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(54) **TELEMETRY SYSTEMS FOR TUBULARS**

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(57) **ABSTRACT**

A device for securing a telemetry segment in a drill pipe includes a pair of diametrically opposed arcuate arms for outwardly engaging an interior wall of the drill pipe, the diametrically opposed arcuate arms being interconnected to one another by a radially inwardly projecting lobe section for capturing the telemetry segment between the lobe section and the interior wall of the drill pipe.

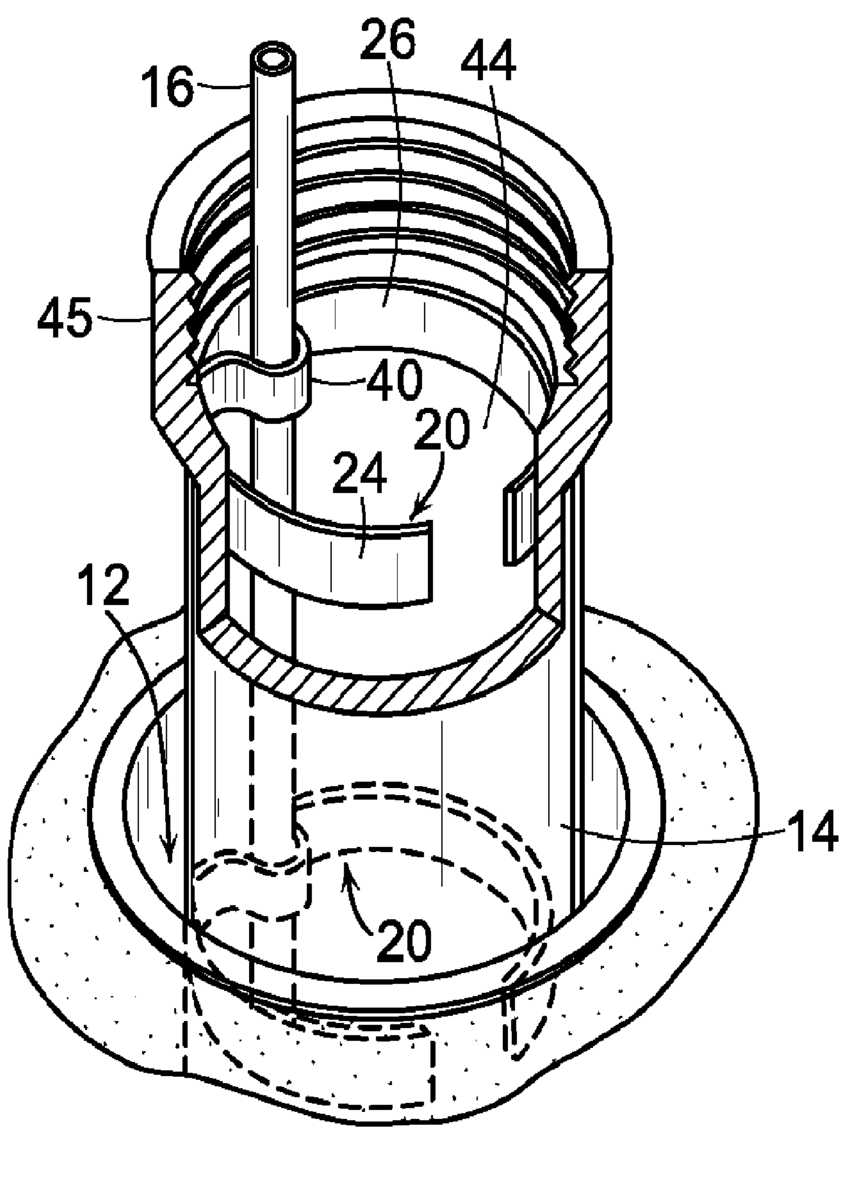


FIG. 1

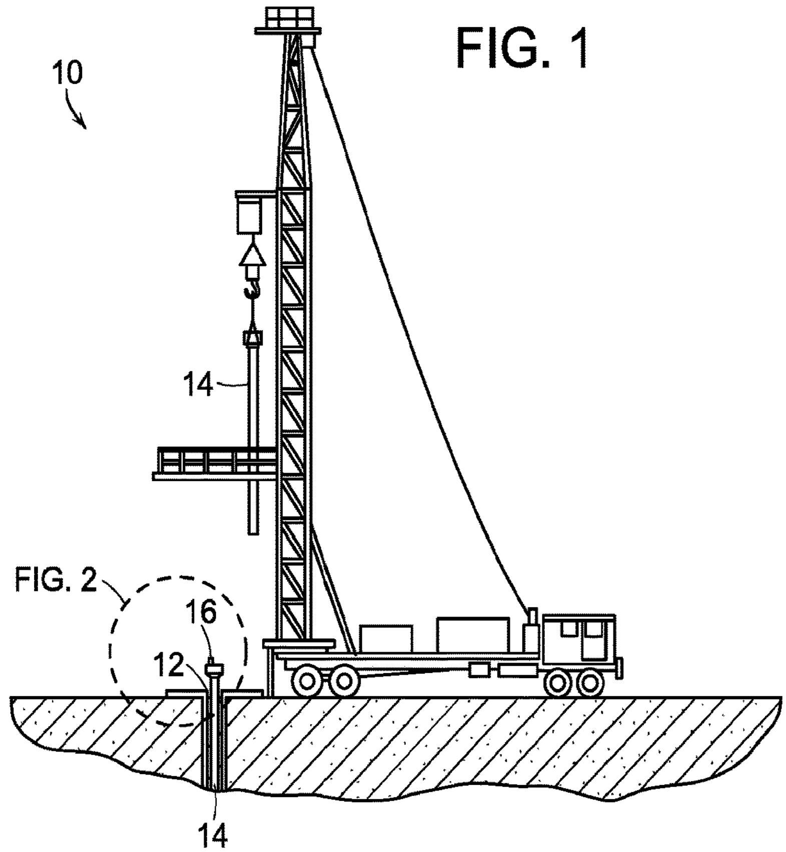


FIG. 2

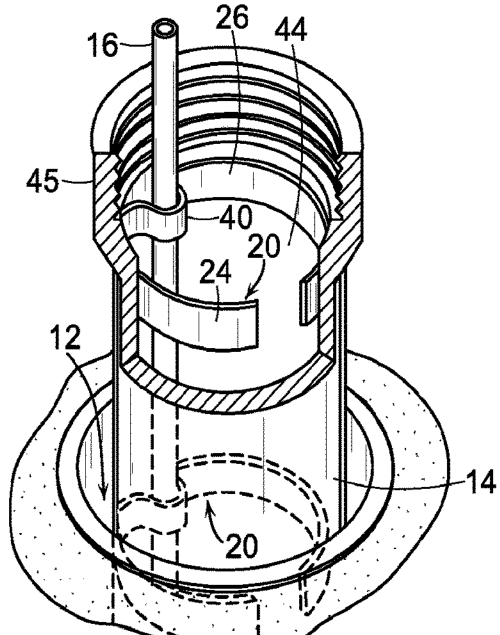


FIG. 3

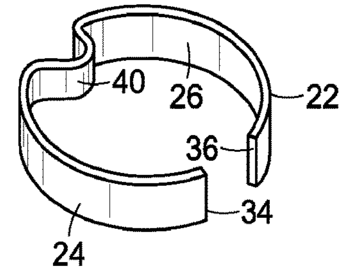


FIG. 4

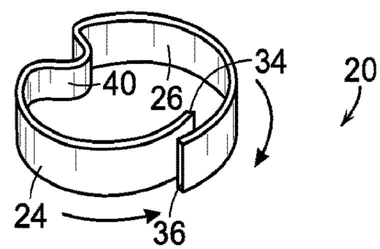


FIG. 5

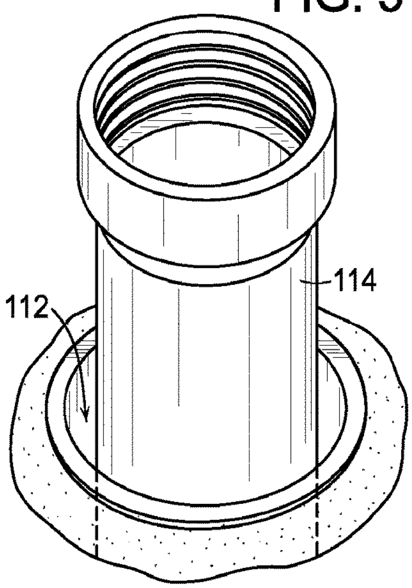


FIG. 6

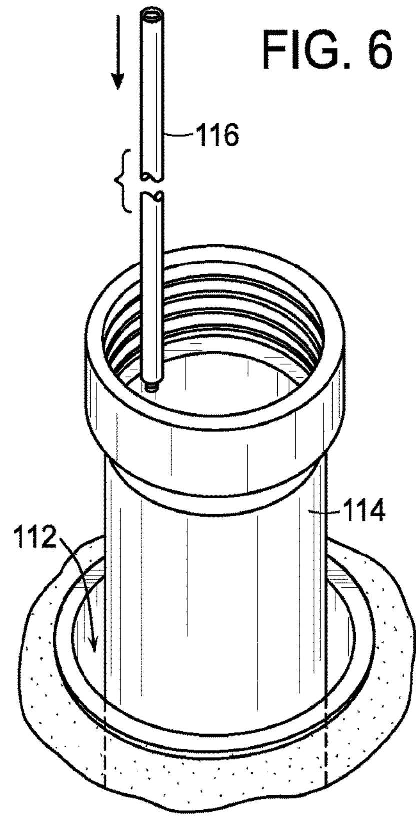


FIG. 7

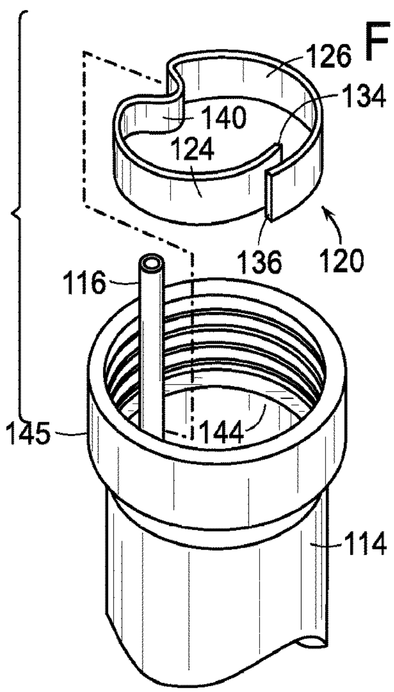
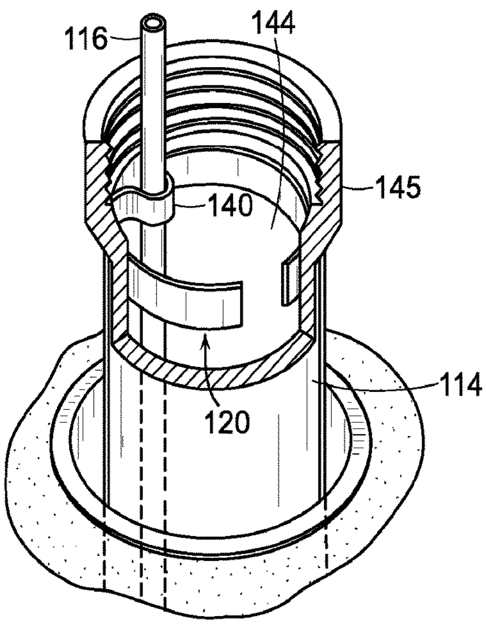


