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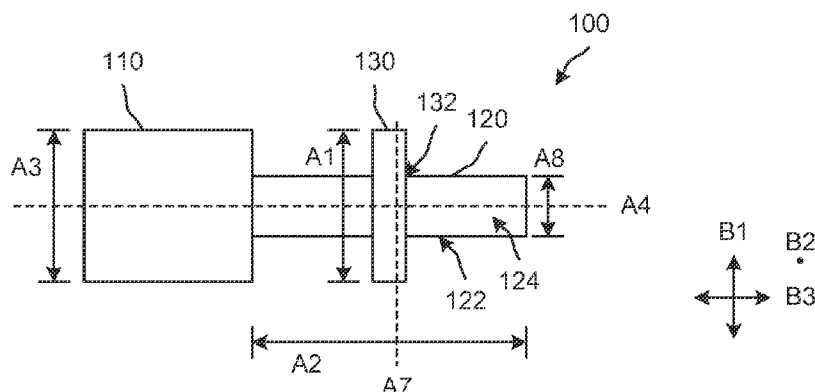


FIG. 1A

(57) Abstract: In one general aspect, an apparatus can include a first base member, a second base member, and a flexible member having a first end coupled the first base member and having a second end coupled to the second base member. The flexible member can be configured to flexibly move between a first configuration and a second configuration. The apparatus can include a transverse section having at least a portion coupled to the flexible member and can be disposed between the first base member and the second base member.

METHODS AND APPARATUS RELATED TO A FLEXIBLE VEHICLE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/819,295, filed on May 3, 2013, the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD

[0002] This description is associated with methods and apparatus related to a flexible vehicle.

BACKGROUND

[0003] Toy vehicles are a source of amusement and entertainment for children and adults alike. In some cases, toy vehicles are configured to traverse or move along a support surface. For example, some toy vehicles are configured to traverse or move along a tabletop or a floor. In some cases, toy vehicles are configured to traverse or move along a toy play set such as a vehicle track set. The toy play set may include features such as jumps and turns that the toy vehicle must pass through as it moves along the toy play set.

[0004] In some cases, the surface over which the toy vehicle travels is not smooth. For example, a tabletop or floor might have a series of bumps that the toy vehicle traverses. Similarly, some toy vehicle track sets may include features or a surface that is not smooth that the toy vehicle must traverse. In such cases, it may be desirable or beneficial to provide a toy vehicle that includes a plurality of sections or portions (such as longitudinal sections or portions) that may move with respect to one another as the toy vehicle traverses such non-smooth surfaces.

SUMMARY

[0005] In one general aspect, an apparatus can include a first base member, a second base member, and a flexible member having a first end coupled the first base

member and having a second end coupled to the second base member. The flexible member can be configured to flexibly move between a first configuration and a second configuration. The apparatus can include a transverse section having at least a portion coupled to the flexible member and can be disposed between the first base member and the second base member.

[0006] The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1A is a diagram that illustrates a top view of a vehicle.

[0008] FIG. 1B is a diagram that illustrates a cross-sectional view of a transverse section of the vehicle shown in FIG. 1A along a line.

[0009] FIG. 1C is a diagram that illustrates a side view of the vehicle shown in FIG. 1A.

[0010] FIG. 2A is a diagram that illustrates a first vehicle coupled to a second vehicle via a coupling mechanism.

[0011] FIG. 2B is a diagram that illustrates the first vehicle de-coupled from the second vehicle.

[0012] FIG. 3 is a diagram that illustrates a specific implementation of a coupling mechanism.

[0013] FIGS. 4A through 4K illustrate various views of a vehicle, according to an implementation.

[0014] FIG. 5A is a diagram that illustrates a top view of a vehicle.

[0015] FIG. 5B is a diagram that illustrates a flexible member of the vehicle shown in FIG. 5A.

[0016] FIG. 5C is a diagram that illustrates a side view of the vehicle shown in FIG. 5A.

[0017] FIGS. 6A and 6B are illustrations of a variation of the vehicle shown in FIGS. 5A through 5C.

[0018] FIG. 7 is a diagram that illustrates transverse sections included in a vehicle.

[0019] FIG. 8 is a diagram that illustrates transverse sections included in another vehicle.

[0020] FIGS. 9A through 9E are diagrams that illustrate another implementation of a vehicle.

[0021] FIGS. 10A through 10E are diagrams that illustrate various views of a vehicle.

[0022] FIG. 11 is a diagram that illustrates a perspective view of another embodiment of a vehicle according to the invention.

[0023] FIG. 12 is a diagram that illustrates a rear perspective view of the vehicle of FIG. 11.

[0024] FIG. 13 is a diagram that illustrates the internal spring component of the vehicle of FIG. 11.

[0025] FIG. 14 is a diagram that illustrates a partial cross-section of an alternative embodiment of a vehicle according to the present invention.

[0026] FIG. 15 is a diagram that illustrates a front view of a transverse member of the vehicle of FIG. 14.

[0027] FIG. 16 is a diagram that illustrates a bottom view of the vehicle of FIG. 11.

[0028] FIGS. 17 and 18 are diagrams that illustrate exploded views of the vehicle in FIG. 16.

DETAILED DESCRIPTION

[0029] FIG. 1A is a diagram that illustrates a top view of a vehicle 100 (the vehicles also can be referred to as toy vehicles herein). As shown in FIG. 1A, the vehicle 100 has a flexible member 120 (also can be referred to a spinal member) and a transverse section 130 (also can be referred to as a rib member). The flexible member 120 is coupled to a base member 110. As shown in FIG. 1A, the flexible member 120 is coupled to the base member 110 so that the flexible member 120 protrudes from or extends from the base member 110, and the flexible member 120 is aligned along a longitudinal axis A4.

[0030] Dimensions aligned along the axis B1, which is orthogonal to the longitudinal axis A4, shown in FIG. 1A can be referred to as widths, dimensions aligned along the axis B2 (into or out of the figures), which is perpendicular to the longitudinal axis A4, can be referred to as heights or thicknesses, and dimensions aligned along the axis B3 can be referred to as lengths. In some implementations, widths, lengths, heights or thicknesses can generally be referred to as dimensions or

as distances.

[0031] The transverse section 130 has at least a portion coupled to a top 124 of the flexible member 120 or coupled to a side 122 of the flexible member 120. In some embodiments, the transverse section 130 may be disposed on or around the flexible member 120 such that the transverse section 130 surrounds an outer surface of the flexible member 120. In other words, at least a portion of the flexible member is disposed within or extends through the transverse section 130. In other embodiments, the transverse section may be coupled to only a portion of an outer surface of the flexible member.

[0032] In some implementations, the flexible member 120 can be made of a relatively flexible material. Accordingly, the flexible member 120 can be configured to flexibly move in a variety of directions. Accordingly, some portions of the vehicle 100 can be configured to move independent of other portions of the vehicle 100.

[0033] The flexible member 120 can be configured to move from a first configuration to a second configuration. In some implementations, the flexible member 120 can be configured to move from the second configuration back to the first configuration, or to a third configuration. In some implementations, the flexible member 120 (and transverse section(s)) can be biased to (or moved) a first configuration so that when a force is applied (e.g., imparted) to the flexible member 120 to move the flexible member 120 to a second configuration, the flexible member 120 moves back to the first configuration when the force is no longer applied. For example, the flexible member 120 can be moved between a substantially linear configuration and a curved or bent configuration. In some implementations, the flexible member 120 is in a substantially linear configuration when no force is applied to the flexible member. Force applied to portions of the vehicles described herein are shown throughout the various views with force arrows F.

[0034] In some implementations, a configuration of the flexible member 120 when at rest (when a force is not applied to the flexible member 120) can be referred to as a rest configuration or as a starting configuration. In some implementations, a configuration of the flexible member 120 when a force is being applied (e.g., actively applied) to the flexible member 120 so that the flexible member 120 changes shape can be referred to as a flexed configuration or as a forced configuration.

[0035] Because the vehicle 100 has the flexible member 120, the vehicle 100 can be configured to traverse a curve having a relatively narrow radius due to the

flexibility of the flexible member. In particular, the vehicle 100 can be configured to traverse a relatively narrow radius compared with a rigid vehicle (e.g., a vehicle without a flexible member) of approximately equal size as the vehicle 100. As another example, the vehicle 100 can be configured to traverse a series of bumps, an uneven or non-smooth surfaces, and/or so forth.

[0036] Although not shown in FIG. 1A, in some implementations, more than one transverse section (similar to transverse section 130) can be coupled to the flexible member 120. In such implementations, the multiple transverse sections can be disposed around the flexible member 120 at various locations (or positions) along the longitudinal axis A4. In some implementations, multiple transverse sections can be disposed around the flexible member 120 at regular intervals (e.g., distances, spacing) or irregular (e.g., random) intervals along the longitudinal axis A4. For example, a first and second transverse sections can be located on opposite sides of a third transverse section and each transverse section can be spaced apart from the other transverse sections.

[0037] In some implementations, multiple transverse sections can be disposed around the flexible member 120 so that a space can be disposed between a pair of the transverse sections. For example, a first transverse section can be coupled to a first portion of the flexible member 120, and a second transverse section can be coupled to a second portion of the flexible member 120 so that a third portion of the flexible member 120 is disposed between the first portion of the flexible member 120 (and the first transverse section) and the second portion of the flexible member 120 (and the second transverse section). In such implementations, the third portion of the flexible member 120 is exposed or devoid of being directly coupled to a transverse section. In some implementations, a first transverse section can have a width that is greater than, the same as, or less than a width of the first transverse section.

[0038] In some implementations, the flexible member 120 can be made of an elastic material. In some implementations, the flexible member 120 can be made of flexible material such as a rubber-based material, a plastic material, a material having a spring force, a flexible metal material, and/or so forth. In some implementations, the flexible member 120 can be made of a flexible material that does not (or substantially does not) plastically deform when moved from one configuration to another configuration.

[0039] In some implementations, an end (or end portion) of the flexible

member 120 can be coupled to (e.g., fixedly coupled to, removably coupled to) the base member 110. In some implementations, the flexible member 120 can be coupled using, for example, a pin, an adhesive, a press-fit, a screw, a fusion process, a snap fit, and/or so forth. More details related to coupling of a flexible member to a base member are described below.

[0040] For example, the flexible member 120 can be configured to bend so that the flexible member 120 is no longer aligned along (or centered about) the longitudinal axis A4 when a force is applied to at least a portion of the flexible member 120. The force can be applied to the portion of the flexible member 120 via a component (e.g., the transverse section 130) coupled to the flexible member 120. In some implementations, the flexible member 120 can be configured to bend in the shape of an arc, an S-shape, and so forth. Accordingly, the flexible member 120 can be configured to bend along direction B1 (e.g., horizontal direction) and/or along direction B2 (e.g., vertical direction). For example, a first portion of the flexible member 120 and a second portion of the flexible member 120 can move along a first horizontal direction while a third portion of the flexible member 120 moves in a second horizontal direction opposite the first horizontal direction.

[0041] In some implementations, the flexible member 120 can be configured to flexibly move in a torsional fashion. In other words, the flexible member 120 can be made of a flexible material so that a portion of the flexible member 120 can rotate about the longitudinal axis A4 while a second portion of the flexible member 120 is at a fixed rotational position with respect to the longitudinal axis A4. In other words, the flexible member 120 can be configured to torsionally rotate.

[0042] In some implementations, the flexible member 120 can be configured to flexibly move in a longitudinal direction. In other words, the flexible member 120 can be configured to flexibly move in a stretching (or lengthening) fashion or contracting (or shortening) fashion. In some implementations, flexibly moving using combinations of stretching and contracting can be used to move the vehicle. For example, contracting the vehicle can be used to store potential energy, that when released, can propel the vehicle along a surface as the flexible member 120 returns to an original shape.

[0043] In some implementations, the flexible member 120 can be configured to flexibly move so that the flexible member 120 torsionally rotates, bends, contracts, and/or stretches. In some implementations, the flexible member 120 can be

configured so that portion of rotation, bending, contracting and/or stretching can be mutually exclusive flexible movements. In some implementations, the flexible member 120 can be configured to flexibly move by bending along only a horizontal direction or only along a vertical direction. In some implementations, the flexible member 120 can be configured to only torsionally rotate without bending, stretching, or contracting. Examples of various types of movement are described in conjunction with at least some of the figures below.

[0044] Although not shown in FIGS. 1A through 1C, when multiple transverse sections are coupled to the flexible member 120, multiple transverse sections (e.g., pairs of transverse sections) can come in contact with one another. For example, when the flexible member 120 is bent, a first transverse section can contact at least a portion of a second transverse section.

[0045] In some implementations, one or more components of the vehicle 100 can have a shape representing (or resembling), for example, an exterior of a vehicle such as an automobile (e.g., car), an exterior of an airplane, and/or so forth. For example, the base member 110 can have a shape representing a front portion or a rear portion of a car. In some implementations, the transverse section 130 can have a shape representing a middle portion of the car.

[0046] Although not shown in FIG. 1A, the vehicle 100 can have more than one base member. For example, the base member 110 can be a first base member and the vehicle 100 can have a second base member. In such implementations, the flexible member 120 can have a first end (or end portion) coupled to the first base member 110 and can have a second end (or end portion) coupled to the second base member. Accordingly, the flexible member 120 can be coupled between the first base member 110 and the second base member. Also, the transverse section 130, which is coupled to the flexible member 120, can be disposed between the first base member 110 and the second base member. Also, in such implementations, the flexible member 120 can be configured to flexibly move when a force is applied to the first base member 110 and/or the second base member.

[0047] Although not shown in FIG. 1A, the vehicle 100 can include more than one flexible member 120. For example, a vehicle can include multiple base members with multiple flexible members (which can have different lengths) disposed between the multiple base members. As a specific example, the vehicle can include a first base member and a second base member. A first flexible member can be coupled between

the first base member and the second base member, and a second flexible member can be coupled between the first base member and the second base member. The first flexible member and the flexible member can have dimensions and can be parallel or non-parallel. As another specific example, a vehicle can include a first base member, a second base member, and a third base member. A first flexible member can be coupled between the first base member and the second base member, and a second flexible member can be coupled between the second base member and the third base member.

[0048] In this implementation, the width A1 of the transverse section 130 is approximately equal to a width A3 of the base member 110. In some implementations, the width A1 of the transverse section 130 can be greater than or less than the width A3 of the base member 110. In this implementation, the transverse section 130 is aligned along line A7, which is orthogonal to longitudinal axis A4. However, in some implementations, transverse section 130 can be aligned along a line non-parallel and non-orthogonal to longitudinal axis A4.

[0049] Although not shown in FIGS. 1A through 1C, the vehicle 100 can include multiple movement mechanisms that facilitate movement of the vehicle 100 along a relatively narrow path or track or along a series of bumps. More details related to these implementations are described in conjunction with at least some of the figures below.

[0050] FIG. 1B is a diagram that illustrates a cross-sectional view of the vehicle 100, shown in FIG. 1A, through the transverse section 130 along line A7. As shown in FIG. 1B, a cross-sectional portion of the flexible member 120 is disposed within a cross-sectional portion of the transverse section 130. In this implementation, the transverse section 130 is entirely disposed around the flexible member 120. In other words, the transverse section 130 is disposed around or surrounds an entire perimeter of the cross-section of the flexible member 120. The transverse section 130 can have an opening 132 into which or through which the flexible member 120 can be inserted.

[0051] In some implementations, the transverse section 130 can be configured so that the transverse section 130 is disposed around only a portion of the flexible member 120. In such implementations, the transverse section 130 can have a different shape such as a C-shape, a U-shape, a semi-circular shape, and/or so forth.

[0052] As shown in FIG. 1B, the transverse section 130 and the flexible

member 120 each have a square or rectangular cross-sectional shape or profile. In some implementations, the flexible member 120 and/or the transverse section 130 can have a different cross-sectional shape or profile. For example, the cross-sectional shape or profile of the flexible member 120 can include one or more curved portions and/or flat portions. Similarly, the cross-sectional shape or profile of the transverse section 130 can have one or more curved portions and/or flat portions. As a specific example, the flexible member 120 can have a circular or oval cross-sectional shape or profile.

[0053] The flexible member 120 in FIGS. 1A through 1C is shown as being linearly aligned along the longitudinal axis A4 or is shown as being relatively planar. In some implementations, the flexible member 120 can be non-planar and/or can be non-linear. In some implementations, the flexible member 120, which in a rest configuration, can be non-planar and/or can be non-linear.

[0054] In this implementation, the transverse section 130 has a height A5 (also can be referred to as a vertical dimension) less than a width A1 (also can be referred to as a horizontal dimension). In some implementations, height A5 of the transverse section 130 can be greater than or equal to width A1 of the transverse section 130. The flexible member 120, similarly, has a width A8 aligned along the horizontal direction B1 less than a height A9 aligned along the vertical direction B2. In some implementations, the width A8 can be greater than or equal to the height A9.

