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SYSTEMS AND METHODS FOR A HANGER FOR SUPPORTING A THREADED OBJECT

Abstract

A hanger is provided for supporting a load on a threaded object with a longitudinal axis. The hanger can include a hanger body, a hole in the hanger body, and a partial thread portion. The hole can be configured to receive the threaded object therethrough. The partial thread portion can be configured to engage with a thread of the threaded object when the hanger is in an engaged configuration. The hanger can be configured to move from a non-engaged configuration to the engaged configuration without rotation of the hanger body or the threaded object about the longitudinal axis of the threaded object.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of U.S. application Ser. No. 18/006,518, which is the national stage entry of PCT International Application No. PCT/2021/042989, filed Jul. 23, 2021, and which claims the benefit of U.S. Provisional Application No. 63/056,055, filed Jul. 24, 2020, the entireties of which are incorporated herein by reference in their entirety.

BACKGROUND

[0002] In many applications it may be useful to support objects relative to threaded objects, such as threaded rods supported from ceilings or other building structures. For example, it may be useful to support raceways, conduit, including electric metallic tube (EMT) conduit, or cable, including metal clad (MC) cable and cable for data transmission, relative to a substrate such as a concrete deck. In some contexts, support of the raceways and cables must be provided from a junction box or other termination point as required by code.

SUMMARY

[0003] Some embodiments of the invention provide a hanger for supporting a load on a threaded object with a longitudinal axis. The hanger can include a hanger body, a hole in the hanger body, and a partial thread portion. The hole can be configured to receive the threaded object therethrough. The partial thread portion can be configured to engage with a thread of the threaded object when the hanger is in an engaged configuration. The hanger can be configured to move from a non-engaged configuration to the engaged configuration without rotation of the hanger body or the threaded object about the longitudinal axis of the threaded object.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of embodiments of the invention:

[0005] FIG. 1 is a top front isometric view of a hanger according to an embodiment of the invention;

[0006] FIG. 2 is a front elevation view of the hanger of FIG. 1;

[0007] FIG. 3 is a top front isometric view of the hanger of FIG. 1 in an engaged configuration relative to a threaded rod;

[0008] FIG. 4 is a cross-sectional view of the hanger of FIG. 1 with the threaded rod of FIG. 3 along line 4-4 of FIG. 3;

[0009] FIGS. 5 and 6 illustrate installation steps for engaging the hanger of FIG. 1 with a threaded rod according to an embodiment of the invention;

[0010] FIG. 7 is a top front isometric view of a hanger according to another embodiment of the invention;

[0011] FIG. 8 is a front elevation view of the hanger of FIG. 7;

[0012] FIG. 9 is a top front isometric view of the hanger of FIG. 7 with a threaded rod in an engaged configuration;

[0013] FIG. 10 is a cross-sectional view of the hanger with the threaded rod of FIG. 9 along line 10-10 of FIG. 9;

[0014] FIG. **10A** is an enlarged view of the cross-sectional view of the hanger of FIG. **7** with the threaded rod of FIG. **10**.

[0015] FIG. **11** is a top front isometric view of a hanger according to another embodiment of the invention, in an open configuration;

[0016] FIG. **12** is a top front isometric view of the hanger of FIG. **12** in a closed configuration;

[0017] FIG. **13** is a top front isometric view of a hanger according to another embodiment of the invention;

[0018] FIG. **14** is a front elevation view of the hanger of FIG. **13**;

[0019] FIG. **15** is a top plan view of the hanger FIG. **13**;

[0020] FIG. **16** is a top front isometric view of a hanger according to another embodiment of the invention;

[0021] FIG. **17** is a top rear isometric view of the hanger of FIG. **16**;

[0022] FIG. **18** is a cross-sectional view of the hanger of FIG. **16** along line **18-18** of FIG. **16**;

[0023] FIG. **19** is a top front isometric view of the hanger of FIG. **16** with a threaded rod and a retainer in a non-engaged configuration according to another embodiment of the invention;

[0024] FIG. **20** is a top front isometric view of the hanger, threaded rod, and retainer of FIG. **19** with the retainer in an engaged configuration;

[0025] FIG. **21** is a top rear isometric view of the hanger, threaded rod, and retainer of FIG. **20**;

[0026] FIG. **22** is a top front isometric view of the hanger of FIG. **16** with the retainer of FIG. **19** in an engaged configuration and another threaded rod according to embodiment of the invention;

