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Edlauer, Newbury Park, CA (US)(21) Appl. No.: **16/794,836**(22) Filed: **Feb. 19, 2020****Related U.S. Application Data**

- (63) Continuation of application No. 16/002,937, filed on Jun. 7, 2018, now abandoned, which is a continuation of application No. 14/723,892, filed on May 28, 2015, now Pat. No. 9,994,278, which is a continuation of application No. 14/043,625, filed on Oct. 1, 2013, now Pat. No. 9,045,189.
- (60) Provisional application No. 61/708,996, filed on Oct. 2, 2012.

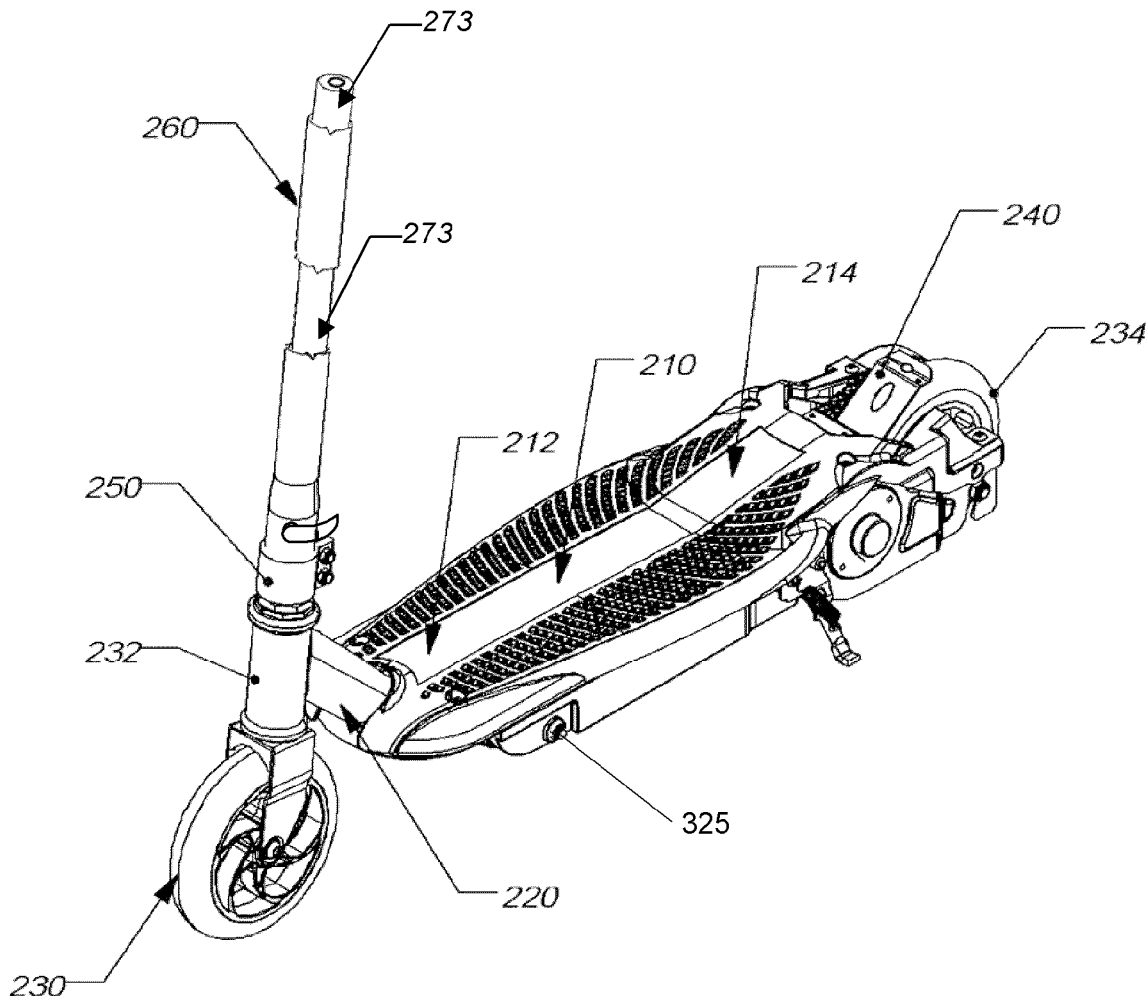
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(2013.01)

(57)

ABSTRACT

In some embodiments, a scooter comprises a deck configured to support a rider, a front wheel and a rear wheel, a head tube, a steering column, and a foot brake. The steering column can include a steering tube and a handlebar assembly, and the steering column can be used to steer the scooter by controlling a direction of the front wheel. The foot brake can be configured to apply a braking force to the rear wheel when the foot brake is pressed down. A plurality of neck members can connect the deck to the head tube.



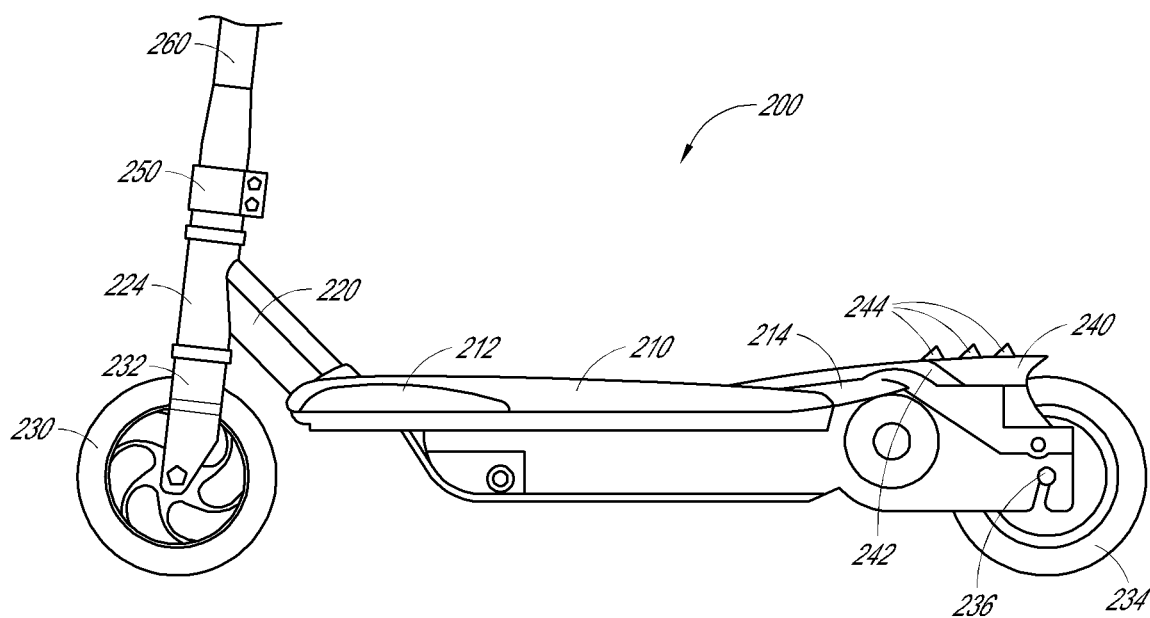
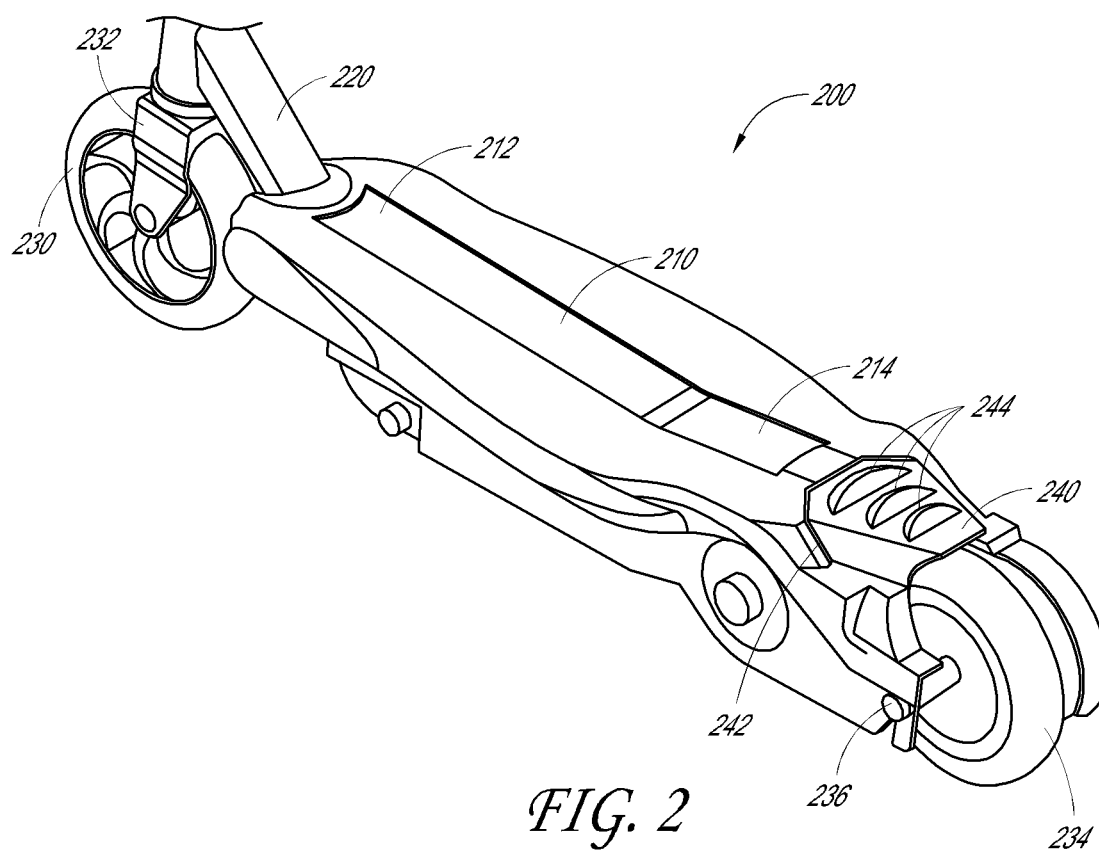


