STABILIZING DOWNHOLE TOOL

Embodiments disclosed herein relate to a downhole tool and a method to abate vibration with the downhole tool. The downhole tool may include a first stabilizing member, a second stabilizing member, a flexible member, and/or a dampening member, in which the downhole tool may be disposed downhole within a wellbore. The flexible member may enable the first stabilizing member and the second stabilizing member to articulate with respect to an axis of the downhole tool. The dampening member may enable vibration received by the downhole tool to be dampened. Further, the first stabilizing member and the second stabilizing member may be rotatable with respect to each other about the axis of the downhole tool.
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STABILIZING DOWNHOLE TOOL

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit, under 35 U.S.C. § 119, of U.S. Provisional Application Serial No. 61/220,474 filed on June 25, 2009 and entitled "Stabilizing Downhole Tool" in the name of George Swietlik and Burney Latiolais. The disclosure of this U.S. Provisional Application is incorporated herein by reference in its entirety.

BACKGROUND OF DISCLOSURE

Field of the Disclosure

[0002] Embodiments disclosed herein generally relate to methods and tools to be disposed downhole within a string of tubular members. More specifically, embodiments disclosed herein relate to a downhole tool to be connected within a string of tubular members, in which the downhole tool may be used to assist in stabilizing the string.

Background Art

[0003] In oilfield exploration and production operations, various oilfield tubulars are used to perform important tasks, including, but not limited to, drilling a borehole (or wellbore) and casing the drilled borehole. For example, a string of tubular members, known in the industry as a drill string, may be used to advance and/or rotate a drill bit at a distal end to create the borehole. As used herein, the term drill string may be used to describe any string of tubular members used to rotate and/or advance a drill bit including, but not limited to, strings of drill pipe, drill collars, premium threaded connections, casing joints, and coiled tubing.

[0004] Furthermore, after a borehole has been created, a casing string may be disposed downhole into the borehole and cemented in place (or merely cemented in-situ where casing is used as the drill string) to stabilize, reinforce, or isolate (among other functions) portions of the borehole. As such, tubular strings may be connected together, end-to-end by threaded connections, where a female "pin" member of a first
tubular is configured to threadably engage a corresponding male "box" member of a second tubular. Alternatively, a tubular string may be made-up of a of male-male ended joints coupled together by female-female couplers. The process by which the threaded connections are screwed together is called "making-up" a threaded joint, and the process by which the connections are disassembled is referred to as "breaking-out" the threaded joint. As would be understood by one having ordinary skill, individual pieces (or "joints") of oilfield tubulars may come in a variety of materials, weights, diameters, configurations, and lengths.

[0005] As such, in the drilling, completing, or reworking of oil wells, a variety of downhole tools may be used. Figure 1 shows one example of a conventional drilling system 100 for drilling an earth formation. The drilling system includes a drilling rig 110 that may lift, lower and/or turn a drilling tool assembly 112 extending downward into a borehole 114. Drilling tool assembly 112 generally includes a drill string 116 with a bottom hole assembly 118 having a drill bit 120 attached to a distal end of drill string 116.

[0006] The drill string 116 may include several joints of drill pipe 116A connected end-to-end through one or more tool joints 116B. The drill string 116 may be connected such that the drill pipe 116A is tightened to a certain amount, such as to a specific torque. The drill string 116 may also be disconnected such that the drill pipe 116A is threadably taken apart. The drill string 116 may transmit drilling fluid (such as through a central bore) and/or rotational torque from the drill rig 110 to the bottom hole assembly 118. The drill pipe 116A may provide a hydraulic passage through which drilling fluid (e.g., mud) is pumped. The drilling fluid typically discharges through selected-size orifices in the bit (e.g., "jets") for the purposes of cooling the drill bit 120 and lifting rock cuttings out of borehole 114 as it is drilled. Similarly, rather than using drilling mud, the drill string 116 may be used to transmit air, such as when air drilling, in which the air is used to lift rock cuttings out of the borehole 114.

[0007] The bottom hole assembly 118 may include the drill bit 120, in addition to other components that may be attached between the drill string 116 and drill bit 120. Examples of additional downhole, e.g., bottom hole assembly, components may include, but are not limited to, drill collars, stabilizers, transducers, measurement-
while-drilling tools, logging-while-drilling tools), downhole motors (e.g., mud motors), or any combination thereof.

[0008] During drilling, axial, lateral, and/or rotational vibration (e.g., movement, oscillations, etc.) may be imparted to the drill bit 120 and drill string 116 (including bottom hole assembly 118) from various downhole (and surface) forces. For example, as the drill bit 120 compacts and cuts the earth formation, the cutting forces may impart vibration to the drill bit 120, the bottom hole assembly 118, and/or the drill string 116. Additionally, the rotation and/or axial displacement of the drill string 116 may further impart vibration to the drill string components (116, 118, and 120) from the forces generated by the rotating drill string 116 contacting the borehole and other downhole components. Furthermore, if the bottom hole assembly 118 is so equipped, a downhole mud motor (e.g., progressive cavity positive displacement mud motors or turbo drills) may impart vibration to the drill bit 120 and drill string 116 (including other components of bottom hole assembly 118) from the forces generated by their operation.

[0009] Vibration may cause the drilling apparatus, including drill string 116, bottom hole assembly 118, and drill bit 120, to bend, twist, bounce, or otherwise deviate off-course, such as having the borehole formed larger than desired or having the trajectory of the borehole formed off-course and generate poor borehole quality. Thus, vibration may inhibit a more efficient excavation of the subterranean formation by the drilling rig 100. Further, vibration may cause damage to one or more of the drill string components (116, 118, and 120) and any downhole components disposed therein. For example, a sensor may be included with a bottom hole assembly 118, in which the sensor may be used for measuring and/or sensing one or more downhole parameters, e.g., drilling parameters. Vibration received therein may damage a sensor and/or interfere with the correct operation of the sensor. Vibration may interfere with the logging, recordation, and/or transmittal of information (e.g., from a downhole sensor) to and/or from the drilling rig 100, in addition to interfering with the performance of the bottom hole assembly 118, and possibly drill string components (116, 118, and 120), altogether. Accordingly, there exists a need to increase the stability of, as well as reduce downhole vibration imparted to, at least a portion of drill strings, drill bits, and bottom hole assemblies.
Additionally, there also exists a need to more effectively maintain contact between the cutting surface of a drill bit and an earth formation during drilling. Drill bit 120 vibration, particularly during cutting, may damage or prematurely wear drill bit 120. Furthermore, vibration may cause the drill bit 120, for example, to lift off of the bottom of the borehole, thereby reducing the bit's rate of penetration into a formation. As such, there exists a need to dampen the vibration of a drill string, for example, a portion of the drill string (including bottom hole assembly and/or drill bit components) in a drilling system.

SUMMARY OF INVENTION

In a first aspect, embodiments disclosed herein relate to a method to abate vibration within a borehole. The method includes connecting a downhole tool within a string of tubular members, the string of tubular members having a drill bit disposed at one end, and disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool having a first stabilizing member, a second stabilizing member, and a flexible member. The method further includes flexing the flexible member such that one of the first stabilizing member and the second stabilizing member contacts a wall of the borehole, and drilling into the borehole with the drill bit.

In another aspect, embodiments disclosed herein relate to a method to abate vibration within a borehole. The method includes connecting a downhole tool within a string of tubular members, the string of tubular members having a drill bit disposed at one end, and disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool having a first stabilizing member located above a flexible member. The method further includes flexing the flexible member such that one of the first stabilizing member and the second stabilizing member contacts a wall of the borehole, and drilling into the borehole with the drill bit.