[0027] FIG. **23** is a top front isometric view of the hanger of FIG. **16** with a threaded rod and a retainer in a non-engaged configuration according to another embodiment of the invention;

[0028] FIG. **24** is a top front isometric view of the hanger of FIG. **23** with the retainer in an engaged configuration;

[0029] FIG. **25** is a top rear isometric view of the hanger, threaded rod, and retainer of FIG. **24**;

[0030] FIG. **26** is a top front isometric view of the hanger of FIG. **16** with the retainer of FIG. **23** in an engaged configuration and another threaded rod according to an embodiment of the invention;

[0031] FIG. **27** is a top front isometric view of straps for a hanger according to another embodiment of the invention;

[0032] FIGS. **28** and **29** illustrate installation steps for retaining a threaded rod within one of the straps of FIG. **16** according to another embodiment of the invention;

[0033] FIG. **30** is top front isometric view of straps that are axially aligned and face in opposing directions according to another embodiment of the invention; and

[0034] FIG. **31** is a bottom rear isometric view of a J-Hook incorporating a hanger with a strap according to another embodiment of the invention.

DETAILED DESCRIPTION

[0035] Before any embodiments of the invention are explained in detail, it is to be

[0036] understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of “including,” “comprising,” or “having” and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless specified or limited otherwise, the terms “mounted,” “connected,” “supported,” and “coupled” and variations thereof are used broadly and encompass both direct and indirect mountings, connections, supports, and couplings. Further, “connected” and “coupled” are not restricted to physical or mechanical connections or couplings.

[0037] As used herein, unless otherwise defined or limited, directional terms are used for convenience of reference for discussion of particular figures or examples. For example, references

to downward (or other) directions may be used to discuss aspects of a particular example or figure, but do not necessarily require similar orientation or geometry in all installations or configurations. [0038] The following discussion is presented to enable a person skilled in the art to make and use embodiments of the invention. Various modifications to the illustrated embodiments will be readily apparent to those skilled in the art, and the generic principles herein can be applied to other embodiments and applications without departing from embodiments of the invention. Thus, embodiments of the invention are not intended to be limited to embodiments shown, but are to be accorded the widest scope consistent with the principles and features disclosed herein. The following detailed description is to be read with reference to the figures, in which like elements in different figures have like reference numerals. The figures, which are not necessarily to scale, depict selected embodiments and are not intended to limit the scope of embodiments of the invention. Skilled artisans will recognize the examples provided herein have many useful alternatives and fall within the scope of embodiments of the invention.

[0039] Some of the discussion below describes a hanger that engages with a threaded object (e.g., a threaded rod). The context and particulars of this discussion are presented as examples only. For example, embodiments of the disclosed invention can be configured in various ways, including with other shapes and arrangements of elements. Similarly, embodiments of the invention can be used with arrangements of support members or other assemblies other than those expressly illustrated or described herein. In this regard, for example, some embodiments not expressly discussed below can include some or all of the components of any number of the embodiments expressly described and illustrated below, in any variety of combinations. Further, some embodiments can be employed to support objects other than conduit or cables.

[0040] In conventional arrangements, a hanger can be attached in various ways to threaded rod to support conduit, cable, or other objects. For example, non-continuous cable supports such as “J-Hooks” can include tabs with holes for receiving a threaded rod therethrough and can be secured to the threaded rod with a nut engaged with the threaded rod. As another example, a J-Hook can have a threaded-rod engaging device riveted, or otherwise attached, to the J-Hook. Examples of threaded rod engaging devices can include a threaded hole or a “bat wing” style clip. Although these conventional arrangements can provide attachment of a hanger to a threaded rod, the hangers can require multiple pieces and installation can require threading the hanger itself to the threaded rod or securing the hanger to the threaded rod by engaging a nut with the threaded rod. Among other issues with conventional designs, the need to rotate a component about a thread axis to provide a secure attachment may complicate installation procedures.

[0041] Embodiments of the invention can address these or other issues. For example, a hanger can include (e.g., be integrally formed with) a threaded object engagement mechanism that includes a partial thread. As used herein, “partial thread” indicates a feature in which threads do not extend fully around a relevant circumference. In some embodiments, partially threaded features can include one or more threads that are suitable to engage a threaded rod or other similarly threaded object, but extend over only 180° or less of a relevant circumference. For example, a partial thread may be formed on a hanger to extend only along one half or less of a cylinder that is defined by the radius of the partial thread. As such, some partially threaded features may be configured to engage a threaded object along a circumferential extent that is limited to only one half of a cylinder defined by the threads of the threaded object.