FIG. 1



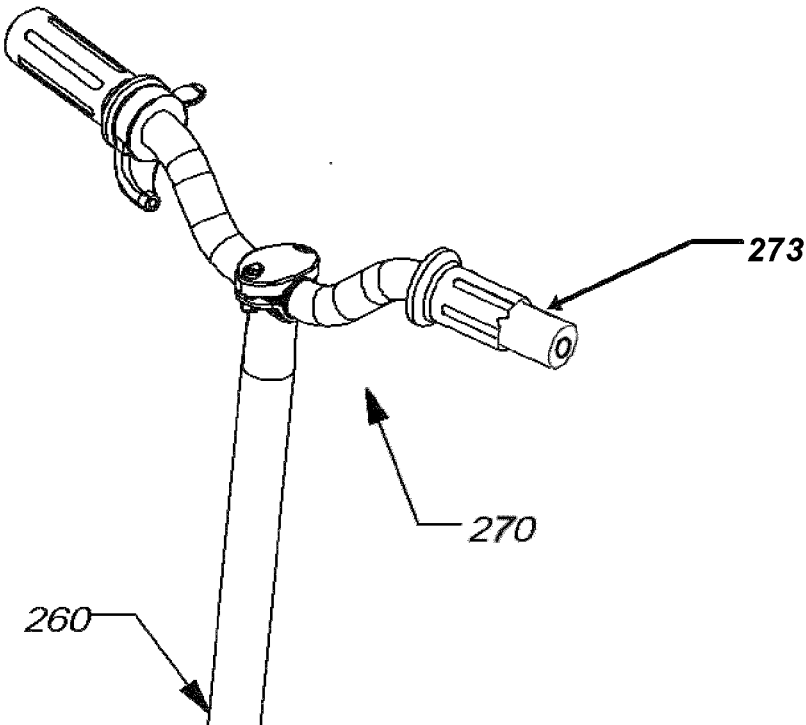


FIG. 3

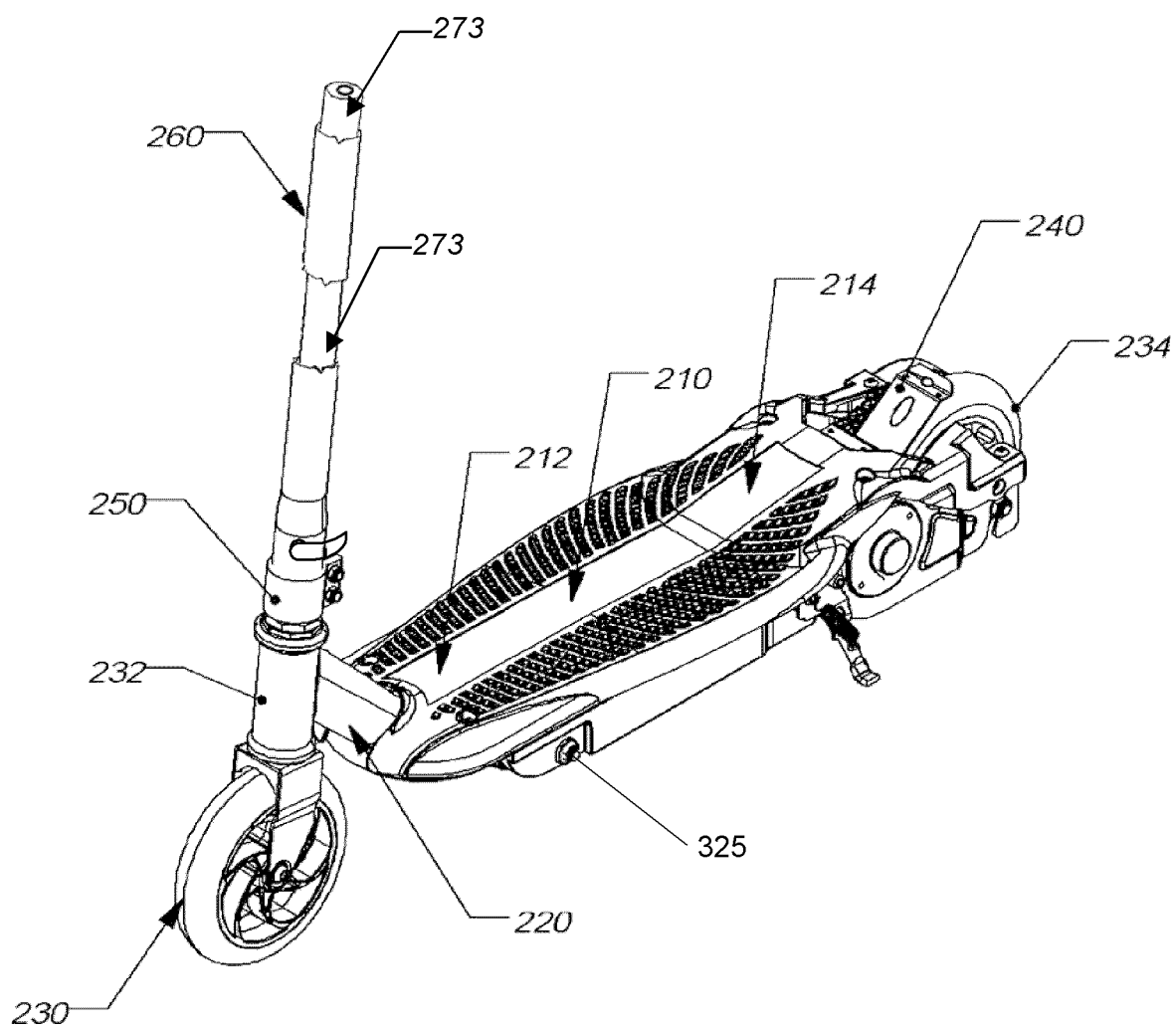


FIG. 4

