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Holmes et al.

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(54) **CERAMIC SPINE SECURITY CABLE**

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(73) Assignee: **Schlage Lock Company LLC**, Carmel, IN (US)

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(Continued)

(51) **Int. Cl.**
E05B 71/00 (2006.01)
E05B 73/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***E05B 73/0005*** (2013.01); ***E05B 15/1614*** (2013.01); ***E05B 67/003*** (2013.01); ***E05B 71/00*** (2013.01)

(58) **Field of Classification Search**
CPC E05B 73/0005; E05B 67/003; E05B 71/00; E05B 15/1614
(Continued)

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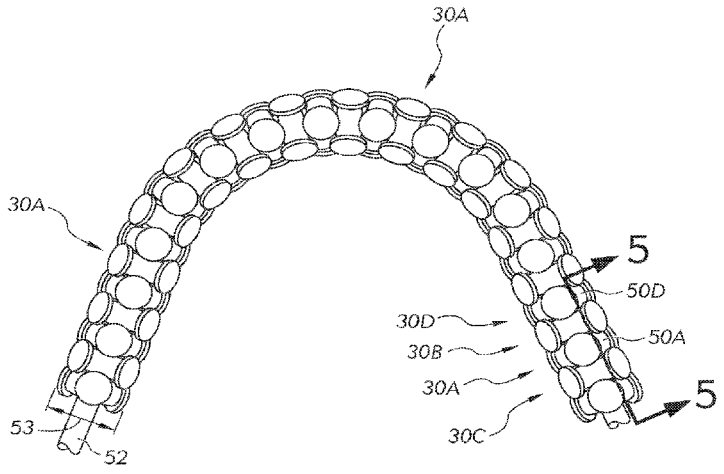
(74) *Attorney, Agent, or Firm* — Taft Stettinius & Hollister LLP

(57) **ABSTRACT**

A cable lock including a lock body having a locking mechanism with a locked state and an unlocked state. A ceramic body cable includes a plurality of nested ceramic bodies and a cord, wherein each one of the plurality of ceramic bodies includes a center portion having an aperture. Each aperture of the plurality of nested ceramic bodies forms a channel through which the cord is positioned. Each of the ceramic bodies also includes a projection and a space such that the projection of one of the ceramic bodies overlaps the space of an adjacent ceramic body. A mesh sleeve is positioned on an exterior of the ceramic body cable and a shrunken heat shrinkable tube is positioned over the mesh sleeve. The combined ceramic body cable, mesh sleeve, and shrunken heat shrinkable tube are coupled to the lock body.

20 Claims, 10 Drawing Sheets



Related U.S. Application Data

(60) Provisional application No. 62/382,379, filed on Sep. 1, 2016.

(51) **Int. Cl.**
E05B 67/00 (2006.01)
E05B 15/16 (2006.01)

(58) **Field of Classification Search**
USPC 70/14, 18, 30, 49, 53, 58, 233, 417
See application file for complete search history.

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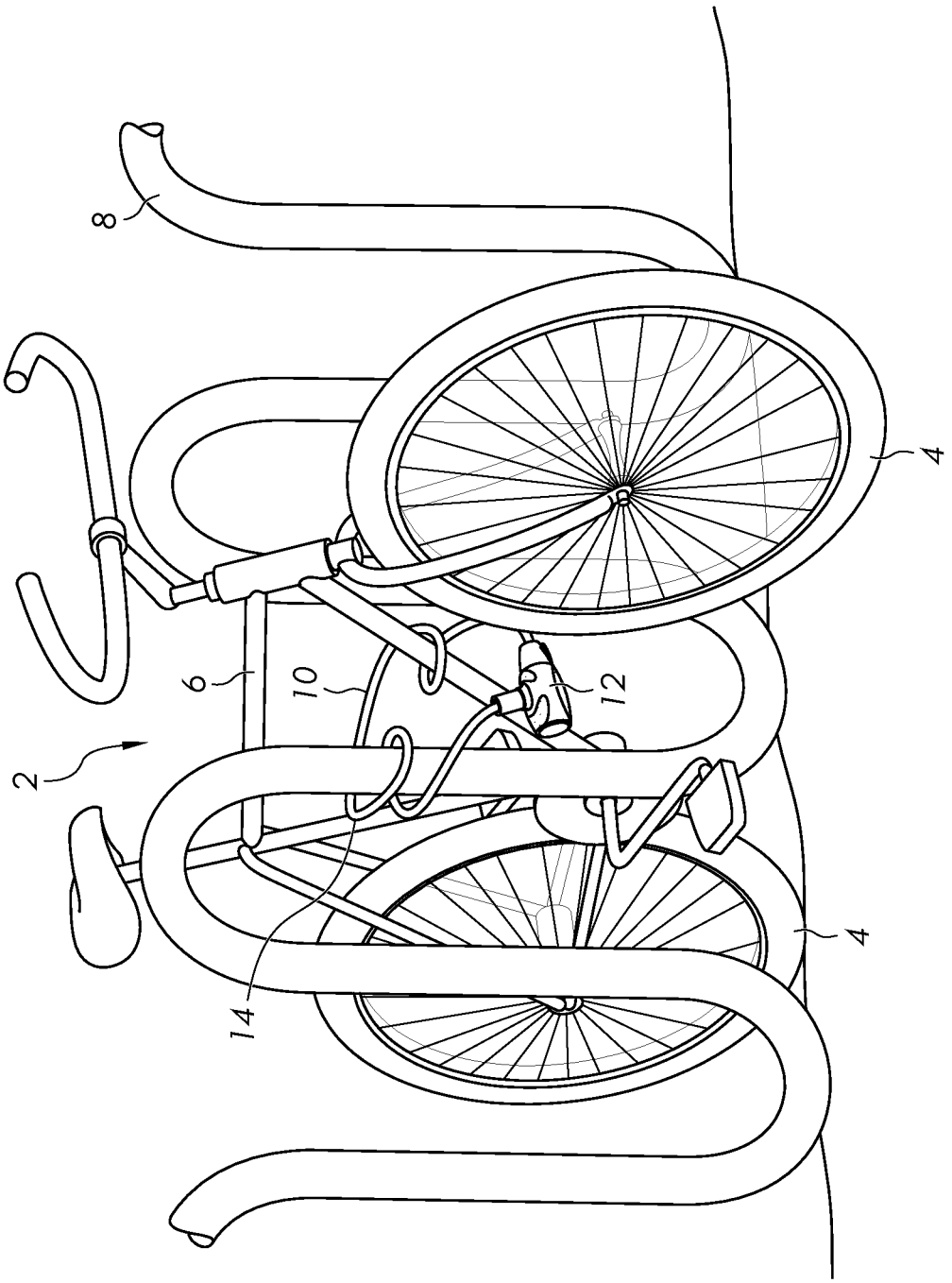