[0042] In some embodiments, a hanger can be engaged with a threaded object without threading the hanger or requiring other parts to secure the hanger (i.e., without the need to rotate the threaded object or the hanger about a thread axis of the threaded object and the relevant partial thread). For example, a hanger can be formed to quickly engage a threaded rod through a lever action perpendicular to the thread axis of a threaded rod.

[0043] In some embodiments, a partial thread portion may be provided in a hole in which the threaded rod is received or at a location adjacent the hole (e.g., on a protrusion or body feature that

extends from or is somewhat removed from the hole). A partial thread may be formed by various methods (e.g., coining, extrusion and tapping, embossing, etc.), may be in one segment, or broken into multiple circumferential segments, and may be located at one or multiple locations axially along a threaded object. In some embodiments, a partial thread may include multiple pitches or may include multiple thread diameters. In some embodiments, a mechanism may be axially spaced from the partial thread to retain a threaded object in a partial thread of a hanger, including as may reduce or prevent radial separation of the partial thread from the threaded object.

[0044] Some embodiments of the invention can include a strap configured to engage a threaded object. In some embodiments, a strap can be axially spaced from a partially threaded hole. In some embodiments, a strap can have threads provided thereon (e.g., partial threads) to engage with a threaded object.

[0045] FIGS. **1-4** illustrate an example hanger **100** according to an embodiment of the present invention. The hanger **100** includes a hanger body **102**. The hanger body **102** is L-shaped and has a set of intersecting legs, a first leg **104** and a second leg **106**. Holes **108, 110**, are located at the intersection of the first and second legs **104, 106** and each extend into both the first and second legs **104, 106**. Each of the holes **108, 110** is configured to separately receive a threaded object, for example, a threaded rod **10** (shown in FIG. **3**), therethrough. It is contemplated that a hanger can have only one hole or more than two holes, and other sizes and orientations of holes than are expressly shown may be possible.

[0046] The first hole **108** and the second hole **110** each have a partial thread portion **112, 114** provided in the part of the hole **108, 110** that extends onto the first leg **104**. As shown, the partial thread portion **112, 114** of the first and second holes **108, 110** have different diameters. The size of the partial thread portions can be based on the size of a threaded object to be engaged therein. For example, the partial thread portion **112** of the first hole **108** can be sized to receive a threaded object having a diameter of $\frac{3}{8}$ inch and the partial thread portion **114** of the second hole **110** can be sized to receive a threaded object having a diameter of $\frac{1}{2}$ inch. It should be understood that these sizes are examples and other sizes are contemplated. In some embodiments, the partial thread portions of first and second holes can have the same diameter.

[0047] The hanger **100** is configured to move between a non-engaged configuration (e.g., as shown in FIG. **6**) and an engaged configuration (shown in FIG. **3**). Looking at the first hole **108** in FIGS. **3** and **4**, the partial thread portion **114** can engage a portion of the circumference of the thread **12** of the threaded rod **10** to carry an axial load when the hanger **100** is in the engaged configuration. A distance **118** from a crest **116** of the partial thread portion **112** to the second leg **106** is less than the outer diameter **14** of the threaded rod **10**. Having the partially threaded portion **112** opposite the second leg **106**, and sizing the distance **118** as provided, can increase the engagement of the hanger **100** and the threaded rod **10** as more load is applied to the second leg **106**. The second leg **106** acts as a retainer, maintaining the engagement of the partial thread portion **112** with the threaded rod **10**.