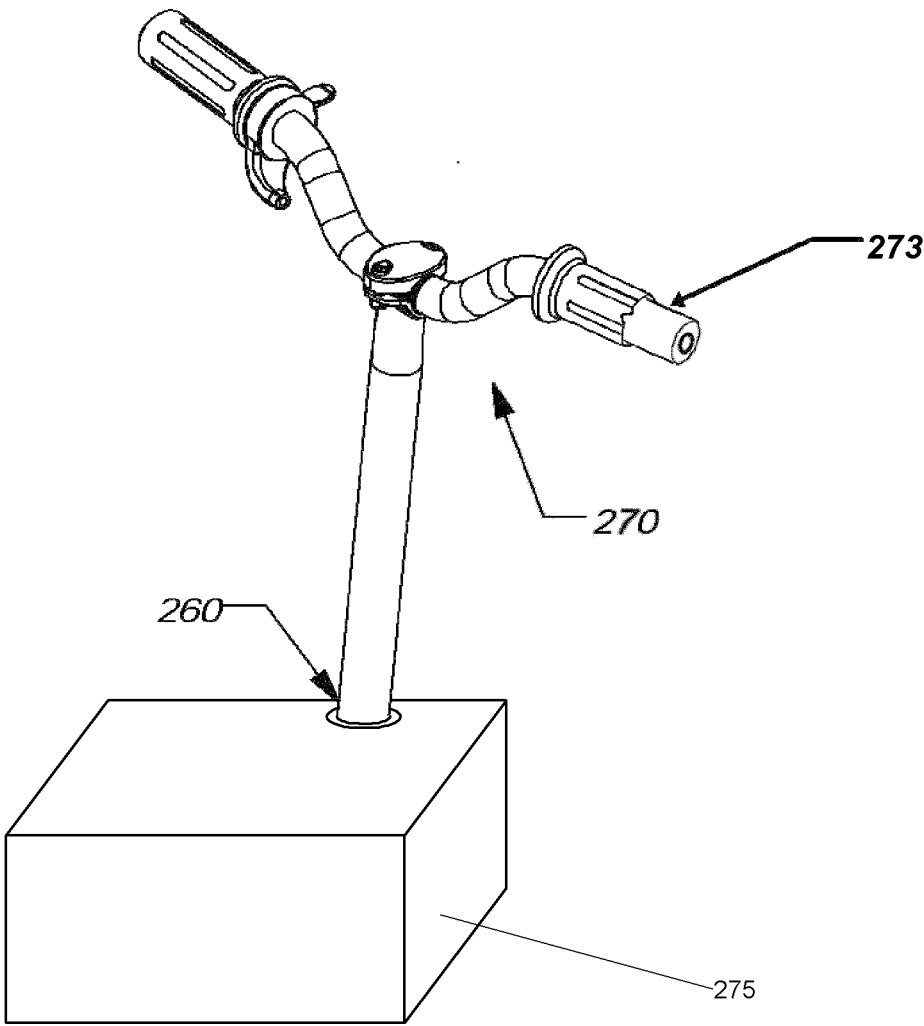


FIG. 5

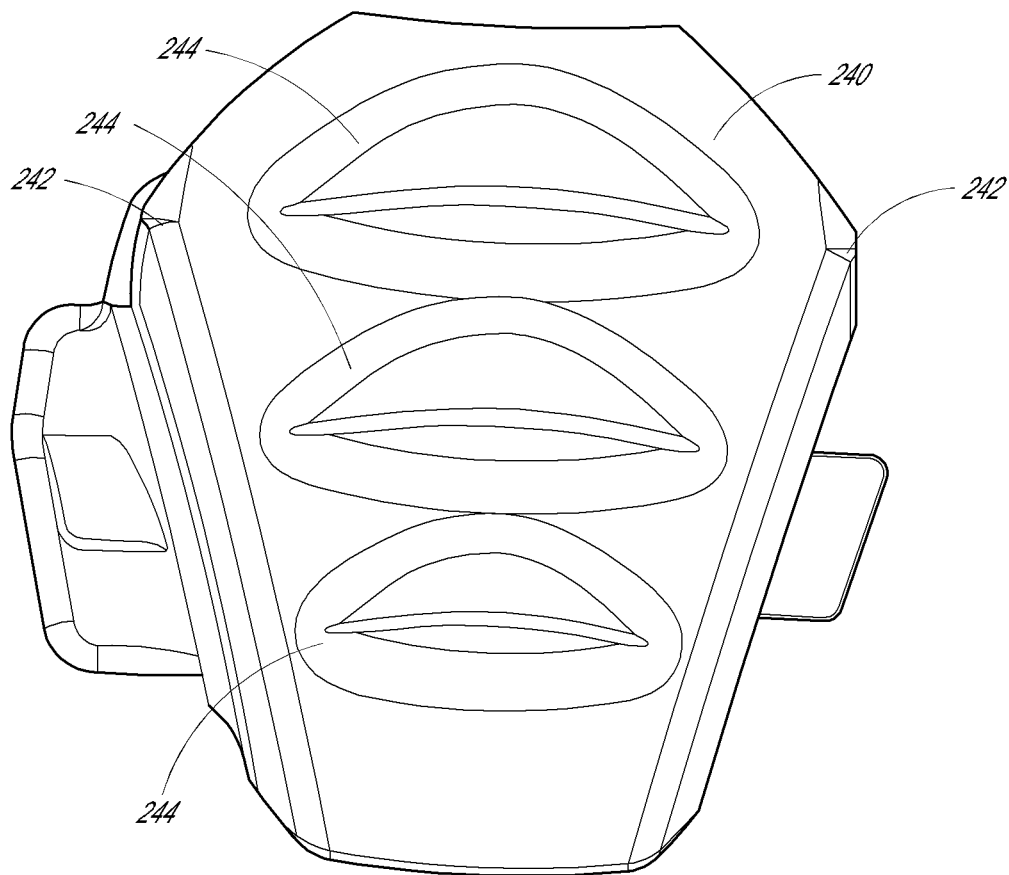


FIG. 6

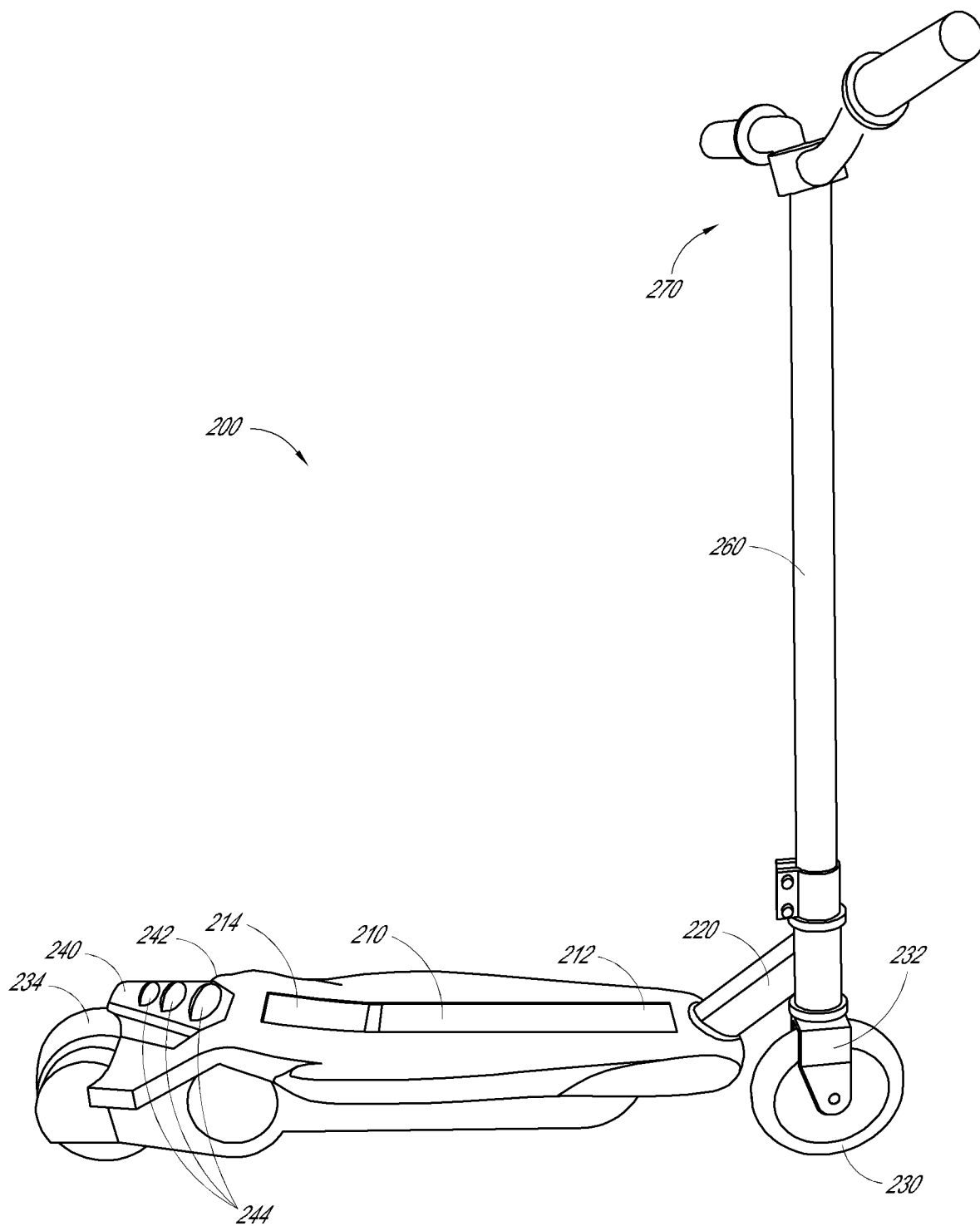