FIG. 8



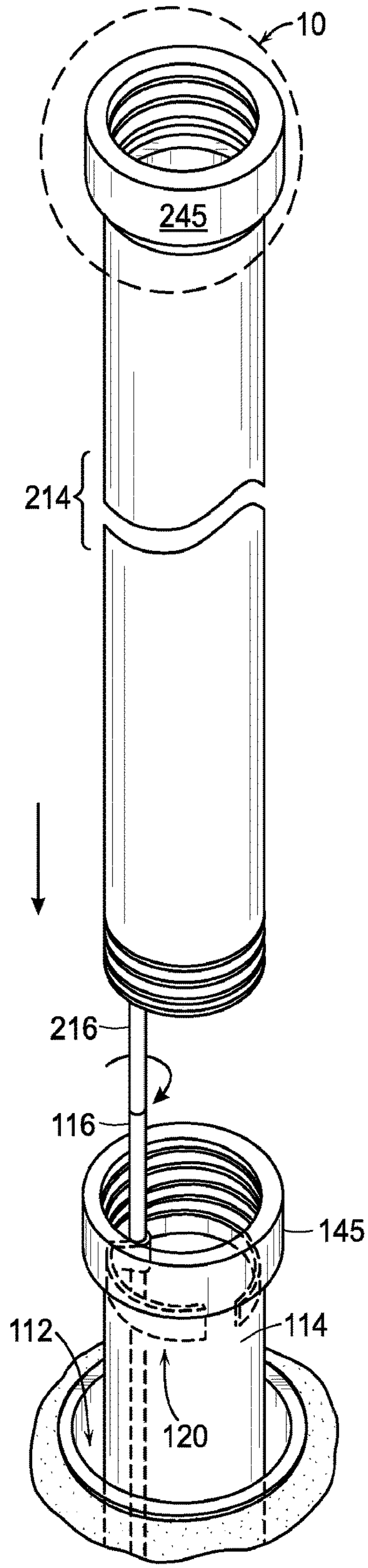


FIG. 9

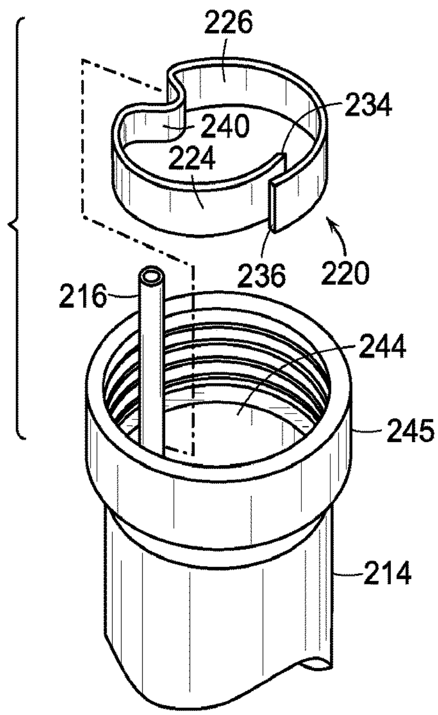


FIG. 10

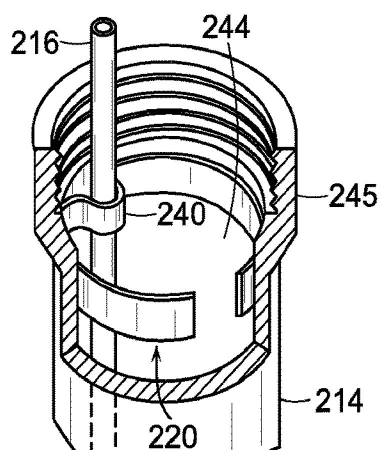


FIG. 11

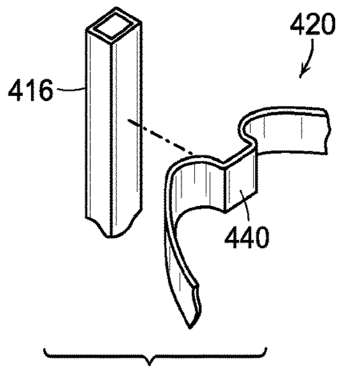


FIG. 12

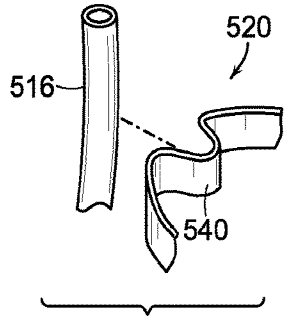


FIG. 13

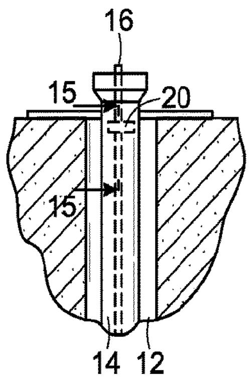


FIG. 14

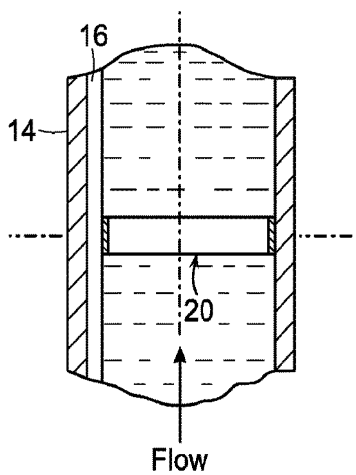


FIG. 15

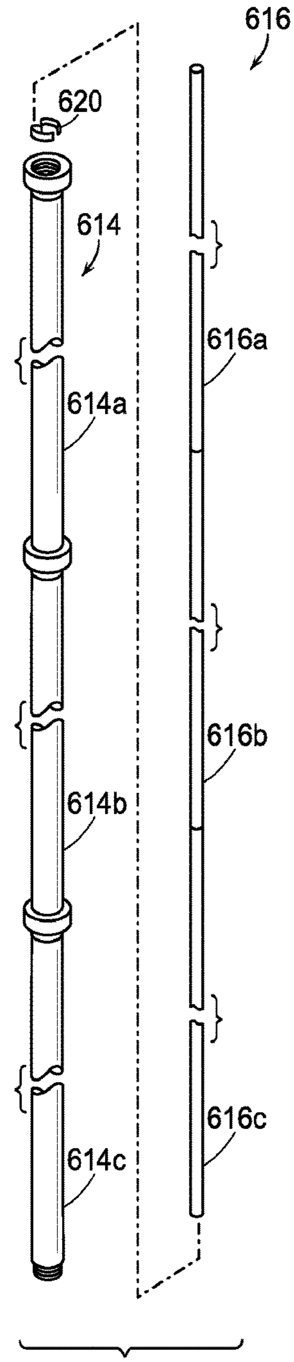


FIG. 16

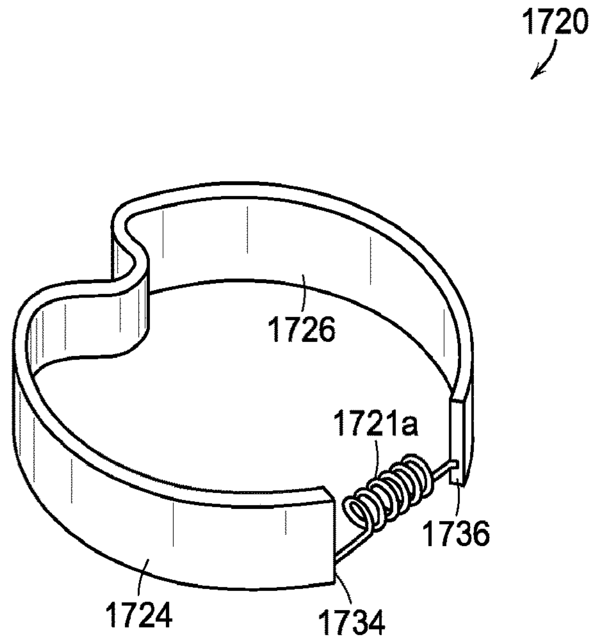

1720
1726
1721a
1736
1724
1734

FIG. 17

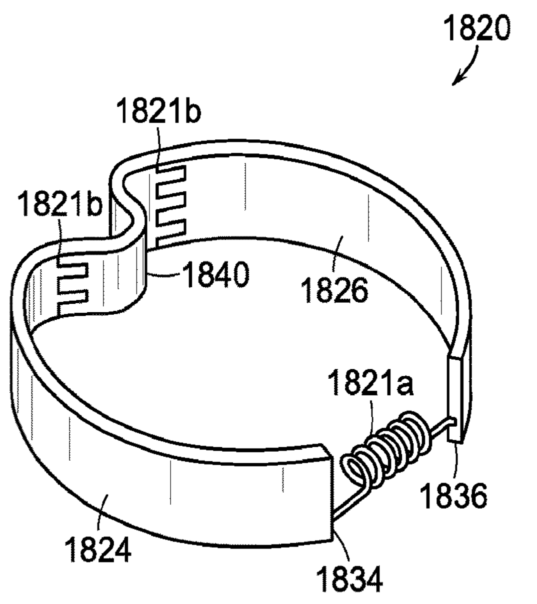

1820
1821b
1821b
1840
1826
1821a
1836
1824
1834

FIG. 18

TELEMETRY SYSTEMS FOR TUBULARS

BACKGROUND

1. Field

[0001] The present disclosure relates to well drilling and exploration, and more particularly, to telemetry systems for tubulars.

2. Description of Related Art

[0002] For well drilling applications, telemetry components can be positioned inside well tubulars (e.g. drill pipes) to transmit telemetry signals through terahertz (THz) radiation. In certain systems, segmented (and periodically amplified) optical fibers can be used inside of a conduit or other suitable covering to form telemetry segments that transmit signals. In such applications, the telemetry segments need to be secured to the tubular before the tubular is placed in the well.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] So that those skilled in the art to which the subject disclosure appertains will readily understand how to make and use the devices and methods of the subject disclosure without undue experimentation, embodiments thereof will be described in detail herein below with reference to certain figures, wherein:

[0004] FIG. **1** is an illustration of a mobile oil drilling platform associated with a well bore containing a drill pipe constructed in accordance with an embodiment of the subject disclosure, which includes an internal system for transmitting telemetry signals;

[0005] FIG. **2** is an enlarged localized perspective view of the upper end of the drill pipe shown in FIG. **1**, where the drill pipe is partially cut-away to show a telemetry segment clamped adjacent to the interior wall of the drill pipe;

[0006] FIG. **3** is a perspective view of an embodiment of a clamping device of the subject disclosure in a normally expanded position;

[0007] FIG. **4** is a perspective view of the clamping device shown in FIG. **3** in a compressed position, in which the diameter is reduced for installation with the upper end of a drill pipe;

[0008] FIG. **5** is a perspective view of the upper end of a first drill pipe;

[0009] FIG. **6** is a perspective view of the upper end of the first drill pipe shown in FIG. **5**, where a first telemetry segment is being positioned inside the first drill pipe;