[0055] Referring back to FIG. 1A, the flexible member 120 has a length A2 along the longitudinal axis A4 (also can be referred to as a longitudinal dimension). The length A2 along longitudinal axis A4 is greater than the width A8 of the flexible member 120. In this implementation, the width A8 of the flexible member 120 is uniform along the longitudinal axis A4. In some implementations, a width of the flexible member 120 can vary along the longitudinal axis A4. In some implementations, a width of the flexible member 120 can vary any periodic fashion along longitudinal axis A4.

[0056] In some implementations, a cross-sectional area of a portion of the flexible member 120 around which the transverse section 130 is disposed can be less than a cross-sectional area of a portion of the flexible member 120 that is not disposed within the transverse section 130. For example, in some implementations, a cross-sectional area of a portion of the flexible member 120 around which the transverse section 130 is disposed can be less than a cross-sectional area of a portion of the

flexible member 120 between the transverse section 130 and the base member 110 (or another transverse section (not shown)). In other words, at least a portion of the transverse section 130 can be disposed within a recess of the flexible member 120. In such implementations, the portion of the transverse section 130 can be disposed within a recess of the flexible member 120 to help prevent movement of the transverse section 130 with respect to the flexible member 120 along the longitudinal axis A4 (along direction B3).

[0057] In some implementations, the transverse section 130 can be fixedly coupled (or maintained) at a position (e.g., a longitudinal position) along the flexible member 120. In some implementations, the transverse section 130 can be fixedly coupled at the position along the flexible member 120 using, for example, a pin, an adhesive, a press-fit, a screw, a fusion process, a snap fit, and/or so forth.

[0058] FIG. 1C is a diagram that illustrates a side view of the vehicle 100 shown in FIG. 1A. A surface 111 (e.g., a top surface, a bottom surface) of the base member 110 and/or a surface 131 (e.g., a top surface, a bottom surface) of the transverse section 130 can be configured to contact one or more surfaces (not shown) (e.g., planes, horizontal surfaces, vertical surfaces) along which the vehicle 100 can move (e.g., slidably move, roll). The surface(s) (e.g., a support surface) can include one or more surfaces of, for example, a track, a series of bumps, a floor, a ramp, a rail, and/or so forth.

[0059] Although not shown in FIG. 1C, in some implementations, one or more movement mechanisms can be coupled to the vehicle 100. The movement mechanism(s) can be configured to contact the surface such that the vehicle 100 can move along the surface. A movement mechanism can include, for example, a wheel (e.g., a rotatably mounted wheel), a protrusion, a rail, a sliding member, and/or so forth.

[0060] In some implementations, the base member 110 can have or include a movement mechanism (not shown) coupled thereto and the movement mechanism of the base member 110 can be engageable with a surface (e.g., a support surface) (not shown). If the vehicle 100 includes multiple base members more than one of the base members can have or include a movement mechanism that can be engageable with a support surface (not shown).

[0061] In this implementation, the height A5 of the transverse section 130 is approximately equal to a height A6 of the base member 110. In some

implementations, the height A5 of the transverse section 130 can be greater than or less than the height A6 of the base member 110.

[0062] In some implementations, the components of the toy vehicle 100 (e.g., the transverse section 130 of the vehicle 100) can be made of different materials and produced (e.g., formed) using one or more molding processes. For example, the flexible member 120 can be produced using a first molding process, and the transverse section 130 can be produced using a second molding process. In some implementations, after the transverse section 130 has been produced using the second molding process, the transverse section 130 can be coupled to the flexible member 120. In some implementations, the transverse section 130 can be a monolithically formed component that is slidably coupled to the flexible member 120.

[0063] In some implementations, the transverse section 130 can include multiple portions that are moved around and coupled together around flexible member 120 using, for example, a screw, a pin, an adhesive, a snap fit, a press-fit, a fusion process, and/or so forth. For example, a first portion of the transverse section 130 can be coupled to a second portion of the transverse section 130 so that the first portion of the transverse section 130 is disposed substantially on a first side of the flexible member 120 and the second portion of the transverse section 130 is disposed substantially on a second side of the flexible member 120. In some embodiments, the transverse section 130 can be insert molded to the flexible member 120. In such embodiments, the transverse section 130 is formed or molded directly onto a portion of the flexible member 120.

[0064] FIG. 2A is a diagram that illustrates a vehicle 200 coupled to a vehicle 202 via a coupling mechanism 280. Although not shown in FIG. 2A, the vehicle 200 and/or the vehicle 202 can be, or can include, one or more features of the vehicle 100 shown in FIGS. 1A through 1C. The coupling mechanism 280 can be used to removably couple the vehicle 200 to the vehicle 202 using a receiving mechanism 284. In other words, a coupling mechanism of one toy vehicle can be coupleable to a base member of a separate toy vehicle.

[0065] FIG. 2B is a diagram that illustrates the vehicle 200 de-coupled (or separate) from the vehicle 202. As shown in FIG. 2B, the coupling mechanism 280 can be included in (e.g., fixedly coupled to) vehicle 200. As shown in FIG. 2B, the receiving mechanism 284 can be included in (e.g., fixedly coupled to) vehicle 200.

[0066] When the vehicle 200 is coupled to the vehicle 202 using the coupling

mechanism 280, the vehicle 200 and the vehicle 202 can collectively move as a single vehicle. For example, when the vehicle 200 is coupled to the vehicle 202, the vehicles 200, 202 can be configured to move along one or more surfaces included in a track, a path, a rail, a ramp, a floor, and/or so forth. Although not shown in FIGS. 2A or 2B, more than two vehicles can be coupled together using one or more coupling mechanisms.

[0067] In some implementations, the coupling mechanism 280 can be used to couple (e.g., removably couple) the vehicle 200 to one or more launch mechanisms and/or to one or more components of a vehicle playset. In some implementations, the vehicle 200 can be suspended from, for example, one or more launch mechanisms using the coupling mechanism 280. In other words, a base member can include a coupling mechanism extending therefrom and the coupling mechanism can allow the toy vehicle to be suspended in a substantially vertical manner by a toy vehicle launch mechanism.

[0068] As shown in this implementation, coupling mechanism 280 is illustrated as protruding from the vehicle 200 and the receiving mechanism 284 is illustrated as being disposed within the vehicle 202. In other implementations, the coupling mechanism 280 can have a portion that is recessed within, or included within, the vehicle 200, and the receiving mechanism 284 can have a portion that protrudes from the vehicle 202.

[0069] Although not shown in this implementation, in some implementations, the receiving mechanism 284 (or a portion thereof) and the coupling mechanism 280 (or a portion thereof) can protrude from the vehicle 202 and the vehicle 200, respectively. In some implementations, coupling mechanism 280 and/or the receiving mechanism 284 can include, for example, a shaft, a hook, a slot, a threaded portion, a screw, a magnet, a curved component, and/or so forth.

[0070] FIG. 3 is a diagram that illustrates a specific implementation of a coupling mechanism 380 for toy vehicles 300, 302. As shown in FIG. 3, the coupling mechanism 380 includes an elongate member 381 and a retention member 382. The retention member 382 is configured to be received by (e.g., inserted into) a receiving mechanism 384. The receiving mechanism 384 can define, or can include, a slot (e.g., corresponding slot) or a recess (e.g., corresponding recess) into which the retention member 382 can be moved (e.g., inserted, slidably moved). The receiving mechanism 384 can include, or can define, at least one or more protrusions that help prevent

movement (e.g., substantially prevent movement) of the retention member 382 out of receiving mechanism 384 after the retention member 382 is inserted into the receiving mechanism 384. In some implementations, coupling mechanism 380 can be press-fit into the receiving mechanism 384. In some implementations, the retention member 382 can be referred to as a ball, and the receiving mechanism 384 can be referred to as a socket.

[0071] FIGS. 4A through 4K illustrate various views of a vehicle 400, according to an implementation. As shown in FIG. 4A, the vehicle 400 includes base members 410 and 415. The base member 410 has a shape representing a front portion of a racecar and the base member 415 has a shape representing a rear portion of a racecar.

[0072] The vehicle 400 includes a flexible member 420 and transverse sections 430 each having portions coupled to the flexible member 420. Also, as shown in FIG. 4A, the vehicle 400 includes a movement mechanism 442 coupled to (or proximate) the base member 410 (e.g., a lower surface or portion of the base member 410) and a movement mechanism 444 coupled to (or proximate) the base member 415 (e.g., a lower surface or portion of the base member 415). In this implementation, the movement mechanism 442 includes two wheels rotatably coupled to each end portion of an axle, and movement mechanism 444 also includes two wheels rotatably coupled to each end portion of an axle. In this implementation, transverse sections 430 include transverse sections 430A through 430E.

[0073] In some implementations, the base member 415 moves relative to the base member 410 (or vice versa) as the flexible member 420 bends. In some implementation, a first transverse section and a second transverse section engage each other when the vehicle 400 is bent and the base member 410 is moved toward the base member 415 (or vice versa).

[0074] In some implementations, the movement mechanism 442 can include less than two wheels, or more than two wheels (e.g., at least a pair of wheels on a lower surface). Similarly, the movement mechanism 444 can include less than two wheels, or more than two wheels. In some implementations, different types of movement mechanisms or multiple movement mechanisms can be coupled to the base member 410 and/or the base member 415.

[0075] FIG. 4B is a zoomed in view of the transverse sections 430 of the vehicle 400. As shown in FIG. 4B, portions of the flexible member 420 are exposed

between pairs of transverse sections from the transverse sections 430 so that pairs of the transverse sections are separated from one another along the flexible member 420.

[0076] FIG. 4B (and FIG. 4A) illustrates the flexible member 420 (and the vehicle 400) in a rest configuration. In this implementation, the flexible member 420 is aligned along a longitudinal axis C1 when in the rest configuration.

[0077] FIG. 4C is a diagram that illustrates the flexible member 420 (and the vehicle 400) when in a flexed configuration. As shown in FIG. 4C, only a portion of the flexible member 420 is aligned along the longitudinal axis C1 when in the flexed configuration. In this implementation, a bottom (or bottom surface) and movement mechanisms 442, 444 of the vehicle 400 are aligned along a first plane, and the flexing of the flexible member 420 occurs within a second plane parallel to (or substantially parallel to) the first plane.

[0078] As shown in FIG. 4C, portions of at least some of the transverse sections 430 on side 402 of the vehicle 400 are contacting one another. In other words, at least a portion of a first transverse section from the transverse sections 430 on side 402 of the vehicle 400 is in contact with at least a portion of a second transverse section from the transverse sections 430 on side 402 the vehicle 400. The first transverse section and the second transverse section when the flexible member 420 (and vehicle 400) is in the flexed configuration shown in FIG. 4C are in closer proximity (or distance) than when the flexible member 420 (and vehicle 400) is in the rest configuration.

[0079] Also, as shown in FIG. 4C, portions of at least some of the transverse sections 430 on side 403 of the vehicle 400 are separated from one another. At least a portion of a first transverse section from the transverse sections 430 on side 403 of the vehicle 400 is separated from at least a portion of a second transverse section from the transverse sections 430 on side 403 the vehicle 400 by a greater distance than separates the first transverse section from the second transverse section when the flexible member 420 (and the vehicle 400) is in the rest configuration.

[0080] FIG. 4D is a diagram that illustrates the flexible member 420 (and the vehicle 400) when in another flexed configuration. As shown in FIG. 4D, only a portion of the flexible member 420 is aligned along the longitudinal axis C1 when in the flexed configuration. In this implementation, the longitudinal axis C1 (or a bottom surface of the base member 415 or a bottom surface of the base member 410) is aligned along a first plane, and the flexing of the flexible member 420 occurs within

a second plane orthogonal to (or substantially orthogonal to) the first plane. In other words, the flexing of the flexible member 420 occurs within a second plane that intersects the first plane.

[0081] FIG. 4E is a diagram that illustrates the flexible member 420 (and the vehicle 400) when in another flexed configuration. As shown in FIG. 4E, the flexible member 420 is torsionally rotated about the longitudinal axis C1. Accordingly, a first transverse section from the transverse sections 430 is rotated about the longitudinal axis C1 from a rest position within the rest configuration to a greater degree than a second transverse section from the transverse sections 430 is rotated about the longitudinal axis C1 from a rest position within the rest configuration.

[0082] In this implementation, the base member 410 is rotated about the longitudinal axis C1 while the base member 415 is at a fixed position with respect to longitudinal axis C1. In some implementations, the base member 410 can be rotated about the longitudinal axis C1 in a direction different than the base member 415 is rotated about longitudinal axis C1 such that the flexible member 420 is torsionally rotated. In this implementation, the base member 410 can have a bottom surface 411 aligned along (e.g., substantially aligned along) a first plane, and the base member 415 can have a bottom surface 416 aligned along (e.g., substantially aligned along) a second plane. When the flexible member 420 (and the vehicle 400) is torsionally rotated as shown in FIG. 4E, the first plane and the second plane can intersect or be non-parallel in relation to one another. When the flexible member 420 (and the vehicle 400) is torsionally rotated as shown in FIG. 4E, the bottom surface 411 can be rotated about the longitudinal axis C1 in a direction different than the bottom surface 416 is rotated about longitudinal axis C1.

[0083] FIG. 4F is a diagram that illustrates the flexible member 420 (and the vehicle 400) when in another flexed configuration. As shown in FIG. 4F, only a portion of the flexible member 420 is aligned along the longitudinal axis C1 when in the flexed configuration.

[0084] As shown in FIG. 4F, a movement mechanism 471 and a movement mechanism 472 are coupled to at least a portion of transverse section 430C. More details related to movement mechanisms 471, 472 are described in connection with FIGS. 4I and 4K.

[0085] FIG. 4G is a diagram that illustrates a side view of the vehicle 400. As shown in FIG. 4G, a coupling mechanism 480 is coupled to the base member 410 of

the vehicle 400. The coupling mechanism 480 includes a shaft and a retention member. In this implementation, the coupling mechanism 480 is aligned along a longitudinal axis C2 nonparallel to the longitudinal axis C1. Although not shown, in some implementations, the coupling mechanism 480 can be aligned along a longitudinal axis (not shown) parallel to, or included in (coextensive to), the longitudinal axis C1.

[0086] As shown in FIG. 4G, each of the transverse sections 430 is aligned along a longitudinal axis non-parallel to and non-orthogonal to the longitudinal axis C1. As a specific example, the transverse section 430B is aligned along a longitudinal axis C3 that is non-parallel to and non-orthogonal to longitudinal axis C1. Although not shown in FIG. 4G, in some implementations, one or more of the transverse sections 430 can be aligned along a longitudinal axis orthogonal to the longitudinal axis C1.

[0087] FIG. 4H is a diagram that illustrates a zoomed in perspective view of the vehicle 400. As shown in FIG. 4H, the longitudinal axis C2, along which the coupling mechanism 480 is aligned, is orthogonal to (e.g., substantially orthogonal to) a longitudinal axis C4 along which the axle (not shown) of the movement mechanism 442 is aligned.

[0088] FIG. 4I is a diagram that illustrates a bottom view of the vehicle 400. As shown in FIG. 4I, each of the transverse sections 430 is maintained in a fixed position with respect to the flexible member 420 using a pin. As a specific example, the transverse section 430D is maintained in a fixed position along the longitudinal axis C1 and along the flexible member 420 using a pin 431D that is inserted into the transverse section 430D and at least a portion of the flexible member 420. Although not shown in FIG. 4I, in some implementations, the pin 431D can pass horizontally through the flexible member 420 instead of vertically through the flexible member 420. In some implementations, the pin 431D can be embedded into at least a portion of the transverse section 430D and embedded into at least a portion of the flexible member 420 so that each end of the pin 431D is concealed (e.g., not exposed). Although not shown in FIG. 4I, in some implementations, the pin 431D can pass through the flexible member 420 from one side of the flexible member 420 to another side of the flexible member 420. In some implementations, the transverse section 430D can be configured to rotate about the pin 431D.

[0089] FIG. 4J is a diagram that illustrates a zoomed in view of movement

mechanisms 471 through 474 coupled to transverse section 430C of the vehicle 400. In the simple mentation, the movement mechanisms 471 through 474 include wheels rotatably coupled to axles. The axles are disposed within portions of the transverse section 430C such that the wheels can rotatably move about the axles. In this implementation, the wheels of the movement mechanisms 472 and 473 are each configured to rotate about an axis C6. The wheels of the movement mechanisms 471 and 474 are each configured to rotate about an axis orthogonal to (or substantially orthogonal to) the axis C6.

[0090] In some implementations, one or more of the movement mechanisms 471 through 474 can be configured to support at least a portion of the vehicle 400 when traveling along, for example, a track. In some implementations, one or more of movement mechanisms 471 or 474 can be configured to facilitate movement of the vehicle 400 along a sidewall of track. In this implementation, the movement mechanisms 471 through 474 coupled to transverse section 430C, which is the middle transverse section from the transverse sections 430.