In another aspect, embodiments disclosed herein relate to a method to abate vibration within a borehole. The method includes connecting a downhole tool within a string of tubular members, the string of tubular members having a drill bit disposed at one end, and disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool comprising a first stabilizing member and a
dampening member. The method further includes dampening vibration received within the downhole tool with the dampening member, and drilling into the borehole with the drill bit.

[0014] In another aspect, embodiments disclosed herein relate to a downhole tool to abate vibration. The downhole tool includes a generally tubular body having an axis defined therethrough, a first stabilizing member disposed at a first location on the tubular body, a second stabilizing member disposed at a second location on the tubular body, in which the first stabilizing member and the second stabilizing member are rotatable with respect to each other about the axis, and a flexible member disposed within the tubular body such that the first stabilizing member and the second stabilizing member are configured to articulate with respect to each other along the axis.

[0015] In another aspect, embodiments disclosed herein relate to a downhole tool having an axis defined therethrough to be disposed within a borehole. The downhole tool includes a first stabilizing member disposed at a first location and a second stabilizing member disposed at a second location. The first stabilizing member and the second stabilizing member are rotatable with respect to each other about the axis, and the first stabilizing member and the second stabilizing member are each configured to engage a wall of the borehole.

[0016] In another aspect, embodiments disclosed herein relate to a system having an axis defined therethrough to be disposed within a borehole. The system includes a downhole tool having a first end and a second end, the downhole tool including a first stabilizing member having a dampening member disposed thereon, a second stabilizing member, wherein the first stabilizing member and the second stabilizing member are rotatable with respect to each other about the axis, and a flexible member disposed within the tubular member such that the first stabilizing member and the second stabilizing member are configured to articulate with respect to each other along the axis. The system further includes an upper bottom hole assembly having a first end and a second end, in which the second end of the upper bottom hole assembly is connected to the first end of the downhole tool, and a lower bottom hole assembly having a first end and a second end, in which the first end of the lower bottom hole assembly is connected to the second end of the downhole tool.
Other aspects and advantages of the invention will be apparent from the following description and the appended claims.

**BRIEF DESCRIPTION OF DRAWINGS**

[0018] Figure 1 is a schematic view of a drilling rig.

[0019] Figures 2A, 2B, and 2C show multiple perspective views of a downhole tool in accordance with an embodiment of the present disclosure.

[0020] Figure 3A shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0021] Figure 3B shows a detailed perspective view of a flexible member in accordance with an embodiment of the present disclosure.

[0022] Figure 4 shows a perspective view of a downhole tool within a string of tubular members in accordance with an embodiment of the present disclosure.

[0023] Figure 5 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0024] Figure 6 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0025] Figure 7 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0026] Figure 8 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0027] Figure 9 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0028] Figure 10 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0029] Figure 11 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.

[0030] Figure 12 shows a cross-sectional view of a downhole tool in accordance with an embodiment of the present disclosure.
DETAILED DESCRIPTION

[0031] Embodiments of the present disclosure will now be described in detail with reference to the accompanying Figures. Like elements in the various figures may be denoted by like reference numerals for consistency. Further, in the following detailed description of embodiments of the present disclosure, numerous specific details are set forth in order to provide a more thorough understanding of the claimed subject matter. However, it will be apparent to one of ordinary skill in the art that the embodiments disclosed herein may be practiced without these specific details. In other instances, well-known features have not been described in detail to avoid unnecessarily complicating the description. Additionally, it will be apparent to one of ordinary skill in the art that the scale of the elements presented in the accompanying Figures may vary without departing from the scope of the present disclosure.

[0032] As used herein, a "drill bit" refers to any tool, mechanism, device, and/or instrument that may be used to cut, shear, drill, bore, puncture, penetrate, and/or use any other method known in the art to remove earth when forming a borehole within a formation. For example, a drill bit may include one or more of a roller-cone drill bit, a shearing drill bit, a rock bit, a PDC (polycrystalline diamond compact) bit, a reamer, a milling tool, and/or any other device or tool known in the art. A drill bit may further include one or more of a cutting element, a shearing element, a compression element, a PCD (polycrystalline diamond) element, and/or any other element known in the art.

[0033] Furthermore, as used herein, "drilling" may refer to any procedure and/or method that may be used to remove earth, such as when forming and/or enlarging a borehole, but may also include other methods and procedures performed during the course of drilling, extending, and/or enlarging a borehole, such as when removing devices and/or components that may be disposed downhole. For example, "drilling" may include the removal of one or more packer elements, the removal of one or more tubular members, and/or the removal of other materials and/or devices disposed within a formation, such as by milling to remove a packer element disposed within a formation during a work over of borehole. Accordingly, the present disclosure contemplates using different structures and types of drill bits in one or more methods when drilling and forming a borehole.
In various aspects disclosed herein, embodiments disclosed herein generally relate to a downhole tool to be used within a drill string and to be disposed downhole within a borehole. The downhole tool may be used to stabilize, or assist in stabilizing, one or more tubular members when the tubular members are disposed downhole within a borehole. Particularly, the downhole tool may be disposed downhole within a borehole, such as having the tool connected within a string of tubular members disposed downhole, in which the downhole tool may engage one or more surfaces of the borehole. Further, the downhole tool may abate vibration (e.g., reduce vibration, reduce the transfer of vibration across the tool, or stop the transfer of vibration across the tool), for example, vibration received during drilling and/or rotation of a drill string. As used herein, vibration may refer to any movement, force, and/or oscillation received by a downhole tool in the axial, radial, and/or rotational directions. As such, the downhole tool may prevent damage to the drillstring, bottom hole assembly, or any other downhole tools disposed within the borehole or attached to a tubular string.

Thus, in one aspect, a downhole tool in accordance with one or more embodiments of the present disclosure may include a generally tubular body having an axis defined therethrough. A first stabilizing member may be disposed at one location on the tubular body, and an optional second stabilizing member may be disposed at another location on the tubular body. In this arrangement, the first stabilizing member and the second stabilizing member may be able to rotate with respect to each other about the axis of the tubular body. The downhole tool may also include a flexible member disposed therein, in which the flexible member may enable the first stabilizing member and the second stabilizing member to be able to deflect (e.g., flex or articulate) with respect to each other along their respective axes. As such, the first stabilizing member and/or the second stabilizing member may be able to engage a wall of a borehole and provide stabilization to the downhole tool.

Further, the downhole tool may additionally have a dampening member. For example, the downhole tool may have a dampening member included therewith. The dampening member may be used to dampen vibration in one or more directions, such as dampen vibration in the axial, radial, and/or rotational direction. As such, when dampening vibration primarily in the axial direction, the dampening member may include, for example, a "shock sub" assembly. In such an embodiment, the shock sub
assembly may be disposed within the downhole tool. Those having ordinary skill in
the art, though, will appreciate that other dampening members may be used to dampen
vibration in one or more directions without departing from the scope of the present
disclosure.