FIG. 1

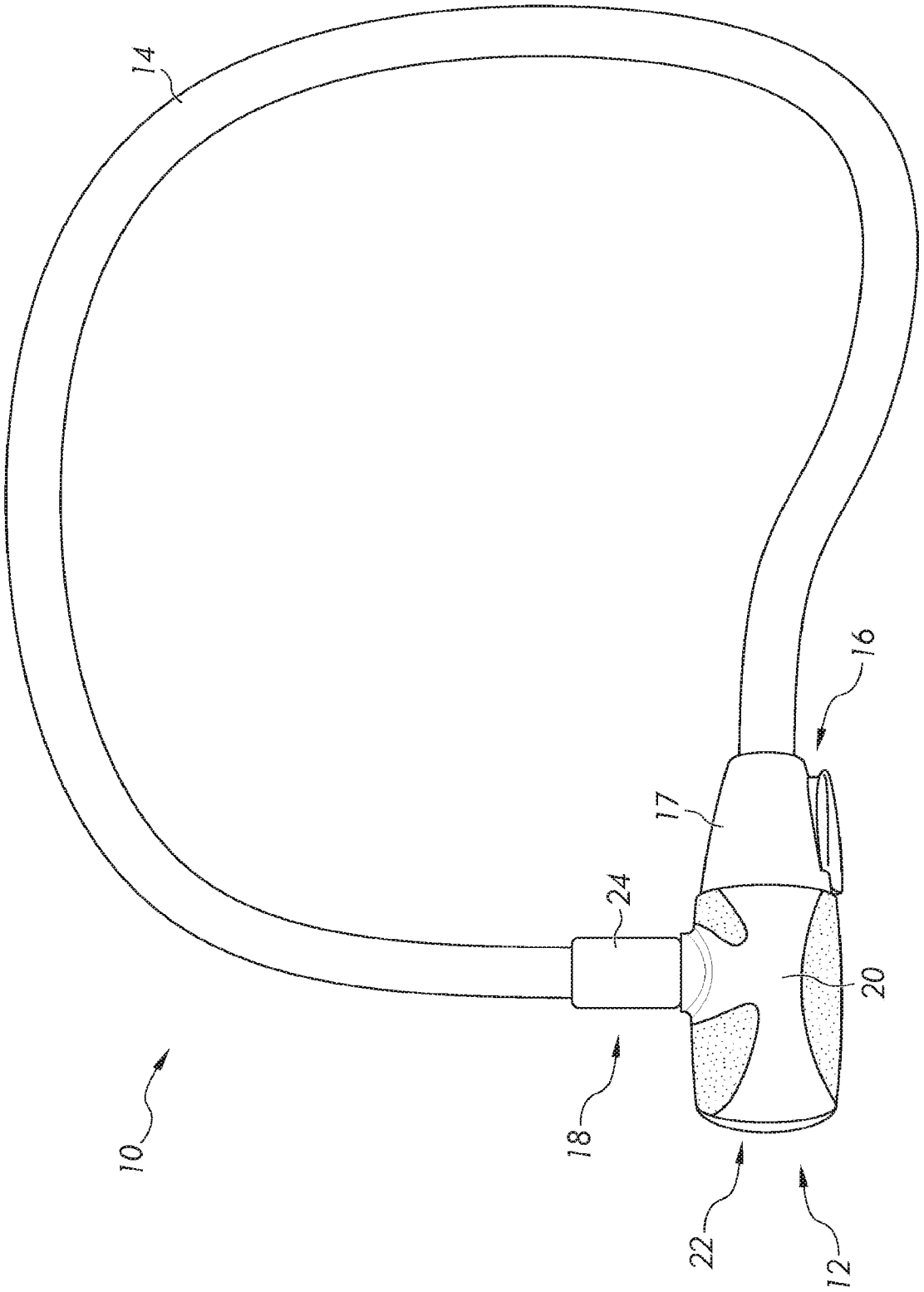
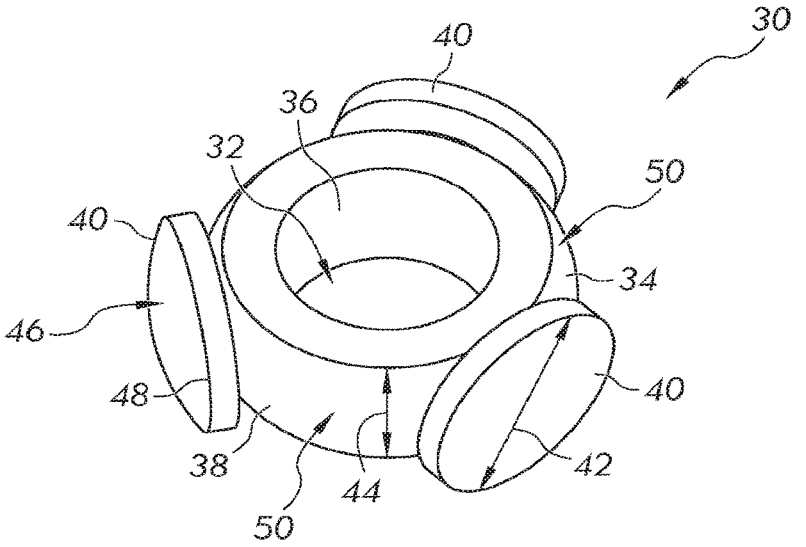