[0091] Although illustrating as having movement mechanisms 471 through 474, in some implementations, the transverse section 430C can include more or less movement mechanisms than shown in FIG. 4J. For example, the transverse section 430C can include movement mechanisms 471 and 474, and can exclude movement mechanisms 472 and 473. In some implementations, the transverse section 430C can include movement mechanisms 472 and/or 473, and can exclude movement mechanisms 471 and/or 474. In some implementations, a first movement mechanism includes a first wheel that is rotatable about a first axis, and a second movement mechanism includes a second wheel that is rotatable about a second axis where the second axis is nonparallel to (e.g., orthogonal to) the first axis. In some implementations, a first movement mechanism can be included on a side of a transverse section opposite another side of the transverse section including a second movement mechanisms.

[0092] As shown in FIG. 4J, the movement mechanism 471 can have at least a portion that extends outside of (or protrudes outside of) an edge 432C of the transverse section 430C. In other words, one or more movement mechanisms (e.g., movement mechanism 471) can be coupled to a side portion of the transverse section 430C. In some implementations, the transverse section 430C can include one or more movement mechanisms different than movement mechanisms shown in FIG. 4J. For

example, the transverse section 430C can include a protrusion that functions as a movement mechanism. Although not shown in FIG. 4J, in some implementations, one or more movement mechanisms can be coupled to one or more of the transverse sections 430, in addition to, or instead of transverse section 430C.

[0093] FIG. 4K is a diagram that illustrates the vehicle 400 suspended from a launch mechanism 40 via the coupling mechanism 480. The coupling mechanism 480 can be disposed within, for example, a slot (not shown) included in a first portion 42 of the launch mechanism 40. The vehicle 400 can be released from the launch mechanism 40 when the first portion 42 of launch mechanism 40 is moved (e.g., slidably moved, rotatably moved) along, for example, direction X (or different direction) with respect to a second portion 41 of the launch mechanism 40. In some implementations, a bottom surface 445 of the vehicle 400 can be configured to contact the second portion 41 of launch mechanism 40 to facilitate release of the vehicle 400 when the first portion 42 is moved with respect to the second portion 41.

[0094] FIG. 5A is a diagram that illustrates a top view of a vehicle 500. The vehicle includes a flexible member 520 coupled between a base member 515 and a base member 510. In this embodiment, the flexible member 520 includes transverse sections 532 monolithically formed (e.g., molded) as a part of the flexible member 520. Also, in this implementation, a transverse section 531 is coupled to a portion of the flexible member 520. The transverse section 531 is not monolithically formed as part of the flexible member 520. In other words, the transverse section 531 can be formed separate from the flexible member 520, and coupled to the flexible member 520.

[0095] In some implementations, the transverse section 531 can be formed of a different material than the flexible member 520 (and/or transverse sections 532). In some implementations, the transverse section 531 can be formed of a same material as the flexible member 520 (and/or transverse sections 532). In some implementation, all of the transverse sections included in the vehicle 500 can be formed as part of the flexible member 520. In such implementations, the transverse section 531 can be excluded from the vehicle 500. Also, in such implementations, one or more of the movement mechanisms 571, 572 that are coupled to the transverse section 531 can be instead coupled to one of the transverse sections formed from the flexible member 520. In this implementation, the movement mechanisms 571, 572 can be referred to as side wheels.

[0096] In this implementation, movement mechanisms 571, 572 are coupled to the transverse section 531. In this example implementation, the movement mechanism 571 is coupled to a first side of the transverse section 531, and the movement mechanism 572 is coupled to a second side of the transverse section 531. Although not shown in FIG. 5A, movement mechanisms can be coupled to one or more of the transverse sections 532. Also, in some implementations, one or more of the movement mechanisms 571, 572 can be excluded from the transverse section 531.

[0097] In this implementation, the transverse section 531 has a width greater than a width of each of the transverse sections 532. In some implementations, one or more of the transverse sections 532 can have a width greater than a width of the transverse section 531. In such implementations, the movement mechanisms 571, 572 can protrude outside of a width of the transverse section 531 so that a distance between an outer edge of the movement mechanism 571 and an outer edge of the movement mechanism 572 can be greater than the width of one or more of the transverse sections 532.

[0098] In this implementation, the transverse section 531 is coupled to the flexible member 520 at approximately a midpoint of a length of the flexible member 520. In some implementations, the transverse section 531 can be coupled to a different location along the length of the flexible member 520. Also, in this implementation, an even number of the transverse sections 532 are disposed on each side of the transverse section 531. In some implementations, different numbers of the transverse sections 532 can be disposed on each side of the transverse section 531.

[0099] The flexible member 520 as a stand-alone component is illustrated in FIG. 5B. As shown in FIG. 5B, the flexible member 520 has an opening 522 included in an end portion 524, and has an opening 521 included in an end portion 523. The openings 521, 522 included in the end portions 523, 524, respectively can be used to couple the flexible member 520 to the base members 510, 515. Specifically, the end portion 523 including the opening 521 can be inserted into an opening (not shown) in, for example the base member 515 (shown in FIG. 5A). An elongate member (not shown) can be inserted into at least a portion of the base member 515 and into at least a portion of the opening 521 so that the end portion 523 can be coupled to the base member 515.

[00100] As shown in FIG. 5B, the flexible member 520 has a non-uniform width or shape along a longitudinal axis of the flexible member 520. Specifically, the

end portion 523 and the end portion 524 each have a width that is greater than a middle portion of the flexible member 520. In some implementation, the end portions 523, 524 can have a relatively large width to facilitate retention within one or more of the base members 510, 515 and/or to facilitate strength of the flexible member 520. In some implementations, one or more the end portions 523, 524 can have a tear-drop shape. In some implementations, one or more of the end portions 523, 524 can have a tab, a protrusion, and/or so forth to facilitate strength and/or retention.

[00101] FIG. 5C is a diagram that illustrates a side view of the vehicle 500 shown in FIG. 5A. As shown in FIG. 5C, a movement mechanism 579 (which can include a wheel) is coupled to the transverse section 531. The movement mechanism 579 can be configured to support a middle portion of the vehicle 500. In particular, the movement mechanism 579 can be configured to support the vehicle 500, which can flex because of the flexible member 520.

[00102] FIGS. 6A and 6B are illustrations of a variation of the vehicle 500 shown in FIGS. 5A through 5C. As shown in FIG. 6A and 6B, the vehicle 500 includes several additional movement mechanisms in addition to those shown in FIGS. 5A through 5C. Specifically, movement mechanisms 573 and 574 are coupled to base member 510, also movement mechanisms 575 and 576 are coupled the base member 515. As shown in FIG. 6B, the movement mechanisms 571 through 576 are aligned along the same horizontal plane. In some implementations, one or more of the movement mechanisms 571 through 576 can be aligned along a different horizontal plane or a nonparallel plane. In some implementations, less or more movement mechanisms can be coupled to the base member 510 and/or the base member 515.

[00103] FIG. 7 is a diagram that illustrates transverse sections 730 included in a vehicle 700. As shown in FIG. 7, the transverse sections 730 each have the same cross-sectional shape.

[00104] FIG. 8 is a diagram that illustrates transverse sections 830 included in another vehicle 800. In this implementation, the transverse sections 830 include transverse sections 830A through 830E.

[00105] As shown in FIG. 8, several of the transverse sections 830 have different cross-sectional shapes. For example, transverse section 830C has a cross-sectional area smaller than a cross-sectional area of transverse section 830A. As shown in FIG. 8, the outer edges of each side of the transverse sections 830

collectively define concave shapes (or profiles) G1, G2 so that the outer edges of the transverse sections 830 collectively define an hourglass shape (or profile). In other words, the transverse sections 830 gradually narrow toward a middle portion of the vehicle 800.

[00106] In this implementation, the transverse section 830C, which has the second narrowest width, includes a movement mechanism. In some implementations, the narrowest of the transverse sections 830 can include one or more movement mechanisms.

[00107] As shown in FIG. 8, the transverse sections 830 collectively define the concave shape G2 on a first side of the vehicle 800 that is mirrored by the concave shape G2 on a second side of the vehicle 800. The shape defined by the transverse sections 830 is mirrored across a plane along a longitudinal axis of the vehicle 800.

[00108] In some implementations, the outer edges of each side of the transverse sections 830 can collectively define a different shape than that shown in FIG. 8. For example, the outer edges of one or more sides of the transverse sections 830 can collectively define a convex shape, a curved shape, a non-uniform shape, and/or so forth. In some implementations, a shape or outer profile defined by the transverse sections 830 may not be mirrored across a plane along a longitudinal axis of the vehicle 100.

[00109] Although not shown in FIG. 8, in some implementation a middle (or centrally located) transverse section from the transverse sections 830 can have a larger width than at least one other transverse section from the transverse sections 830. Although not shown in FIG. 8, in some implementation a middle (or centrally located) transverse section from the transverse sections 830 can have a larger width than any of the remaining transverse sections from the transverse sections 830.

[00110] FIGS. 9A through 9E are diagrams that illustrate another implementation of a vehicle 900. In this implementation, the vehicle 900 includes a base member 910 and a base member 915. As shown in FIGS. 9A and 9B, the vehicle 900 includes links 935 that define transverse sections 930. In other words, each of the links 935 includes a transverse section 930. As a specific example, link 935B includes a transverse section 931B.

[00111] In this implementation, the transverse sections 930 are formed and positioned within a middle portion of the vehicle 900 as the links 935 are coupled together. For example link 935B, which includes transverse section 931B, can be

coupled to (e.g., linkably coupled to) link 935C, which includes transverse section 931C, such that the transverse sections 931B, 931C are disposed between the base member 910 and the base member 915.

[00112] The vehicle 900 can be configured to flexibly move via the connected links 935. In some implementations, the links 935 can be configured so that the vehicle 900 can be configured to flexibly move in a variety of directions similar to those described in connection with at least FIGS. 1A through 1C. In some implementations, the links 935 can be configured so that the vehicle 900 flexibly moves in a limited number of directions such as bending only within a horizontal plane or bending only within a vertical plane. In some implementations, the links 935 can be configured so that the vehicle 900 flexibly moves only in a torsional fashion. In some implementations, one or more of the links 935 (or portions thereof) can be made of a flexible material configured so that the vehicle 900 flexibly move by contracting or stretching.

[00113] As shown in FIGS. 9A and 9B, the links 935 can be configured to couple using, for example, a ball and socket mechanism. In some implementations, additional links, in addition to the links 935 shown in FIGS. 9A and 9B, can be included in and coupled to the links 935 so that an overall length (and number of links) of the vehicle 900 is increased. In some implementations, one or more of the links 935 shown in FIGS. 9A and 9B can be removed so that an overall length (and number of links) of the vehicle 900 is decreased.

[00114] Although illustrated in FIGS. 9A and 9B as having relatively the same shape, the links 935 can have different dimensions (e.g., widths, heights, cross-sections). Also, the links 935 can have different linking mechanisms, which are discussed in more detail below.

[00115] FIG. 9C is a diagram that illustrates a top view of the link 935B. As shown in FIG. 9C, link 935B includes link mechanism 985B and link mechanism 986B. The link mechanism 985B protrudes from a first side of the transverse section 931B of the link 935B, and the link mechanism 986B protrudes from a second side of the transverse section 931B of the link 935B. The link mechanism 985B includes a recess configured to receive at least a portion of (e.g., a retention member of) another link mechanism from a separate link, and the link mechanism 986B includes a retention member configured to be inserted into at least a portion of (e.g., a recess of) a link mechanism from yet another separate link. FIG. 9D is a diagram that illustrates

a perspective view of the link 935B.

[00116] In some implementations, different types of link mechanisms can be included within the links 935. For example, the link mechanisms that can be included in the links 935 can be similar to, or the same as, the coupling mechanisms described above.

[00117] As shown in FIGS. 9A and 9B, the link 935C includes movement mechanisms. FIG. 9E is a diagram that illustrates a perspective view of the link 935C. As shown in FIG. 9E, the link 935C includes movement mechanisms 971C through 974C. Specifically, the movement mechanisms 971C through 974C protrude from the transverse section 931C of the link 935C. In some implementations, one or more of the movement mechanisms 971C through 974C can include a wheel (e.g., a wheel configured to rotate about an axle or axis). Although only a single link with movement mechanisms as illustrated in FIGS. 9A and 9B, in some implementations, multiple links with movement mechanisms can be included in (e.g., linkable he coupled within) the vehicle 900.

[00118] FIGS. 10A through 10E are diagrams that illustrate various views of a vehicle 1000. Specifically, FIG. 10A is a diagram that illustrates a perspective view of a portion of a bottom of the vehicle 1000. As illustrated in FIG. 10A, the vehicle 1000 includes transverse sections 1030. In this implementation, each of the transverse sections includes at least two portions that are coupled to a flexible member 1020. For example, transverse section 1030B includes a first portion 1031B and a second portion 1032B. The transverse section 1030B is formed by coupling the first portion 1031B to the second portion 1032B around the flexible member 1020. The first portion 1031B and the second portion 1032B can be clamped around the flexible member 1020. The first portion 1031B and the second portion 1032B can be coupled together using a pin, an adhesive, a press-fit, a screw, a fusion process, a snap fit, and/or so forth.

[00119] Although not shown, in some implementations the transverse section 1030B can optionally include only the first portion 1031B or only the second portion 1032B. Although not shown, in some implementations the transverse section 1030B can optionally include one or more portions (e.g., a c-shape portion) around one or more sides of the flexible member 1020.

[00120] As shown in FIG. 10A, each of the transverse sections 1030 includes at least one movement mechanism. In some implementations, one or more of the

movement mechanisms can be coupled to one or more of the transverse sections 1030 via a component used to couple portions of the transverse sections. For example, a movement mechanism included in a transverse section (from the transverse sections 1030) can be coupled to the transverse section via a pin (or axle) used to couple a first portion and a second portion of the transverse section. In some implementations, the movement mechanism can be configured to rotatably move about the pin. FIGS. 10B-10E illustrate different views of the vehicle 1000.

[00121] Referring to FIGS. 11-18, alternative embodiments of vehicles are illustrated. Referring to FIG. 11, a perspective view of a toy vehicle is illustrated. Toy vehicle 2000 includes a front portion or base member 2100 and a rear portion or base member 2200. The toy vehicle 2000 includes a middle portion or flexible member 2300 that is coupled at each of its ends to the front portion 2100 and the rear portion 2200. The flexible member 2300 is formed of a molded polymer available from, for example, KRATON. The toy vehicle 2000 also includes several transverse sections or rib members 2400 located along the flexible member 2300. Referring to FIGS. 11 and 12, a coupler or tail member 2250 is pivotally coupled to the rear portion 2200 and movable between a lowered position shown in FIG. 11 and a raised position shown in FIG. 12. The coupler 2250 can be used to connect the toy vehicle 2000 to, for example, a launcher.

[00122] Referring to FIG. 13, the flexible member 2300 is located around a spring 2350. In this implementation, spring 2350 is a tightly wound coil spring that extends along the length of the flexible member 2300, as described in greater detail below. The flexible member 2300 is molded with the transverse sections 2400. Each of the transverse sections 2400 is placed in a mold spaced from each other. In addition, the spring 2350 is placed in the mold through the transverse sections 2400. The polymer material is then inserted into the mold, passing through the transverse sections 2400 and along the outside of the spring 2350. As a result, openings 2310 are formed in the flexible member 2300 by the transverse sections 2400. The spring 2350 provides structural support for the flexible member 2300 while permitting it to bend and curve.

[00123] Referring to FIG. 14, a perspective view of a cross-section of part of another toy vehicle 2400 according to the invention is illustrated. In this view, the spring 2350 extending through the flexible member 2300 is shown. Referring to FIG. 15, an embodiment of a transverse section 2400 is illustrated. Transverse section

2400 includes a body 2410 that includes a through opening that has a ring 2412 coupled to supports 2414. The ring 2412 defines a central opening 2416 through which the spring 2350 is inserted and several slots 2418 defined by the ring 2412 and supports 2414. During the manufacturing process, the polymer material flows through the slots 2418 and around the supports 2414 to form the flexible member 2300.

[00124] Referring to FIGS. 16-18, bottom views of the toy vehicle 2000 illustrated in FIG. 11 are illustrated. Referring to FIG. 16, the base members 2100 and 2200 of the toy vehicle 2000 include lower portions 2110 and 2210, respectively. Several connectors 2112, such as screws, are used to mount the lower portions 2110 and 2210. In this embodiment, the central transverse portion 2400 includes a roller or wheel 2420 that engages a support surface as the toy vehicle 2000 travels therealong.

[00125] Referring to FIG. 17, the lower portion 2110 has been removed from base member 2100. As shown, wheels 2120 and an axle are captured between the lower portion 2110 and an upper portion 2114 of the base member 2100. The upper portion 2114 includes several bosses 2116 and a pair of posts 2118. End portion 2312 of the flexible member 2300 has an opening 2314 that is sized to receive boss 2116, which couples the flexible member 2300 to the base member 2100. In addition, each end of the spring 2350 includes a loop that can be slid onto the post of a base member, such as post 2116 of base member 2100.