[0037] The downhole tool may include a dampening member disposed between a first
stabilizing member and a second stabilizing member. Further, the downhole tool may
have a dampening member disposed on or adjacent to the first stabilizing member
and/or second stabilizing member. For example, the dampening member may be
disposed upon an outer surface of a stabilizing member, and/or the dampening
member may be disposed between an outer surface of a stabilizing member and an
inner bore of the downhole tool. The dampening member may include a dampening
material, such as by having the dampening material disposed between the first
stabilizing member and the second stabilizing member, disposed on a wellbore
contacting surface of the first stabilizing member and/or the second stabilizing
member, and/or disposed within the first stabilizing member and/or the second
stabilizing member. The dampening member may dampen (e.g., reduce) vibration
received by components of the drill string (including the bottom hole assembly, e.g.,
sensors therein, and the drill bit), such as by reducing at least a portion of the
vibration received within the dampening member, thereby reducing vibration received
within the downhole tool and/or other components of the drill string. In various
embodiments disclosed herein, the dampening member may include an elastomeric
member and/or an elastomeric material. Further, the downhole tool may be disposed
with a bottom hole assembly, for example, disposed between an upper bottom hole
assembly and a lower bottom hole assembly. In such embodiments, a downhole tool
in accordance with embodiments disclosed herein may dampen vibration within the
bottom hole assembly, for example, between the upper bottom hole assembly (which
may include a downhole component, e.g., sensor) and the lower bottom hole
assembly.

[0038] Referring now to Figures 2A and 2B, multiple perspective views of a
downhole tool 201 in accordance with embodiments disclosed herein are shown.
Particularly, Figure 2A shows an outlined perspective view of the downhole tool 201,
and Figure 2B shows a textured perspective view of the downhole tool 201. The
illustrated downhole tool 201 includes a generally tubular body 203 having an axis 205 defined therethrough. As such, a bore may be defined within the body 203 that extends through the body 203 of the downhole tool 201, such as to induce fluid flow through the downhole tool 201. Additionally, as shown, the tubular body 203 of the downhole tool 201 may include one or more body portions. In this embodiment, the downhole tool 201 includes a first body portion 207 and a second body portion 209. However, those having ordinary skill in the art will appreciate that a downhole tool in accordance with embodiments disclosed herein may include more than two body portions, as shown, or may include a single body portion (e.g., with a flexible member).

Further, the downhole tool 201 may include one or more stabilizing members disposed thereon and/or attached thereto. As used herein, the term "stabilizing member" refers to a location along the outer profile of the drill string (including bottom hole assembly) having a relatively increased outer profile, e.g., outer diameter. For example, stabilizers may be constructed as having multi-blade, longitudinally straight members, as having multi-blade, radially straight members, or as having single or multi-bladed spiral (helical) shaped members. As such, the bladed members may be disposed or constructed on the outer surface of the stabilizing members, thereby providing a surface for engagement of the stabilizing members with a wall of a borehole (as discussed more below). Regardless of particular configuration, stabilizing members typically function to contact the inner profile of the borehole wall (or the inner diameter of a cased borehole) such that adjoining portions of the drill string (or bottom hole assembly) will not contact the borehole wall. The desire to prevent components of the drillstring or bottom hole assembly from contacting the borehole wall may come from a variety or reasons, including, but not limited to, creating a desired offset from the borehole for a particular measurement device and protecting an outer structure the drilling apparatus that might otherwise become damaged if it were allowed to contact the borehole wall. As described herein, a stabilizing member may act as a grounding point(s) in a downhole tool such that the drill string and/or bottom hole assembly may engage a wall of the borehole to flex about a single stabilizing member or between two or more stabilizing members.
For example, as shown in Figures 2A and 2B, the downhole tool 201 includes a first stabilizing member 211 and a second stabilizing member 213. Specifically, in this embodiment, the first stabilizing member 211 is disposed on the first body portion 207, and the second stabilizing member 213 is disposed on the second body portion 209. As such, the first stabilizing member 211 and the second stabilizing member 213 may be used to stabilize the downhole tool 201, such as when disposed downhole and/or attached to a string of tubular members (discussed more below) by having the stabilizing members engage the wall of a borehole. Thus, as shown, the downhole tool 201 may have at least two points-of-contact to engage the wall of the borehole, in which one point-of-contact by the first stabilizing member 211 may be axially spaced along the axis 205 from another point-of-contact by the second stabilizing member 213. However, those having ordinary skill in the art will appreciate that a downhole tool in accordance with embodiments disclosed herein may include more than two stabilizing members disposed thereon and/or attached thereto. Alternatively, those having ordinary skill will appreciate that a downhole tool in accordance with embodiments disclosed herein may include a single stabilizing member disposed thereupon.

A stabilizing member may be rotationally fixed or rotatable relative to the body portion it is connected to, e.g., be rotationally stationary relative to a borehole. In accordance with embodiments disclosed herein, dual stabilizing members and may be rotatable with respect to each other about the axis of the downhole tool. For example, as shown in Figures 2A and 2B, the first stabilizing member 211 may be able to rotate, e.g., about the axis 205, with respect to the second stabilizing member 213. More particularly, the body 203 of the downhole tool 201 may be able to rotate between the first body section 207 and the second body section 209, thereby enabling rotation between the first stabilizing member 211 and the second stabilizing member 213. In this embodiment, the first body section 207 and the second body section 209 may be able to rotate with respect to each other through the use of, for example, a bearing being disposed therebetween. However, those having ordinary skill in the art will appreciate that other mechanisms may be used to enable rotation between the body sections and/or the stabilizing members in accordance with embodiments disclosed herein.
Additionally, an outer diameter of one or more of the stabilizing members may be larger than an outer diameter of the remainder of the tubular body of the downhole tool. For example, as shown in Figures 2A and 2B, the outer diameter of the first stabilizing member 211 and the second stabilizing member 213 is larger than the outer diameter of the remainder of the tubular body 203. Further, an outer diameter of one of the stabilizing members may be larger than an outer diameter of the other stabilizing members. For example, with reference to Figures 2A and 2B, the outer diameter of the first stabilizing member 211 may be larger than the outer diameter of the second stabilizing member 213. In such an embodiment, the first stabilizing member 211 may engage and contact a wall of a borehole before the second stabilizing member 213 engages and contact the wall of the borehole. As such, in an embodiment in which a borehole has a diameter of at least about 8.75 inches (22.2 cm), the second stabilizing member 213 may have an outer diameter of about 8.5 inches (21.6 cm), and the first stabilizing member 211 may have an outer diameter of about 8.625 inches (21.9 cm). Further, in another embodiment, the outer diameter of the second stabilizing member 213 may be larger than the outer diameter of the first stabilizing member 211.

One or more of the stabilizing members of a downhole tool in accordance with embodiments disclosed herein may include one or more bladed members disposed thereon and/or attached thereto. As shown, the first stabilizing member 211 includes a plurality of bladed members 215 formed thereon and disposed radially thereabout, and the second stabilizing member 213 includes a plurality of bladed members 217 formed thereon and disposed radially thereabout. In such an embodiment, the bladed members 215 and 217 may be used to engage and contact a wall of a borehole, thereby providing stabilization to the downhole tool 201.

Further, the downhole tool 201 may include one or more dampening members, e.g., disposed thereon and/or attached thereto. More specifically, one or more of the stabilizing members 211 and 213 of the downhole tool 201 may include one or more dampening members, e.g., disposed thereon and/or attached thereto. For example, as shown in Figures 2A and 2B, the plurality of bladed members 215 of the first stabilizing member 211 each includes a dampening member 219 formed thereon. As used herein, a dampening member refers to a member that may be configured to
dampen vibration (e.g., reduce vibration, movement, and/or energy), such as by having the dampening member stabilize the downhole tool against a borehole wall for dampening. As shown, though only the first stabilizing member 211 includes a dampening member 219 in Figures 2A and 2B, those having ordinary skill in the art will appreciate that the second stabilizing member 213 may additionally or alternatively include a dampening member in accordance with embodiments disclosed herein.