FIG. 2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44
42

FIG. 3

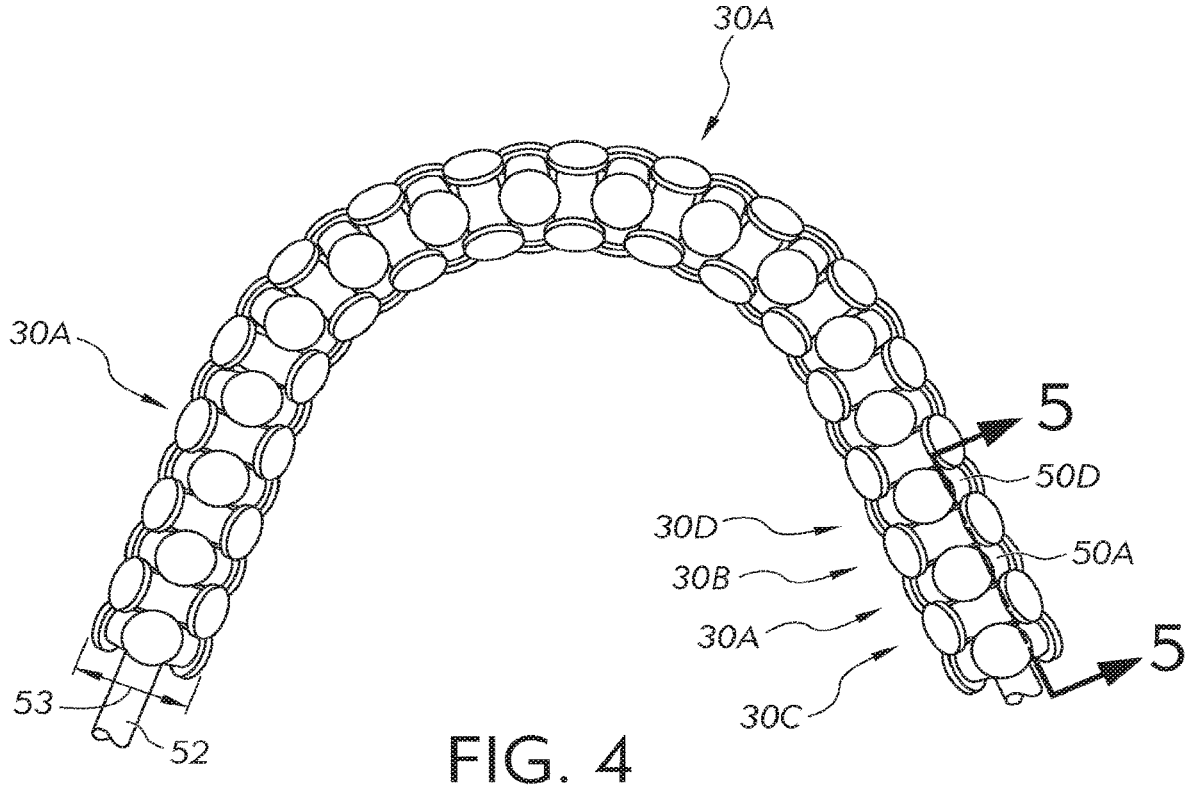

30A
30A
5
50D
30D
50A
30B
30A
5
53
52
30C

FIG. 4

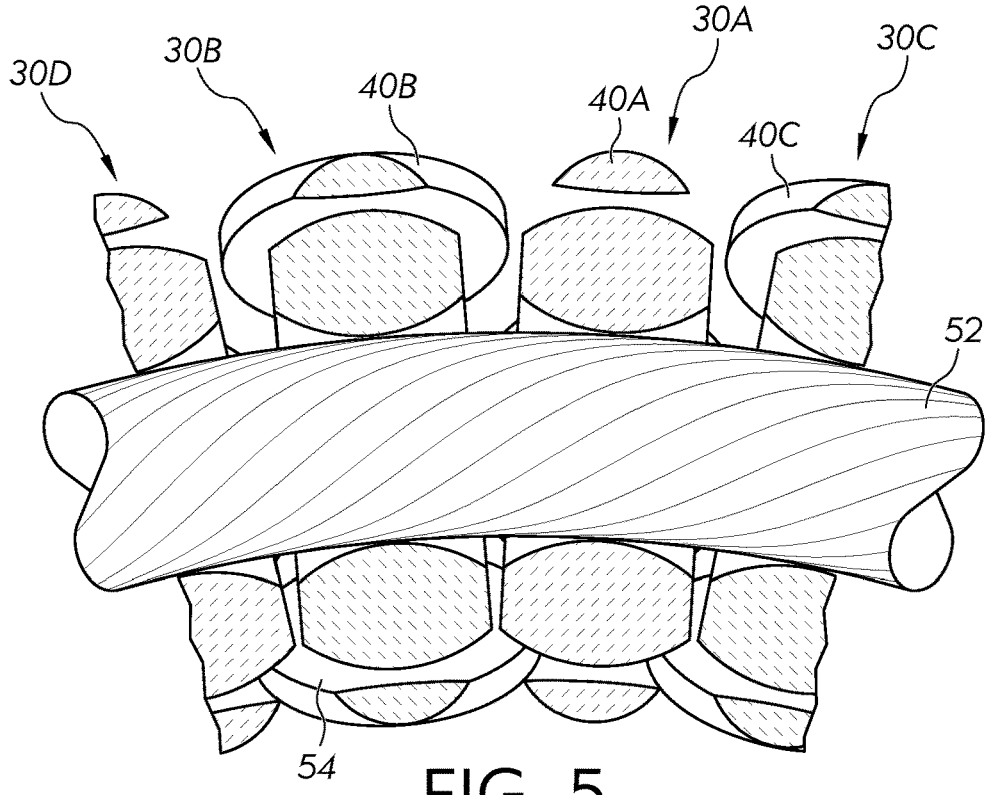
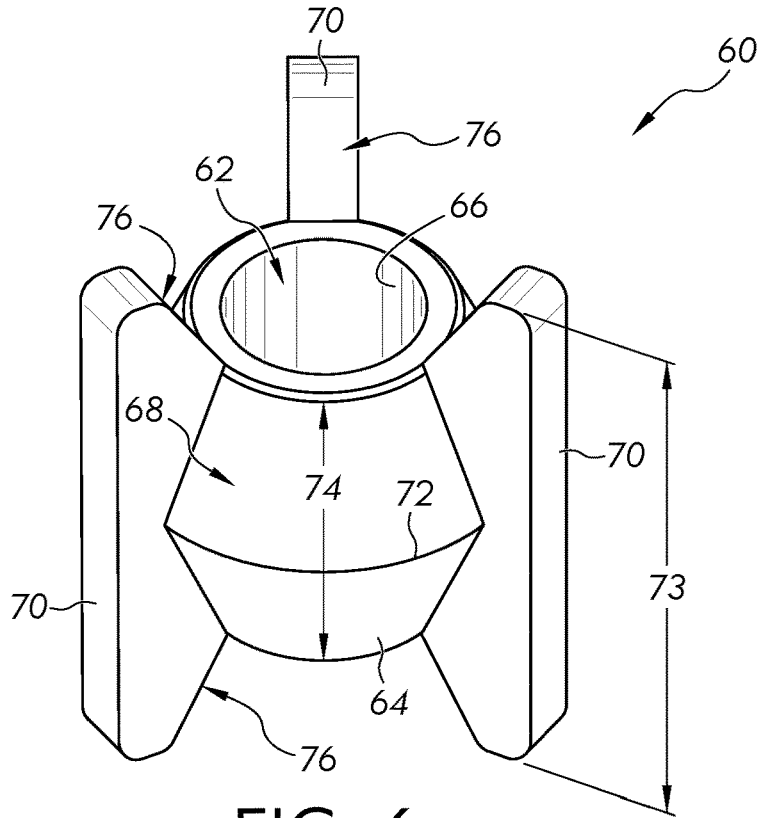