FIG. 7

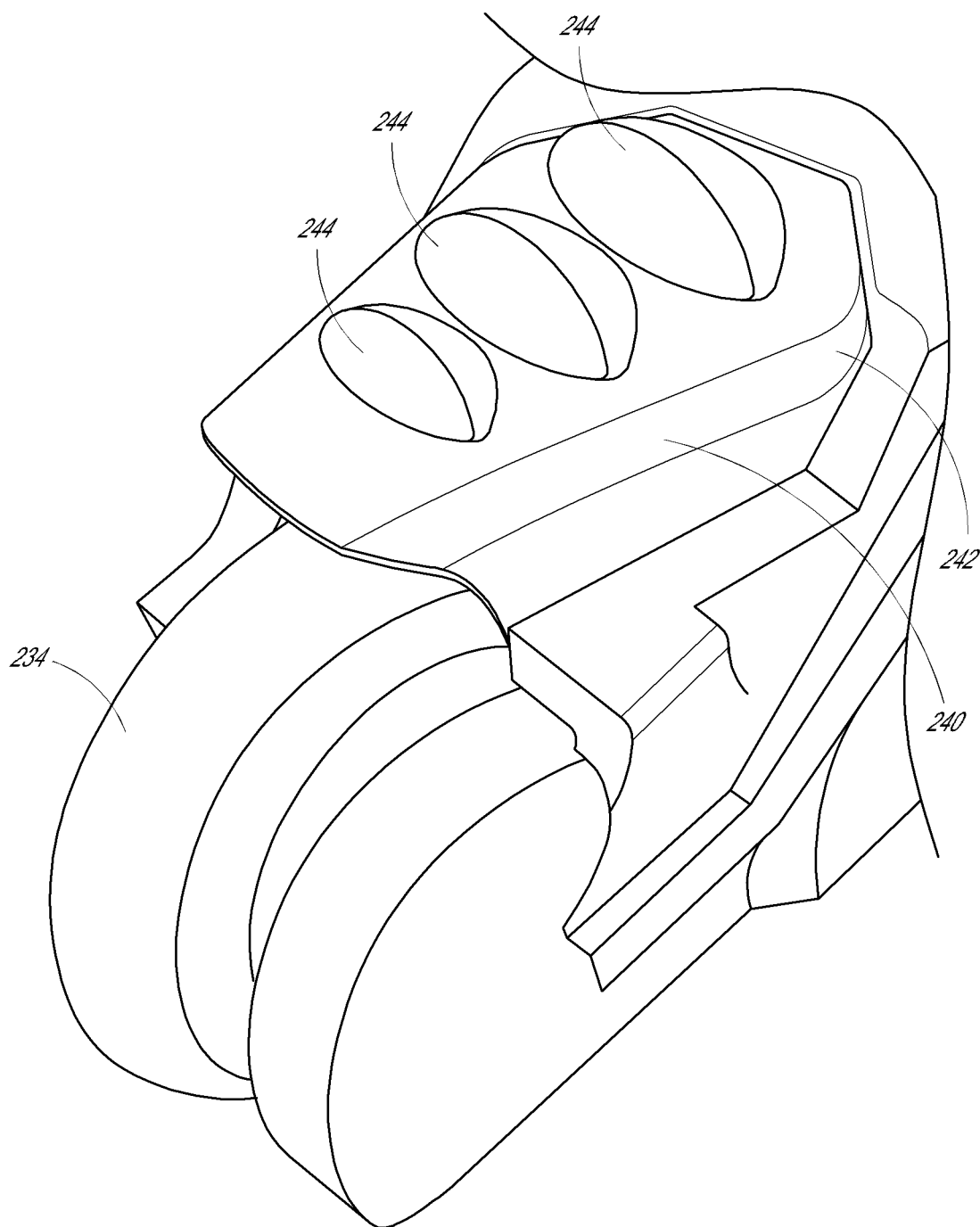


FIG. 8

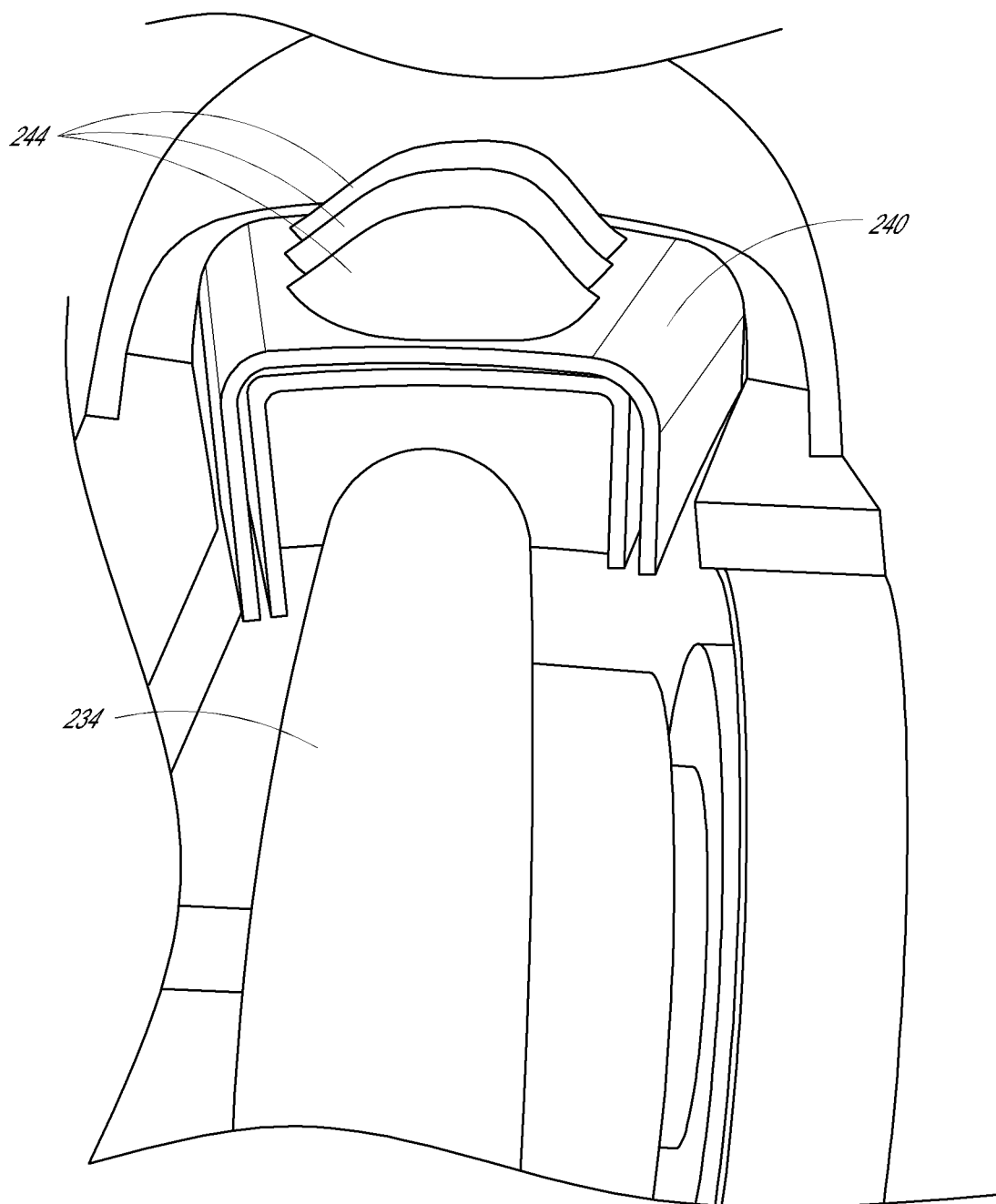


FIG. 9