[0048] Looking at FIGS. **5** and **6**, the process of installing the hanger **100** on the threaded rod **10** is shown. As shown in FIG. **5** in particular, the hanger **100** is oriented to receive the threaded rod **10** through the first hole **108**. The hanger **100** can be then moved in the direction of the arrow as shown in FIG. **5** to receive the threaded rod **10** in the first hole **108**. Once the rod is received through the first hole **108** (e.g., as shown in FIG. **6**), the partial thread portion **112** of the first hole **108** is positioned to engage the thread **12**. The hanger **100** is then pivoted about the partial thread portion **112** in the direction of the arrow as shown in FIG. **6**, in some cases, until the second leg **106** contacts the threaded rod **10** (shown in FIG. **3**). The L-shape of the hanger **100** is such that the second leg **106** acts as a lever to move the partial thread portion **112** into engagement with the thread **12**. The contact of the hanger **100** with both sides of the threaded rod **10** can then help to retain the threaded rod **10** in the engaged configuration, although the partial thread portion **112** extends around only half (or less) of the circumference of the threaded rod **10**. Further, due to the position of the engagement of the thread **12** with the partial thread portion **112** and the relative

offset thereto of a load applied to the second leg **106**, any increasing in the load may tend to further increase the engagement, even despite an axial load tending to urge the thread **12** and partial thread portion **112** apart due to the angle of the threads.

[0049] In different embodiments, a partial thread can be formed in different ways. In some cases, a partial thread portion can be formed by coining. In some cases, coining can be performed by compressing an inner circumference of a partial thread tool into a chamfered edge of a hole. As another example, a partial thread can be formed by tapping. An example, the partial thread portions **112**, **114** can also be formed by tapping a thread into the first and second holes **108**, **110**.

[0050] In some embodiments, a partial thread may include a single thread (i.e., may have a single crest) or may include multiple threads (i.e., may have multiple crests). As shown in FIGS. **1** and **2**, for example, the partial thread portions **112**, **114** are each a single thread. If desired, more threads can be formed, including through a process of extruding a hanger at a relevant hole to provide a side wall at the hole with a depth greater than the thickness of the hanger body. The hole, including the extruded feature can then be tapped, and a portion of the extruded feature removed to provide a partial thread portion. An example of an extruded partially threaded feature can be seen in FIG. **31**, as an extruded partial thread portion **812**.

[0051] As shown in FIGS. **1-6**, the first leg **104** and the second leg **106** are different sizes, with the second leg **106** larger than the first leg **104**. It should be understood that the size of the first and second legs **104**, **106** can be modified, wherein a first leg is larger than a second leg and wherein the legs are of the same size.

[0052] FIGS. **7-10** illustrate another hanger **200** according to an embodiment the invention. The hanger **200** includes a hanger body **202**. The hanger body **202** is Z-shaped and has an upper leg **204**, an intermediate portion **206**, and a lower leg **208**. A hole **210** is located in and extends across the intermediate portion **206**. The hole **210** is configured to receive the threaded rod **10** (shown in FIGS. **9** and **10**) therethrough. Although the hanger **200** is shown with only one hole, it is contemplated that the hanger **200** can have more than one hole. Further, some embodiments may include a hole that extends only partially across an intermediate portion of a Z-shaped body, or a hole that is otherwise arranged.

[0053] Looking at FIGS. **7** and **8** in particular, a partial thread portion **212** is shown in the upper leg **204**. The partial thread portion **212** extends from the upper leg **204** in the direction of the hole **210** and the lower leg **208** and has a plurality of threads **216** (see also FIG. **10**). The partial thread portion **212** can be formed through coining, similar to the partial thread portions **112**, **114** described above with respect to hanger **100** or through a variety of other processes. The partial thread portion **212** is configured to engage with threads **12** of the threaded rod **10**, generally similarly to the partial thread portions **112**, **114** as discussed above. Additionally, or alternatively, a partial thread portion (not shown) can be provided on the lower leg **208** extending in the direction of the hole **210** and the upper leg **204**.

[0054] A cross-section of the hanger **200** engaged with the threaded rod **10** is shown in FIG. **10** and an enlarged view of the partial thread portion **212** of FIG. **10** is shown in FIG. **10A**. In particular, it can be seen that the partial thread portion **212** has been formed to have ribs **214** opposite the roots **218** of the partial thread portion **212**. In some embodiments, such an arrangement can result in a more efficient and effective manufacturing process. In some embodiments, this arrangement can make more efficient use of the material used to form the partial thread **212**.