30A
30B
30C
30D
40A
40B
40C
52
54

FIG. 5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70
64
76

FIG. 6

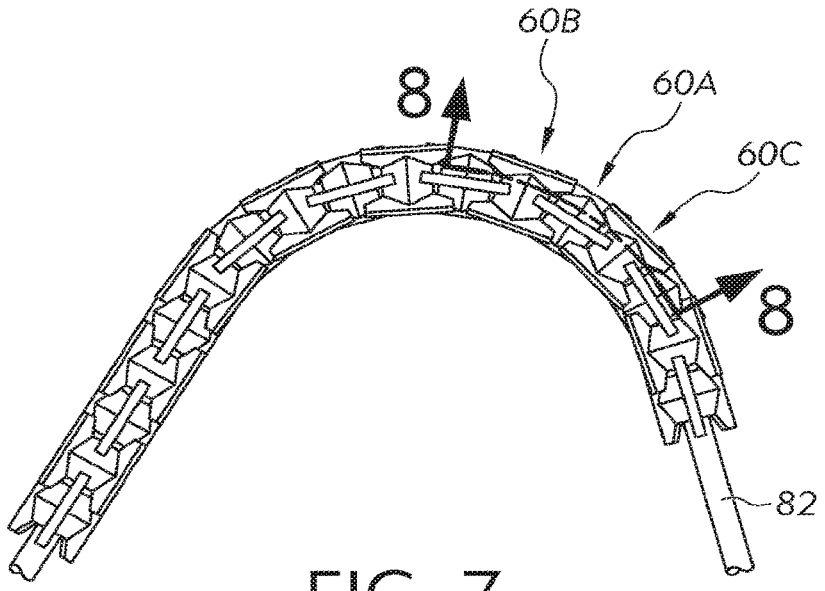

FIG. 7

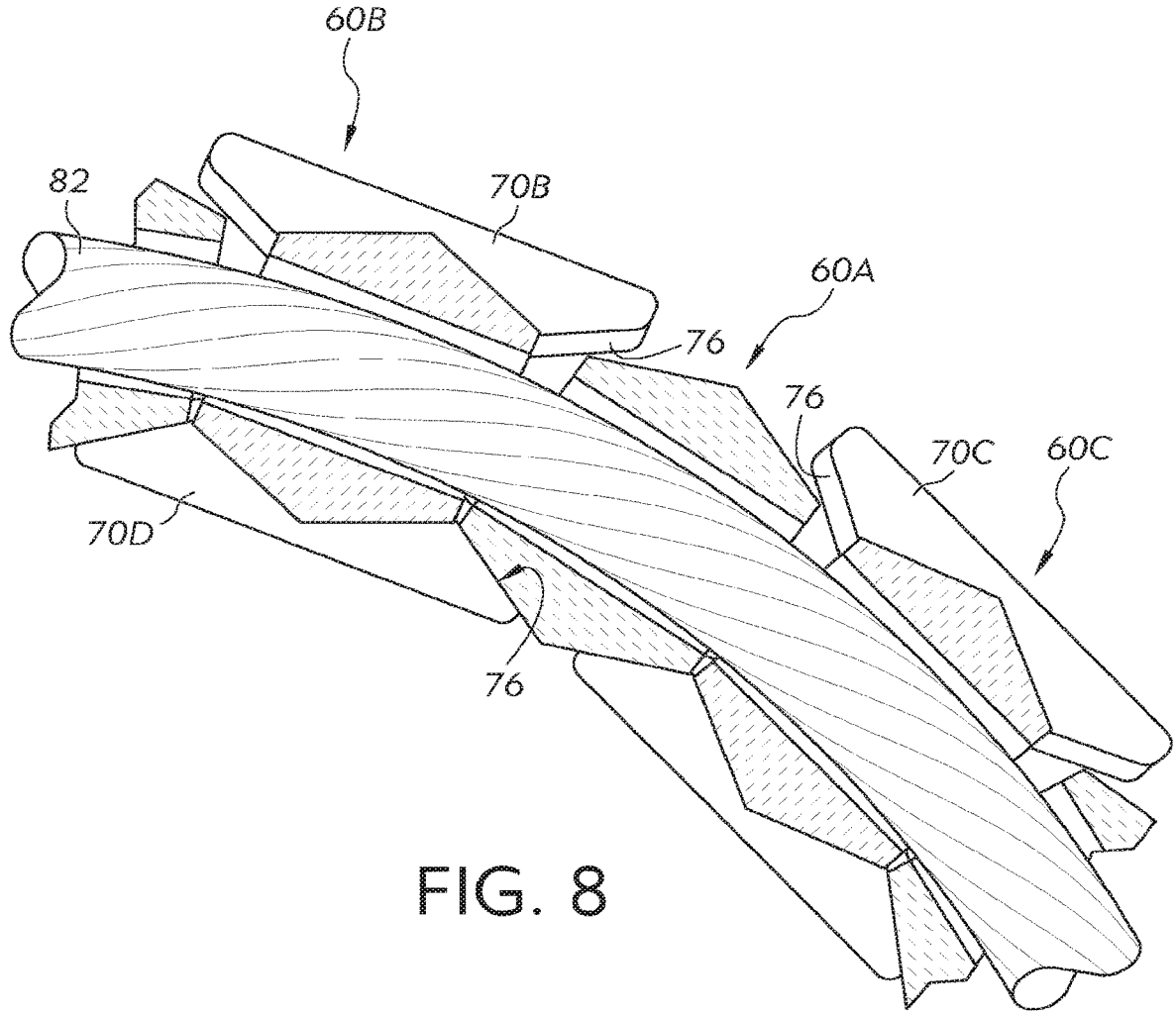

FIG. 8

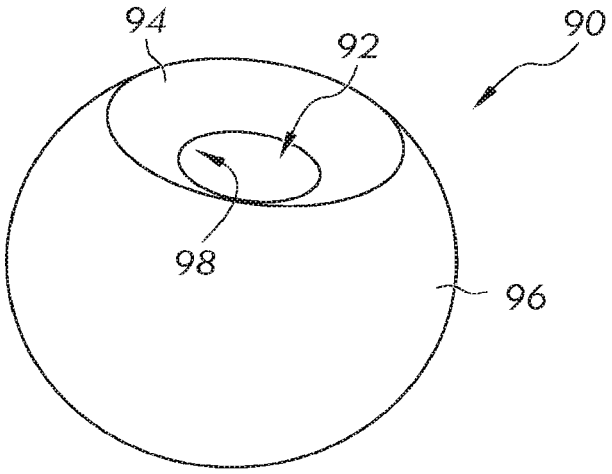

FIG. 9

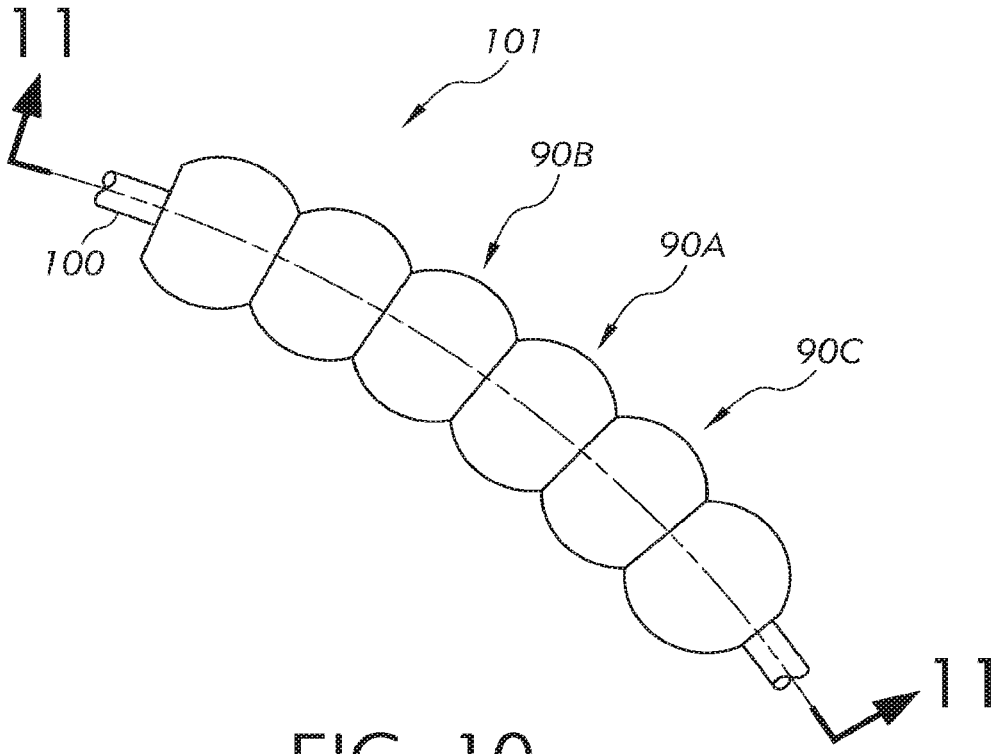

FIG. 10

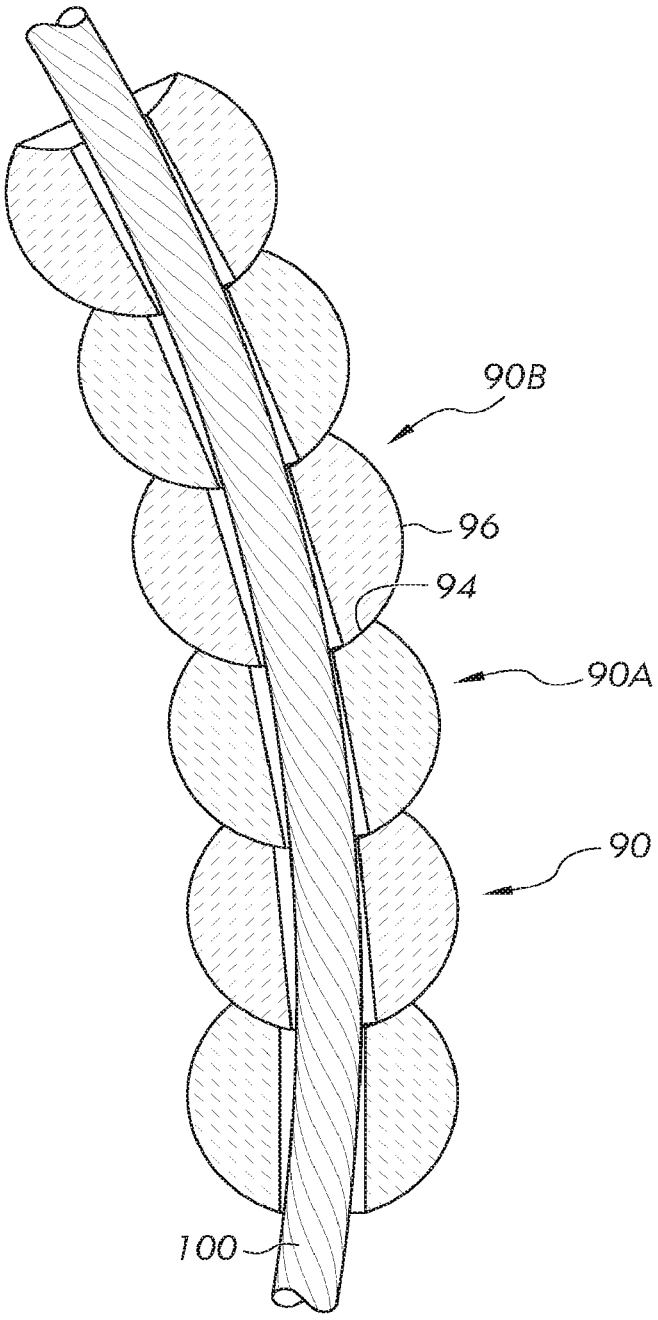

FIG. 11

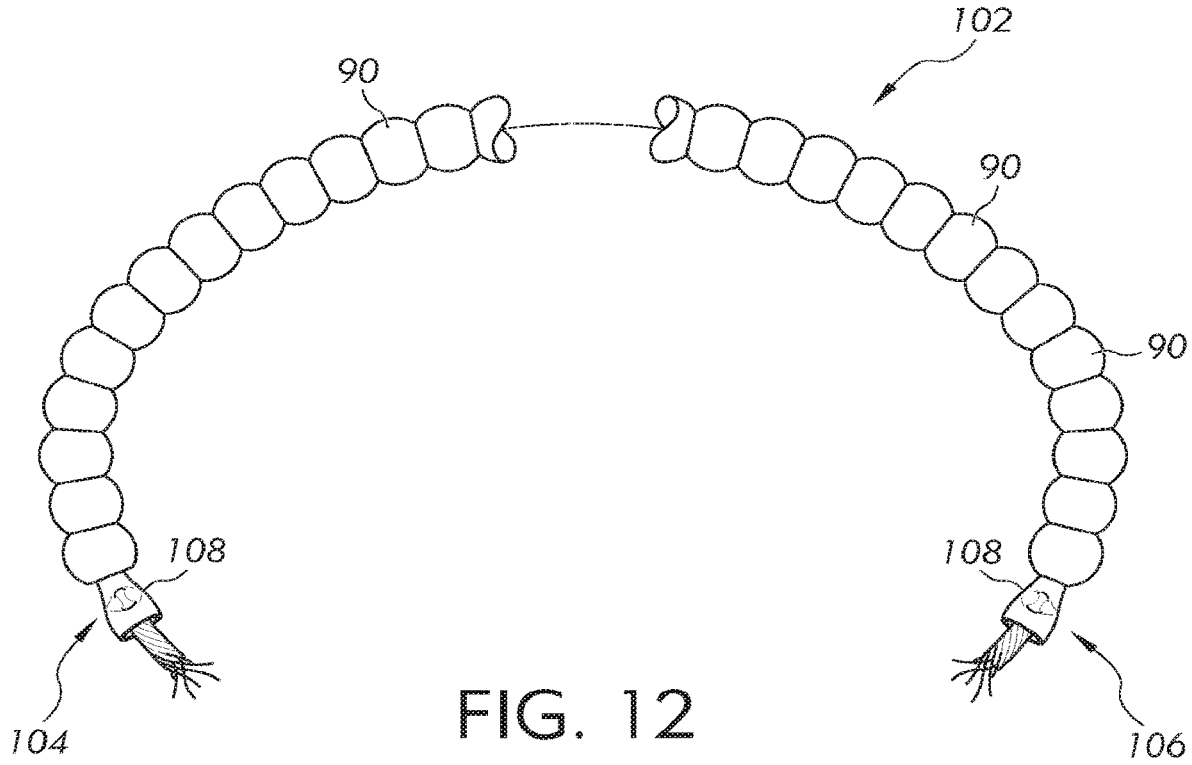

FIG. 12

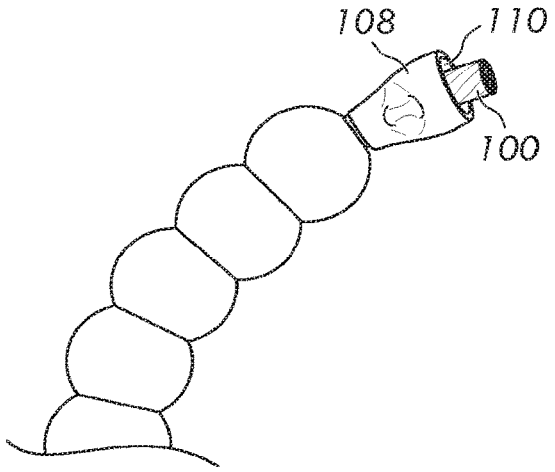

FIG. 13

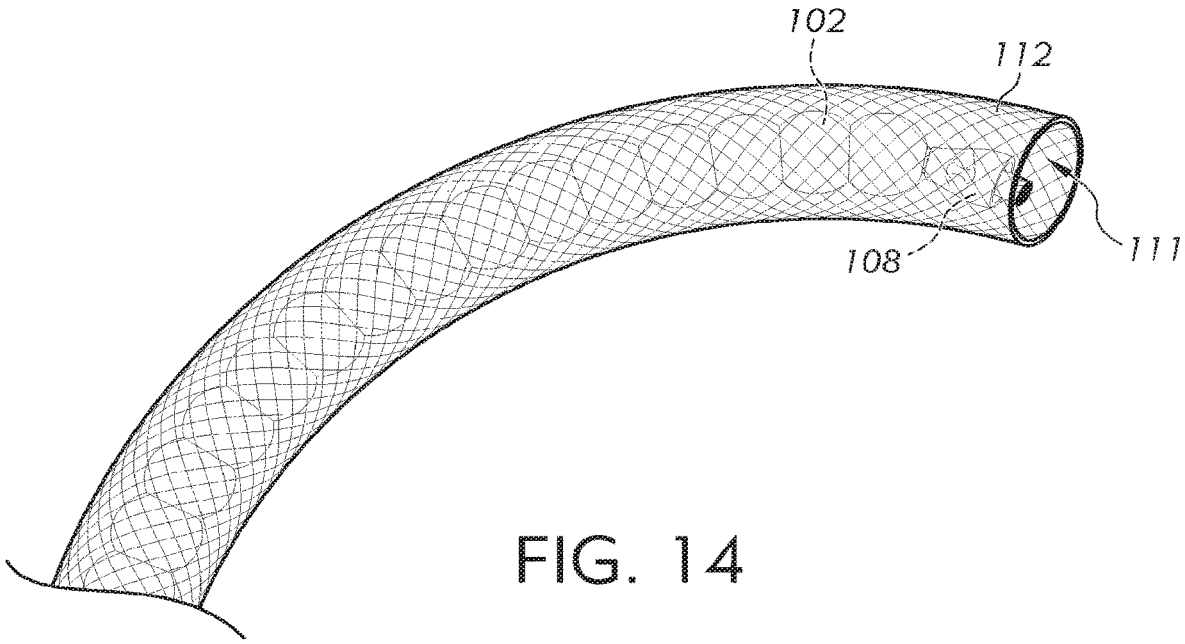

FIG. 14

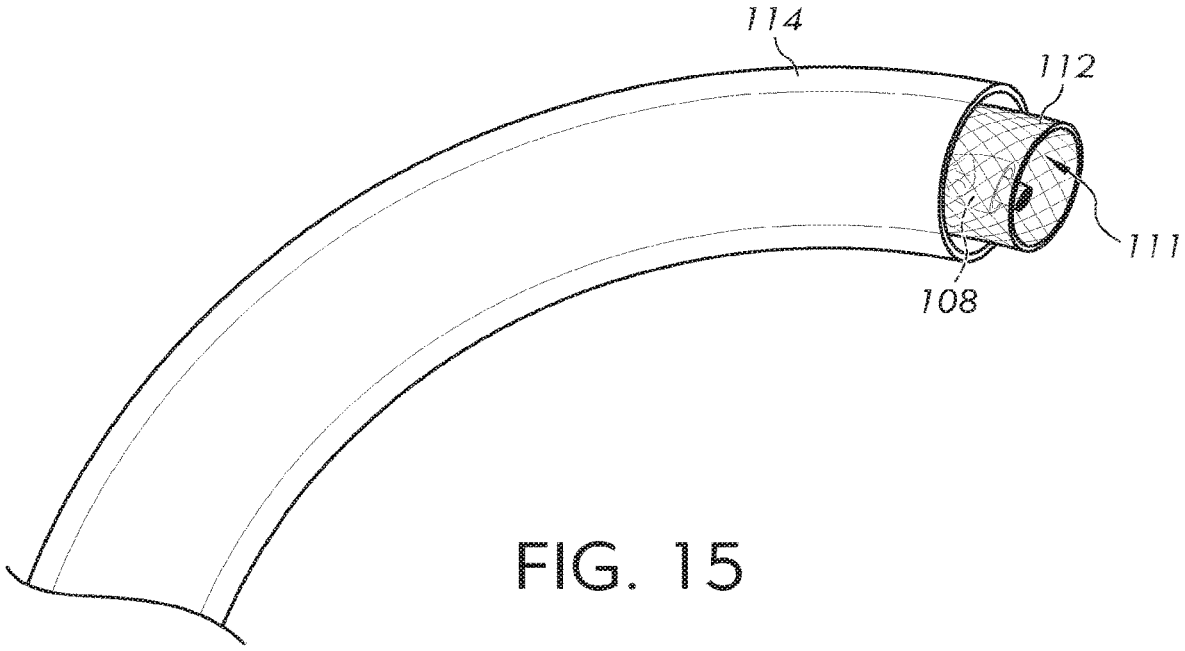

FIG. 15

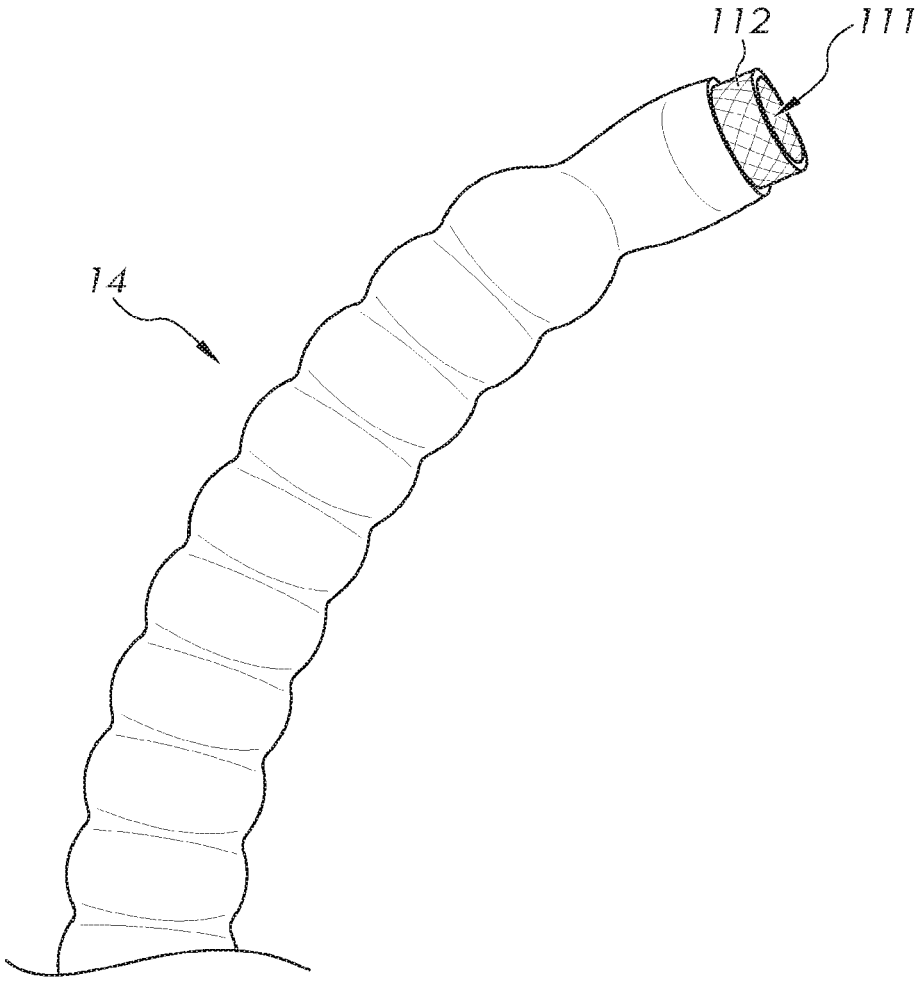

FIG. 16

CERAMIC SPINE SECURITY CABLE

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 15/693,608 filed Sep. 1, 2017 and issued as U.S. Pat. No. 10,196,837, which claims the benefit of U.S. Provisional Patent Application Ser. No. 62/382,379 filed Sep. 1, 2016, the contents of each application are hereby incorporated by reference in their entirety.

FIELD OF THE INVENTION

The present disclosure relates to a security device, and more particularly to a security cable lock for securing movable items such as bicycles, motorbikes, scooters, lawn equipment, outdoor furniture, and other items.

BACKGROUND

Lightweight transportation vehicles can be stolen due to the ease with which the vehicles can be removed from where the vehicle is stored or parked. In particular, bicycles are often subject to theft since a bicycle can simply be ridden away if not properly stored or protected. To reduce or eliminate the risk of theft of such vehicles, a wide variety of locks have been proposed, including U-locks and cable locks.

A U-lock typically includes a semi-enclosure member or shackle having legs or fittings with configured feet, a straight crossbar having openings for reception of the feet, and a locking mechanism in the crossbar for retaining or releasing the feet. A cable lock typically includes a relatively flexible cable having at one end a leg or fitting with a configured foot and a lock housing extending from the other end of the cable. The lock housing includes an opening for reception of the foot, and a locking mechanism in the lock housing to releasably retain the foot. For protection against theft, either of the locks can be used to couple a bicycle frame to a suitable object, such as a post, rail, rack or station. Once the U-lock or cable lock couples the bicycle frame to the suitable object, the lock is locked to prevent or reduce the likelihood of theft of the bicycle.

While both U-locks and cable locks are capable of securing a bicycle to a suitable object, neither of these types of locks provide complete protection against a thief having unlimited time and/or tools. For instance, some types of locks provide little protection when exposed to a thief having certain kinds of tools that are capable of breaking the lock housing, breaching or cutting the shackle, or cutting the cable of a cable lock.