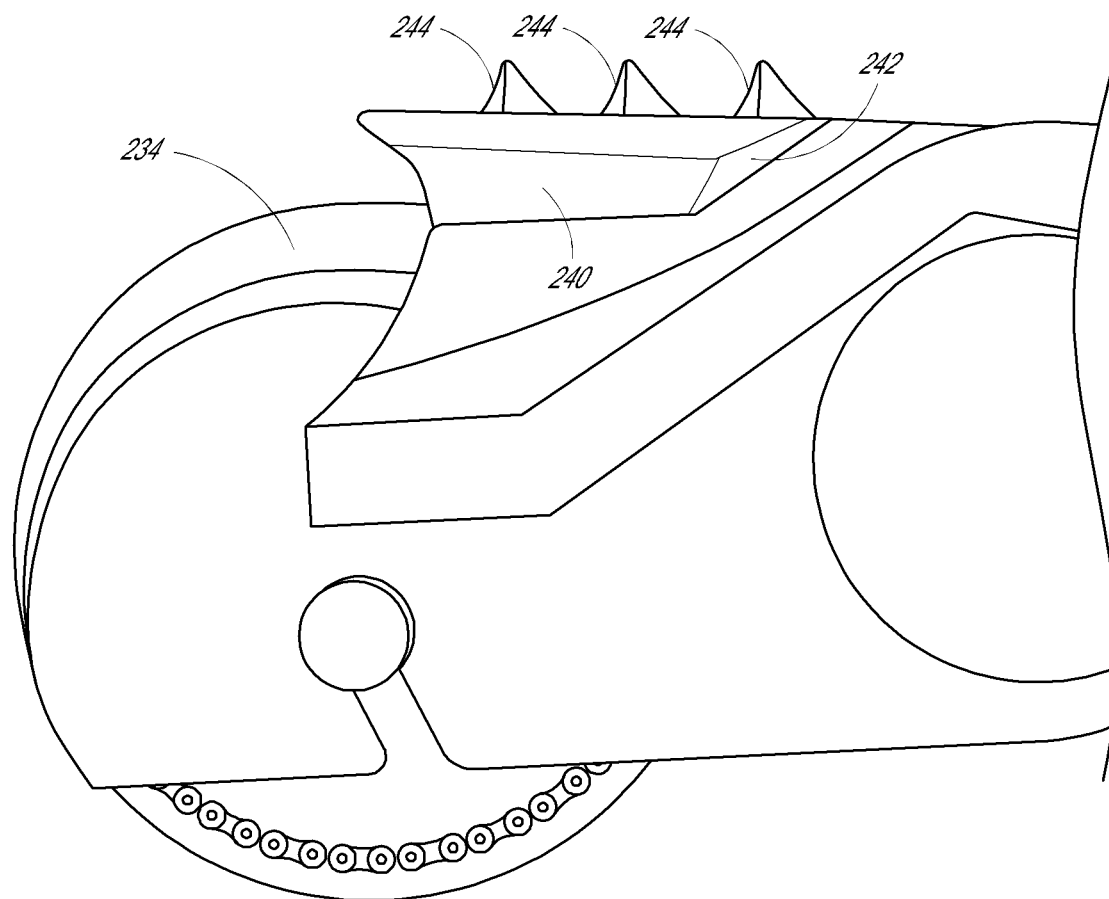


FIG. 10

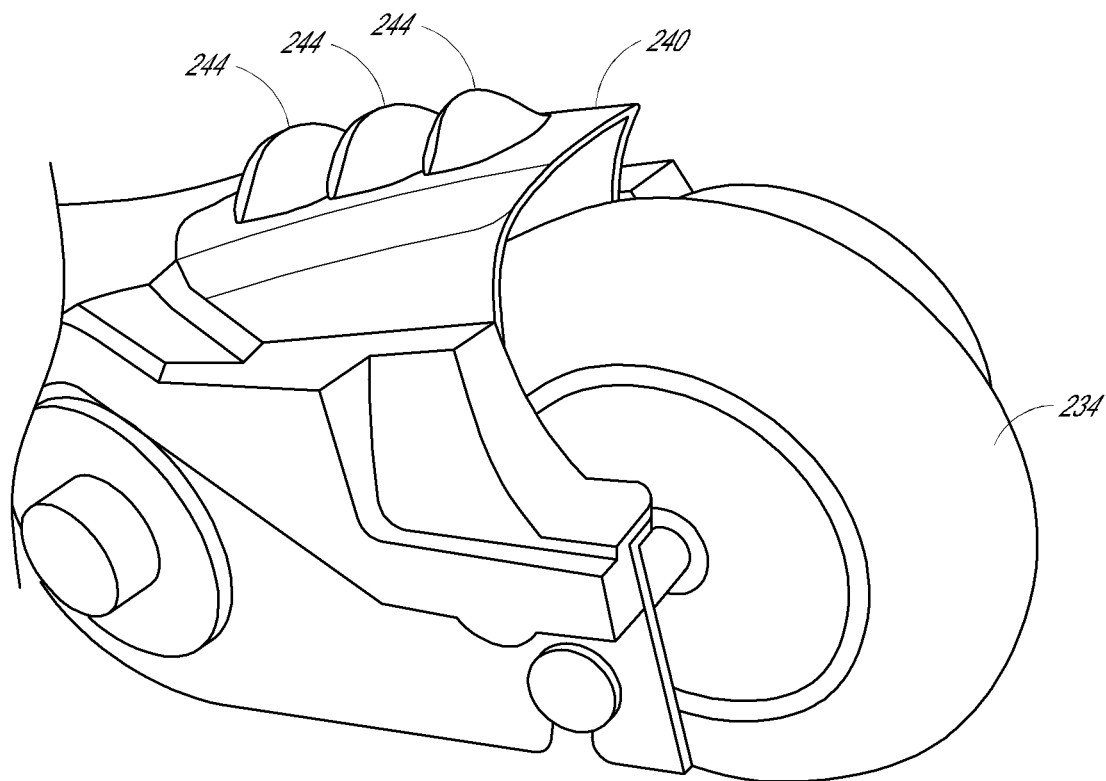


FIG. 11