[0045] The dampening member may be formed from any dampening material and/or mechanism known in the art. For example, in Figures 2A and 2B, the bladed members 215 of the first stabilizing member 211 may include a dampening material, such as an elastomeric material, in which the dampening material of the bladed members 215 may engage a borehole wall to provide stabilization to the downhole tool 201, e.g., a dampening material on the outer surface of the bladed members 215.

[0046] Further, in another embodiment, a stabilizing member of a downhole tool in accordance with embodiments disclosed herein may include a dampening member disposed within a stabilizing member. For example, with reference to Figure 2C, a detailed cross-sectional view of a stabilizing member 211 in accordance with embodiments disclosed herein is shown. In this embodiment, rather than having a dampening member 219 formed upon the stabilizing member 211, the dampening member 219 is disposed within the stabilizing member 211. The dampening member 219 may still dampen vibration, such as dampen vibration within the stabilizing member 211 when engaging a wall of a borehole. Additionally, when disposing a dampening member upon the downhole tool and within the stabilizing member, the dampening member 219 may be fixed to the body section of the downhole tool, or alternatively, the dampening member may be rotatable about the body section of the downhole tool.

[0047] Furthermore, in accordance with one or more embodiments disclosed herein, the downhole tool may additionally, or alternatively, have a dampening member disposed within the body of the downhole tool. More particularly, the downhole tool may have a dampening member disposed within the downhole tool between the first stabilizing member and the second stabilizing member. For example, in one embodiment, the first stabilizing member may be able to move along and/or about the
axis of the tool with respect to the second stabilizing member. As such, a dampening member may be disposed between the first stabilizing member and the second stabilizing member to dampen vibration therebetween. The dampening member may include an elastomeric material, as described above, a biasing mechanism (e.g., a spring), and/or any other dampening material and/or mechanism known in the art. For example, the dampening member may include a cavity, such as a fluid cavity, in which the cavity may be used to dampen vibration received therein. Those having ordinary skill in the art will also appreciate that a dampening member may be disposed in other locations of a downhole tool in accordance with embodiments disclosed herein with departing from the scope of the present disclosure. For example, a downhole tool having only one stabilizing member, rather than two stabilizing members as shown in Figures 2A and 2B, may include a dampening member disposed within the body of the downhole tool, such as at the location or adjacent to the stabilizing member, without departing from the scope of the present disclosure.

Furthermore still, one or more bladed members may include one or more pads disposed thereon and/or attached thereto, thereby providing protection for the stabilizing members. For example, in Figures 2A and 2B, the bladed members 217 of the second stabilizing member 213 may include a protection member, e.g., one or more pads 221 (a plurality of pads 221 as shown in this embodiment) disposed thereon, e.g., in which the pads 221 may be used to engage the borehole wall. In this embodiment, the pads 221 may provide protection to the second stabilizing member 213, such as by preventing, or assist in preventing, wear to the second stabilizing member 213 when engaging a borehole wall. Those having ordinary skill in the art will also appreciate that other protection members may be added to one or more of the stabilizing members of a downhole tool in accordance with embodiments disclosed herein without departing from the present disclosure.

Referring now to Figure 3A, a cross-sectional view of a downhole tool 301 in accordance with embodiments disclosed herein is shown. Similar to above, the downhole tool 301 includes a tubular body 303 having a first body portion 307 and a second body portion 309 with a first stabilizing member 311 and a second stabilizing member 313 disposed thereon, respectively. The first stabilizing member 311 may
rotate with respect to the second stabilizing member 313 about an axis 305 of the
downhole tool 301.

[0050] Further, a downhole tool in accordance with embodiments disclosed herein
may have a flexible member, such as by having a flexible member disposed therein.
With reference to Figure 3A, the downhole tool 301 includes a flexible member 331,
in which the flexible member 331 may be disposed within the tubular body 303. For
example, as shown, the flexible member 331 may be disposed particularly within the
second body portion 309 of the downhole tool 301. Figure 3B provides a detailed
perspective view of the flexible member 331 shown in Figure 3A. The flexible
member 331 may enable the first stabilizing member 311 to flex (e.g., bend) along the
axis 305 of the downhole tool 301 with respect to the second stabilizing member 313.

[0051] In the embodiment shown in Figures 3A and 3B, the second body portion 309
may include a first body member 323 and a second body member 325, in which the
flexible member 331 may be disposed within the second body portion 309 between
the first body member 323 and the second body member 325. As such, the flexible
member 331 may enable the first body member 323 and the second body member 325
to flex (e.g., bend) with respect to each other along the axis 305, thereby enabling the
first stabilizing member 311 and the second stabilizing member 313 to rotate with
respect to each other along the axis 305. Particularly, in one or more embodiments,
the flexible member 331 may enable the first body member 323 and the second body
member 325 to flex across substantially 360 degrees about the axis 305 with respect
to each other. For example, the first body member 323 may flex in substantially
every direction about the axis 305 with respect to the second body member 325.
However, those having ordinary skill in the art will appreciate that the embodiments
disclosed herein are not so limited, in which other flexible members may be used with
departing from the scope of the present disclosure.

[0052] A flexible member in accordance with embodiments disclosed herein may
include and/or be formed from a flexible material. For example, in Figures 3A and
3B, the flexible member 331 may include an elastomeric material 337, in which the
elastomeric material may allow the downhole tool 301 to flex along the axis 305. The
elastomeric material 337 may be disposed in one or more locations within the flexible
member 331. For example, as shown in Figure 3B, the elastomeric material 337 may
be disposed adjacent to the first body member 323 and the second stabilizing member 313, in which the second stabilizing member 313 is attached to the second body member 325. Further, elastomeric material 340 may also be disposed adjacent to teeth 339 of the flexible member 331. As such, the elastomeric material 337 may allow the flexible member 331, and, thus, the downhole tool 301, to flex along the axis 305 thereof. Additionally, the elastomeric material 337 may be used to provide support (e.g., to dampen) in the axial and/or radial direction of the flexible member 331 with respect to the axis 305 of the downhole tool 301. Those having ordinary skill in the art, however, will appreciate that other flexible materials and/or locations of the flexible materials may be used within the flexible member in Figures 3A and 3B without departing from the scope of the present disclosure. For example, as shown in Figure 3B, the flexible member 331 may include elastomeric material 338 disposed at the lower end of the flexible member with departing from the scope of the present disclosure.

[0053] The dampening of flexure, e.g., dampening of the flexure in flexible member 331 by elastomeric material 337, 338, and/or 340, e.g., the elastomeric material 337 radially disposed about axis 305 of the downhole tool 301, as depicted, may abate vibration, e.g., abate vibration transmitted across the flexible member 331. As discussed above, elastomeric material may also be utilized to dampen axial movement, e.g., an axial dampening member. For example, elastomeric material may be disposed between axially spaced components to dampen axial vibration.

[0054] The teeth 339 of the flexible member 331 may be used to translate torque from the first body member 323 to the second body member 325, such as by having the teeth 339 engage recesses formed within an inner surface of the second stabilizing member 313, or vice versa. Teeth 339 may have an arcuate and/or rounded surface formed thereon, as shown in Figure 3B, in which the teeth 339 may enable the flexing within the flexible member 331 between the first body member 323 and the second body member 325.