U-locks and cable locks are not only used to secure bicycles, but are also used to secure other types of vehicles such as, for example, motorbikes, motorcycles, scooters, four wheelers, and other vehicles used for transportation. U-locks and cable locks are also used to secure items having value which are often stored outdoors such as, for example, lawn furniture, propane tanks, and gas grills. Any movable item having value can be prone to theft. What is therefore needed is a cable lock which provides an increased level of security for these and other items that are subject to theft.

SUMMARY

The present invention is directed to a cable lock for securing an item to prevent or to reduce the likelihood of theft of an item. The cable lock includes a cable having nested ceramic segments arranged on a cord or rope made of a metal wire or other materials.

In one embodiment there is provided a cable lock including a lock body with a locking mechanism having a locked state and an unlocked state, and a plurality of ceramic bodies. Each of one of the plurality of ceramic bodies includes a center portion having an aperture and a plurality of projections extending from the center portion, wherein each of the ceramic bodies is adjacently located and the plurality of projections of one of the plurality of ceramic bodies overlaps the center portion of each of two adjacently located ceramic bodies. A cord extends through the aperture of each of the plurality of adjacently located ceramic bodies and is operatively connected to the lock body.

In another embodiment there is provided a cable lock including a lock body having a locking mechanism, wherein the locking mechanism has a locked state and an unlocked state, and a ceramic body cable. The ceramic body cable includes a plurality of nested ceramic bodies and a cord, and wherein each one of the plurality of ceramic bodies includes a center portion having an aperture. The apertures of the plurality of nested ceramic bodies form a channel through which the cord is located. A mesh sleeve is located on an exterior of the ceramic body cable and a shrunken heat shrinkable tube located over the mesh sleeve.

In still another embodiment there is provided a method of forming a cable lock including providing a plurality of ceramic elements, a cord, a mesh sleeve, a heat shrinkable tube, and a lock body. The method further includes the steps of threading the cord through the plurality of ceramic elements to form a ceramic body cable, threading the ceramic body cable through the mesh sleeve, threading the mesh sleeve and ceramic body cable through the heat shrinkable tube, shrinking the heat shrinkable tube about the mesh sleeve, and connecting the combined ceramic body cable, mesh sleeve, and shrunken heat shrinkable tube to the lock body.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a bicycle secured to a bicycle rack with a cable lock.

