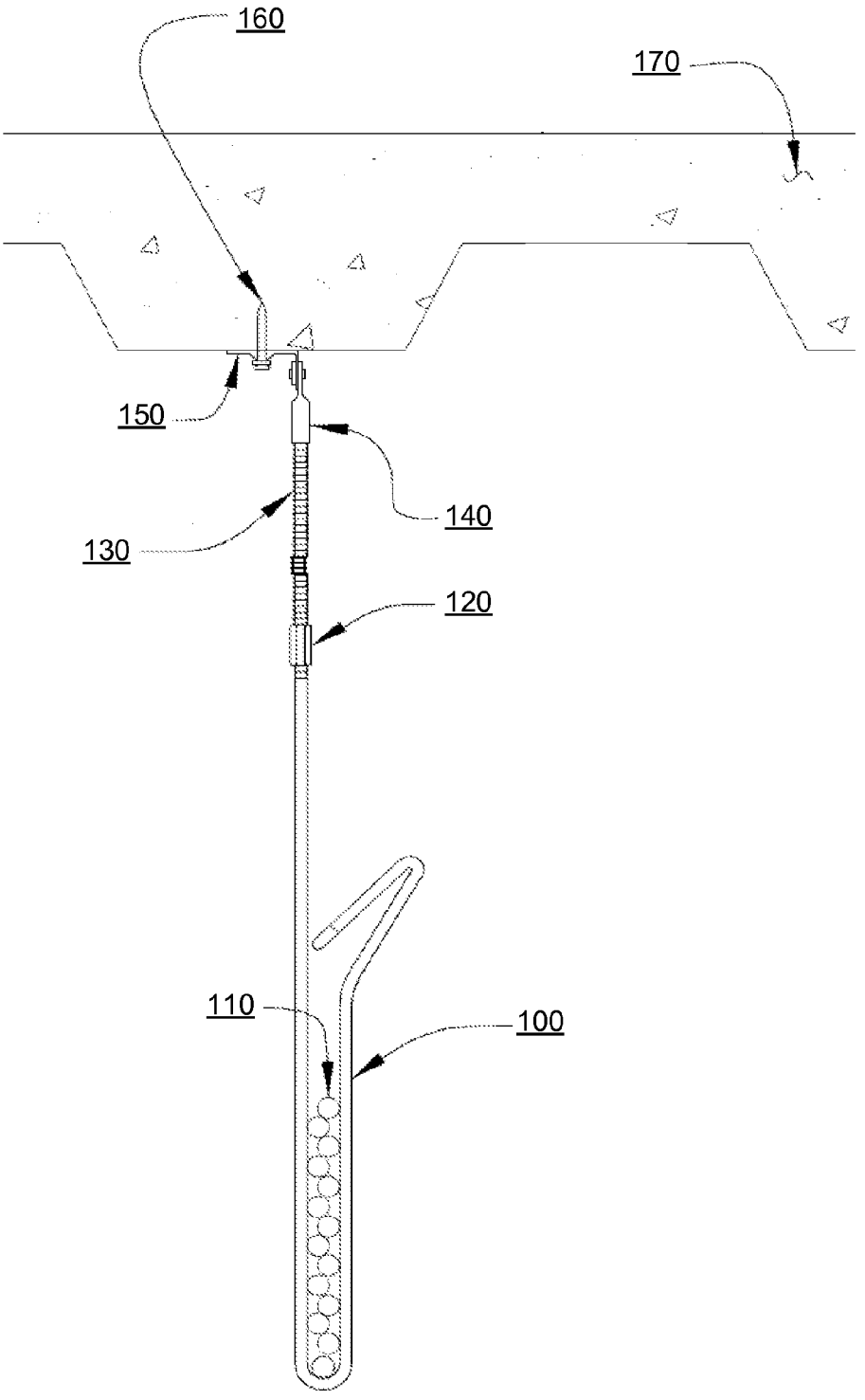


FIG. 1

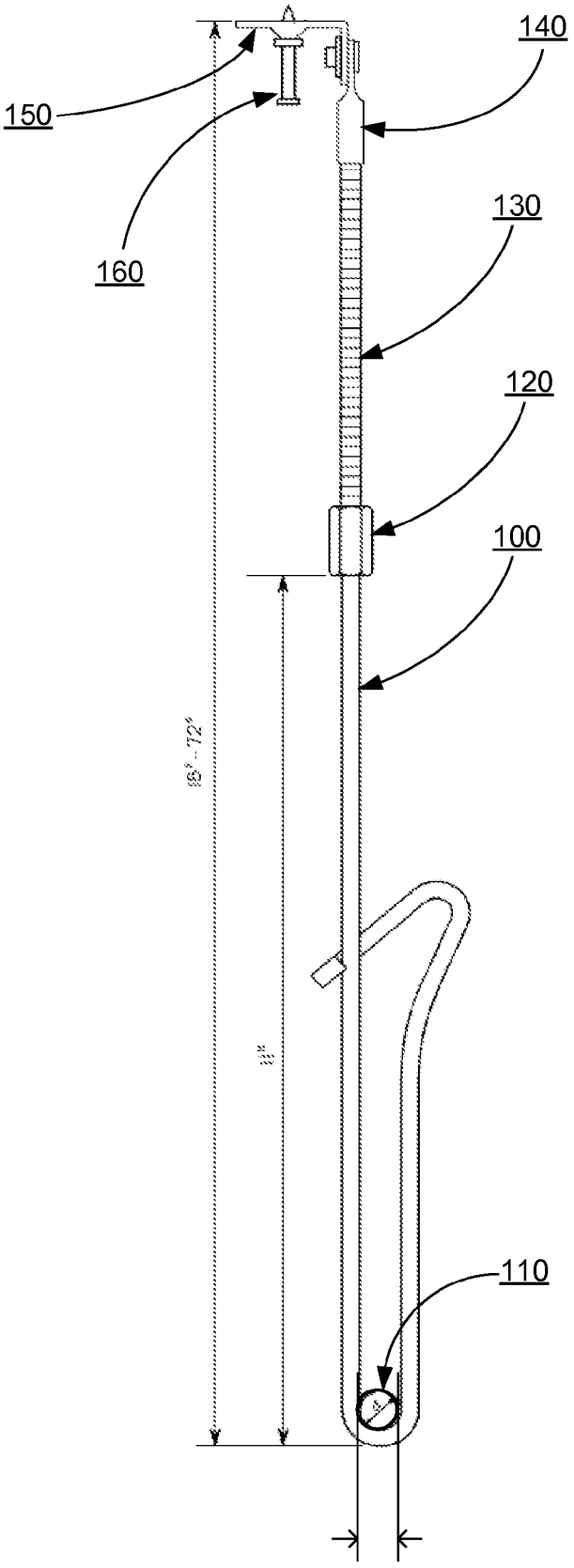


FIG. 2

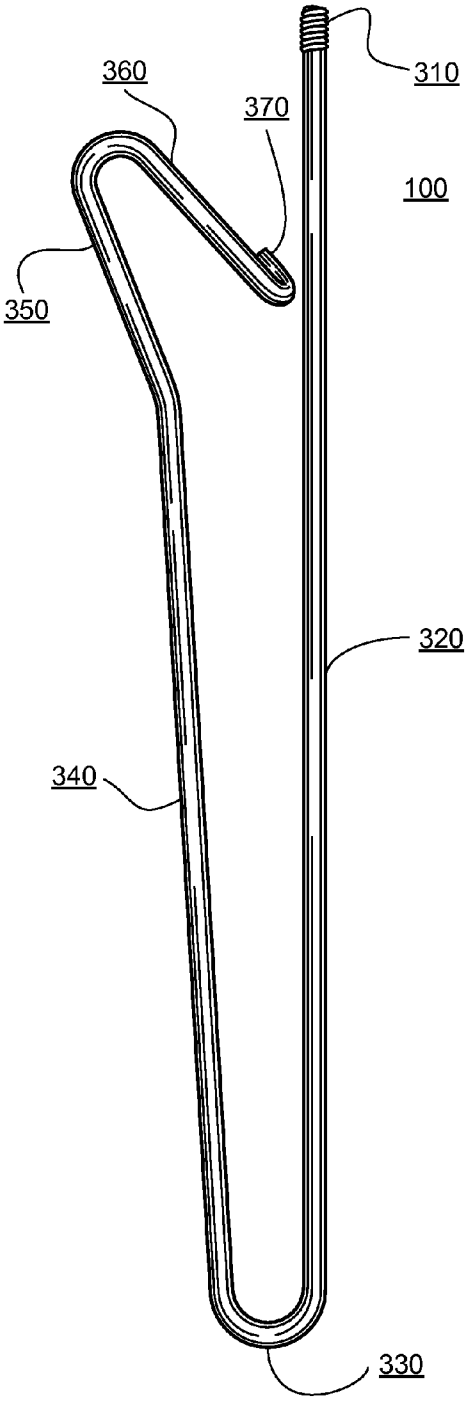


FIG. 3

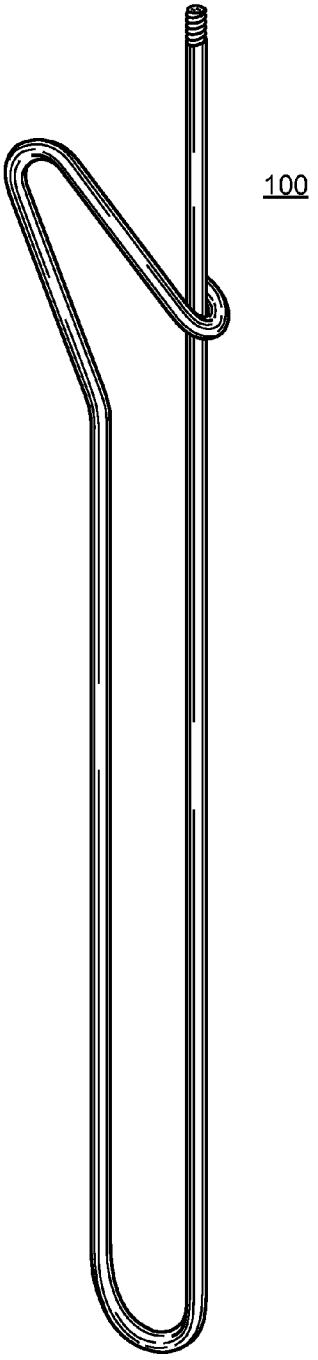


FIG. 4

CABLE HANGER

BACKGROUND

[0001] 1. Field of the Art

[0002] The present invention relates in general to cable positioning devices, and in particular to a cable hanger for suspending cables and conduits.

[0003] 2. Description of the Related Art

[0004] Electrical cables such as power cables release heat. This heat (also know as Joule heat) is caused by the passage of electric currents through the electronic conductors in the power cables. Traditionally, the cable hangers hung (or supported) the electrical cables in a bundle (or a pile). The electrical cables bundled together can generate and trap a substantial amount of heat, raising safety concern. Regulations and building codes prohibiting electrical cables from being piled together have been passed to address this concern. Examples