[0055] Further, the flexible member within the downhole tool of the present disclosure may include a straightening member disposed therein, in which the straightening member may be used to provide rigidity (e.g., restoring force) within the flexible member. For example, as shown in Figures 3A and 3B, the flexible member
331 may include a straightening member 335 disposed within the downhole tool 401. In this embodiment, the straightening member 335 is a spring beam formed as a tubular member, in which the straightening member 335 extends from the first body member 323 to the second body member 325 of the second body portion 309 and enables fluid flow therebetween. However, those having ordinary skill in the art will appreciate that another straightening member may used within the downhole tool to provide rigidity to the flexible member of the downhole tool without departing from the scope of the present disclosure.

[0056] Furthermore, those having ordinary skill in the art will appreciate that other flexible members may used within the downhole tool to enable a rotation of the stabilizing members with respect to each other along the axis of the downhole tool without departing from the scope of the present disclosure. For example, in another embodiment, one or more swivels, joints, intersections for flexure and/or other flexible members may be included within a downhole tool in accordance with embodiments disclosed herein to provide flexing of the tubular body along the axis of the downhole. For example, downhole tools having a flexible member and/or a flexible joint may include those described in U.S. Patent Nos. 6,945,338 and 7,216,726, which are each incorporated herein by reference in their entirety.

[0057] The flexible member within the downhole tool of the present disclosure may provide a point of flexure, in which the point of flexure provides articulation along the axis of the downhole tool. As such, in one or more embodiments, the point of flexure for the flexing member is disposed between or at the location of the stabilizing members of the downhole tool. For example, as shown in Figure 3A, the point of flexure 333 of the flexible member 331 is disposed at about the location of the second stabilizing member 313. However, those having ordinary skill in the art will appreciate that the point of flexure may also be disposed at about the location of the first stabilizing member 311, or a location between the first stabilizing member 311 and the second stabilizing member 313, without departing from the scope of the present disclosure. Additionally, while the term "point of flexure" may be understood to mean a single location along the axis of the downhole tool, it should be understood that the flexure of flexible member 331 may occur over a region. For example, flexible member 331 may be characterized as having a point of flexure that is
distributed along a selected axial length of the downhole tool rather than a single "point" location.

[0058] Referring now to Figure 4, a perspective view of a downhole tool 401 disposed within a string of tubular members 441 in accordance with embodiments disclosed herein is shown. In this embodiment, the downhole tool 401, having a first stabilizing member 411 and a second stabilizing member 413 with a flexible member 431 disposed therein, is attached to and connected within the string of tubular members 441. As shown, the string of tubular members 441 may include a lower bottom hole assembly 443 and an upper bottom hole assembly 445. As such, the string 441 may be used as a drill string, e.g., in which the lower bottom hole assembly 443 includes a drill bit 447 disposed at an end thereof. It should be understood that the use of terms "upper" and "lower" is arbitrary in referring to components of the drill string (and bottom hole assembly). However, by convention, "upper" typically refers to a location placed farther away from the drill bit than a "lower" location.

[0059] While it should be understood that any variety of drill collars, stabilizers, transducers, measurement-while-drilling tools, logging-while-drilling tools, downhole motors (e.g., mud motors), or any combination thereof may be located within either the upper 445 or lower 443 bottom hole assemblies, typically, a lower bottom hole assembly 443 includes drilling components (e.g., mud motors, air drilling hammers, etc.) that may be used to facilitate drilling and the upper bottom hole assembly 445 includes ancillary components (e.g., transducers, measurement-while-drilling tools, logging-while drilling tools, etc).

[0060] As discussed above, a downhole tool in accordance with embodiments disclosed herein may be disposed downhole within a borehole, in which the downhole tool may be used to stabilize, or assist in stabilizing, one or more tubular members and/or other downhole tools disposed within the borehole. For example, with reference to Figure 4, the downhole tool 401 and the string of tubular members 441 may be disposed downhole to drill within and/or form a borehole within a formation. The string of tubular members 441 may be disposed downhole, in which the drill bit 447 may rotated with respect to the borehole to drill at the bottom of the borehole. Drill bit 447 may be rotated by the rig (e.g., top drive or rotary table) and/or downhole motor. During drilling, the first stabilizing member 411 and second stabilizing
member 413 may be used to stabilize the downhole tool 401 and the string 441, such as by engaging a wall of the borehole. Particularly, in this embodiment shown, the downhole tool 401 may have at least two points-of-contact to engage the wall of the borehole, in which one point-of-contact 451 may be established by the first stabilizing member 411 engaging the wall of the borehole, and another axially spaced point-of-contact 453 may be established by the second stabilizing member 413 engaging the wall of the borehole. The points-of-contact with the wall of the borehole may be used to stabilize, or assist in stabilizing, the string of tubular members 441 and drill bit 447. Additionally, while the term "point-of-contact" may be understood to mean a single location along the surface of a stabilizing member of the downhole tool that engages the wall of the borehole, it should be understood that the contact of a stabilizing member may occur over a region. For example, the first stabilizing member 411 and/or the second stabilizing member 413 may be characterized as having a point-of-contact with the wall of the borehole that is distributed along a selected radial section of the downhole tool, rather than a single location with the first stabilizing member 411 and/or the second stabilizing member 413.

Flexible member 431 may be used to provide flexure (e.g., bending) along an axis of the downhole tool 401, thereby enabling the first stabilizing member 411 and the second stabilizing member 413 to also flex along the axis. As such, depending on the direction and/or force used by the drill bit 447 to drill, one or both of the first stabilizing member 411 and the second stabilizing member 413 may engage the borehole wall. The first stabilizing member 411 and the second stabilizing member 413 may also provide additional control for the string 441, such as by dampening vibration and/or flexure within the string 441. For example, the flexible member 431 may have a dampening member disposed therein, in which the flexible member 431 may be used to dampen vibration. As such, the flexible member 431 may be used to dampen vibration between the first stabilizing member 411 and the second stabilizing member 413 within the downhole tool 401 and other portions of the string 441, in addition to providing flexure between the first stabilizing member 411 and the second stabilizing member 413 within the downhole tool 401 and other portions of the string 441.
For example, during use of the string 441 downhole, the drill bit 447 may be used to form and/or extend a borehole downhole. During this use of the string 441, the drill bit 447 may generate vibration from the drilling within the earth formation. As such, the vibration generated by the drill bit 447 may propagate along the string 441, such as through the lower bottom hole assembly 443, and into the downhole tool 401. To stabilize the string 441, one or both of the stabilizing members 411 and 413 may be used to engage the wall of the borehole, in which vibration received by the stabilizing members 411 and 413 may be dampened against the wall of the borehole. The vibration that has propagated into and through the lower bottom hole assembly 443 may be dampened using the downhole tool 401, thereby reducing and/or insulating altogether the vibration the upper bottom hole assembly 445 may receive. As such, the downhole tool 401 may dampen the vibration received by the upper bottom hole assembly 445. Further, to additionally dampen vibration, the downhole tool 401 may include a dampening member (as discussed above). During use of the string 441, the dampening member may additionally dampen vibration within the downhole tool 401 to reduce and/or insulate altogether the vibration the upper bottom hole assembly 445 may receive.