[0010] FIG. **7** is a perspective view of the upper end of the first drill pipe as shown in FIG. **6**, where a compressed clamp is being installed within the upper end portion of the first drill pipe;

[0011] FIG. **8** is a perspective view of the upper end of the first drill pipe as shown in FIG. **7**, but partially cut-away, to show the clamp in an expanded position within the upper end of the first drill pipe, securing the first telemetry segment adjacent to the interior wall of the first drill pipe;

[0012] FIG. **9** is a perspective view showing a lower end of a second telemetry segment being connected to an upper end of the first telemetry segment, which has been previously clamped, and showing a second drill pipe being positioned over the second telemetry segment and connecting the second drill pipe to an upper end of the first drill pipe;

[0013] FIG. **10** is a perspective view of an upper end portion of the second drill pipe of FIG. **9**, illustrating the placement of a compressed clamp into the upper end of the second drill pipe;

[0014] FIG. **11** is a perspective view of the upper end of the second drill pipe of FIG. **10**, partially cut-away to show the clamp in an expanded position within the upper end of the second drill pipe, securing the second telemetry segment adjacent to the interior wall of the second drill pipe;

[0015] FIG. **12** is a partial perspective view of an embodiment of a clamp which has an inwardly projecting lobe section for accommodating a non-circular telemetry segment;

[0016] FIG. **13** is a partial perspective view of an embodiment of a clamp which has an inwardly projecting lobe section for accommodating a telemetry cable segment;

[0017] FIG. **14** is an illustration of a drill pipe constructed in accordance with an embodiment of the subject disclosure, which includes an internal system for transmitting telemetry signals which is secured by clamps;

[0018] FIG. **15** is a cross-sectional view taken along line **15-15** of FIG. **14**, illustrating the interior of a drill pipe section in which the clamp is in intimate engagement with the interior wall of the pipe section with sufficient strength to withstand movement when subjected to drag forces exerted by fluid passing through the drill pipe; and

[0019] FIG. **16** is an exploded perspective view of a string of coupled telemetry segments for clamping within a stand of three interconnected drill pipes, in accordance with an embodiment of the subject disclosure.

[0020] FIG. **17** is a perspective view of an embodiment of a clamping device in accordance with this disclosure, shown having a spring member positioned between the ends of each arcuate arm.

[0021] FIG. **18** is a perspective view of an embodiment of a clamping device in accordance with this disclosure, shown having a spring member positioned between the ends of each arcuate arm and hinges positioned between each arcuate arm and the lobe member.