of the regulations and building codes include the National Electric Code (NEC) and the National Fire Protection Association Building Construction and Safety Code (NFPA 5000).

[0005] Therefore, the art lacks a cable hanger that can stack and positively retain cables.

SUMMARY

[0006] In one embodiment, the present disclosure includes a cable hanger that hangs cables in a linear vertical position. The cable hanger includes a bent resilient rod with two elongated sections (legs) and a base section that form a U-shape design (or opening, elongated space) for holding cables. The bent resilient rod has a curved section and a downturn section extending from one of the two elongated sections (the first leg). The downturn section has a hook end. When the two elongated sections are pressed toward each other, the hook end can connect with the other elongated section (the second leg), thereby positively retaining (or locking) the cables in the U-shape design.

[0007] Embodiments of the cable hanger advantageously stack cables in a linear vertical position in the U-shape design. Therefore, heat generated by the cables can be quickly released to surrounding air. Embodiments of the cable hanger also advantageously provide a mechanism to slide cables into the U-shape design and positively retain them there.

[0008] The features and advantages described in the specification are not all inclusive and, in particular, many additional features and advantages will be apparent to one of ordinary skill in the art in view of the drawings, specification, and claims. Moreover, it should be noted that the language used in the specification has been principally selected for readability and instructional purposes, and may not have been selected to delineate or circumscribe the disclosed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings in which like reference numerals refer to similar elements.

[0010] FIG. **1** illustrates one embodiment of a cable hanger holding multiple cables.