[0055] As can be seen in FIG. **10**, the hanger **200** engages with the threaded rod **10** in a similar manner as the hanger **100**. In particular, the threaded rod **10** is received through the hole **210**. When the partial thread portion **212** of the hanger **200** is aligned with a portion of the thread **12** of the threaded rod **10**, the thread **12** can then be then engaged with the partial thread portion **212** (e.g., by translation or pivoting of the hanger **200**). The hanger **200** can then be pivoted relative to the threaded object **10** to move the upper and lower legs **204**, **208** toward the threaded rod **10** (e.g., until the lower leg **208** contacts the threaded rod **10**). The lower leg **208** acts as a retainer,

maintaining the engagement of the partial thread portion **212** with the threaded rod **10** when rotated to an engaged configuration.

[0056] FIGS. **11** and **12** illustrate another embodiment of a hanger **300** according to the invention, as also can be engaged with a threaded object (not shown). In many aspects, the hanger **300** is similar to the hanger **200** described above and similar numbering in the **300** series is used for the hanger **300**. For example, the hanger **300** has a hanger body **302** that is Z-shaped, and has an upper leg **304**, an intermediate portion **306**, and a lower leg **308**. Further, a hole **310** is located in the intermediate portion **306**. The hanger **300** is also shown with a partial thread portion **312** in the upper leg **304**.

[0057] In some aspects, however, the hangers **200**, **300** differ from each other. For example, the hanger **300** further includes a side entry **320**. The side entry **320** has a closure **322** extending from and bendable relative to the lower leg **308**. The intermediate portion **306** does not extend along the location of the closure **322** (or, alternatively, the closure **322** can be viewed as forming a substantial part of the intermediate portion **306**), which allows lateral access to the hole **310** when the hanger **300** is in an open configuration as shown in FIG. **11**. The side entry **320** allows placement of the hanger **300** anywhere along a threaded object, without the need to “stab” the threaded object into the hole **310**. For example, if no end of the threaded rod **10** is accessible, the side entry **320** allows a threaded object (for example, the threaded rod **10** shown in FIG. **9**) to be received through the side entry **320**.

[0058] In some embodiments, the closure **322** can be configured to be secured in an open or closed configuration in a variety of ways. For example, have a closure tab **324** extending from a distal end of the closure **322**. The closure tab **324** is receivable with a hole **326** within the upper leg **304**. When in a closed configuration as shown in FIG. **12**, the closure **322** is bent relative to the lower hanger body **302**, towards the upper leg **304**, and the closure tab **324** is received within the hole **326**. In the closed configuration, with a threaded object engaged therein, the hanger **300** is capable of carrying a load and the closure **322** acts as a retainer (as does the leg **308**), maintaining the engagement of the partial thread portion **312** and the lower leg **308** with the threaded rod **10** and prevents the threaded object from laterally exiting the hole **310**. It should be noted that other configurations of a side entry are contemplated. For example, a closure can be positioned on the other side of the hole **310**, a closure can extend from the upper leg **304** with a closure tab or other latching mechanism to be engaged with the lower leg **308**, or some combination of these.

[0059] Looking now to FIGS. **13-15**, a partial thread portion can also be formed with multiple sized threads according to another embodiment of the invention. For example, a partial thread portion **412** on a hanger body **402** of a hanger, for example the hanger **300**, is shown with a set of nested threads, including a first thread **416A** nested within a second thread **416B**. The first thread **416A** is smaller than the second thread **416B** (i.e., is configured to engage threads of a threaded object with a smaller diameter than is the thread **416B**). By superimposing a smaller thread into a larger thread, multiple diameters of threaded objects can be engaged by the same partially threaded feature. For example, the first thread **416A** can be sized to engage a $\frac{1}{4}$ inch diameter threaded object (not shown) and the second thread **416B** can be sized to receive a $\frac{3}{8}$ inch diameter threaded object (not shown). Thus, for example, the partial thread portion **412** can be used to secure a hanger to threaded rods with diameters of either $\frac{1}{4}$ inch or $\frac{3}{8}$ inch. It is contemplated that other embodiments can have different thread sizes. In some embodiments, the first thread **416A** can be sized to engage a $\frac{3}{8}$ inch diameter threaded object (not shown) and the second thread **416B** can be sized to receive a $\frac{1}{2}$ inch diameter threaded object (not shown).