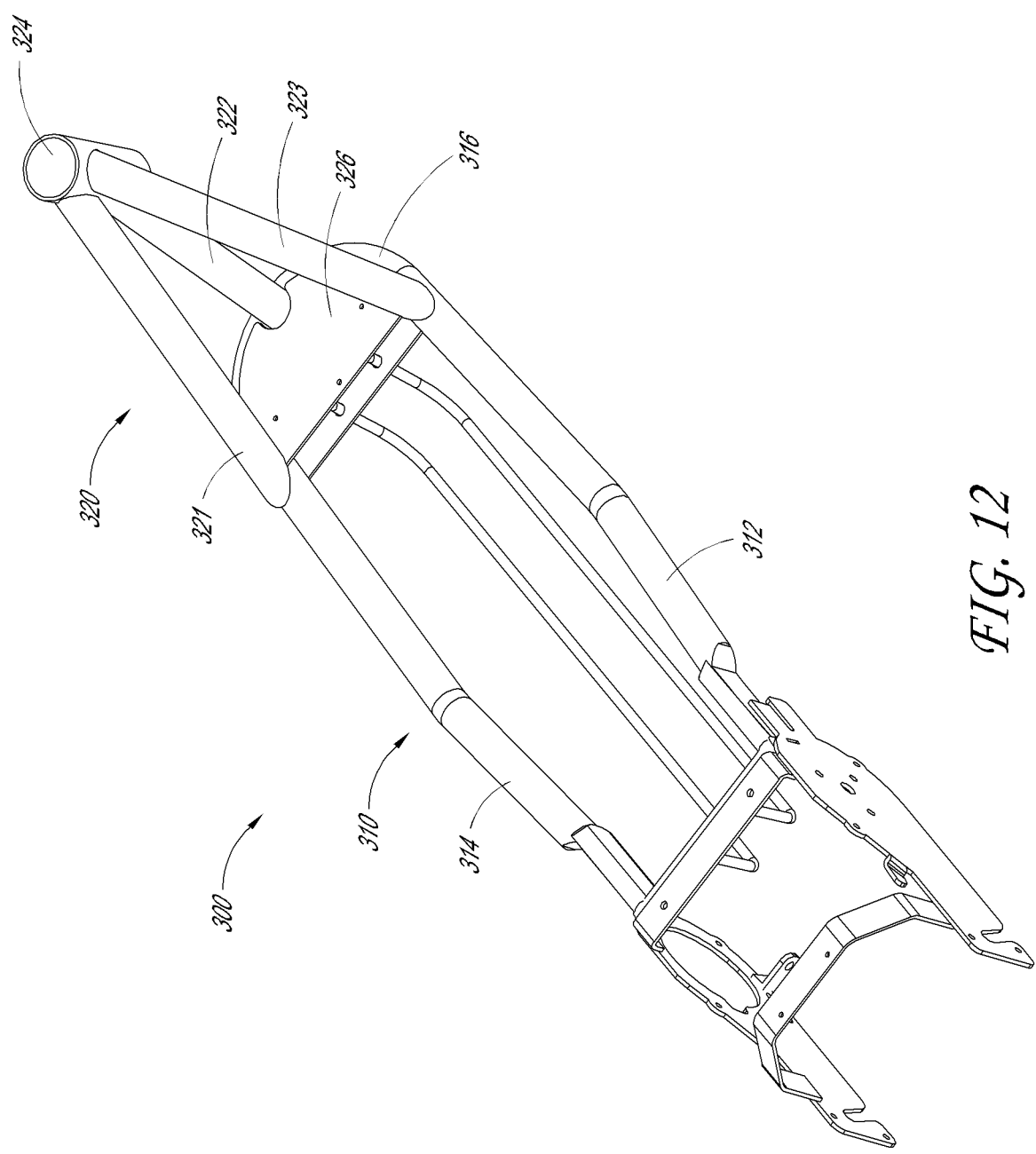


FIG. 12

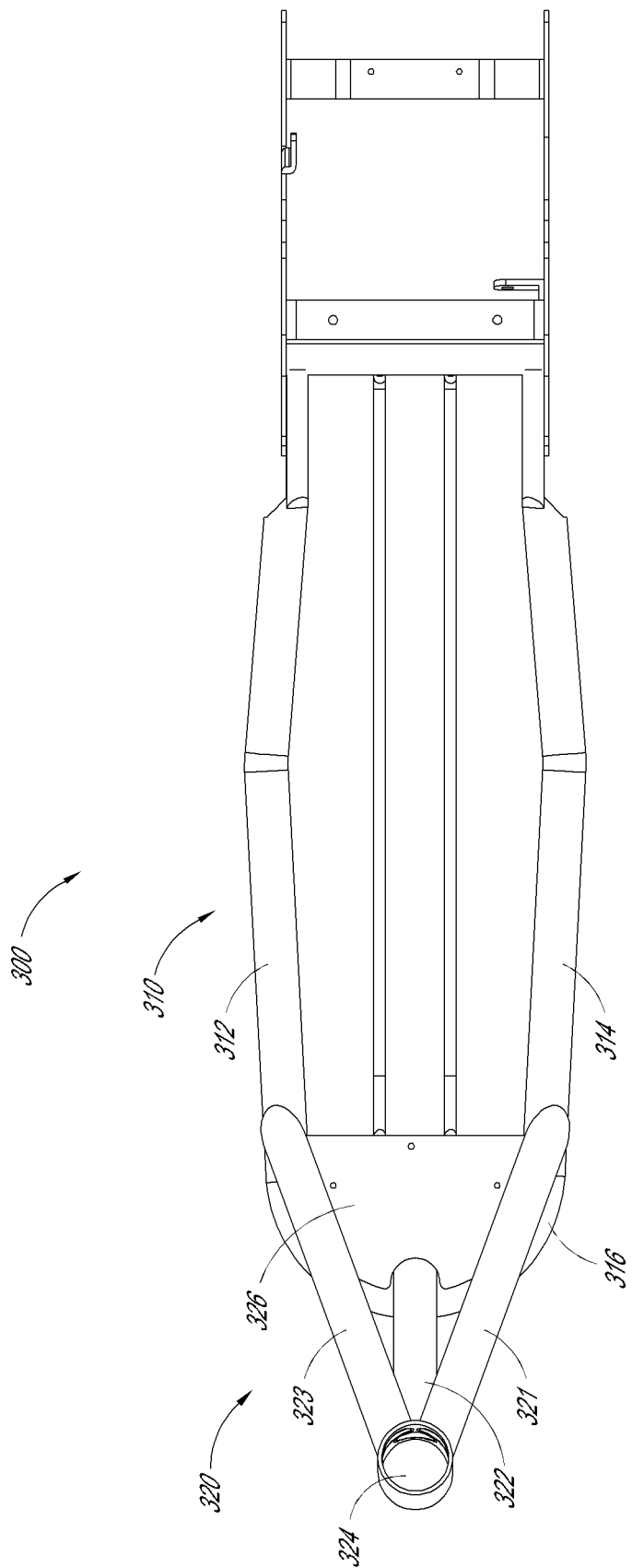
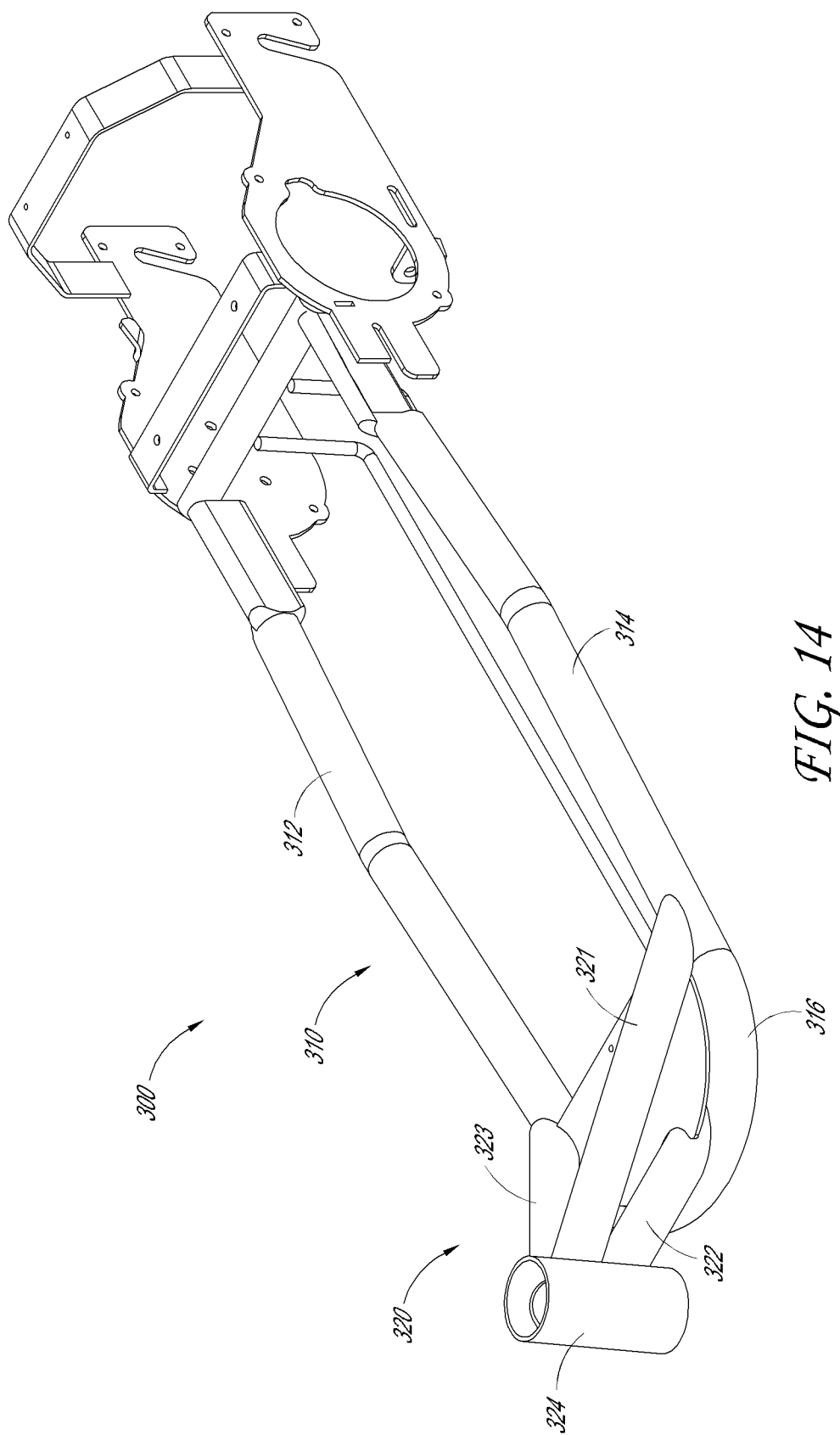