[0011] FIG. **2** illustrates one embodiment of a cable hanger connected to peripheral components.

[0012] FIG. **3** illustrates one embodiment of a cable hanger in an open state.

[0013] FIG. **4** illustrates one embodiment of a cable hanger in a closed state.

DETAILED DESCRIPTION

[0014] FIG. **1** illustrates one embodiment of a cable hanger **100** holding multiple cables **110**. The cable hanger **100** is fixed to a ceiling **170** via peripheral components. The peripheral components include a coupling **120**, a threaded rod **130**, an eye coupling **140**, a flash **150**, and a fastener **160**. The cable hanger **100** couples to the threaded rod **130** via the coupling **120**. The rod **130** is connected to the eye coupling **140**. The eye coupling is riveted to the flash **150**. The flash **150** is fastened to the ceiling **170** via the fastener **160**.

[0015] As illustrated in FIG. **1**, the cable hanger **100** hangs multiple cables (or wires, conduits) **110** in a linear vertical position. The coupling **120** may be a hardware fastener such as a hinge or a nut. The rod **130** may be an all-threaded rod or a partially threaded rod of various lengths. Depending on the nature of the ceiling (e.g., metal, concrete, wood), the fastener **160** may be any fastener component, such as a nail, a screw, a rivet, or an anchor (e.g., a hammer drive anchor). One example of the flash **150** and the fastener **160** is the FlashFastener of Lord & Sons, Inc. In one embodiment, two or more of the cable hanger **100**, the coupling **120**, the threaded rod **130**, the eye coupling **140**, the flash **150**, and the fastener **160** can be combined into a single component.

[0016] FIG. **2** illustrates an embodiment of the cable hanger **100** connected with the peripheral components. The cable hanger **100** as illustrated is 11 inches in length (excluding the portion inside the coupling **120**). It is noted that the cable hanger **100** can be of any length and/or width depending on actual needs. Because one can connect the cable hanger **100** with threaded rods of various lengths, the total length of the cable hanger **100**, the coupling **120**, the threaded rod **130**, the eye coupling **140**, and the flash **150** connected together may be as long as needed. For example, the total length as illustrated in FIG. **2** may be between 18 inches and 72 inches, inclusively.

[0017] In one embodiment, the cable hanger **100** may be customly designed for cables of certain sizes. As illustrated in FIG. **2**, the cable hanger **100** holds cables in a U-shape elongated space (the U-shape design). For cables of a certain diameter size (or a range of diameter sizes), the U-shape design can be set with a specific diameter (the internal width) such that the cables can be stacked in the U-shape design. For example, the internal width can be set slightly larger than the thickest cable's diameter. As illustrated in FIG. **2**, the diameter of the cable **110** is proximate to the internal width of the cable hanger **100**. In one example, the internal width of a cable hanger is ½ inch. As another example, the internal width may be ⅝ inch.

[0018] FIG. **3** illustrates an embodiment of the cable hanger **100**. As illustrated, the cable hanger **100** is a bent rod having two elongated sections (or legs) **320** and **340** and a base section **330**, each having a first end and a second end. The second end of the leg **320** is adjacent to the first end of the base section **330**. The second end of the base section **330** is adjacent to the first end of the leg **340**. Both of the legs **320**, **340** have a straight portion substantially (or relatively) parallel to each other. The straight portion of the leg **320** is longer than the straight portion of the leg **340**. The distance between the straight portions is shorter than the length of either straight

portion. The two legs **320**, **340** and the base section **330** form a narrow relatively (or substantially) U-shape elongated space (the U-shape design). The first end of the leg **320** is a threaded end **310**. The cable hanger **100** also has an outward curved section **350** and a downturn section **360**, each having a first end and a second end. The first end of the outward curved section **350** is adjacent to the second end of the leg **340**. The second end of the outward curved section **350** is adjacent to the first end of the downturn section **360**. The outward curved section **350** and the downturn section **360** form a relatively (or substantially) V-shape extension of the U-shape design. The second end of the downturn section **360** is a hook end (or hook section) **370**. Except the hook end **370**, the cable hanger **100** is approximately in one plane.

[0019] In one embodiment, a single piece of rod is bent according to the above configuration to take shape of the cable hanger **100**. In alternative embodiments, one or more sections of the cable hanger **100** can be joint with adjacent section(s) via connection means such as welding or adhesive.