[00126] In addition, in FIG. 17, a clip or coupler 2140 is slidably mounted on the posts 2118. Referring to FIG. 18, the clip 2140 is removed from the posts 2118 includes opening 2142 which receives the posts 2118. The toy vehicle 2000 also includes a string or elongate member 2500 that is inserted into and through the spring 2350 and extends from each of the ends of the spring 2350. The elongate member 2500 extends from the end portion 2312 of the flexible member 2300. At each end of the elongate member 2500 (only end 2510 is illustrated in FIG. 18) is a knot 2520. The elongate member 2500 is inserted between the posts 2118 with the knot 2520 on the outer side of the posts 2118. The elongate member 2500 limits the distance that the base members 2100 and 2200 can be pulled apart along the direction of arrow "A." In addition, the clip 2140 is used to maintain the knot 2520 between the posts 2118.

[00127] In this embodiment of the toy vehicle 2000, the flexible member 2300 and the spring 2350 provide the flexibility of the toy vehicle 2000, permitting the base

members 2100 and 2200 to move relative to each other. The elongate member or string 2500 limits the extent to which the base members 2100 and 2200 can be moved apart. The wheels on each base member 2100 and 2200 and the wheel 2420 on the central transverse member 2400 travel along a support surface, such as a track. The quantity of transverse members and wheels supported thereon can vary in different embodiments of toy vehicle 2400.

[00128] While certain features of the described implementations have been illustrated as described herein, many modifications, substitutions, changes and equivalents will now occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the scope of the implementations. It should be understood that they have been presented by way of example only, not limitation, and various changes in form and details may be made. Any portion of the apparatus and/or methods described herein may be combined in any combination, except mutually exclusive combinations. The implementations described herein can include various combinations and/or sub-combinations of the functions, components and/or features of the different implementations described.

WHAT IS CLAIMED IS:

1. A toy vehicle, comprising:
a first base member;
a second base member;
a flexible member having a first end coupled the first base member and having a second end coupled to the second base member, the flexible member configured to flexibly move between a first configuration and a second configuration; and
a transverse section having at least a portion coupled to the flexible member and being disposed between the first base member and the second base member.
2. The toy vehicle of claim 1, further comprising:
a first movement mechanism coupled to the transverse section; and
a second movement mechanism coupled to the first base member.
3. The toy vehicle of claim 2, wherein the first movement mechanism includes a rotatably mounted wheel.
4. The toy vehicle of claim 2, wherein the first movement mechanism includes a first wheel that is rotatable about a first axis, and the second movement mechanism includes a second wheel that is rotatable about a second axis, the second axis being nonparallel to the first axis.
5. The toy vehicle of claim 4, wherein the second axis is orthogonal to the first axis.
6. The toy vehicle of claim 2, wherein the transverse section has a side portion and the first movement mechanism is a wheel coupled to the side portion of the transverse section, and the first base member includes a lower surface and the second movement mechanism is a wheel coupled proximate to the lower surface of the first base member.
7. The toy vehicle of claim 2, further comprising:

a third movement mechanism coupled to the transverse section on an opposite side of the transverse section from the first movement mechanism.

8. The toy vehicle of claim 1, wherein the flexible member is configured to at least one of torsionally rotate, bend, stretch, or contract.

9. The toy vehicle of claim 1, wherein the transverse section is a first transverse section having a first cross-sectional area, and the toy vehicle further comprises:

a second transverse section having at least a portion coupled to the flexible member, the second transverse section being separate from the first transverse section by a space, the second transverse section having a second cross-sectional area smaller than the first cross-sectional area.

10. The toy vehicle of claim 1, wherein each of the first base member and the second base member includes a pair of wheels on a lower surface, and the transverse section includes a first wheel located on one side of the transverse section and a second wheel located on another side of the transverse section opposite the second wheel.

11. The toy vehicle of claim 1, wherein the transverse section is a first transverse section and the toy vehicle includes a second transverse section and a third transverse section, the second and third transverse sections being located on opposite sides of the first transverse section and spaced apart therefrom, each of the transverse sections being coupled to the flexible member so that the transverse sections move with the flexible member as a force is imparted to the flexible member.

12. The toy vehicle of claim 1, wherein the first base member includes a coupling mechanism extending therefrom, the coupling mechanism allowing the toy vehicle to be suspended in a substantially vertical manner by a toy vehicle launch mechanism.

13. A toy vehicle, comprising:

a first base member having a movement mechanism coupled thereto, the movement mechanism of the first base member being engageable with a support surface;

a second base member having a movement mechanism coupled thereto, the movement mechanism of the second base member being engageable with a support surface;

a flexible member having a first end portion coupled to the first base member and a second end portion coupled to the second base member, the flexible member being movable between a substantially linear configuration and a curved or bent configuration;

a transverse section coupled to the flexible member, the transverse section being located between the first base member and the second base member, the transverse section being movable with the flexible member when the flexible member is bent or curved.

14. The toy vehicle of claim 13, wherein the flexible member is in its substantially linear configuration when no force is applied to the flexible member.

15. The toy vehicle of claim 13, wherein the second base member moves relative to the first base member as the flexible member bends.

16. The toy vehicle of claim 13, further comprising:

a coil spring extending through the flexible member, the coil spring being coupled to the first base member and to the second base member, the coil spring being flexible with the flexible member.

17. The toy vehicle of claim 16, further comprising:

an elongate member extending through the coil spring, the elongate member being coupled to the first base member and to the second base member, the elongate member limiting the movement of the first base member away from the second base member.

18. An apparatus, comprising:

a first base member;

a second base member;

a flexible member having a first end coupled the first base member and having a second end coupled to the second base member, the flexible member configured to flexibly move between a first configuration and a second configuration;

a first transverse section having at least a portion coupled to the flexible member and being disposed between the first base member and the second base member; and

a second transverse section having at least a portion coupled to the flexible member, the second transverse section having a width greater than a width of the first transverse section.

19. The apparatus of claim 18, further comprising:

a third transverse section having at least a portion coupled to the flexible member, the second transverse section being disposed between the first transverse section and the third transverse section.

20. A toy vehicle, comprising:

a base member;

a movement mechanism coupled to the base member;

a flexible member having an end portion coupled the base member, the flexible member being movable relative to the base member between a substantially linear configuration and a curved or bent configuration;

a transverse section coupled to the flexible member; and

a coupling mechanism coupled to the base member.

21. The toy vehicle of claim 20, wherein the coupling mechanism is coupleable to a base member of a separate toy vehicle.

22. The toy vehicle of claim 20, wherein the coupling mechanism includes an elongate portion and a retention member coupled to the elongate portion, the elongate portion and retention member being engageable with a toy vehicle launch mechanism.