DETAILED DESCRIPTION

[0022] Reference will now be made to the drawings wherein like reference numerals identify similar structural features or aspects of the subject disclosure. FIG. **1** is an illustration of a mobile oil drilling platform **10** associated with a well bore **12** containing a drill pipe **14** constructed in accordance with an embodiment of the subject disclosure. The drill pipe **14** includes a plurality of interconnected telemetry segments **16** for transmitting telemetry signals during a drilling operation. While a drill pipe **14** is shown and described, it is appreciated by those skilled in the art the telemetry systems and clamps as described herein can be applied to any suitable well tool/tubular device.

[0023] As recognized in the embodiments described below, telemetry segments may be installed within the interior of a drill pipe such that the telemetry segments stay in position, close to the interior walls of the drill pipes. If the telemetry segments are able to move around freely, they could move toward the center of the drill pipe, where the telemetry segments would be subjected to the greatest mud flow velocity within the pipe, causing unwanted wear and tear on the segments for example. By contrast, the mud flow velocity is much lower closer to the interior walls of the drill pipes.

[0024] Furthermore, during a drilling operation, it is sometimes necessary to insert specialized tools into the drill pipe (e.g., tools to release a stuck drill bit). For this reason too, it can be beneficial to keep the telemetry segments close to the walls of the drill pipes. Otherwise, if the telemetry segments are permitted to move towards the center of the drill pipe, they can block the path for inserted tools.

[0025] Further still, if the telemetry segments are floating freely within the drill mud inside of the drill pipe, they might be flushed downwards within the pipe by the mud flow. In this case, a number of telemetry segments could become concentrated at the lower end of the drill pipe, where they might eventually block the drill pipe. Also, the mudflow will likely put strain on freely floating telemetry segments, which could cause them to be pulled apart.

[0026] FIG. **2** is an enlarged localized perspective view of the upper end of the drill pipe shown in FIG. **1**, where the drill pipe is partially cut-away to show a telemetry segment clamped adjacent to the interior wall of the drill pipe. The herein described embodiments overcome these above noted potential problems associated with installing telemetry segments within a drill pipe. In particular, a mechanical clamp **20** is provided to secure a telemetry segment **16** in a fixed position close to the internal wall of a drill pipe **14**, adjacent to an upper end portion **45** thereof, as shown in FIG. **2**. It is envisioned that one or more additional clamps **20** (e.g., as shown in phantom in FIG. **2**) could also be installed in the drill pipe **14** to further secure the telemetry segment **16**, and that clamp **20** could be located further down the drill pipe near its mid-section. Any suitable number (e.g., a single clamp **20**) and/or placement for the one or more clamps **20** is contemplated herein.

[0027] As shown in FIG. **2**, the telemetry segment **16** can include a thin metal pipe that has a circular cross-section. However, as discussed below, the shape of the metal pipe of the telemetry segment **16** can vary. The telemetry segments **16** can be used as a waveguide to transmit telemetry signals relating to downhole information relating to the drill string and surrounding geologic formations through THz radiation. Alternatively, the telemetry segments can be in the form of an optical fiber positioned within a sheath or conduit.

[0028] FIG. **3** is a perspective view of an embodiment of a clamping device of the subject disclosure in an expanded position. As shown, the mechanical clamp **20** has a clamp body **22** for conforming to an interior of a generally circular tubular member such as the inner diameter (ID) of the drill pipe **14** of FIG. **2**. The clamp body **22** is not required to form a true circle but a portion of the clamp body **22** is arcuate and may be substantially circular as shown to facilitate conforming to a tubular member when inserted therein. In particular, the clamp body **22** includes a pair of arcuate arms **24**, **26** that are intended to engage and generally conform to the ID of a tubular member. The arcuate arms **24**, **26** as illustrated have a smooth (optionally semi-circular) shape to facilitate fluid flow through a tubular member. However, the arms **24**, **26** could alternately have a non-smooth (e.g. slightly undulating or wavy) shape, but with an overall shape that would still generally conform to the interior of such a tubular member.

[0029] The arcuate arms **24**, **26** can be circumferentially spaced about a center of the clamp body **22**, such that each arm **24**, **26** engages the ID of the drill pipe **14** (FIG. **2**) or other tubular member at different circumferential locations. In the example of FIG. **3**, the arcuate arms **24**, **26** are circumferentially spaced at approximately 180 degrees to engage corresponding locations of the tubular member, with a reaction force directed substantially radially inward toward an approximate center of the clamp body **22**; in that context, the arcuate arms **24**, **26** may be described as diametrically opposed. Throughout this disclosure, the arcuate arms **24**, **26** may be described as opposed or diametrically opposed, by way of example, with the understanding that a suitable circumferential spacing of the arcuate arms or circumferential spacing of locations of the tubular member engaged by the arms **24**, **26** may be greater or less than 180 degrees.

[0030] Still referring to the example of FIG. **3**, the opposed arcuate arms **24**, **26** can have free ends **34**, **36**, respectively, forming an arcuate gap there between. Furthermore, the opposed arcuate arms **24**, **26** are connected to one another through a radially inwardly projecting lobe section **40** which is dimensioned and configured to accommodate a telemetry segment **16**. The lobe section **40** is diametrically opposed to the arcuate gap formed between the free ends **34**, **36** of arcuate arms **24**, **26**.

[0031] FIG. **4** is a perspective view of the clamping device shown in FIG. **3** in compressed position, in which the diameter is reduced for installation with the upper end of a drill pipe. As shown, the clamp body **22** can be moveable between a compressed position for installation within a drill pipe **14** in which the free ends **34**, **36** of the opposed arcuate arms **24**, **26** are approximated toward one another, as shown in FIG. **4**, and an expanded position for deployment within the drill pipe in which the opposed arcuate arms **24**, **26** are normally biased away from one another into intimate engagement with an interior wall **44** of the drill pipe **14**, as shown in FIGS. **2** and **3**. It should be understood that when the free ends **34**, **36** of arm portions **24**, **26** are approximated toward one another compressing the clamp **20**, it may be necessary to overlap the free ends **34**, **36** to sufficiently reduce the overall diameter of the clamp **20** for installation in the drill pipe **14**.