Furthermore, as mentioned above, at least one or both of the first stabilizing member 411 and the second stabilizing member 413 may be able to rotate about the axis of the downhole tool 401 with respect to the tool mandrel (e.g., be rotationally geostationary relative to the borehole). The first stabilizing member 411 may be rotatable with respect to the second stabilizing member 413, and vice-versa, or, in an embodiment having only one of the stabilizing members (e.g., 411 and 413), the body 403 of tool 401. A motor may be disposed within the string 441, such as within the lower bottom hole assembly 443. A motor may rotate the drill bit 447 and may also rotate the remainder of the lower bottom hole assembly (e.g., if a motor is disposed within the lower bottom hole assembly 443) and/or the second stabilizing member 413, e.g., if a stabilizing member is rotationally fixed to the tool 401. However, because of the enabled rotation about the axis of the downhole tool 401 between the first stabilizing member 411 and the second stabilizing member 413, the first stabilizing member 411 may rotate at a slower rate with respect to the second stabilizing member 413, or the first stabilizing member 411 may remain substantially fixed.
rotationally stationary with respect to the borehole while the second stabilizing member 413 is rotating with the lower bottom hole assembly 413. As such, the first stabilizing member 411 may remain rotationally stationary during engagement and stabilization with the wall of the borehole, while the second stabilizing member 413 rotates during engagement and stabilization with the wall of the borehole. Additionally, in an embodiment in which both the first stabilizing member 411 and the second stabilizing member 413 may be able to rotate about the axis of the downhole tool 401, the first stabilizing member 411 and the second stabilizing member 413 may remain substantially rotationally stationary with respect to the borehole while the lower bottom hole assembly 443 is rotating. In such an embodiment, both the first stabilizing member 411 and the second stabilizing member 413 may remain rotationally stationary during engagement and stabilizing with the wall of the borehole.

[0064] Referring now to Figure 5, a cross-sectional view of a downhole tool 501 in accordance with embodiments disclosed herein is shown. Similar to above, the downhole tool 501 includes a tubular body 503 having a first body portion 507 and a second body portion 509 with a first stabilizing member 511 and a second stabilizing member 513 disposed thereon, respectively. The first stabilizing member 511 may rotate with respect to the second stabilizing member 513 about an axis 505 of the downhole tool 501.

[0065] Further, as shown and similar to the embodiments above, the downhole tool 501 includes a flexible member 531. However, in this embodiment, rather than having the flexible member 531 disposed at about the location of the second stabilizing member 513, the flexible member 531 is disposed between the first stabilizing member 511 and the second stabilizing member 513. Particularly, the depicted flexible member 531 is disposed substantially the same distance from the first stabilizing member 511 and the second stabilizing member 513. As mentioned above, though, those having ordinary skill in the art will appreciate that the location of the flexible member within the downhole tool is not so limited, as the flexible member may be disposed at any of the multiple locations within the downhole tool (e.g., at any location between the first and second stabilizing members, at the location of the first stabilizing member, or at a location outside of the section between the first
and second stabilizing members) without departing from the scope of the present disclosure.

[0066] Additionally, as shown, the flexible member 531 may have an outer diameter substantially the same as an outer diameter of the remainder of the tubular body of the downhole tool, as depicted, excluding the diameter of the stabilizing members. As such, the flexible member 531 may have an outer diameter that is smaller than an outer diameter of the first stabilizing member 511 and/or the second stabilizing member 513. However, those having ordinary skill in that art will appreciate that the diameter of the flexible member may be selected from any of the multiple diameters available within a downhole tool without departing from the scope of the present disclosure.

[0067] Referring now to Figure 6, a cross-sectional view of a downhole tool 601 in accordance with embodiments disclosed herein is shown. Similar to the above embodiments, the downhole tool 601 includes a tubular body 603. Further, the downhole tool 601 includes a drill bit 661 disposed at an end thereof, in which the drill bit 661 may be used to drill to form, enlarge, and/or remove earth and/or other material within a borehole. As such, in this embodiment, the downhole tool 601 may include a flexible member 631, in which the flexible member 631 may have substantially the same outer diameter as the tubular body 603. Furthermore, the downhole tool 601 may include another drill bit 663, in which the drill bit 663 may be included and/or attached to the downhole tool 601 adjacent to the flexible member 631.

[0068] In the embodiment shown in Figure 6, and as discussed above, the drill bit 661 may be a milling tool, in which the drill bit 661 may be used to mill within a borehole when drilling. Further, the drill bit 663 may be a milling tool and/or a reamer, in which the drill bit 663 may be used to also mill within the borehole when drilling. Accordingly, a downhole tool in accordance with embodiments disclosed herein may include one or more drill bits and/or drilling tools, in which the drill bits and/or drilling tools may be one of a number of different tools, devices, and/or components, as discussed above.

[0069] In Figure 6, a deflector 671 is shown disposed within the borehole. The deflector 671, which may also be a diverter, a whipstock, and/or may include a
concave surface for receiving the downhole tool 601, may be used to deflect the downhole tool 601 when contacting the deflector 671. The angle of deflection may vary, but the deflector 671 may be used to deflect the drill bit 661 of the downhole tool 601 when in contact, and thereby deflect the trajectory of the downhole tool 601 such that the downhole tool 601 may be used to drill through casing 691 within the borehole and drill within the formation. As such, the flexible member 631 may be used to provide flexure and/or dampen vibration when using the downhole tool 601, particularly when drilling through the casing 691 and into the formation.

[0070] Referring now to Figure 7, a cross-sectional view of a downhole tool 701 in accordance with embodiments disclosed herein is shown. The downhole tool 701 may include a drill bit 761 disposed at an end thereof, in which the drill bit 761 may be used to drill to form, enlarge, and/or remove earth and/or other material within a borehole. Further, the downhole tool 701 may include a flexible member 731, in which the flexible member 731 may be used to provide flexure and/or dampen vibration when using the downhole tool 701.

[0071] Further, as shown in Figure 7, equipment 773 may be disposed downhole within the borehole. The equipment 773, which may include a packer, a bridge plug, a wellbore flow control device, a wellbore isolation device, a tubular member, and/or any other type of equipment that may be disposed downhole within a borehole, may be impeding the performance of the well including the borehole. As such, the downhole tool 701 may be used to drill through the equipment 773, such as mill through the equipment 773, thereby removing the equipment 773 from the borehole. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may be used to mill to remove equipment from a borehole, in which the flexible member of the tool may be used to provide flexure and/or dampen vibration when using the downhole tool, particularly when drilling through the equipment disposed downhole.

[0072] Referring now to Figure 8, a cross-sectional view of a downhole tool 801 in accordance with embodiments disclosed herein is shown. The downhole tool 801 may include a drill bit 861 disposed at an end thereof. Further, the downhole tool 801 may include a stabilizing member 811 and/or a flexible member 831. The stabilizing member 811 may be used to provide stability when using the downhole tool 801, and
the flexible member 831 may be used to provide flexure and/or dampen vibration when using the downhole tool 801.

[0073] As such, in this embodiment, the downhole tool 801 may be used to drill through the equipment 873, such as mill through the equipment 873, to remove the equipment 873 from the borehole. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may be used to mill to remove equipment from a borehole, in which the stability member and the flexible member of the tool may be used to provide stability, flexure and/or dampen vibration when using the downhole tool, particularly when drilling through the equipment disposed downhole.