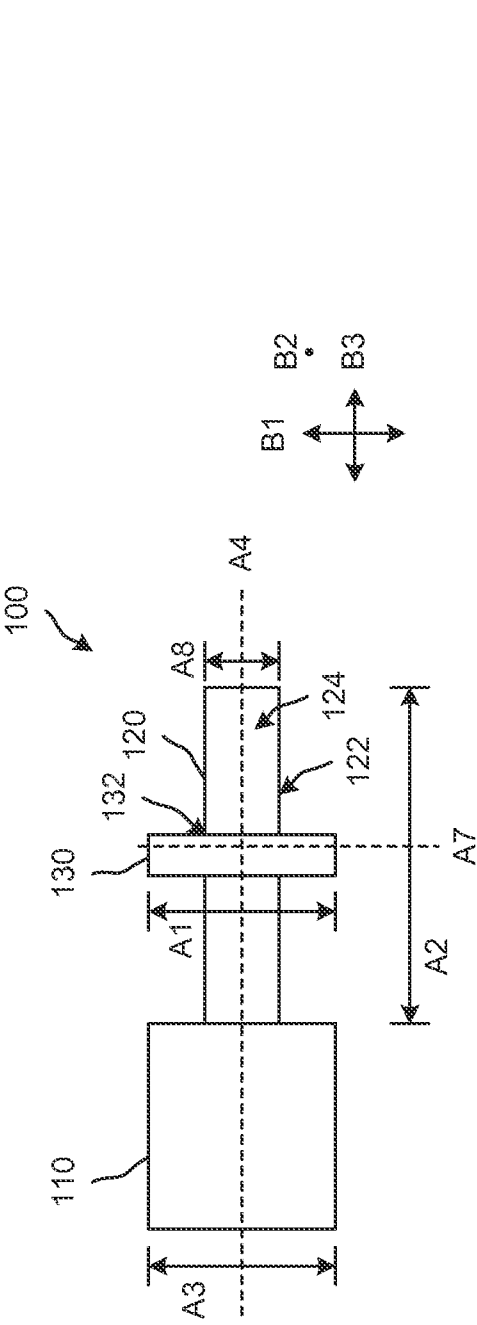


FIG. 1A

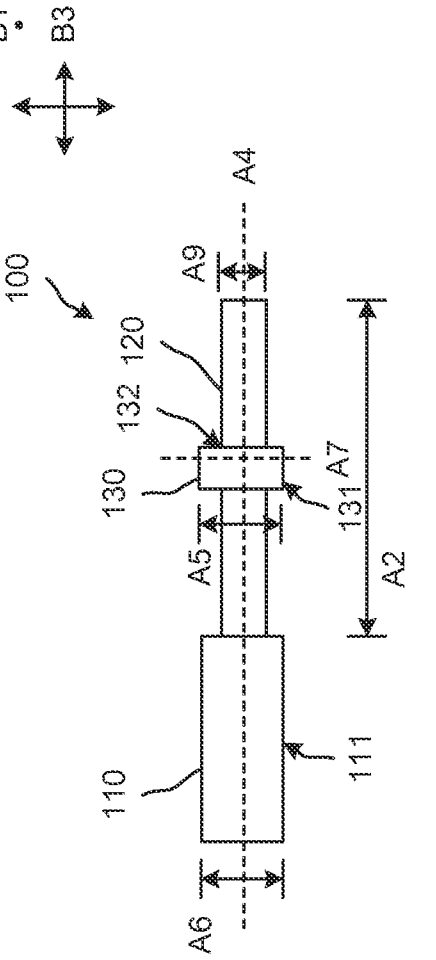


FIG. 1B

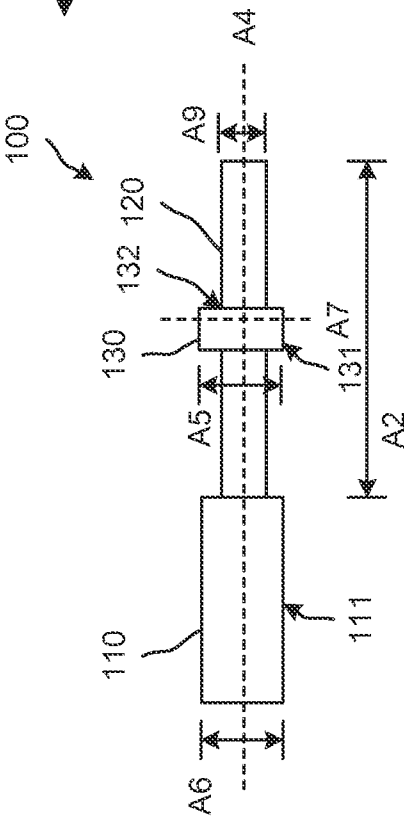


FIG. 1C

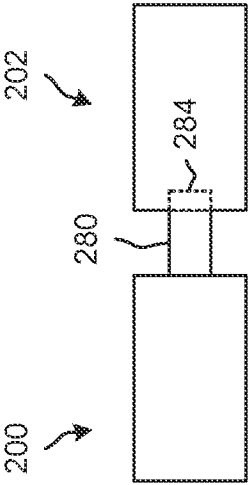


FIG. 2A

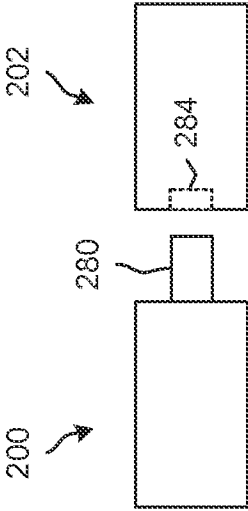


FIG. 2B

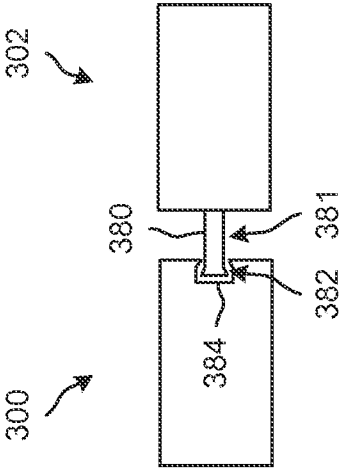


FIG. 3

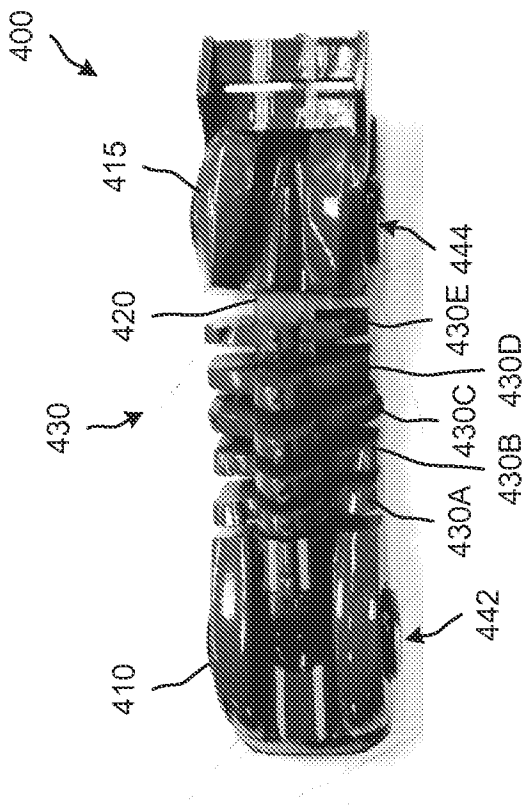


FIG. 4A

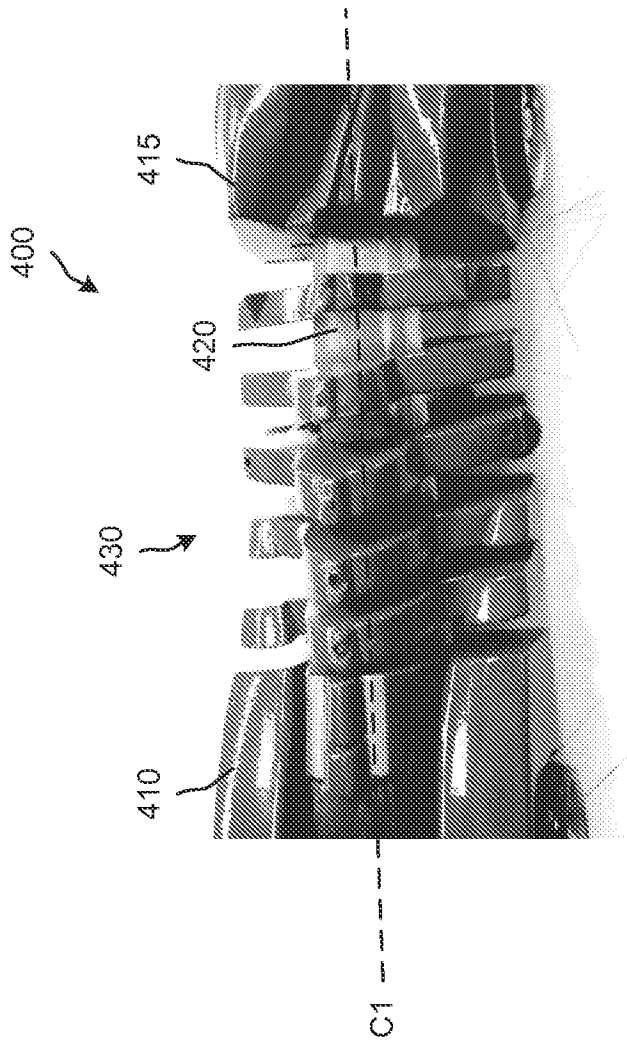


FIG. 4B

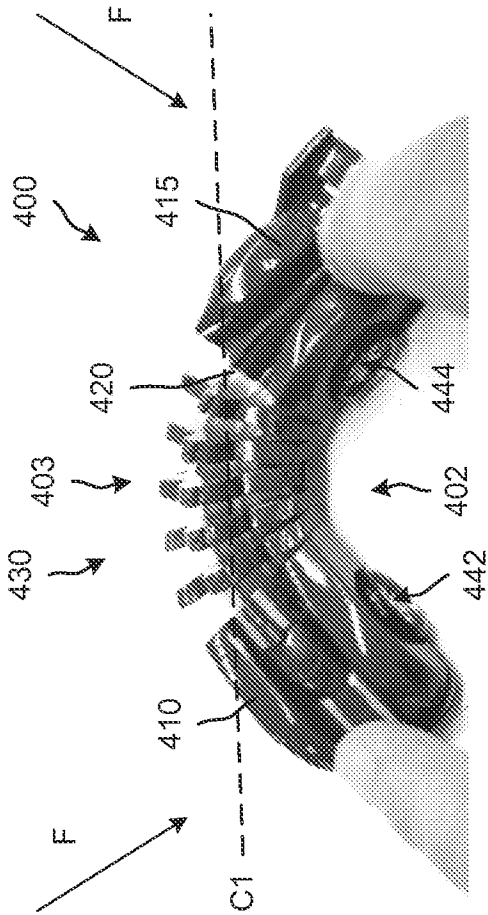


FIG. 4C

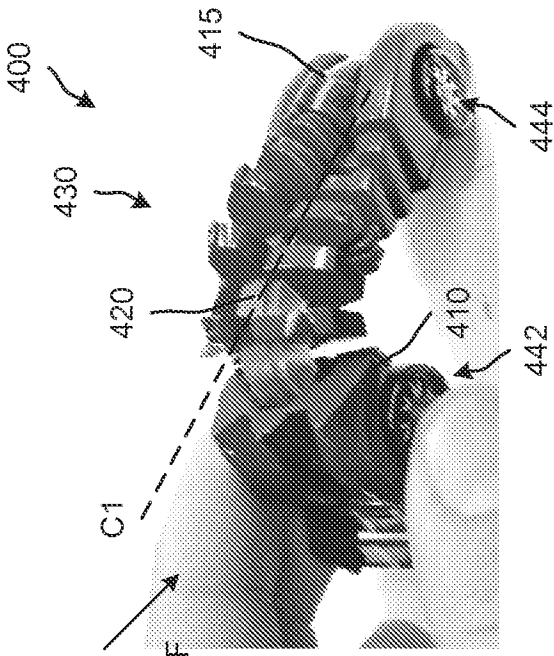
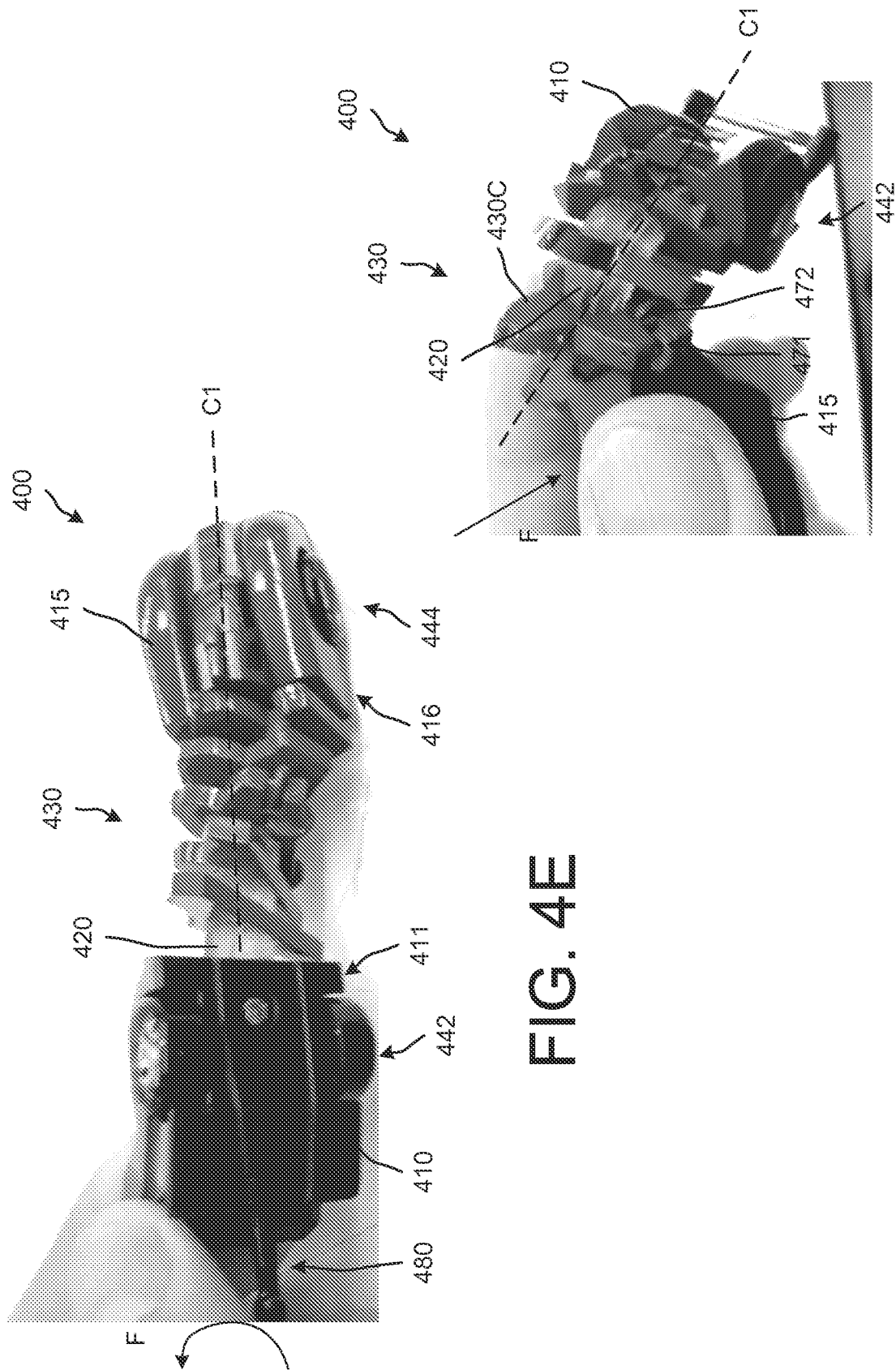
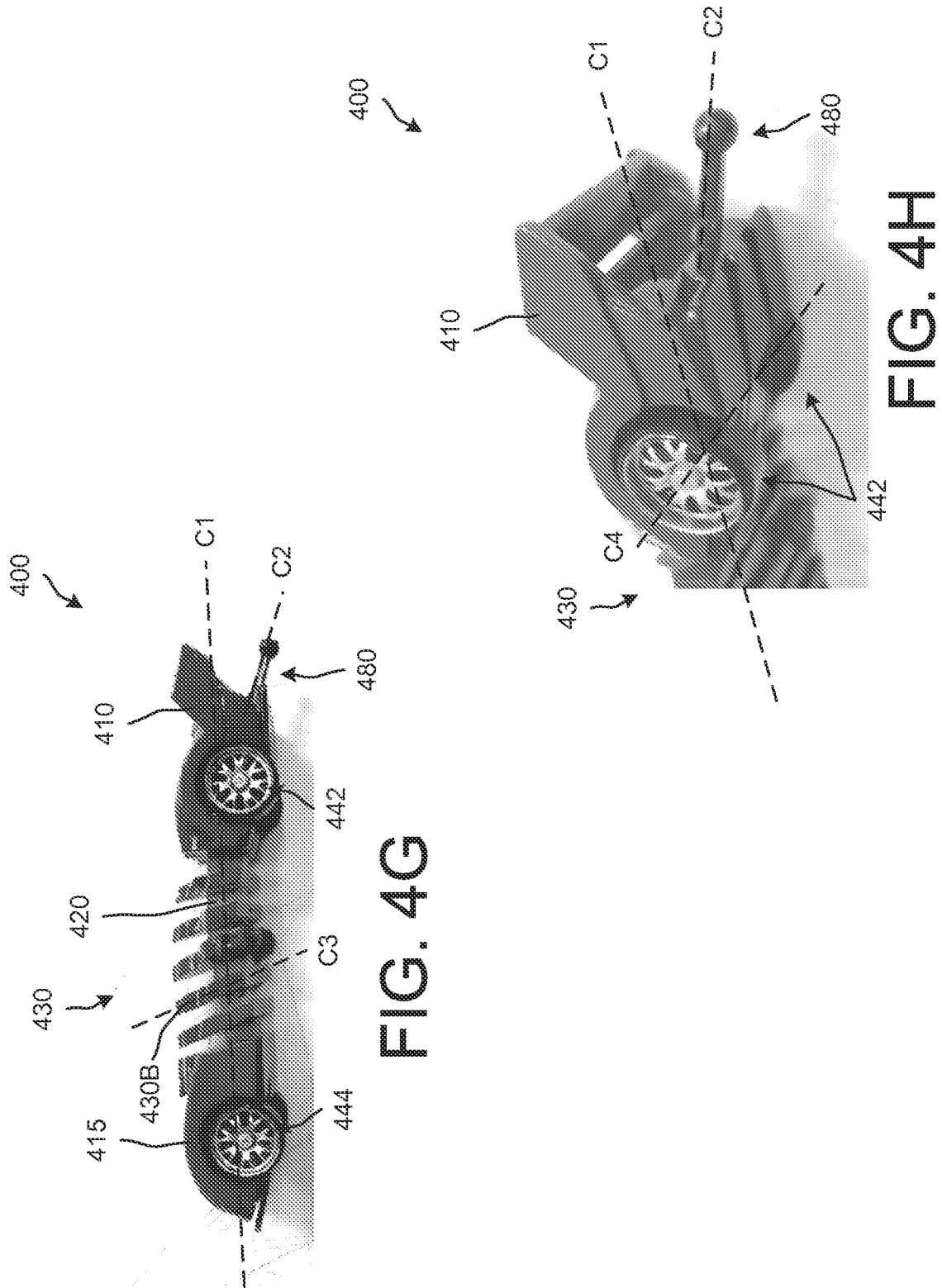


FIG. 4D



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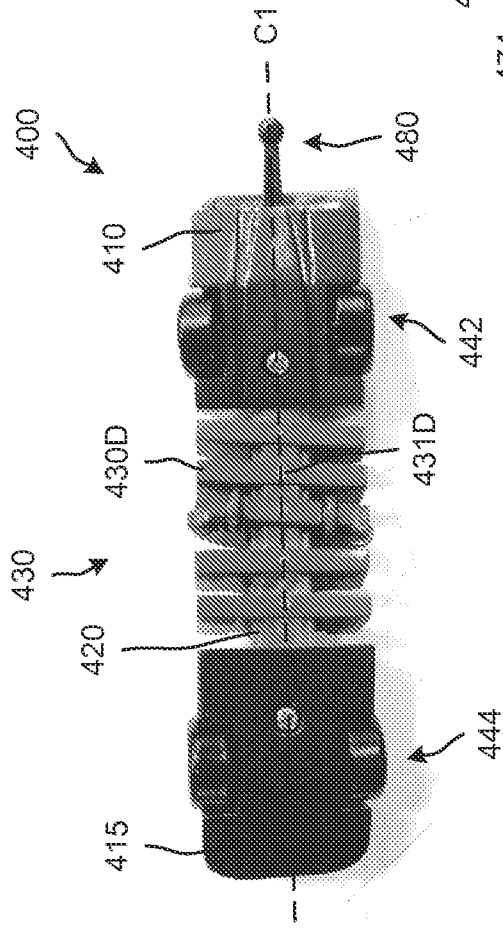