[0060] FIGS. **16** through **26** illustrate another embodiment of a hanger **500** according to the invention, as also can be used with nested threads of different sizes in a partial thread portion **512** on a hanger body **502**. In many aspects, the hanger body **502** is similar to the hanger **402** described above and similar numbering in the **500** series is used for the hanger **500**. For example, the hanger body **502** has a partial thread portion **512** with a set of nested threads, including a first thread **516A**

nested within a second thread **516B**. The first thread **512A** is smaller than the second thread **516B**. Further, as can be seen in FIGS. **16** and **17**, in some embodiments, the backside of the partial thread portion **512** is corrugated. For example, the partial thread portion **512** has ribs **514** opposite roots **518** of the first and second threads **516A**, **516B**. This is also similar to the partial thread portion **212** described above with respect to the hanger **200**.

[0061] In some aspects, however, the hanger bodies **402**, **502** differ from each other. For example, the hanger body **502** includes a set of slots **520** configured to be part of a threaded object retention assembly, which can include the set of slots **520** and a retainer (e.g., a clip retainer strap **522** as shown in FIGS. **17** through **20** or a hinged retainer strap **524** as shown in FIGS. **23** through **26**). The clip retainer strap **522** has a set of clip ends **526**, each with catch **528** and a tab **530** extending outward and disposed at an angle greater than zero degrees from the respective clip end **526**. In some embodiments, the clip retainer strap **522** can be formed from spring steel.

[0062] The catches **528** are configured to be received within the set of slots **520**. The catches **528** can be configured to be bent to prevent the removal of the clip ends **526** from the set of slots **520** and relatively loosely couple the clip retainer strap **522** to the hanger body **502** in a receiving position (shown in FIG. **19**). A threaded object (e.g., a $\frac{1}{2}$ inch threaded rod **20** as shown in FIGS. **19** through **21**) can be received between the partial thread portion **512** and the clip retainer strap **522**. From the receiving position, the clip retainer strap **522** is configured to move from a non-engaged configuration (shown in FIG. **19**) in which the catches **528** of the clip ends **526** are passed through the set of slots **520** and an engaged configuration (shown in FIGS. **20** and **21**) in which the clip ends **526** are urged further within the set of slots **520** until the tabs **530** pass through the set of slots **520**. In the illustrated embodiment, the tabs **530** are resilient and configured to bend (e.g., resiliently flex) relative to the clip end **526** to pass through the set of slots **520** and spring back to contact the back of the hanger body **502** as shown in FIG. **21** to induce a retention force onto the threaded rod **20** to retain thread engagement between threads of the threaded rod **20** that are engaged with the partial thread portion **512**. However, a strap or other retainer in other embodiments can otherwise engage a hanger body according to various known mechanical engagement types (e.g., keyhole openings, bayonet engagements, etc.). FIG. **22** further illustrates a $\frac{3}{8}$ inch threaded rod **30** retained between the partial thread portion **512** and the clip retainer strap **522**.

[0063] The hinged retainer strap **524** shown in FIGS. **23** through **26** is similar to the clip retainer strap **522**. However, the hinged retainer strap **524** has a hinge end **532** and a clip end **534**. The hinge end **532** can be formed as a curved section of the hinged retainer strap **524** that extends through one of the set of slots **520** and is hingedly retained therein by the curvature of the curved section. The hinged retainer strap **524** can then rotate relative to the hanger body **502** via the hinge end **532**. The clip end **534** can include a set of tabs **536** to pass through the other slot of the set of slots **520** and engage with the back side of the hanger body **502**.

[0064] The clip retainer strap **522** and the hinged retainer strap **524** are provided as examples of retention devices. Other configurations of retention devices are contemplated, including, for example, both retention devices integrally formed with the hanger body **502** and independently formed from the hanger body **502**.

[0065] In some embodiments, other features can be provided to help secure a threaded object. For example, FIG. **27** illustrates a set of straps **600**, **700** that can be used alone or in conjunction with the hangers **100**, **200**, or other hangers with partial threads, to engage a threaded object. The strap **600** includes a strap body **602**, a set of thread engagement tabs **604**, **606** that form partial threaded portions, a locking tab **608** extending from the body **602**, and a set of retention clip locks **610**, **612** sized to receive and retain the locking tab **608** thereunder. Additionally, or alternatively, the strap body **602** can be formed with a partial thread portion extending inward toward the thread engagement tabs **604**, **606**.