[0074] Referring now to Figure 9, a cross-sectional view of a downhole tool 901 in accordance with embodiments disclosed herein is shown. The downhole tool 901 may include a drill bit 961 disposed at an end thereof, and may further include a flexible member 931. Equipment 973 may also be disposed downhole within the borehole. The equipment 973, in this embodiment, may include a tubular member disposed downhole within the borehole. As such, the downhole tool 901 may be used to drill through the equipment 973, such as mill through the equipment 973, thereby removing the equipment 973 from the borehole. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may be used to mill to remove equipment from a borehole, in which the flexible member of the tool may be used to provide flexure and/or dampen vibration when using the downhole tool, particularly when drilling through the equipment disposed downhole.

[0075] Referring now to Figure 10, a cross-sectional view of a downhole tool 1001 in accordance with embodiments disclosed herein is shown. The downhole tool 1001 may include a drill bit 1061 disposed at an end thereof, and may further include a stabilizing member 1011 and/or a flexible member 1031. The stabilizing member 1011 may be used to provide stability when using the downhole tool 1001, and the flexible member 1031 may be used to provide flexure and/or dampen vibration when using the downhole tool 1001. As discussed above, the downhole tool 1001 may be used to drill through the equipment 1073 to remove the equipment 1073 from the borehole. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may be used to mill to remove equipment from a borehole, in which the stability member and the flexible member of the tool may be
used to provide stability, flexure and/or dampen vibration when using the downhole tool, particularly when drilling through the equipment disposed downhole.

[0076] Referring now to Figure 11, a cross-sectional view of a downhole tool 1101 in accordance with embodiments disclosed herein is shown. The downhole tool 1101 includes a tubular body 1103 with a drill bit 1161 disposed at an end thereof. The downhole tool 1101 may further include a first stabilizing member 1111, a second stabilizing member 1113, and/or a flexible member 1131. The stabilizing members 1111 and 1113 may be used to provide stability when using the downhole tool 1101, such as when drilling with the downhole tool 1101. Further, the flexible member 1131 may be used to provide flexure and/or dampen vibration when using the downhole tool 1101. As such, the downhole tool 1101 may be used to drill through the equipment 1173 to remove the equipment 1173 from the borehole.

[0077] As shown in Figure 11, the first stabilizing member 1111 may be able to rotate, such as about an axis of the downhole tool 1101, with respect to the second stabilizing member 1113. For example, the second stabilizing member 1113 may be able to rotate with respect to the tubular body 1103 of the downhole tool 1101. Accordingly, when drilling with the downhole tool 1101, the second stabilizing member 1113 may remain rotationally stationary and/or rotate independently of the first stabilizing member 1113 if the first stabilizing member 1111 rotates during the drilling with the downhole tool 1101. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may include one or more stabilizing members, one or more flexible members, and/or one or more drill bits included therewith.

[0078] Similar to Figure 11, Figure 12 shows a cross-sectional view of a downhole tool 1201 in accordance with embodiments disclosed herein. As with the above embodiments, the downhole tool 1201 includes a drill bit 1261 disposed at an end thereof and further includes a first stabilizing member 1211, a second stabilizing member 1213, and/or a flexible member 1231. The stabilizing members 1211 and 1213 may be used to provide stability when using the downhole tool 1201, and the flexible member 1231 may be used to provide flexure and/or dampen vibration. As such, the downhole tool 1201 may be used to drill through the equipment 1273 to remove the equipment 1273 from the borehole. Further, the first stabilizing member
121 I may be able to rotate, such as about an axis of the downhole tool 1201, with respect to the second stabilizing member 1213. Accordingly, a downhole tool in accordance with one or more embodiments disclosed herein may be used to mill to remove equipment from a borehole, in which the stability member and the flexible member of the tool may be used to provide stability, flexure and/or dampen vibration when using the downhole tool, particularly when drilling through the equipment disposed downhole.

[0079] It should also be understood that the present disclosure contemplates having other structures and/or arrangements for a downhole tool to stabilize a string of tubular members within a borehole. As shown in the above embodiments, the downhole tool includes two stabilizing members. However, in another embodiment, more than two stabilizing members may be used within the downhole tool. Further, the downhole tool may include more than one flexible member, or the flexible member may be disposed at different locations and/or have different arrangements than as shown and discussed above. It should also be understood that the present disclosure contemplates a method to dampen a downhole assembly while drilling (including reaming, etc.). In particular, a downhole tool may be disposed in a borehole and may include a first stabilizing member, a second stabilizing member, and a flexible member. The method may include flexing the flexible member such that the first or the second (if present) stabilizing member contacts the wall of the borehole and dampens remaining components of the drill string, bottom hole assembly, or drill bit.

[0080] Embodiments disclosed herein may provide for one or more of the following advantages. First, embodiments disclosed herein may provide for a downhole tool that may be connected within a string of tubular members disposed downhole, in which the downhole tool may engage one or more surfaces of the borehole. When engaging the surfaces of the borehole, the downhole tool may dampen vibration (e.g., reduce vibration) received by the downhole tool. As such, the downhole tool may prevent damage to the tubular members and/or other downhole tools disposed downhole within a borehole and/or attached to a tubular string. Further, embodiments disclosed herein provide for a downhole tool that may include at least two stabilizing members. In such embodiments, each of the stabilizing members may provide a
point-of-contact with a borehole wall, thereby providing additional control and direction to a string of tubular members, such as during drilling.

[0081] While the present disclosure has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that other embodiments may be devised which do not depart from the scope of the disclosure as described herein. Accordingly, the scope of the invention should be limited only by the attached claims.
What is claimed is:

1. A method to abate vibration during drilling within a borehole, the method comprising:
   connecting a downhole tool to a string of tubular members, the string of tubular members having a drill bit disposed at one end;
   disposing the downhole tool having an axis defined therethrough within the borehole,
   the downhole tool comprising a first stabilizing member, a second stabilizing member, and a flexible member;
   flexing the flexible member such that at least one of the first stabilizing member and the second stabilizing member contacts a wall of the borehole; and
   drilling into the borehole with the drill bit.

2. The method of claim 1, wherein the drilling into the borehole comprises at least one of:
   rotating the string of tubular members with a drill rig such that the drill bit rotates with respect to the borehole; and
   rotating the drill bit with a mud motor such that the drill bit rotates with respect to the borehole.

3. The method of claim 1, further comprising:
   rotating the first stabilizing member and the second stabilizing member with respect to each other about the axis.

4. The method of claim 1, further comprising:
   rotating at least one of the first stabilizing member and the second stabilizing member with respect to the drill bit such that the at least one of the first stabilizing member and the second stabilizing member remains substantially rotationally stationary with respect to the borehole.

5. The method of claim 1, further comprising:
   dampening the flexing of the flexible member.

6. The method of claim 1, further comprising:
   providing the downhole tool with a dampening member.
7. The method of claim 6, wherein the dampening member dampens vibration to a level such that damage is prevented to a sensor connected to the string of tubular members.

8. The method of claim 1, wherein the string of tubular members comprises a lower bottom hole assembly and an upper bottom hole assembly, wherein the downhole tool is connected to the string of tubular members between the lower bottom hole assembly and the upper bottom hole assembly.

9. The method of claim 1, wherein at least one of the first stabilizing member and the second stabilizing member comprises a dampening member.

10. A method to abate vibration during drilling within a borehole, the method comprising: connecting a downhole tool to a string of tubular members, the string of tubular members having a drill bit disposed at one end; disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool comprising a first stabilizing member and a flexible member; flexing the flexible member such that the first stabilizing member contacts a wall of the borehole; and drilling into the borehole with the drill bit.

11. The method of claim 10, further comprising: rotating the first stabilizing member with respect to the flexible member.