FIG. 4I

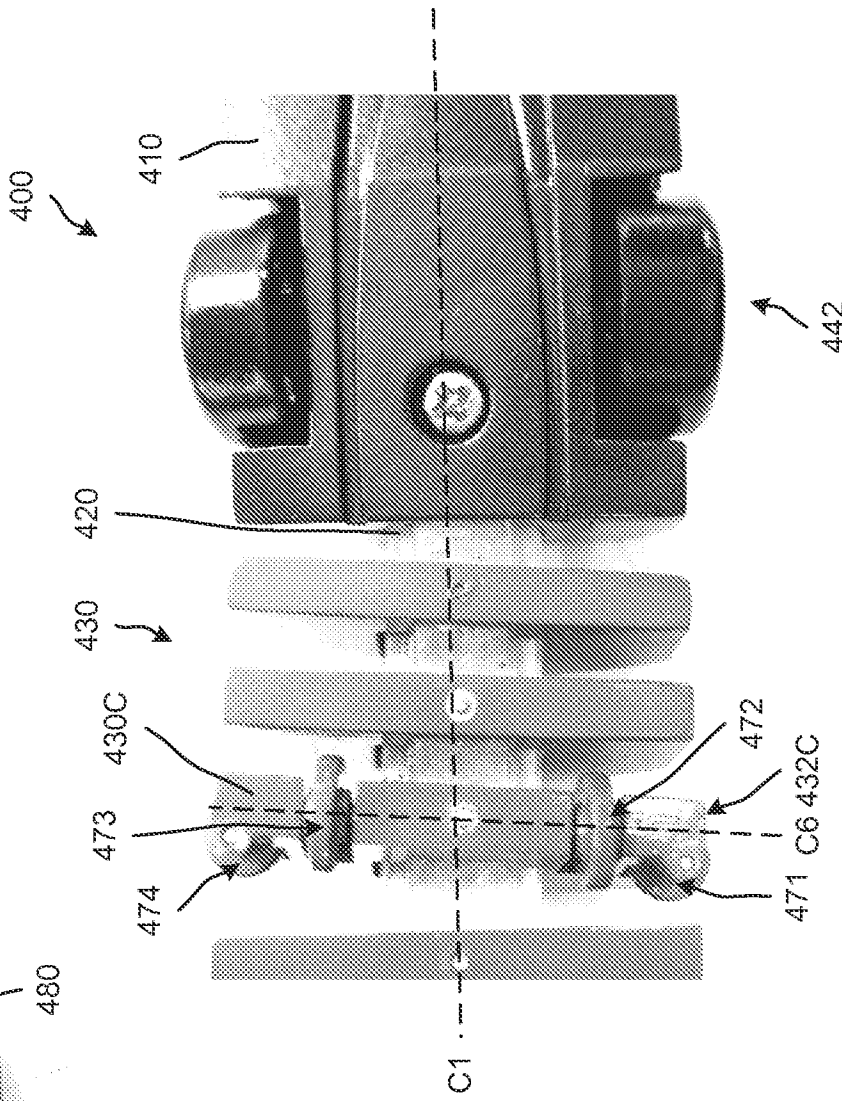


FIG. 4J

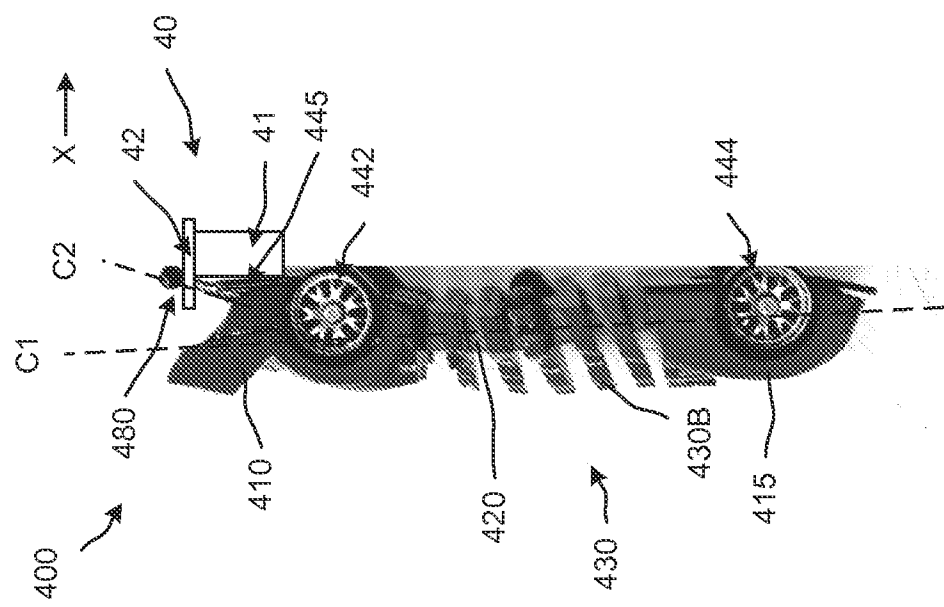
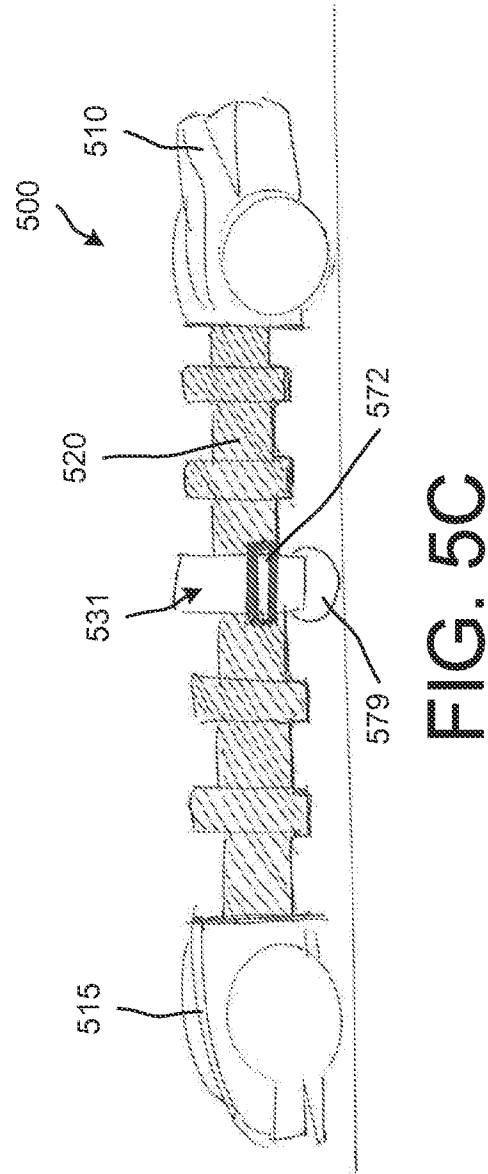
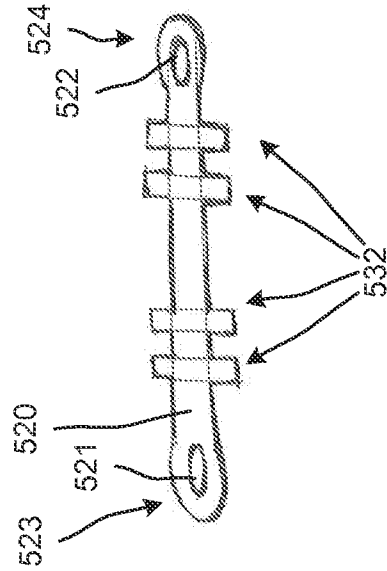
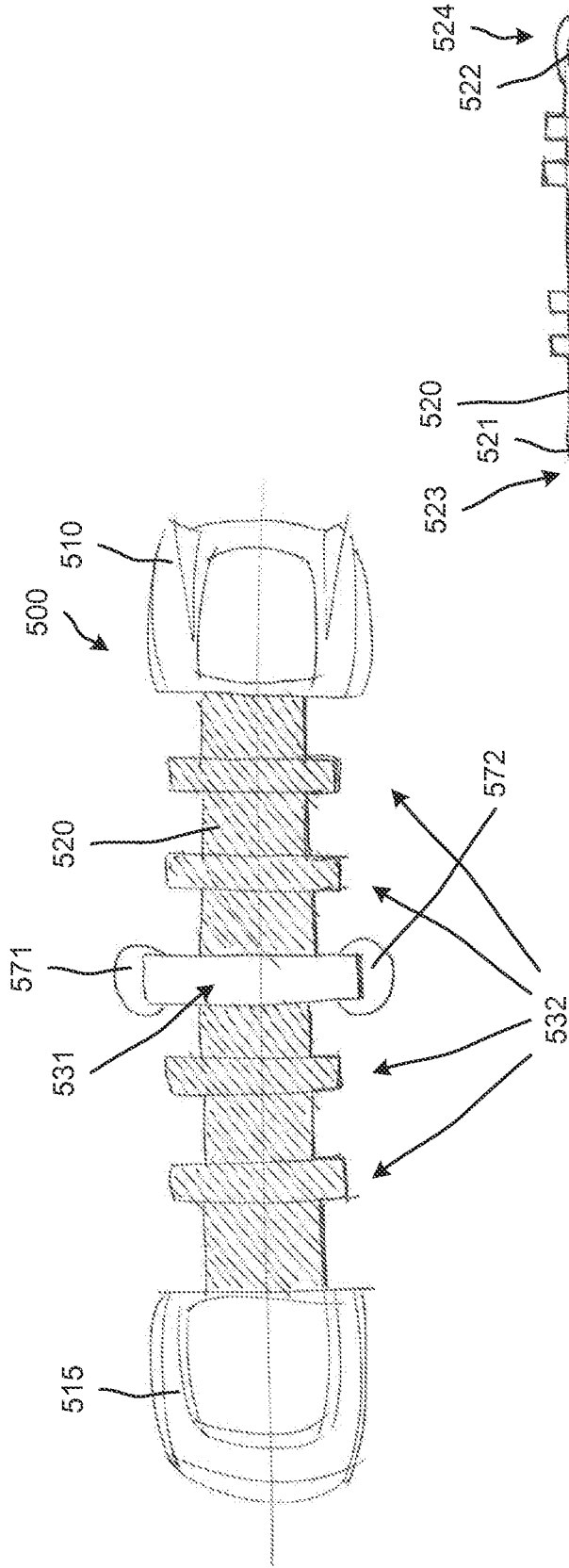