[0020] The bent rod configuration as described above has resilience (or flexibility) about the U-shape design. The two legs **320**, **340** may be moved toward each other when a force is applied to them (e.g., when they are squeezed closer). When the force is released, the two legs **320**, **340** move back to their original (or rest, free) position.

[0021] The U-shape design hosts cables, conduits, wires, and the like. In one embodiment, the internal width of the U-shape design is designed to be less than twice the diameter of the cables. Thus, the cables in the U-shape design are linearly stacked, not bundle together. As described above with respect to FIG. **2**, the U-shape design can be tailored such that the internal width is approximate to the diameters of the cables. In one embodiment, the length of the U-shape design ranges from 8 to 18 inches.

[0022] The threaded end **310** is designed to be connected to a rod via a coupling. Examples of the rod and the coupling are described above with respect to the FIGS. **1** and **2**. In one embodiment, the length of the threaded end **310** equals to or exceeds its diameter to ensure proper connectivity and fasten (or coupling) strength with the coupling and/or the rod. The cable hanger **100** and the rod may be connected using other kinds of connections such as a snap connection. For example, the cable hanger **100** can be equipped with spring-loaded clips (e.g., balls) near the first end of the leg **320**. The rod can be equipped with a tube end with indentations (or holes) inside the tube end. The cable hanger **100** can be connected to the rod by inserting the first end of the leg **320** into the tube end of the rod, such that the spring loaded clips can snap into the indentations, thereby locking the cable hanger **100** and the rod together.

[0023] In one embodiment, the position of the cable hanger **100** can be adjusted while it is fixed to, for example, a concrete surface. For example, the cable hanger **100** can rotate with respect to the coupling and/or the rod while fixed with the coupling and the rod. As another example, as illustrated in FIG. **1**, the eye coupling **140** can rotate with respect to the flash **150**. In another embodiment, the cable hanger **100** can have a connecting end other than the threaded end **310**. For example, the cable hanger **100** and the rod may be connected using other kinds of joints such as a ball and socket joint. As a result, the cable hanger **100** may have up to three axis of movement while connected with the rod. In yet another embodiment, the cable hanger **100** can be fastened directly to a concrete surface (e.g., a ceiling) via a fastener.

[0024] The outward curved section **350** and the downturn section **360** together form a relatively (or substantially) V-shape space that enlarges (or widens) the U-shape design and enables the cable hanger **100** to stack more cables. In addition, the downturn section **360** also functions to guide cables into the elongated space. Therefore, a longer downturn section **360** makes the process of adding cables to the cable hanger **100** easier. Because the outward curved section **350** widens the distance between the two legs **320**, **340**, it enables the downturn section **360** to be longer than it otherwise would have been. In alternative embodiments, the outward curved section **350** is optional and the downturn section **360** may curve horizontally or upward instead of downward towards the base section **330**.

[0025] The hook end **370** can clasp around the leg **320** and close the U-shape design between the two legs **320**, **340**, thereby positively retaining (or locking) cables within the U-shape design. As a result, the cable hanger **100** has two states, an open state, when the hook end **370** is not connected with the leg **320**, and a closed state, when the hook end **370** is clasped around the leg **320**. When the cable hanger **100** is in the open state, the distance between the two legs **320**, **340** is at least wide enough for a cable to slide down the downturn section **360** and into the opening (the U-shape elongated space). The open state may also be an original (or rest, free) position for the configuration. When the cable hanger **100** is in the closed state, cables are positively retained (or locked) in the U-shape design. A tensions (or force) may be applied to each leg **320**, **340** so that the distance between them is reduced. The tension may be maintained by wrapping the hook end **370** about the longer leg **320**, thereby keeping the cables hanger **100** in the closed state. The cable hangers illustrated in FIGS. **1** and **3** are in open states. The cable hangers illustrated in FIGS. **2** and **4** are in closed states.

[0026] As noted previously, in one embodiment, the bent rod that forms the cable hanger **100** is made of resilient material (e.g., metal such as steel, alloy such as low carbon steel, and plastic), and the free (or original, rest) position of the cable hanger **100** (e.g., without external forces) is in the open state. One can press the two legs **320**, **340** close together, such that the hook end **370** clasps around the leg **320**. Because the bent rod is in a tension state, the hook end **370** is held together with the leg **320** through application of tension force. As a result, the two legs **320**, **340** are positively connected together via the hook end **370**, forming an enclosed elongated space. Therefore, the hook end **370** serves as a locking mechanism that prevents cables held in the U-shape design from popping out.