[0066] In FIGS. **28** and **29**, a threaded object, for example, the threaded rod **10**, is shown in the

process of being engaged with the strap **600**. The threaded rod **10** is received between the strap body **602** and the thread engagement tabs **604**, **606** and the strap body **602** is then bent over the threaded rod **10** to secure the threaded rod **10** between the strap body **602** and the thread engagement tabs **604**, **606** and engage the threaded rod **10** with the thread engagement tabs **604**, **606**. The locking tab **608** is then pressed into and between the retention clip locks **610**, **612** to retain the locking tab **608** and to further secure the engagement of the strap **600** around the threaded rod **10**.

[0067] Looking back to FIG. 27, the strap **700** is shown with a strap body **702** and a set of thread engagement tabs **704**, **706** that form partial threaded portions on either side of the strap body **702**. Additionally, or alternatively, the strap body **702** can be formed with a thread portion extending inward toward the thread engagement tabs **704**, **706**. In use, a threaded object can be received between the strap body **702** and the thread engagement tabs **704**, **706**. The strap body **702** is configured to be bent or resiliently move over the threaded object (not shown) to further retain the engagement of the thread engagement tabs **704**, **706** with a threaded object (not shown).

[0068] In some embodiments, multiple straps can be used. For example, as shown in FIG. 30, a set of two of the straps **700** are axially aligned with each other, with openings that face in opposing directions. A threaded object (not shown) can be received with each of the straps **700** and the strap bodies **702** can be bent (or resiliently flex) around the threaded object to further engage the threaded object with the thread engagement tabs **704**, **706** of each of the straps **700**. For example, a hanger with the straps **700** arranged as in FIG. 30 can be pivoted within the plane of a substrate that supports the straps **700** to snap a threaded rod into engagement with both of the straps **700** and all of the partial threaded portions of the tabs **704**, **706**.

[0069] In some instances a strap may be used to secure a threaded object in conjunction with another thread engaging mechanism. For example, in FIG. 31 a strap body **702** is shown axially spaced from an extruded partial thread portion **812** on hanger **800** with a J-Hook support **802**. A threaded object (not shown) can be engaged with the threads of the extruded partial portion **812** and further secured to the J-Hook support **802** by the strap body **702**.

[0070] In other embodiments, other configurations are possible. For example, certain features and combinations of features that are presented with respect to particular embodiments in discussion above, can be utilized in other embodiments and in other combinations, as appropriate. In this regard, for example, different configurations of partial thread portions, hanger bodies, straps, and so on, as presented with respect to a particular one of the hangers **100**, **200** or other examples discussed above can be implemented in combination with features of any number of the other hangers **100**, **200** or others.

[0071] In some implementations, devices or systems disclosed herein can be utilized or installed using methods embodying aspects of the invention. Correspondingly, description herein of particular features or capabilities of a device or system is generally intended to inherently include disclosure of a method of using such features for intended purposes and of implementing such capabilities. Similarly, express discussion of any method of using a particular device or system, unless otherwise indicated or limited, is intended to inherently include disclosure, as embodiments of the invention, of the utilized features and implemented capabilities of such device or system. For example, some methods have been described with respect to the hangers **100**, **200** and the engagement with the threaded rod **10** therein and with respect to the hanger body **502**, the clip retainer strap **522**, the hinged retainer strap **544**, and the engagement with the threaded rods **20**, **30**, however, other methods are contemplated.

[0072] Thus, embodiments of the inventions can provide an improved hanger for engaging a threaded object, such as threaded rods. In some embodiments, hangers according to the invention can substantially reduce the time and labor that may be required during installation and use, such as by obviating the need to thread the hanger onto the threaded rod or otherwise use a nut to secure the hanger thereto. Further, some embodiments of the invention can be releasably engaged with the

threaded rod to more easily install and move the hanger, thereby allowing for attachment of the hanger to the threaded rod in hard or difficult areas to reach. Additionally, some embodiments of the invention can be used, without modification, on a variety of threaded object sizes.