FIG. 13



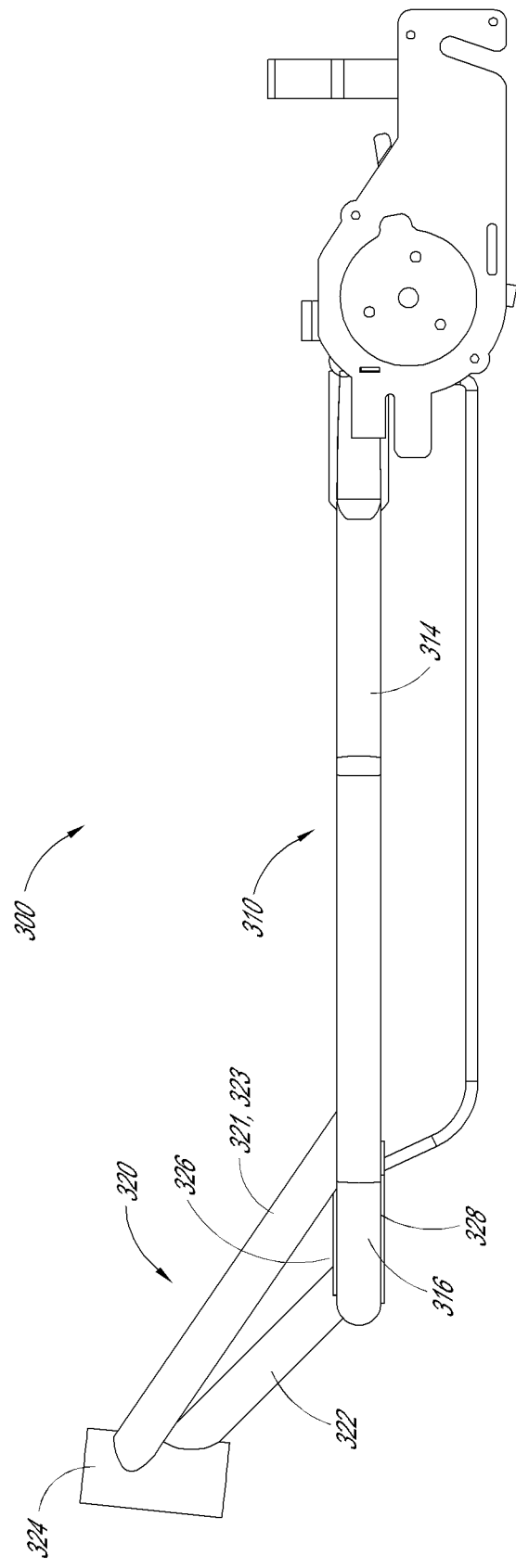


FIG. 15

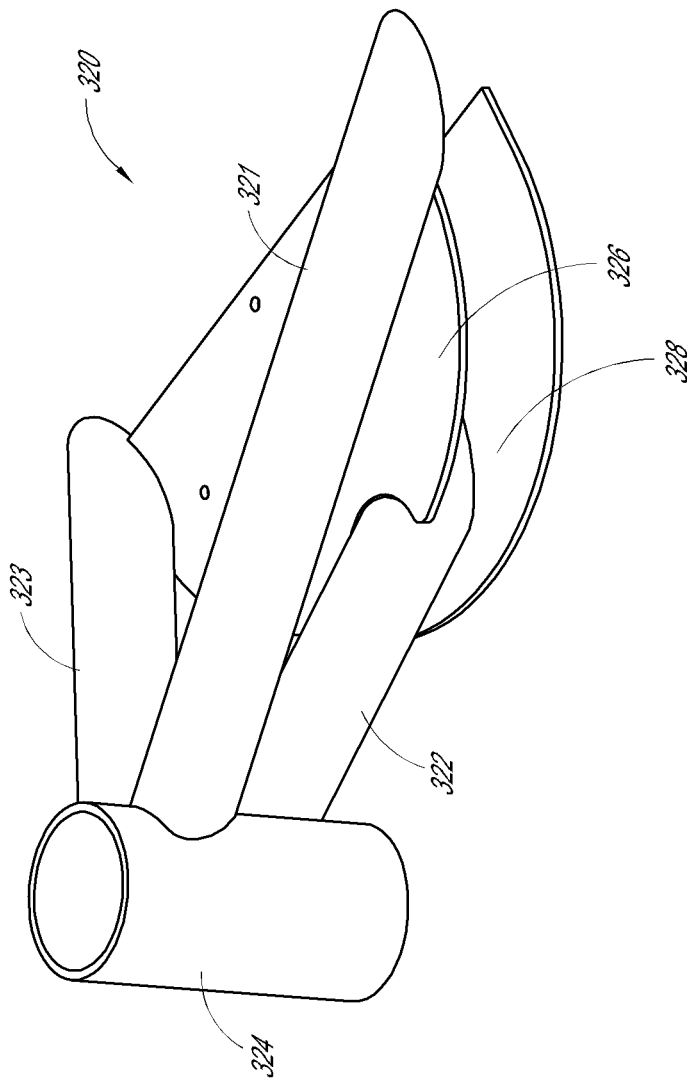


FIG. 16

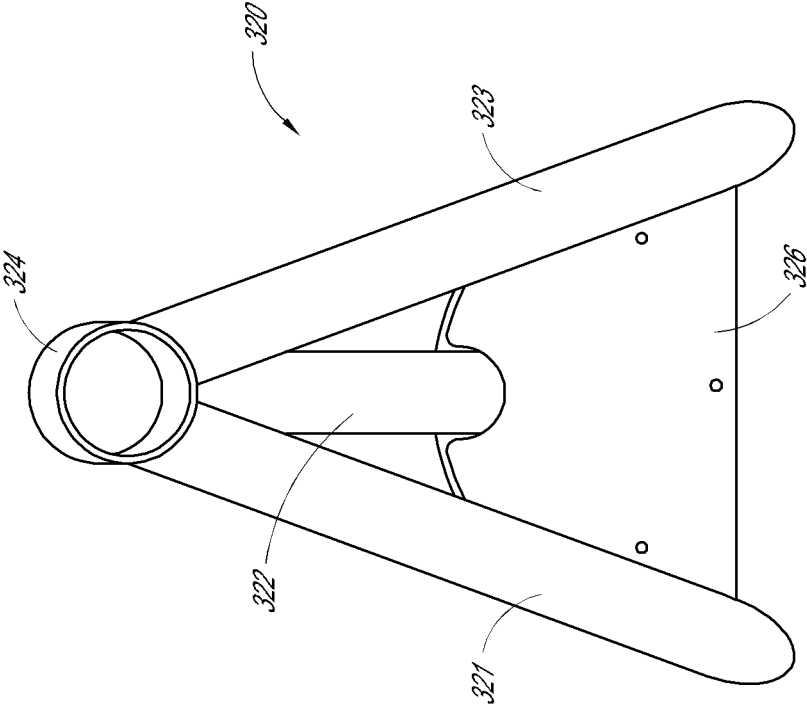