[0027] In one embodiment, the bent rod is made of alloy such as low carbon steel. In order to provide sufficient strength and resilience, the bent rod may be a pencil rod with sufficient thickness. For example, the bent rod may be a solid steel rod of 0.211 inch diameter. It is noted that the diameter of the bent rod may vary depending on actual needs. For example, the diameter of the bent rod may be between 0.125 inch and 0.25 inch, inclusively. In one embodiment, the strength of the bent rod is selected such that an adult can use a single hand to squeeze the two legs to make the cable hanger **100** changes from one state to another (e.g., from an open state to a closed state).

[0028] In another embodiment, the cable hanger **100** can have a locking mechanism other than the hook end **370**, such as a carabiner or other spring-based locking components. In yet another embodiment, the cable hanger **100** includes a

separate component that serves as a locking mechanism (the locking component). For example, one end of the locking component can be rotatably mounted to one leg, and the other end can be locked together with the other leg (e.g., by tension force or by a carabiner).

[0029] The disclosed embodiments advantageously stack cables together in a linear position so that they have greater exposure to open air. As a result, heat generated by the cables can be released quickly into surrounding air. Therefore, the cable hanger as disclosed effectively releases heat from electrical cables and can improve fire safety.

[0030] In addition, the cable hanger can beneficially be adjusted even when fixed to a hard surface. This adjustable flexibility allows for repositioning of wires easily when required due to space constraints. Further, the cable hanger advantageously allows for single hand use so that cables can be easily added and removed from the cable hanger.

[0031] Finally, it should be noted that the language used in the specification has been principally selected for readability and instructional purposes, and may not have been selected to delineate or circumscribe the disclosed subject matter. Accordingly, the disclosure is intended to be illustrative, but not limiting, of the scope, which is set forth in the following claims.

What is claimed is:

1. A cable hanger comprising:

a bent resilient rod including a first elongated section, a second elongated section, and a base section, the first and second elongated sections and the base section forming a U-shape design, a straight portion of the second elongated section longer than a straight portion of the first elongated section, the U-shape design being for hanging one or more cables,

the bent resilient rod further including a downturn section extending from the first elongated section, the downturn section having an inward edge for the one or more cables to slide into the U-shape design, and

the bent resilient rod further including a hook section extending from the downturn section, the hook section including a bent portion that can be fastened to the second elongated section when pressed, whereby positively retaining the one or more cables in the U-shape design.

2. The cable hanger of claim **1**, wherein the first and second elongated sections are substantially parallel to each other, the distance between the first and second elongated sections being shorter than the length of the straight portion of either of the first and second elongated sections.

3. The cable hanger of claim **1**, wherein the distance between the first and second elongated sections is close to a diameter of the one or more cables.

4. The cable hanger of claim **1**, wherein the first and second elongated sections, the base section, the curved section, and the downturn section are approximately in one plane.

5. The cable hanger of claim **1**, wherein the bent resilient rod comprises low carbon steel.

6. The cable hanger of claim **1**, wherein the bent resilient rod further includes a connecting end extending from the second elongated section for coupling with a fastener.

7. The cable hanger of claim **6**, wherein the connecting end includes a threaded end.

8. The cable hanger of claim **6**, wherein the connecting end and the fastener are connected via a ball and socket joint.

9. The cable hanger of claim **1**, wherein the cable hanger has an open state and a closed state, wherein when the cable hanger is in the open state, the hook section is not fastened to the second elongated section and a cable can slide in and out of the U-shape design, and wherein when the cable hanger is in the closed state, the hook section is fastened to the second elongated section and the one or more cables are positively retained in the U-shape design.

10. The cable hanger of claim **9**, wherein when the cable hanger is in the closed state, the hook section is held together with the second elongated section through application of tension force of the bent resilient rod.

11. The cable hanger of claim **1**, wherein the bent resilient rod further includes an outward curved section extending from the first elongated section, wherein the downturn section is extended from the outward curved section.

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