[0032] The clamp **20** can be positioned within and fixed to the drill pipe **14** in any suitable manner. For example, the clamp **20** can be biased via a spring member (e.g., integral with and/or forming all or part of the arms **24**, **26**/lobe section **40**, and/or through a separate biasing member) to push against the interior walls **44**. In certain embodiments, the clamp **20** can be constructed from a metallic material and/or any other suitable material that has mechanical characteristics and a sufficient thickness to withstand movement between the expanded position of FIG. **3** and the radially compressed position of FIG. **4** without permanently deforming so that the clamp **20** provides a bias due to its own material properties when allowed to expand within the tubular. For example, it is contemplated that the entire clamp **20**, one or more of the arms **24**, **26**, or any suitable portion of the lobe section **40** can be constructed from a resilient material (e.g., stainless steel or any other suitable metal). It is not necessary that the entire clamp **20** be made of a resilient material, e.g., one or more portions of arms **24**, **26** and/or the lobe section **40** can include a resilient material that resists deformation of the arms **24**, **26**. The clamp **20** may also have a vertical width that is sufficient to prevent rotational movement of the clamp **20** about an axis extending perpendicular to a longitudinal axis of the drill pipe **14** when the clamp **20** is in the expanded position shown in FIG. **2**.

[0033] In certain embodiments, the spring member that biases the clamp **20** can include a separate spring member. Referring to FIG. **17**, for example, an embodiment of a clamping device **1720** includes a spring member **1721***a* positioned between free ends **1734**, **1736** of the opposed arcuate arms **1724**, **1726**. In this regard, the device **1720** can be made of any suitable material and need not have spring-like material properties as described above. The spring member **1721***a* can include any suitable spring (e.g., a coil spring) and can have any suitable spring constant. The spring member **1721***a* can be positioned on any other suitable portion of the device **1820**.

[0034] Referring to FIG. **18**, an embodiment of a clamping device **1820** includes one or more hinges **1821***b* positioned between the inwardly projecting lobe **1840** and the free ends **1834**, **1836** of the opposed arcuate arms **1824**, **1826**. The one or more hinges **1821***b* allow one or more of the arcuate arms **1824**, **1826** to rotate relative to the inwardly projecting lobe **1840**, e.g., between a closed position and an open position (as shown) to provide a clamping force against the tubular. One or more spring members **1821***a* can be positioned between the free ends **1834**, **1836** as shown to bias the arcuate arms to the open position. However, it is contemplated that the one or more spring members **1821***a* can be positioned on and/or within any other suitable portion of the device **1820** (e.g., one or more rotational springs positioned within the hinges **1821***b*).

[0035] While the clamp **20** is shown as being deformed and allowed to expand to be biased against the interior wall **44**, it is contemplated that the clamp **20** can be non-resilient and may require one or more suitable fasteners (e.g., screws, bolts) and/or any other suitable attachment (e.g., one or more adhesives, magnets, cement) to fix the clamp **20** to the interior wall **44** of the tubular. Moreover, the clamp **20** and/or attachments that affix the clamp **20** can have mechanical and/or material properties that are sufficient to prevent movement of the clamp **20** relative to the interior wall **44** of the drill pipe **14** when it is subjected to drag forces exerted by fluid or drilling mud passing through the drill pipe **14** when the clamp **20** is in the expanded position, as illustrated for example in FIGS. **14** and **15**. For example, the clamp **20** can be mechanically fixed to and/or biased with sufficient spring force against the interior wall **44** to produce attachment/frictional forces that prevent movement of the clamp **20** when there is a fluid flow (e.g., a mud flow) in the tubular.

[0036] FIG. **5** is a perspective view of the upper end of a first drill pipe **114**. FIG. **6** is a perspective view of the upper end of the first drill pipe **114** shown in FIG. **5**, where a first telemetry segment **116** is being positioned inside the first drill pipe **114**. FIG. **7** is a perspective view of the upper end of the first drill pipe **114** as shown in FIG. **6**, where a compressed clamp **120** is being installed within the upper end portion of the first drill pipe **114**. FIG. **8** is a perspective view of the upper end of the first drill pipe **114** as shown in FIG. **7**, but partially cut-away, to show the clamp **120** in an expanded position within the upper end of the first drill pipe **114**, securing the first telemetry segment **116** adjacent to the interior wall of the first drill pipe **114**.

[0037] To use the mechanical clamp of the subject disclosure as intended, a first drill pipe **114** is provided in a bore hole **112**, as shown in FIG. **5**. Then, a first telemetry segment **116** is positioned inside the first drill pipe **114**, as shown in FIG. **6**. The first telemetry segment **116** is then clamped adjacent to an interior wall **144** of the first drill pipe **114** by a first mechanical clamp **120**, close to the upper end portion **145** of pipe **114**. More particularly, the clamp **120** is radially compressed by approximating the free end **134**, **136** of arcuate arms **124**, **126** to reduce its diameter, as shown in FIG. **7**. At such a time, the telemetry segment **116** is positioned within the radially inwardly projecting lobe section **140** of clamp **120**, as shown in FIG. **8** and the clamp **120** is allowed to expand to hold the telemetry segment **116** within the drill pipe **114**.

[0038] FIG. **9** is a perspective view showing a lower end of a second telemetry segment **216** being connected to an upper end of the first telemetry segment **116**, which has been previously clamped, and showing a second drill pipe **214** being positioned over the second telemetry segment **216** and connecting the second drill pipe **214** to an upper end of the first drill pipe **114**. FIG. **10** is a perspective view of an upper end portion of the second drill pipe **214** of FIG. **9**, illustrating the placement of a compressed clamp **220** into the upper end of the second drill pipe **214**. FIG. **11** is a perspective view of the upper end of the second drill pipe of FIG. **10**, partially cut-away to show the clamp **220** in an expanded position within the upper end of the second drill pipe **214**, securing the second telemetry segment **216** adjacent to the interior wall of the second drill pipe **214**.