FIG. 4K



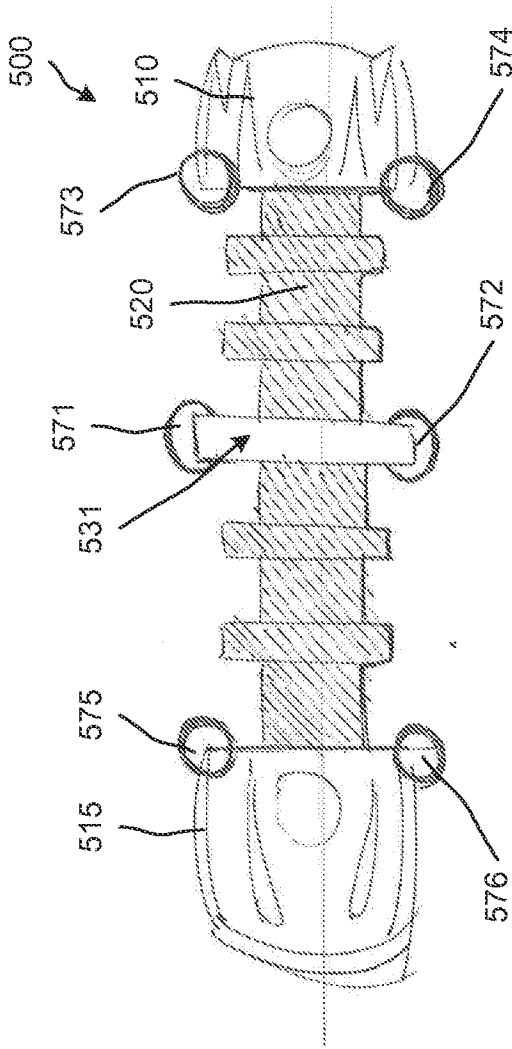


FIG. 6A

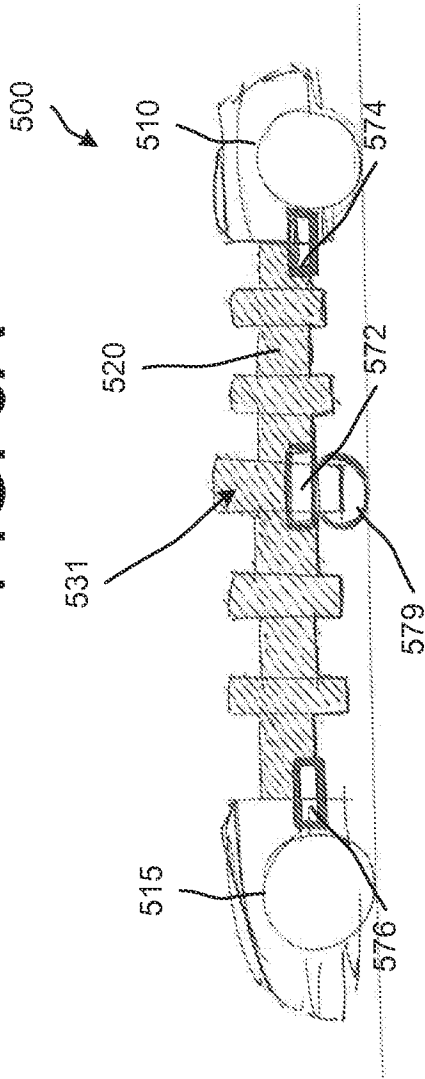


FIG. 6B

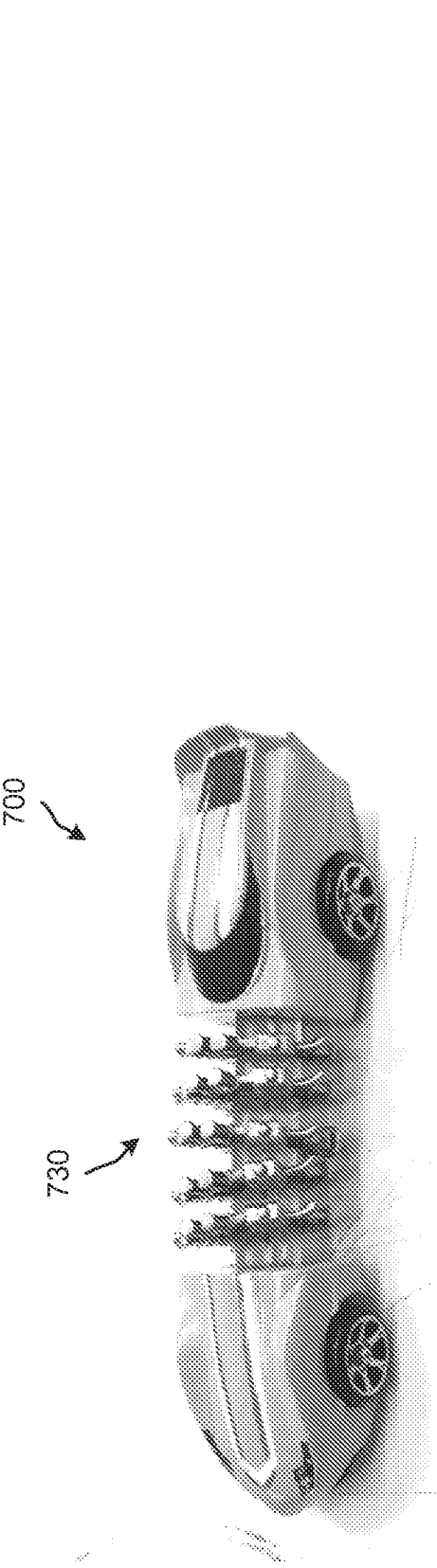


FIG. 7

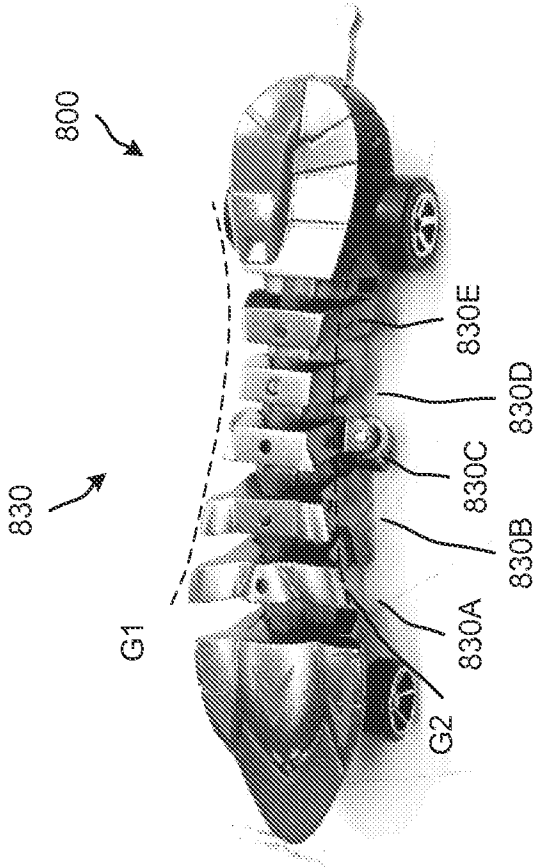


FIG. 8

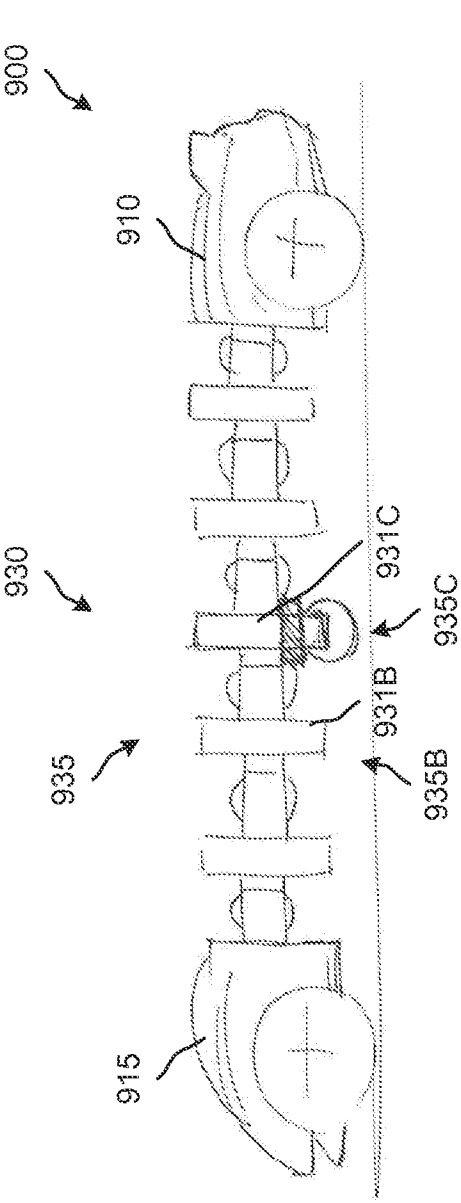


FIG. 9A

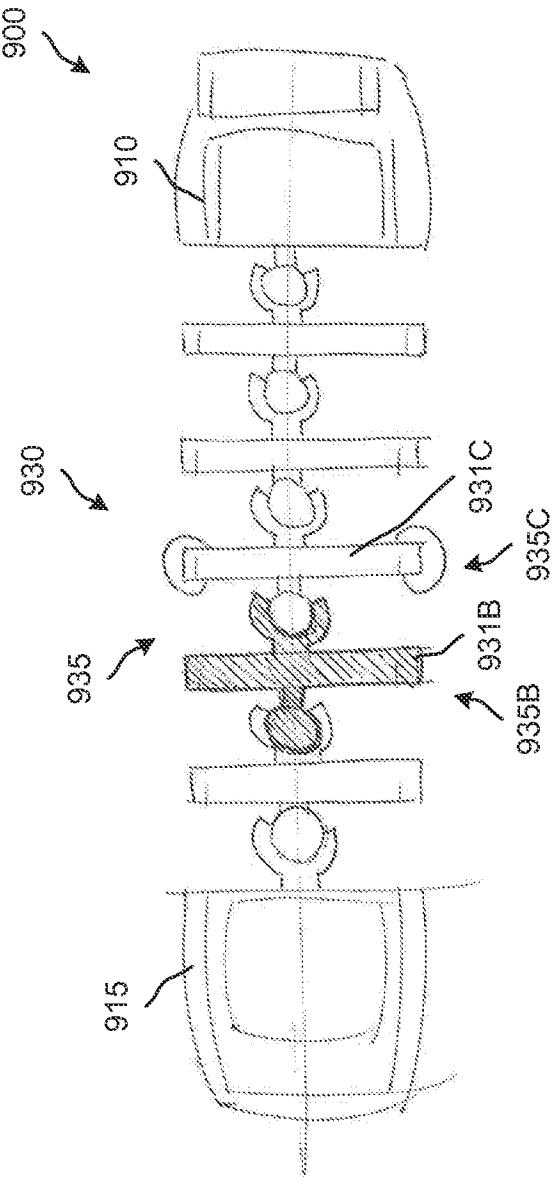


FIG. 9B

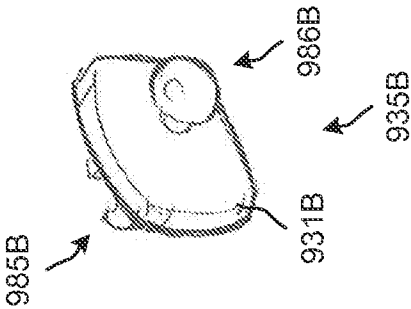


FIG. 9D

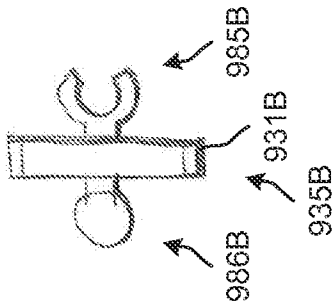


FIG. 9C

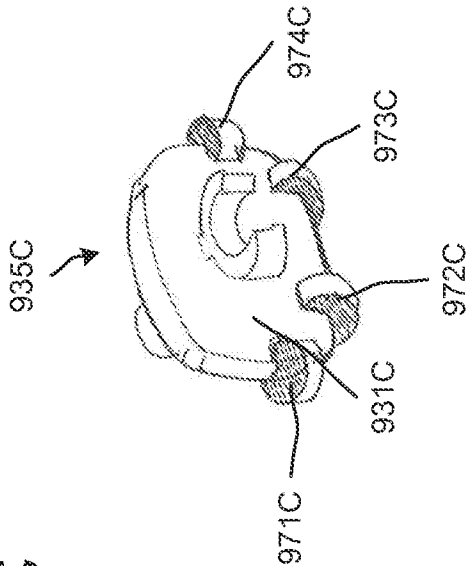


FIG. 9E

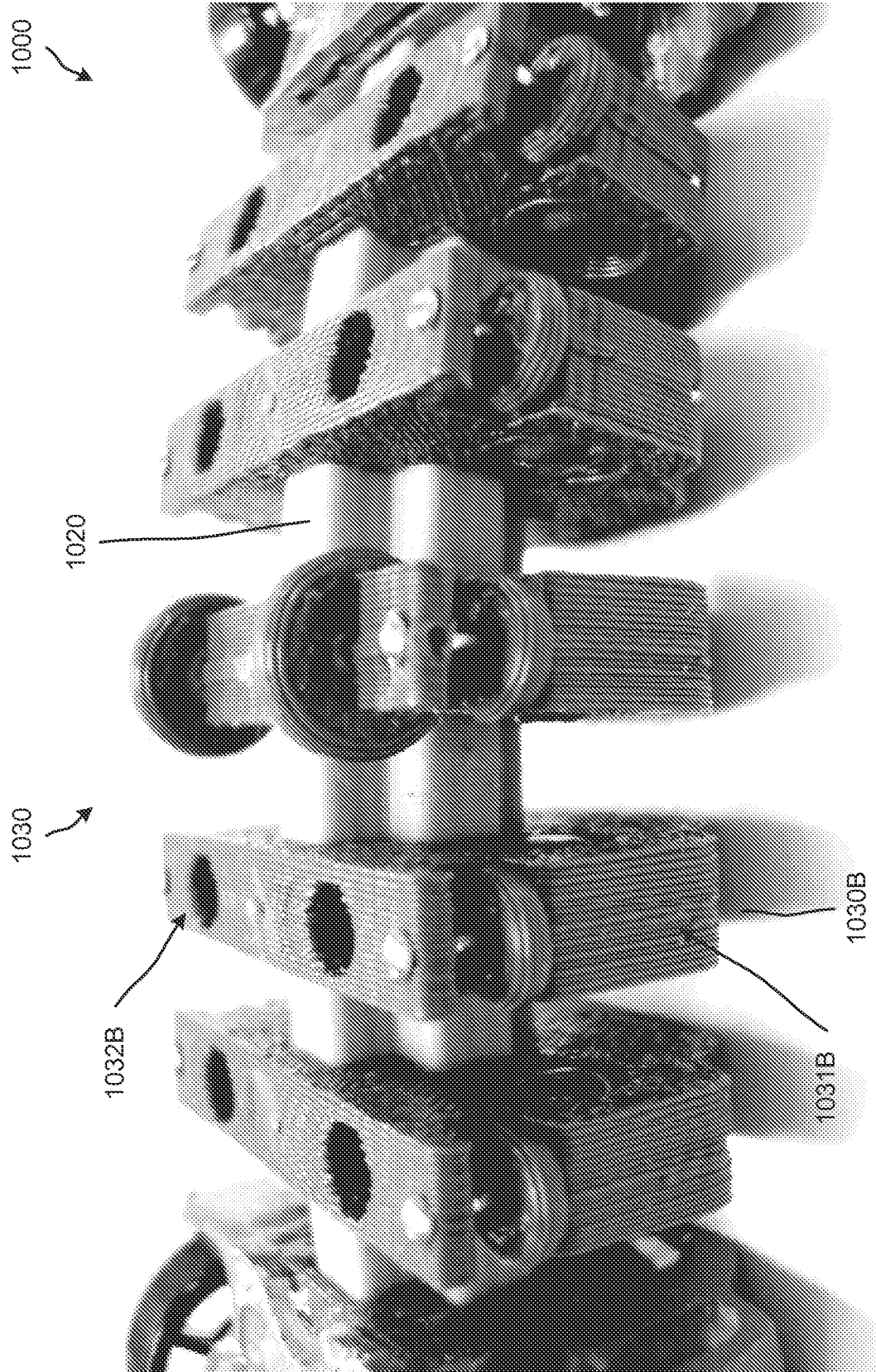


FIG. 10A

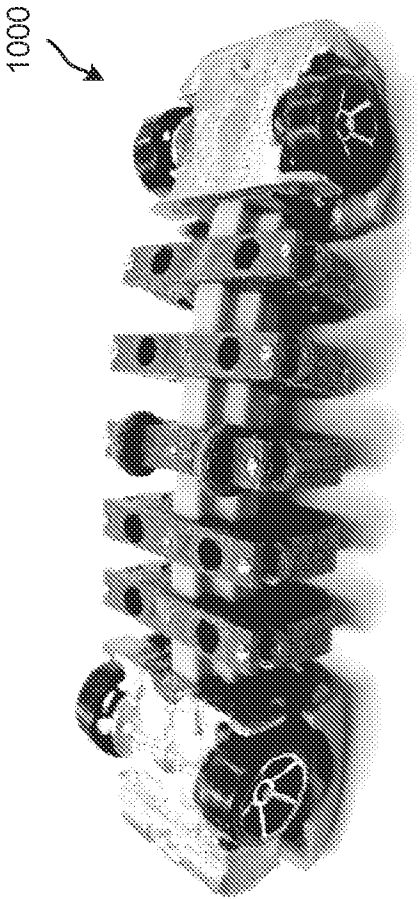


FIG. 10B

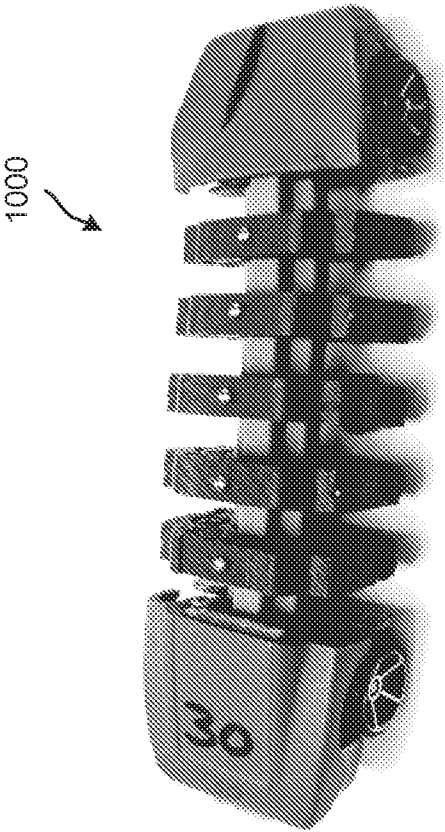


FIG. 10C



FIG. 10D

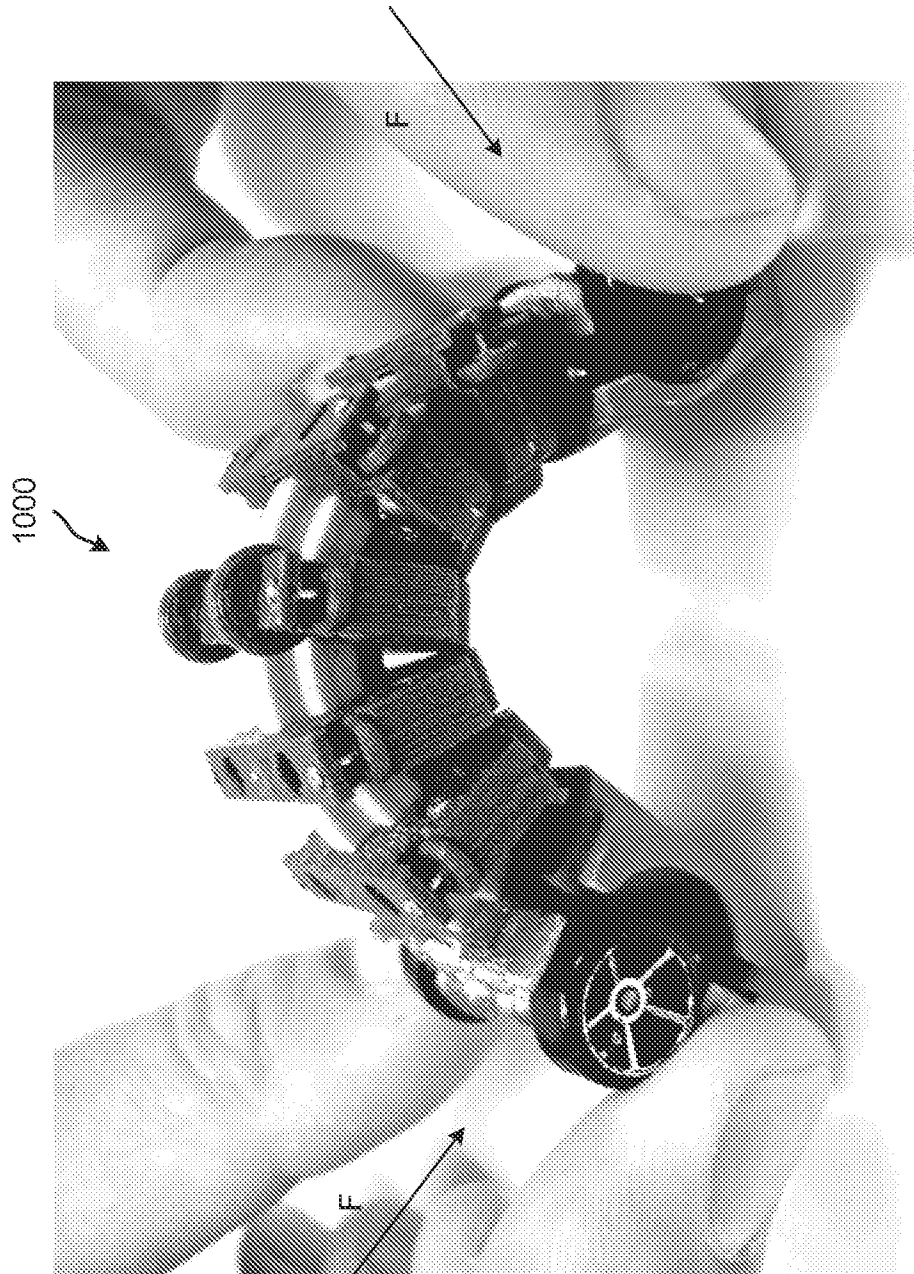
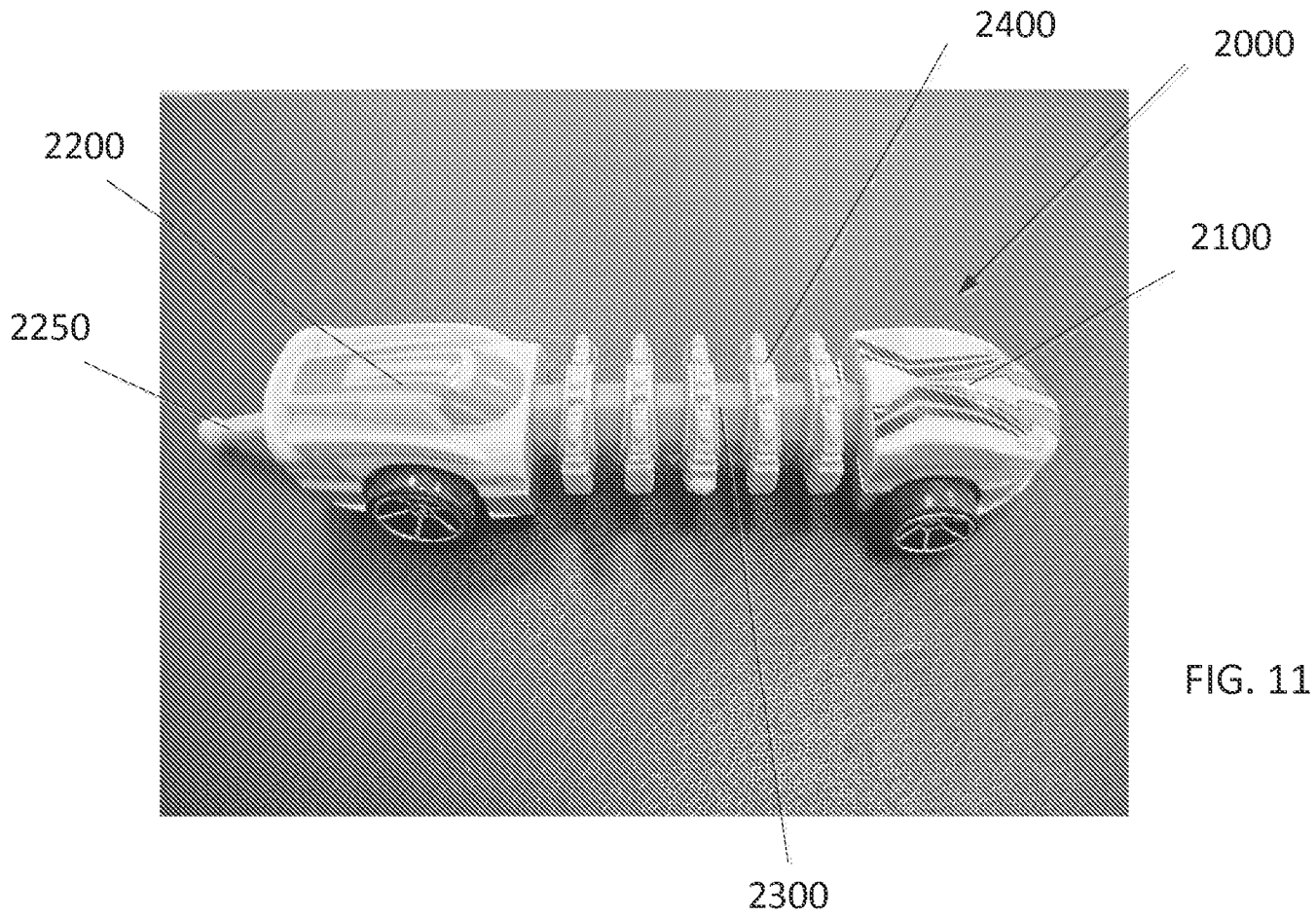