FIG. **2** is a plan view of a cable lock including a lock housing and a cable releasably coupled to the lock housing.

FIG. **3** is a perspective view of a ceramic segment.

FIG. **4** is a perspective view of a plurality of the nested ceramic segment of FIG. **3**.

FIG. **5** is a cross-sectional view of a few of the plurality of the nested ceramic segments of FIG. **4**.

FIG. **6** is a perspective view of another ceramic segment.

FIG. **7** is a perspective view of a plurality of the nested ceramic segments of FIG. **6**.

FIG. **8** is a cross-sectional view of a few of the plurality of nested ceramic segments of FIG. **7**.

FIG. **9** is a perspective view of another ceramic segment.

FIG. **10** is a perspective view of a plurality of the nested ceramic segments of FIG. **9**.

FIG. **11** is a cross-sectional view of a few of the plurality of nested ceramic segments of FIG. **10**.

FIG. **12** is a plan view of a cable of a cable lock illustrating the segments of FIG. **9**.

FIG. **13** is a plan view of a crimped end of a cable of a cable lock.

FIG. **14** is a plan view of a sleeve covering the cable of FIG. **12**.

FIG. **15** is a plan view of a shrinkable tube covering the sleeve of FIG. **14**.

FIG. **16** is a plan view of the shrinkable tube of FIG. **15** after being shrunk around the cable of FIG. **12**.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings where specific language is used to describe the same. It should be understood that no limitation of the scope of the invention is thereby intended. Any alterations and further modifications in the described embodiments, and any further applications of the principles of the invention as described herein are contemplated as would normally occur to one skilled in the art to which the invention relates.

FIG. **1** illustrates a perspective view of a bicycle **2** having wheels **4** supported by a frame **6**. The bicycle frame **6** is secured to a bicycle rack **8** with a cable lock **10**. The cable lock **10** includes a lock head **12** coupled to a lock cable **14**. To lock the bicycle **2** to the rack **8**, the lock cable **14** is wrapped around the rack **8** and the frame **6** to secure the frame **6** to the rack **8**. While locking the frame **6** to the rack **8** is illustrated in the figures, the illustrated method of securing the bicycle is only one possibility. The user of the bicycle **2** generally determines the best method of locking and many other methods are used and known. In addition, more than one lock can be used and locks of the same type or different types are often utilized.