[0039] As shown in FIG. **9**, the second telemetry segment **216** can be coupled (e.g., threadably, plug-in, snap connected, bayonet connected) to an upper end of the first telemetry segment **116**. The second drill pipe **214** can be positioned over the second telemetry segment **216** and the second drill pipe **214** can be connected (e.g., threadably) to an upper end portion **145** of the first drill pipe **114**. Advantageously, while screwing the second drill pipe **214** into the upper end portion **145** of the first drill pipe **114**, the second telemetry segment **216** will not get damaged or bent, because it has not yet been secured or otherwise clamped adjacent to the second drill pipe **214**. Moreover, the second telemetry segment **216** can freely slip relative to the second drill pipe **214** at this point in the assembly process. Once the second drill pipe **214** has been tightened, the second telemetry segment **216** is clamped adjacent to an interior wall **244** of the second drill pipe **214** by installing a second mechanical clamp **220** therein, close to the upper end portion **245** of the second drill pipe **214**, as shown in FIG. **10**. As shown in FIG. **11**, the second clamp **220** is shown holding the second telemetry segment **216** in place.

[0040] FIG. **12** is a partial perspective view of an embodiment of a clamp **420** which has an inwardly projecting lobe **440** section for accommodating a non-circular telemetry segment **416**. As shown, the radially inwardly projecting lobe section **440** is dimensioned and configured to accommodate a non-circular telemetry segment **416**. For example, telemetry segment **416** includes a thin metal pipe that has a generally rectangular configuration.

[0041] FIG. **13** is a partial perspective view of an embodiment of a clamp **520** which has an inwardly projecting lobe section **540** for accommodating a telemetry cable segment **516**. As shown, the radially inwardly projecting lobe section **540** that is dimensioned and configured to accommodate a telemetry segment **516** in the form of a jacketed optical cable. For example, telemetry segment **516** includes a flexible outer sheath or conduit that has a circular configuration. Any other suitable shapes for the projecting lobe sections as described above are contemplated herein.

[0042] FIG. **14** is an illustration of a drill pipe **14** constructed in accordance with an embodiment of the subject disclosure, which includes an internal system for transmitting telemetry signals which is secured by clamps **20**. FIG. **15** is a cross-sectional view taken along line **15-15** of FIG. **14**, illustrating the interior of a drill pipe **14** in which the clamp **20** is in intimate engagement with the interior wall of the pipe section with sufficient strength to withstand movement when subjected to drag forces exerted by fluid passing through the drill pipe **14**.

[0043] FIG. **16** is an exploded perspective view of a string of coupled telemetry segments for clamping within a stand of three interconnected drill pipes, in accordance with an embodiment of the subject disclosure. It is envisioned that the mechanical clamp of the subject disclosure can be utilized to secure a one or more telemetry segments (e.g., a string of coupled telemetry segments) within a stand of drill pipes, as illustrated in FIG. **16**. That is, a stand **614** of at least two (e.g., three) connected drill pipes **614***a*-**614***c* can be provided, a string **616** of at least two (e.g., three) coupled telemetry segments **616***a*-**616***c* can be positioned inside the stand of connected drill pipes **614**, and the string of coupled telemetry segments **616** can be secured adjacent to an interior wall of an uppermost drill pipe **614***a* in the stand of connected drill pipes **614** by a mechanical clamp **620**.

[0044] It is contemplated that any suitable number of telemetry segments can be utilized with any suitable number of tubulars. For example if each drill pipe has a length of 10 meters, and a stand of three drill pipes is used, then the length of the stand is 30 meters. In this case three telemetry segments each having a length of 10 meters could be utilized. Alternatively, for example, a single telemetry segment having a length of 30 meters can be utilized, and in that case only a single telemetry segment for the entire 30 meter stand can be utilized.

[0045] In accordance with any embodiment or combination of embodiments disclosed above, a device for securing a telemetry segment in a drill pipe includes a pair of diametrically opposed arcuate arms for outwardly engaging an interior wall of the drill pipe, the diametrically opposed arcuate arms being interconnected to one another by a radially inwardly projecting lobe section for capturing the telemetry segment between the lobe section and the interior wall of the drill pipe.

[0046] In accordance with any embodiment or combination of embodiments disclosed above, the device can further include a spring element for biasing the arcuate arms into outward engagement with the interior wall of the drill pipe, wherein the arcuate arms interconnected by the lobe section are moveable against the biasing of the spring element to a compressed position for installation within a drill pipe.

[0047] In accordance with any embodiment or combination of embodiments disclosed above, the spring element can be positioned between an end of each of the arcuate arms.

[0048] In accordance with any embodiment or combination of embodiments disclosed above, the spring element includes at least a portion of one or more of the arcuate arms and/or the lobe section.

[0049] In accordance with any embodiment or combination of embodiments disclosed above, the spring member provides a spring force sufficient to cause frictional engagement greater than a predetermined force exerted by a fluid flow through the drill pipe when the device is outwardly engaged to the interior wall of a drill pipe.

[0050] In accordance with any embodiment or combination of embodiments disclosed above, a drill pipe assembly can include an elongated drill pipe having an interior bore defined by an interior wall, a telemetry segment for installation within the interior bore of the drill pipe, and a device for securing the telemetry segment in the drill pipe, comprising a pair of diametrically opposed arcuate arms for outwardly engaging an interior wall of the drill pipe, the diametrically opposed arcuate arms being interconnected to one another by a radially inwardly projecting lobe section for capturing the telemetry segment between the lobe section and the interior wall of the drill pipe.

[0051] In accordance with any embodiment or combination of embodiments disclosed above, the assembly can include a spring element for biasing the arcuate arms into outward engagement with the interior wall of the drill pipe, wherein the arcuate arms interconnected by the lobe section are moveable against the biasing of the spring element to a compressed position for installation within a drill pipe.

[0052] In accordance with any embodiment or combination of embodiments disclosed above, a method for clamping a telemetry segment in a drill pipe includes providing a first drill pipe, positioning a first telemetry segment inside the first drill pipe, and clamping the first telemetry segment adjacent to an interior wall of the first drill pipe.

[0053] In accordance with any embodiment or combination of embodiments disclosed above, the method can include connecting a second telemetry segment to an upper end of the first telemetry segment.

[0054] In accordance with any embodiment or combination of embodiments disclosed above, the method can include positioning a second drill pipe over the second telemetry segment and connecting the second drill pipe to an upper end of the first drill pipe.

[0055] In accordance with any embodiment or combination of embodiments disclosed above, the method can include clamping the second telemetry segment adjacent to an interior wall of the second drill pipe.

[0056] In accordance with any embodiment or combination of embodiments disclosed above, clamping can include installing a first clamp in the first drill pipe proximate to an upper end of the first drill pipe, wherein the first clamp includes a section for accommodating the first telemetry segment.