FIG. 10E



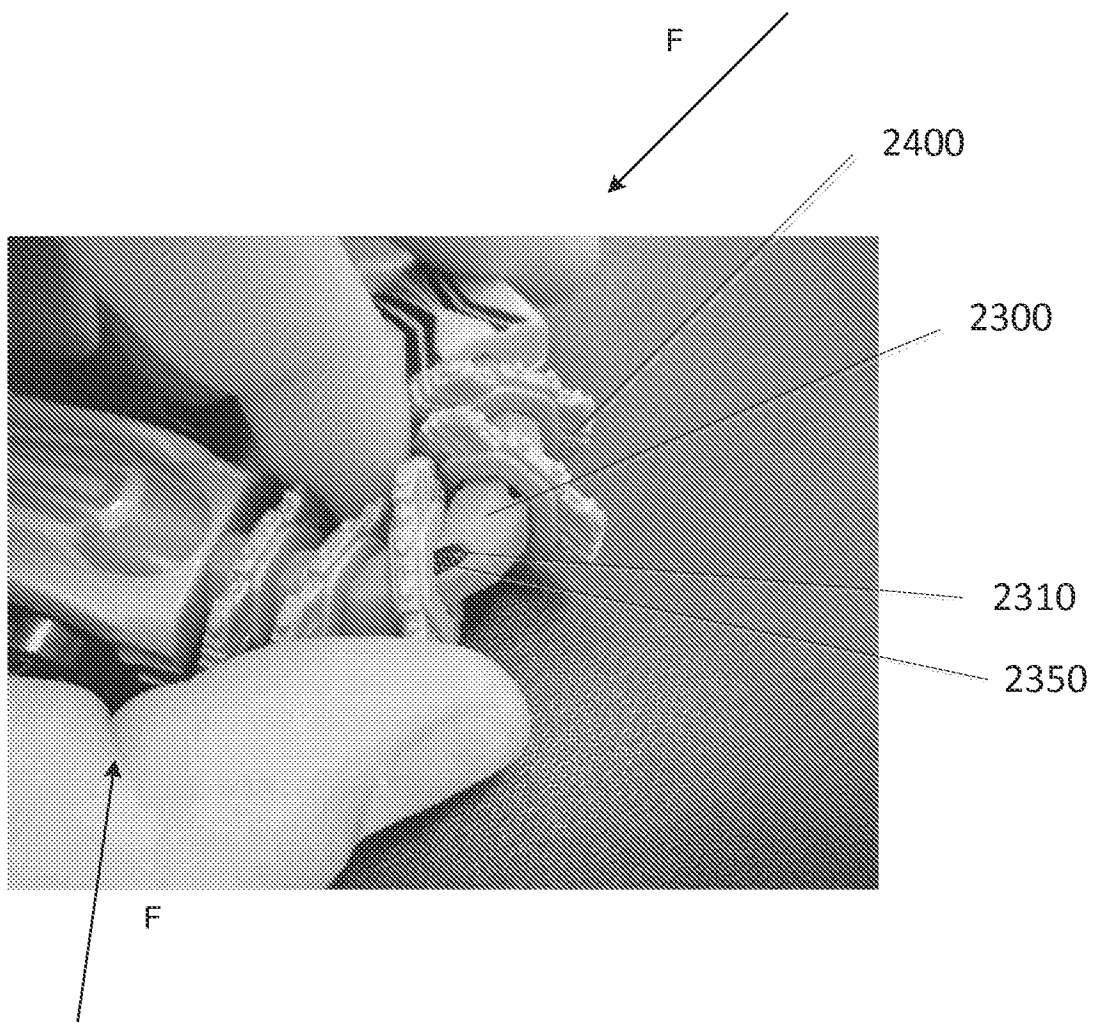


FIG. 13

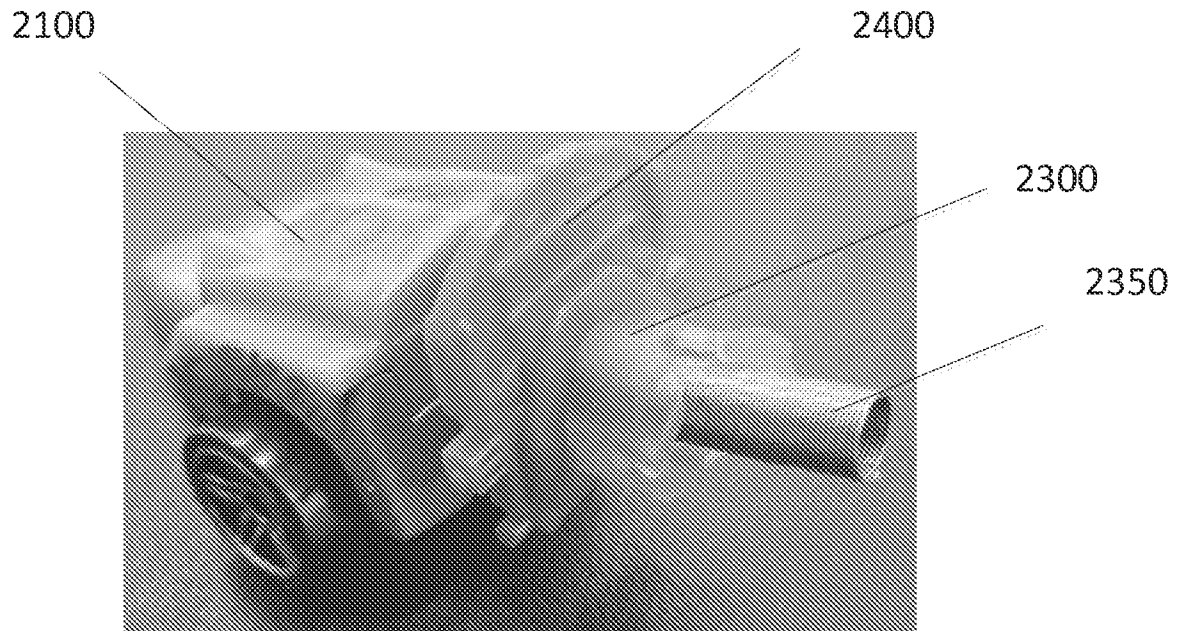


FIG. 14

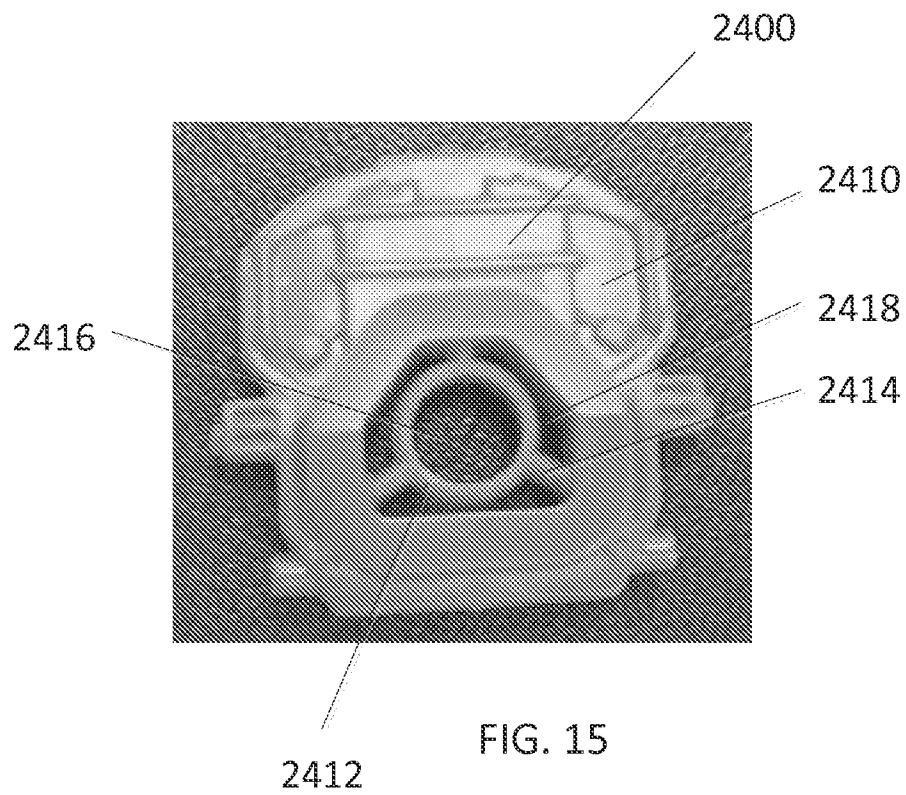


FIG. 15

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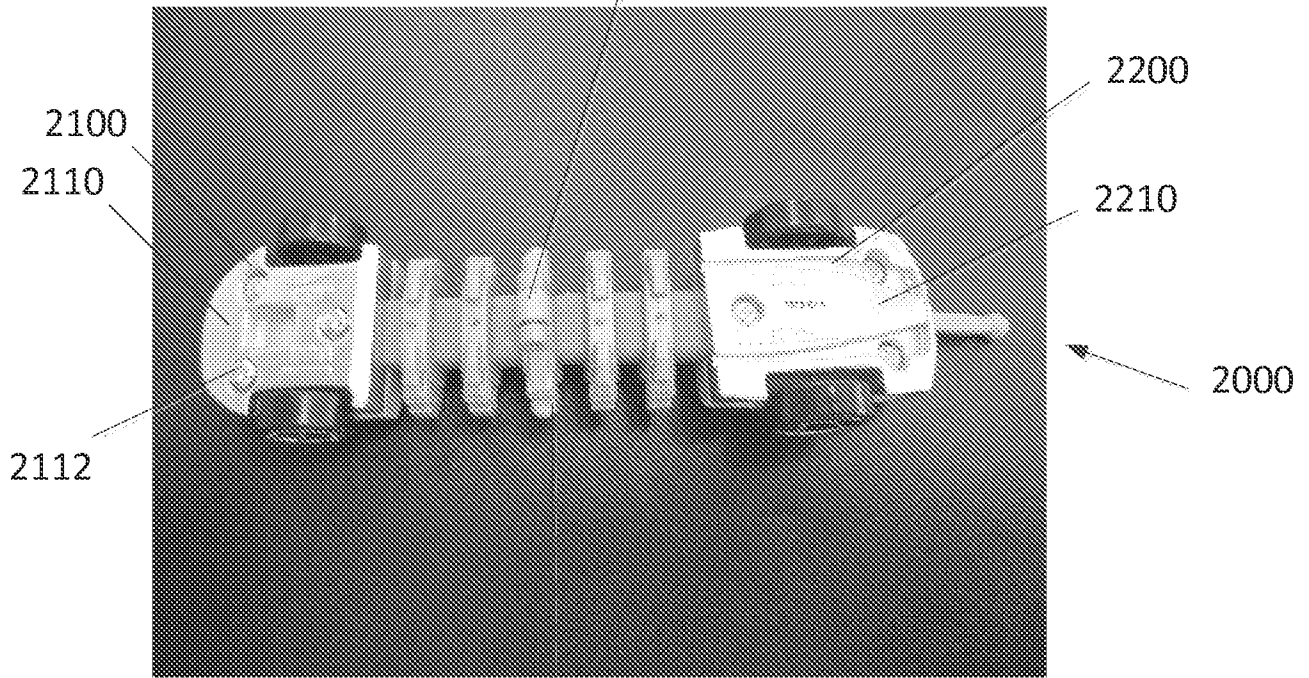


FIG. 16

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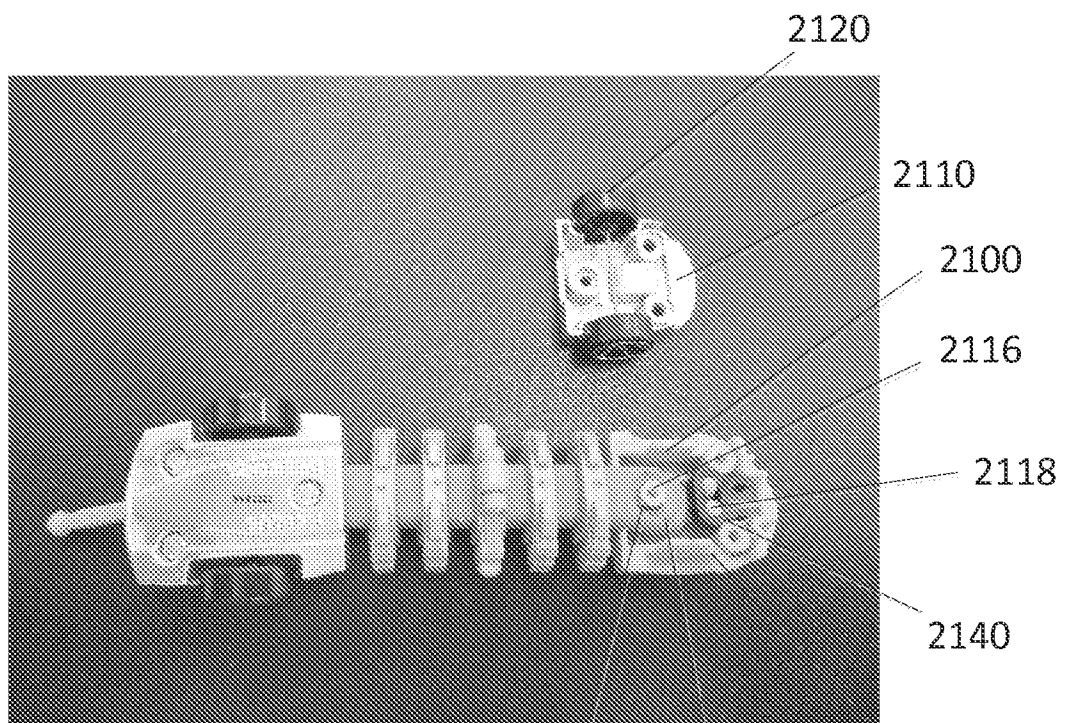


FIG. 17

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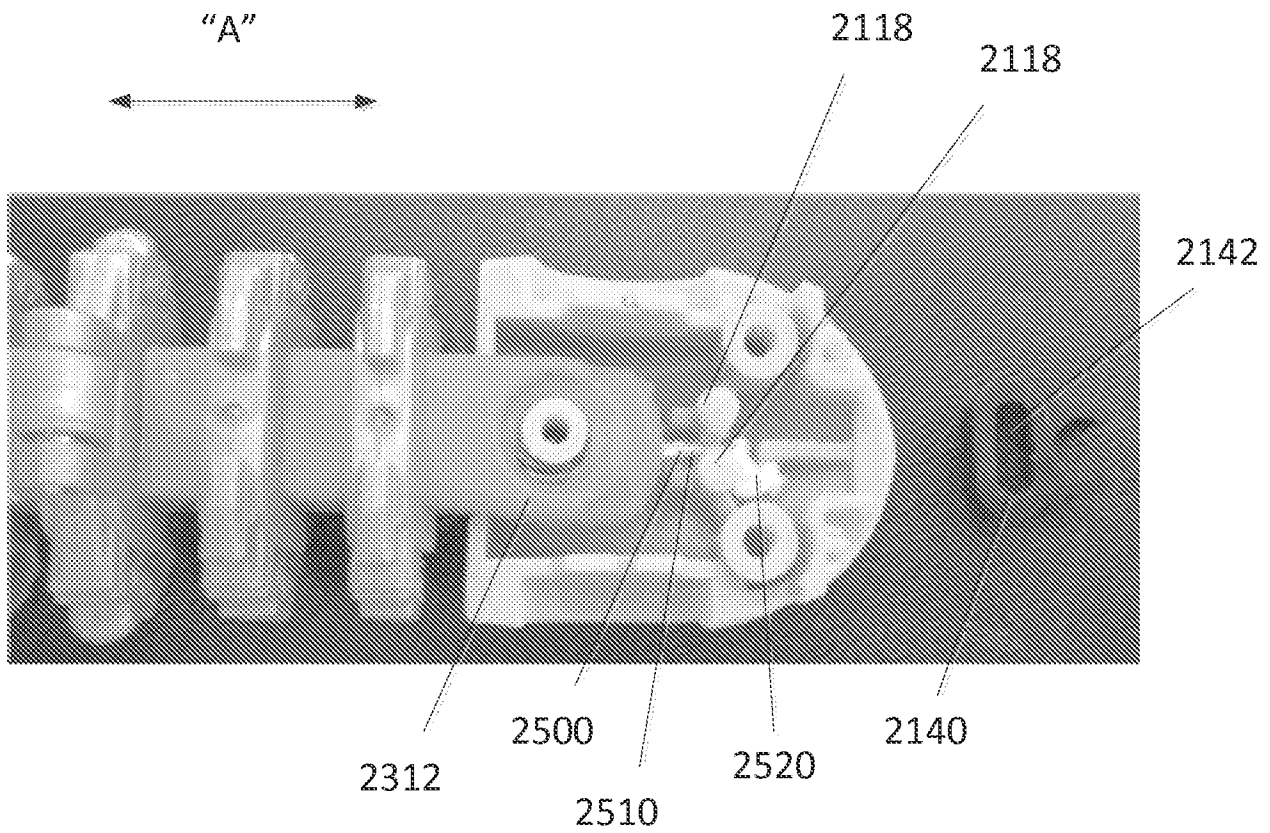


FIG. 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/036661**A. CLASSIFICATION OF SUBJECT MATTER****A63H 17/00(2006.01)i, A63H 17/26(2006.01)i, A63H 7/04(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A63H 17/00; A63H 3/36; A63H 29/00; A63H 33/08; A63H 7/02; A63G 19/00; A63H 33/04; A63H 3/02; A63H 17/26; A63H 7/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords:toy vehicle, flexible member, movement mechanism, coupling, and coil spring**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 3099939 U (YAMAMOTO, YUJI) 10 December 2003 See paragraphs [0006]–[0007]; and figures 1, 3–4.	1–22
Y	KR 10–2011–0022421 A (LEE, HAE GON) 07 March 2011 See paragraphs [0008]–[0010]; and figures 1–3.	1–19
Y	US 2003–0017782 A1 (MAN, MA CHEUK) 23 January 2003 See paragraphs [0028], [0031]; and figures 1–3.	4–7, 10
Y	US 7,815,486 B2 (BERNSTEIN et al.) 19 October 2010 See column 5, lines 7–37, column 8, lines 6–37; and figures 1, 8–9, 10A.	12, 20–22
Y	US 2008–0305712 A1 (KAZAKOFF, POLLY) 11 December 2008 See paragraphs [0024]–[0025], [0028]–[0030]; claim 1, and figure 2.	16–17



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

16 September 2014 (16.09.2014)

Date of mailing of the international search report

17 September 2014 (17.09.2014)

Name and mailing address of the ISA/KR

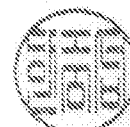
International Application Division
Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan City, 302-701,
Republic of Korea

Facsimile No. +82-42-472-7140

Authorized officer

HAN, Joong Sub

Telephone No. +82-42-481-5606



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/036661

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 3099939 U	10/12/2003	None	
KR 10-2011-0022421 A	07/03/2011	None	
US 2003-0017782 A1	23/01/2003	US 6572434 B2	03/06/2003
US 7815486 B2	19/10/2010	US 2008-0166947 A1	10/07/2008
		WO 2008-048681 A2	24/04/2008
		WO 2008-048681 A3	19/06/2008
US 2008-0305712 A1	11/12/2008	None	