FIG. **2** illustrates a plan view of the cable lock **10** including the lock head **12** coupled to the lock cable **14**. The lock cable **14** includes a first end **16** fixedly coupled to the lock head **12** and a second end **18** releasably coupled to the lock head **12**. The first end **16** is fixedly connected to a collar **17** which is part of the lock head **12**. The second end **18** is inserted into a lock housing **20** and held securely to the lock head **12** when locked by a lock mechanism (not shown). An end **22** of the lock head **12** includes a keyhole (not shown) configured to receive a key for locking and unlocking the lock mechanism. In other embodiments, the lock head **12** includes a combination lock. In different embodiments, the combination lock includes a rotating dial, rotating discs, an electronic keypad or a mechanical keypad, as is understood by those skilled in the art. In still other embodiments, the lock head includes an electronic lock responsive to a key fob. The second end **18** of the lock cable **14** includes a collar **24** which holds a locking pin, not shown. The locking pin is inserted into the lock mechanism and held securely to the lock head **12** when the lock is locked. In the unlocked condition, the locking pin is removed from the lock mechanism to free the second end **18** of the lock cable **14** from the housing **20**.

The lock cable **14** includes a plurality of segments or bodies located on a cord or rope which is placed through each of the plurality of segments. FIG. **3** illustrates one embodiment of a segment **30** which includes a bore **32** through which the rope is located. The segment **30** includes a band or ring **34**, also called a center portion, having a circular inner surface **36**. In different embodiments, the band **34** is a circular band or other shapes. The ring further includes an outer surface **38** which is curved from top to bottom from which extends a plurality of projections **40**.

As disclosed herein the segments are formed of relatively hard material including a ceramic material. The ceramic material includes, but is not limited to, a crystalline or non-crystalline material, such as silicon carbide, boron oxide, silicon nitride, born carbide, and tungsten carbide-cobalt. In addition, the segments, in different embodiments, are formed of composite materials having a ceramic matrix, such as embedded ceramic fibers.

Each of the plurality of projections **40** is generally disc shaped and includes a diameter **42** having a length greater than a height **44** of the ring **34**. The projections **40** are centrally located along the ring **34** such that a portion of the projection **40** extends above the ring **34** and a portion of the projection **40** extends below the ring **34**. The projection **40** also includes a convex surface **46** having a central area extending further from the surface **38** of the ring **34** than does a circular edge **48** of the projection **40**.

The segment **30** in the embodiment of FIG. **3** includes three of the projections **40**. The projections **40** are equally spaced about the outer surface **38** of the ring **34** to define a space **50** located between each of the projections **40**. The space **50** includes a lateral dimension which is sufficiently sized to accommodate a portion of the projection of an adjacent segment as illustrated in FIG. **4**.

As shown in FIGS. **4** and **5**, a rope or cord **52** extends through the bore **32** of each of the segments **30**. Each one of a plurality of the segments **30** is located next to another segment **30**, such that one of the segments **30** nests with an adjacent segment **30**. For instance a segment **30**A is located between a segment **30**B and a segment **30**C. Segment **30**D is located adjacent to segment **30**B. The projections **40**, of one of the segments, overlaps with the adjacent space **50** of an adjacent segment **30**. For example, a projection **40**B extends over and overlaps the space **50**A and extends over and overlaps the space **50**D such that each of segments **30** are nested with an adjacent segment **30** on one or both sides. In one embodiment, each of the plurality of segments **30** is substantially similar. In different embodiments, the rope includes a threaded cable, a braided cable, a woven cable, and a twisted cable. In one embodiment, the cable is a seven by seven twisted cable made of seven individual wires braided to form a single wire part and seven of these wire parts braided together. In one embodiment, the combined rope **52** and segments **30** include an outside diameter **53** of from about 10.0 to 12.00 millimeters. Other diameters of different sizes are also possible.

To accommodate nesting of adjacent segments **30**, each of the segments **30** is rotated a predetermined amount with respect to an adjacent segment **30** to overlap a space with a projection. In the segment **30**, as shown in the embodiment of FIG. **3**, the segment **30** includes three of the projections **40** such that the amount of rotation with an adjacent segment is approximately 60 degrees. In other embodiments of the segments having other numbers of projections, the amount of relative rotation is determined based on the number of projections. For instance, in a segment having two projections, the amount of relative rotation between adjacent segments is 90 degrees. In a segment having four projections, the amount of relative rotation between adjacent segment is 45 degrees.

FIG. **5** illustrates a cross-sectional view of a few of the plurality of the nested ceramic segments of FIG. **3**. In this embodiment, the rope **52** is bent such that a projection **40**B extends over and into the adjacent spaces **50**A and **50**D, but does not contact the surfaces defining the spaces **50**A and **50**D. Sufficient bending of the rope **52** places the projections **40** into contact with an adjacent space **50** of an adjacent segment **30** on an inside curve of the cable. Consequently, the amount of curve of the cable is limited by contact of an inside surface **54** of a projection **40**. In this and other

embodiments, the rope is approximately 3 to 4 millimeters in diameter. Other diameters are also possible.

FIG. **6** illustrates another embodiment of a segment **60** which includes a bore **62** through which the rope is located. The segment **60** includes a circular band or ring **64** having a circular cylindrical inner surface **66** which is generally flat from top to bottom of the segment. The ring further includes an outer surface **68** which is curved from top to bottom from which extends a plurality of projections **70**. In this embodiment, the surface **68** does not include a continuous curvature, but is instead divided into two surfaces divided by a centerline **72**. The centerline **72** defines a diameter with a central axis of the bore **62** which is greater than a diameter of terminating edges of the surface **68**. Consequently, the surfaces extending away from the centerline **72** are inclined toward the bore **62**.

Each of the plurality of projections **70** is generally fin shaped and includes a height **73** having a length greater than a height **74** of the ring **64**. The projections **70** are centrally located about a circumferential center defined by a central axis extending lengthwise along the segment **60**, such that a portion of the projections **70** extends above the centerline **72** and a portion of the projections **70** extends below the centerline **72**. The projection **70** also includes surfaces **76** which extend away from and are inclined with respect to the central axis of the bore **62**. In one embodiment, the angle of inclination of the surfaces **76** away from the bore is substantially the same as the angle of inclination of each of the surfaces on either side of the centerline **72** of the surface **68**.

The segment **60** in the embodiment of FIG. **6** includes three of the projections **70**. The projections **70** are equally spaced about the outer surface **68** of the ring **64** to define a space located between each of the projections **70**. The space includes a lateral dimension which is sufficiently sized to accommodate a projection of an adjacent segment as illustrated in FIGS. **7** and **8**.

As shown in FIG. **7**, a rope or cord **82** extends through the bore **62** of each of the segments **60**. Each one of a plurality of the segments **60** is located next to another segment **60**, such that one of the segments **60** nests with an adjacent segment **60**. For instance a segment **60**A is located between a segment **60**B and a segment **60**C. The projection **70** of one of the segments overlaps with the adjacent space of an adjacent segment **60**. For example, a projection **70**A extends over and overlaps the space of segment **60**B and extends over and overlaps the space of segment **60**C such that the each of segments **60** is nested with an adjacent segment **60** on one or both sides. The segments **60** and cord **82** form a ceramic body cable.

To accommodate nesting of adjacent segments **60**, each of the segments **60** is rotated a predetermined amount with an adjacent segment **60** to align the projections with a space. In the embodiment of FIG. **6** of the segment **60** having three of the projections **70**, the amount of rotation is approximately 60 degrees. In other embodiments of segments having other numbers of projections, the amount of relative rotation is determined based on the number of projections. For instance, in a segment having two projections, the amount of relative rotation between adjacent segments is 90 degrees. In a segment having four projections, the amount of relative rotation is 45 degrees.

FIG. **8** illustrates a cross-sectional view of a few of the plurality of the nested ceramic segments of FIG. **7**. In this embodiment, the rope **82** is bent such that a projection **70**B extends over, but does not contact the surface defining the adjacent space of segment **60**A and a projection **70**C also extends over, but does not contact the surface defining the space of segment **60**A. Sufficient bending of the rope **82**, however places the projection **70**D into contact with a surface defining an adjacent space, or bearing surface, of the adjacent segment **60**A on an inside curve of the rope **82**. Consequently, the amount of curve of the cable is limited by contact of an inside surface or contact surface **76** of a projection **70**.