12. The method of claim 10, further comprising: rotating the first stabilizing member with respect to the drill bit such that the first stabilizing member remains substantially rotationally stationary with respect to the borehole.

13. The method of claim 10, further comprising: dampening the flexing of the flexible member.

14. The method of claim 10, wherein the downhole tool further comprises a dampening member.

15. The method of claim 10, wherein the first stabilizing member comprises a dampening member.
16. The method of claim 10, wherein the drilling into the borehole with the drill bit comprises milling the borehole with the drill bit, thereby removing at least a portion of material disposed within the borehole.

17. The method of claim 10, wherein the drill bit comprises one of a roller-cone drill bit, a shearing drill bit, a rock bit, a PDC bit, a reamer, and a milling tool.

18. A method to abate vibration during drilling within a borehole, the method comprising:
   connecting a downhole tool to a string of tubular members, the string of tubular members having a drill bit disposed at one end;
   disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool comprising a first stabilizing member and a first dampening member;
   providing the downhole tool with a second dampening member; and
   drilling into the borehole with the drill bit.

19. The method of claim 18, wherein the downhole tool further comprises a flexible member.

20. The method of claim 18, wherein the first dampening member is axially spaced from the second dampening member.

21. A downhole tool to abate vibration during drilling, comprising:
   a generally tubular body having an axis defined therethrough;
   a first stabilizing member disposed at a first location on the tubular body;
   a second stabilizing member disposed at a second location on the tubular body, wherein the first stabilizing member and the second stabilizing member are rotatable with respect to each other about the axis; and
   a flexible member disposed within the tubular body such that the first stabilizing member and the second stabilizing member are configured to articulate with respect to each other along the axis.

22. The downhole tool of claim 21, further comprising a dampening member disposed within the tubular body and configured to dampen vibration received by the downhole tool.
23. The downhole tool of claim 21, wherein the flexible member comprises a dampening member configured to dampen flexure of the flexible member.

24. The downhole tool of claim 23, wherein one of the first stabilizing member and the second stabilizing member comprises the dampening member.

25. The downhole tool of claim 24, wherein the dampening member comprises an elastomeric member.

26. The downhole tool of claim 21, wherein one of the first stabilizing member and the second stabilizing member comprises a plurality of bladed members.

27. The downhole tool of claim 26, wherein at least one of the plurality of bladed members comprises an elastomeric material.

28. The downhole tool of claim 21, wherein the generally tubular body comprises a first body portion and a second body portion, wherein the first stabilizing member is disposed on the first body portion and the second stabilizing member is disposed on the second body portion.

29. The downhole tool of claim 28, wherein at least one component of the flexible member is disposed within the second body portion.

30. The downhole tool of claim 28, wherein the second body portion comprises a first body member and a second body member, wherein the flexible member is disposed between the first body member and the second body member.

31. The downhole tool of claim 30, wherein the flexible member comprises an elastomeric member.

32. The downhole tool of claim 21, wherein a maximum outer diameter of one of the first stabilizing member and the second stabilizing member is greater than a maximum outer diameter of the other of the first stabilizing member and the second stabilizing member.

33. A downhole tool to abate vibration during drilling, the downhole tool having an axis defined therethrough to be disposed within a borehole, comprising:
   a first stabilizing member disposed at a first location; and
a second stabilizing member disposed at a second location;
wherein the first stabilizing member and the second stabilizing member are rotatable
with respect to each other about the axis, and
wherein the first stabilizing member and the second stabilizing member are each
configured to engage a wall of the borehole.

34. The downhole tool of claim 33, further comprising:
a flexible member disposed within a tubular member of the downhole tool such that
the first stabilizing member and the second stabilizing member are configured to
articulate with respect to each other along the axis.

35. The downhole tool of claim 34, wherein the flexible member comprises an
elastomeric member.

36. The downhole tool of claim 33, wherein the flexible member comprises a dampening
member configured to dampen flexure of the flexible member.

37. The downhole tool of claim 33, further comprising:
a dampening member disposed within a tubular member of the downhole tool such
that the dampening member is configured to dampen vibration received within the
downhole tool.

38. The downhole tool of claim 33, wherein at least one of the first stabilizing member
and the second stabilizing member comprises a dampening member.

39. A system to abate vibration during drilling, the system having an axis defined
therethrough to be disposed within a borehole, the system comprising:
a downhole tool having a first end and a second end, comprising:
a first stabilizing member having a dampening member disposed thereon;
a second stabilizing member, wherein the first stabilizing member and the
second stabilizing member are rotatable with respect to each other about
the axis; and
a flexible member disposed within the tubular member such that the first
stabilizing member and the second stabilizing member are configured to
articulate with respect to each other along the axis; and
an upper bottom hole assembly having a first end and a second end, wherein the second end of the upper bottom hole assembly is connected to the first end of the downhole tool; and

a lower bottom hole assembly having a first end and a second end, wherein the first end of the lower bottom hole assembly is connected to the second end of the downhole tool.

40. The system of claim 39, wherein a drill bit is connected to the second end of the lower bottom hole assembly.

41. The system of claim 39, wherein the upper bottom hole assembly comprises a sensor.

42. A method to abate vibration during drilling within a borehole, the method comprising:
   connecting a downhole tool to a string of tubular members, the string of tubular members having a drill bit disposed at one end;
   disposing the downhole tool having an axis defined therethrough within the borehole, the downhole tool comprising a flexible member;
   drilling into the borehole with the drill bit; and
   flexing the flexible member when drilling with the drill bit.

43. The method of claim 42, wherein the downhole tool further comprises a first stabilizing member, wherein the flexing the flexible member comprises flexing the flexible member such that the first stabilizing member contacts a wall of the borehole.

44. The method of claim 43, further comprising:
   rotating the first stabilizing member with respect to the flexible member.

45. The method of claim 43, wherein the downhole tool further comprises a second stabilizing member.

46. The method of claim 43, further comprising:
   rotating the first stabilizing member with respect to the second stabilizing member.

47. The method of claim 42, further comprising:
   dampening the flexing of the flexible member.
48. The method of claim 42, wherein the drill bit comprises a milling tool, wherein the drilling into the borehole with the drill bit comprises milling the borehole with the milling tool.

49. The method of claim 42, wherein the drill bit comprises one of a roller-cone drill bit, a shearing drill bit, a rock bit, a PDC bit, a reamer, and a milling tool.

50. A downhole tool to abate vibration during drilling, comprising:
   a generally tubular body having an axis defined therethrough;
   a drill bit connected to the tubular body at an end thereof; and
   a flexible member disposed within the tubular body such that the drill bit is configured to articulate with respect to the axis of the tubular body.

51. The downhole tool of claim 50, further comprising:
   a first stabilizing member disposed at a first location on the tubular body, wherein the first stabilizing member is configured to articulate with respect to the axis of the tubular body.

52. The downhole tool of claim 51, further comprising:
   a second stabilizing member disposed at a second location on the tubular body, wherein the first stabilizing member and the second stabilizing member are rotatable with respect to each other about the axis.

53. The downhole tool of claim 50, wherein the flexible member comprises a dampening member configured to dampen flexure of the flexible member.

54. The downhole tool of claim 50, further comprising:
   a dampening member disposed within a tubular member of the downhole tool such that the dampening member is configured to dampen vibration received within the downhole tool.

55. The downhole tool of claim 50, wherein the drill bit comprises one of a roller-cone drill bit, a shearing drill bit, a rock bit, a PDC bit, a reamer, and a milling tool.
FIG. 12

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