[0073] The previous description of the disclosed embodiments is provided to enable any person skilled in the art to make or use the invention. Various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without departing from the spirit or scope of the invention. Thus, the invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

Claims

1. A hanger for retaining a threaded rod, the hanger comprising: a first partial thread portion, including: first threads arranged to engage a thread of the threaded rod; and first ribs that are opposite first roots of the first threads; and a retainer connected to the first partial thread portion and resiliently movable relative to the first partial thread portion between an installation configuration and an engaged configuration; in the installation configuration, the retainer being spaced from the first partial thread portion to admit the threaded rod into threaded engagement with the first partial thread portion, without rotation of the first partial thread portion or the threaded rod about a longitudinal axis of the threaded rod; and in the engaged configuration, the retainer being spaced from the first partial thread portion to retain the threaded rod in threaded engagement with the first partial thread portion, to carry an axial load on the threaded rod.
2. The hanger of claim 1, wherein the first threads of the first partial thread portion include: a first set of threads sized to engage with rod threads of a first diameter; and a second set of threads sized to engage with rod threads of a second diameter, wherein the first diameter is smaller than the second diameter.
3. The hanger of claim 2, wherein the first set of threads are nested within the second set of threads or superimposed on the second set of threads.
4. The hanger of claim 1, wherein the retainer includes a second partial thread portion, including second threads that face toward the first threads of the first partial thread portion to threadedly engage the thread of the threaded rod.
5. The hanger of claim 1, wherein the retainer and the first partial thread portion are integrally included in a hanger body of the hanger.
6. The hanger of claim 5, wherein the retainer integrally includes a second partial thread portion.
7. The hanger of claim 6, wherein the retainer is cantilevered from the hanger body to align the second partial thread portion on an opposite side of the threaded rod from the first partial thread portion.
8. The hanger of claim 6, wherein the second partial thread portion includes second threads arranged to engage the thread of the threaded rod, and second ribs that are opposite second roots of the second threads.
9. A hanger for retaining a threaded rod, the hanger comprising: a hanger body with a first partial thread portion configured to engage with a thread of the threaded rod; and a retainer coupled to the hanger body, the retainer being resiliently movable relative to the first partial thread portion between an installation configuration, in which the retainer is spaced from the first partial thread portion to permit axial translation of the threaded rod between the first partial thread portion and the retainer, and an engaged configuration, in which the retainer secures the threaded rod in threaded engagement with the first partial thread portion, the first partial thread portion includes a threaded-rod-engaging side with first threads having first roots, and a side opposite the threaded-rod-engaging side with first ribs positioned opposite the first roots.
10. The hanger of claim 9, wherein the retainer includes a second partial thread portion configured

to engage with the thread of the threaded rod opposite the first partial thread portion.

11. The hanger of claim 10, wherein the second partial thread portion includes a threaded-rod-engaging side with second threads having second roots, and a side opposite the threaded-rod-engaging side with second ribs positioned opposite the second roots.

12. The hanger of claim 10, wherein the retainer is configured to resiliently return from the installation configuration to the engaged configuration to biasingly urge the threaded rod into threaded engagement with the first partial thread portion.

13. The hanger of claim 12, wherein retainer is integral with the hanger body.

14. The hanger of claim 13, wherein the retainer is cantilevered relative to the hanger body to support the second partial thread portion and to biasingly engage the second partial thread portion with the threaded rod in the engaged configuration.

15. A method for securing a threaded rod, the method comprising: providing a hanger that includes a first partial thread portion and a retainer connected to the first partial thread portion and resiliently movable relative to the first partial thread portion between an installation configuration and an engaged configuration, the first partial thread portion including first threads and first ribs that are opposite first roots of the first threads; and without rotation of the threaded rod or the hanger about a longitudinal axis of the threaded rod, moving the threaded rod or the hanger to: with the retainer in the installation configuration, admit the threaded rod into threaded engagement with the first threads; and after admitting the threaded rod into threaded engagement with the first threads, retain the threaded rod in threaded engagement with the first partial thread portion, with the retainer in the engaged configuration, to support an axial load on the threaded rod.

16. The method of claim 15, wherein, with the retainer in the engaged configuration, a second partial thread portion of the retainer threadedly engages the threaded rod to support the axial load.

17. The method of claim 16, wherein the moving of the threaded rod or the hanger resiliently deflects the retainer to the installation configuration, to admit the threaded rod into threaded engagement with the first threads.

18. The method of claim 17, wherein the retainer resiliently returns from the installation configuration to the engaged configuration to engage the second partial thread portion with the threaded rod.

19. The method of claim 16, the retainer is a cantilevered strap connected integrally to a retainer body that includes the first partial thread portion.

20. The method of claim 19, wherein the second partial thread portion includes threads with roots facing towards the threaded rod and ribs positioned opposite the roots and facing away from the threaded rod, the threads engaging the threaded rod in the engaged configuration to support the axial load.