FIG. **9** is a perspective view of another ceramic segment **90**. In this embodiment, the segment **90** includes a bore **92** through which the rope is located. The segment **90** is generally spherical and includes an inclined bearing surface **94** which extends from an outer spherical surface **96** of the segment **90** to an inner surface **98** of the bore **92**. The inclined surface **94** is inclined with a central axis of the bore **92** such that the surface is generally concave and extends into the segment **90**. The angle of inclination of the surface **94** is based on the curvature of the surface **96** to provide an interface between the inclined surface **94** of one segment **90** with the exterior surface **96** of an adjacent segment **90**. The portion of the segment that defines the inclined bearing surface may be referred to herein as a bearing portion.

Because the surface **96** is generally spherical, the surface **96** lacks areas which could provide access points for tools used to cut through the lock cable. Consequently, a cutting tool tends to skip off of the spherical surface toward an interface located between adjacent segments. The interface, however, provides a spherical surface of one segment located beneath a spherical surface of the adjacent segment to provide two layers of protective surfaces.

As shown in FIGS. **10** and **11**, a rope or cord **100** extends through the bore **92** of each of the segments **90**. Each one of a plurality of the segments **90** (ceramic bodies) is located next to another segment **90**, such that one of the segments **90** nests with an adjacent segment **90**.

For instance a segment **90**A is located between a segment **90**B and a segment **90**C. The surface **96** of one of the segments interfaces with the adjacent surface **94** of an adjacent segment **90**. For example, the surface **96** of segment **90**B extends into a space defined by the surface **94** of the adjacent segment **90**A such that each of the plurality of segments **90** is nested with an adjacent segment **90**. In one embodiment, each of the plurality of segments **90** is substantially similar. In this embodiment, therefore, the exterior surface **96** of sphere **90**A extends over, or overlaps, the exterior surface **96** of sphere **90**B. Depending on the bend of the bend in the ceramic body cable, the surface **94** contacts the surface **96** of an adjacent segment. The combined segments **90** and cord **100** are also called a ceramic body cable **101** having ceramic bodies and a cord.

FIGS. **12** and **13** illustrate one embodiment of a string **102** of the elements **90** having a first end **104** and a second end **106**, each of which includes a crimped sleeve **108**. In one embodiment, the crimped sleeve **108** includes a channel **110** which is slid over the rope **100** and which is crimped to collapse the sleeve **108** into direct holding contact with the rope **100**. By crimping each of the sleeves **108**, the segments **90** are held in direct contact with adjacent segments **90**.

Once each of the first end **104** and second end **106** include a crimped sleeve **108**, the string **102** is inserted into a channel **111** defined by a braided sleeve **112**. In one embodiment, the sleeve is made of polyethylene terephthalate. In other embodiments, other materials are used including nylon, steel, copper, aluminum, and stainless steel. The sleeve **112** is shown as being expanded with respect to the string **102** for purposes of illustration. In different embodiments, the sleeve **112** is in a collapsed condition and insertion of the string **102** expands the sleeve **112**. Once the

string **102** located in the channel **111**, the sleeve **112** stretches around the string **102** for a form fit.

After the string **102** is located within the sleeve **112**, the combined the string **102** and sleeve **112** are inserted into a tube **114** of unshrunk heat shrinkable tubing as shown in FIG. **15**. The tube **114** includes a diameter large enough to enable the tube **114** to slide the combined string **102** and sleeve **112**, but small enough to shrink to a tight fit when heated. In different embodiments, the tube **114** is made of a thermoplastic material, including but not limited to, polyolefin, fluoropolymer, polylvinyl chloride, neoprene, silicone elastomer, or synthetic rubber.

Once heated, as shown in FIG. **16**, the tube **114** collapses about the sleeve **112** and conforms to the shapes of the individual segments of the string **102**. After the cable **14** is complete, one end is fixedly connected to the collar **17** and the other end is fixedly connected to the collar **24**. In one embodiment, the completed cable **14** includes a length of twenty-four inches.

The disclosed embodiments of a cable lock provide increased security while maintaining the necessary flexibility to lock a bicycle to a stand. The cable lock is also easy to use and store transport. The flexible cable lock provides greater protection against attempts to defeat the protection provided by the cable, including attempts using power tools, angle grinders, bolt cutter, and saws. The use of the nested ceramic segments provides an improved deterrent against theft since the interface between adjacent segments is protected by the overlapping features of the segments. For instance, where the segments include projections, the projections act as a shield or barrier to a seam located between adjacent segments.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that preferred embodiments have been shown and described and that all changes and modifications that come within the spirit of the inventions are desired to be protected.

It should be understood that while the use of words such as preferable, preferably, preferred or more preferred utilized in the description above indicate that the feature so described may be more desirable, it nonetheless may not be necessary and embodiments lacking the same may be contemplated as within the scope of the invention, the scope being defined by the claims that follow. In reading the claims, it is intended that when words such as "a," "an," "at least one," or "at least one portion" are used there is no intention to limit the claim to only one item unless specifically stated to the contrary in the claim. When the language "at least a portion" and/or "a portion" is used the item can include a portion and/or the entire item unless specifically stated to the contrary.

What is claimed is:

1. A cable lock, comprising:

a lock body including a locking mechanism having a locked state and an unlocked state;

a plurality of segments, each including a center portion defining an aperture and a plurality of projections extending from the center portion, wherein the plurality of segments are located adjacent one another, and wherein the plurality of projections of one of the plurality of segments overlaps the center portion of each of two adjacently-located ones of the plurality of segments; and

a cord extending through the aperture of each of the plurality of segments and operatively connected to the lock body.

2. The cable lock of claim **1**, wherein each of the plurality of segments is formed of a ceramic material.

3. The cable lock of claim **2**, wherein the ceramic material is a ceramic composite.

4. The cable lock of claim **1**, wherein the center portion of each of the plurality of segments comprises a ring.

5. The cable lock of claim **1**, wherein each of the plurality of projections comprises a disc.

6. The cable lock of claim **5**, wherein each disc defines a diameter that is greater than a height of the center portion.

7. The cable lock of claim **1**, wherein each of the plurality of projections comprises a fin.

8. The cable lock of claim **7**, wherein each fin has a height greater than a height of the center portion.

9. The cable lock of claim **1**, further comprising a heat shrinkable tube, wherein the plurality of segments are located in the heat shrinkable tube.

10. A lock apparatus, comprising:

a lock body including a locking mechanism having a locked state and an unlocked state;

a plurality of overlapping segment members, each comprising:

a bearing portion including an aperture; and

an overlap portion extending from the bearing portion; and

a cord threaded through the apertures and connected to the lock body;

wherein for each of the segment members:

the segment member is positioned adjacent an adjacent segment member;

the overlap portion of the segment member overlaps the bearing portion of the adjacent segment member; and

the bearing portion of the segment member is overlapped by the overlap portion of the adjacent segment member.

11. The lock apparatus of claim **10**, wherein each of the plurality of overlapping segment members comprises a ceramic material.

12. The lock apparatus of claim **11**, wherein the ceramic material is a ceramic composite.

13. The lock apparatus of claim **10**, wherein each bearing portion is substantially annular.

14. The lock apparatus of claim **10**, wherein each overlap portion comprises a plurality of angularly-spaced fins or a plurality of angularly-spaced discs.

15. The lock apparatus of claim **10**, wherein for one or more of the plurality of overlapping segment members:

the segment member is further positioned adjacent a second adjacent segment member such that the segment member is positioned between the adjacent segment member and the second adjacent segment member;

the overlap portion of the segment member overlaps the bearing portion of the second adjacent segment member; and

the bearing portion of the segment member is overlapped by the overlap portion of the second adjacent segment member.

16. A method of forming a cable lock, the method comprising:

forming a cable having a first end and an opposite second end, wherein forming the cable comprises threading a cord through a plurality of segment members, and wherein each of the plurality of segment members is positioned adjacent an adjacent segment member that

partially overlaps the segment member and is partially overlapped by the segment member; and

coupling the first end of the cable to a lock body including a lock mechanism having a locked state and an unlocked state, wherein the lock mechanism is operable to selectively retain the second end of the cable within the lock body.

17. The method of claim **16**, wherein each of the plurality of segment members comprises a body portion and a plurality of projections, wherein the body portion of each of the plurality of segment members is overlapped by the projections of the adjacent segment member, and wherein the projections of each of the plurality of segment members overlap the body portion of the adjacent segment member.

18. The method of claim **16**, wherein each of the plurality of segment members is formed of a ceramic material.

19. The method of claim **18**, wherein the ceramic material is a ceramic matrix.

20. The method of claim **16**, wherein forming the cable further comprises attaching a collar to the cord to at least partially define the second end of the cable.

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