[0057] In accordance with any embodiment or combination of embodiments disclosed above, installing a first clamp in the first drill pipe can include moving the first clamp from a normally expanded position to a compressed position.

[0058] In accordance with any embodiment or combination of embodiments disclosed above, installing a first clamp in the first drill pipe can include returning the first clamp to the normally expanded position from the compressed position.

[0059] In accordance with any embodiment or combination of embodiments disclosed above, clamping can include installing another clamp in the first drill pipe in a medial section of the drill pipe for accommodating the first telemetry segment.

[0060] In accordance with any embodiment or combination of embodiments disclosed above, clamping the second telemetry segment can include installing a second clamp in the second drill pipe proximate to an upper end of the second drill pipe, wherein the second clamp includes a section for accommodating the second telemetry segment.

[0061] In accordance with any embodiment or combination of embodiments disclosed above, a method for clamping one or more telemetry segments within a stand of drill pipes can include providing a stand of at least two connected drill pipes, positioning one or more telemetry segments inside the stand of connected drill pipes, and clamping the one or more telemetry segments adjacent to an interior wall of an uppermost drill pipe in the stand of connected drill pipes.

[0062] In accordance with any embodiment or combination of embodiments disclosed above, clamping can include installing a clamp in the uppermost drill pipe in the stand of connected drill pipes proximate to an upper end of the uppermost drill pipe, wherein the clamp includes a section for accommodating the one or more telemetry segments.

[0063] In accordance with any embodiment or combination of embodiments disclosed above, clamping can include installing a clamp in the uppermost drill pipe in the stand of connected drill pipes includes moving the clamp from a normally expanded position to a compressed position.

[0064] In accordance with any embodiment or combination of embodiments disclosed above, installing a clamp in the uppermost drill pipe in the stand of connected drill pipes further can include returning the clamp to the normally expanded position from the compressed position.

[0065] The devices and methods of the present disclosure, as described above and shown in the drawings, provide for improved clamping of telemetry segments within the interior of drill pipes. While the devices and methods of the subject disclosure have been shown and described with reference to certain embodiments, those skilled in the art will readily appreciate that changes and/or modifications may be made thereto without departing from the spirit and scope of the subject disclosure as defined by the appended claims.

What is claimed is:

1. A device for securing a telemetry segment in a drill pipe, comprising:

a pair of arcuate arms for outwardly engaging an interior wall of the drill pipe, interconnected by a radially inwardly projecting lobe section for capturing the telemetry segment between the lobe section and the interior wall of the drill pipe.

2. The device of claim **1**, further comprising a spring element for biasing the arcuate arms into outward engagement with the interior wall of the drill pipe, wherein the arcuate arms interconnected by the lobe section are moveable against the biasing of the spring element to a compressed position for installation within a drill pipe.

3. The device of claim **2**, wherein the spring element is positioned between an end of each of the arcuate arms.

4. The device of claim **1**, wherein the spring element includes at least a portion of one or more of the arcuate arms and/or the lobe section.

5. The device of claim **2**, wherein the spring member provides a spring force sufficient to cause frictional engagement greater than a predetermined force exerted by a fluid flow through the drill pipe when the device is outwardly engaged to the interior wall of a drill pipe.

6. A drill pipe assembly, comprising:

an elongated drill pipe having an interior bore defined by an interior wall;

a telemetry segment for installation within the interior bore of the drill pipe; and

a device for securing the telemetry segment in the drill pipe, comprising a pair of diametrically opposed arcuate arms for outwardly engaging an interior wall of the drill pipe, the diametrically opposed arcuate arms being interconnected to one another by a radially inwardly projecting lobe section for capturing the telemetry segment between the lobe section and the interior wall of the drill pipe.

7. The assembly of claim **6**, further comprising a spring element for biasing the arcuate arms into outward engagement with the interior wall of the drill pipe, wherein the arcuate arms interconnected by the lobe section are moveable against the biasing of the spring element to a compressed position for installation within a drill pipe.

8. A method for clamping a telemetry segment in a drill pipe, comprising:

providing a first drill pipe;

positioning a first telemetry segment inside the first drill pipe; and

clamping the first telemetry segment adjacent to an interior wall of the first drill pipe.

9. The method of claim **8**, further comprising connecting a second telemetry segment to an upper end of the first telemetry segment.

10. The method of claim **9**, further comprising positioning a second drill pipe over the second telemetry segment and connecting the second drill pipe to an upper end of the first drill pipe.

11. The method of claim **10**, further comprising clamping the second telemetry segment adjacent to an interior wall of the second drill pipe.

12. The method of claim **8**, wherein clamping includes installing a first clamp in the first drill pipe proximate to an upper end of the first drill pipe, wherein the first clamp includes a section for accommodating the first telemetry segment.

13. The method of claim **12**, wherein installing a first clamp in the first drill pipe includes moving the first clamp from a normally expanded position to a compressed position.

14. The method of claim **13**, wherein installing a first clamp in the first drill pipe further includes returning the first clamp to the normally expanded position from the compressed position.

15. The method of claim **14**, wherein clamping further comprises installing another clamp in the first drill pipe in a medial section of the drill pipe for accommodating the first telemetry segment.

16. The method of claim **11**, wherein clamping the second telemetry segment includes installing a second clamp in the second drill pipe proximate to an upper end of the second drill pipe, wherein the second clamp includes a section for accommodating the second telemetry segment.

17. A method for clamping one or more telemetry segments within a stand of drill pipes, comprising:

providing a stand of at least two connected drill pipes;

positioning one or more telemetry segments inside the stand of connected drill pipes; and

clamping the one or more telemetry segments adjacent to an interior wall of an uppermost drill pipe in the stand of connected drill pipes.

18. The method of claim **17**, wherein clamping includes installing a clamp in the uppermost drill pipe in the stand of connected drill pipes proximate to an upper end of the uppermost drill pipe, wherein the clamp includes a section for accommodating the one or more telemetry segments.

19. The method of claim **18**, wherein clamping includes installing a clamp in the uppermost drill pipe in the stand of connected drill pipes includes moving the clamp from a normally expanded position to a compressed position.

20. The method of claim **19**, wherein installing a clamp in the uppermost drill pipe in the stand of connected drill pipes further includes returning the clamp to the normally expanded position from the compressed position.

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