FIG. 17

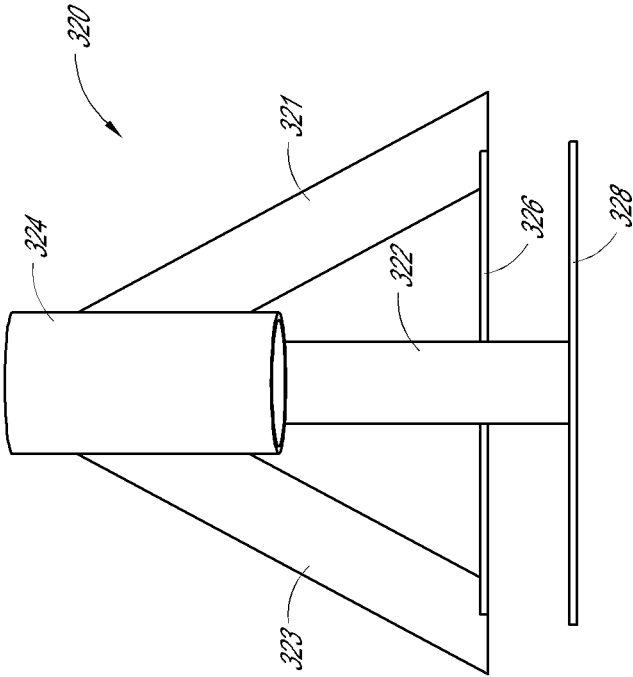


FIG. 18

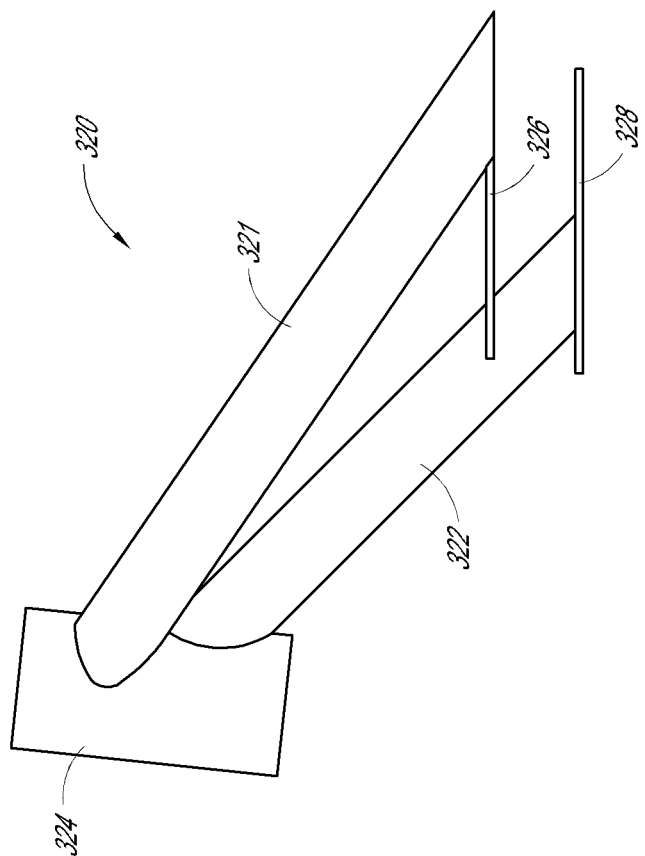


FIG. 19

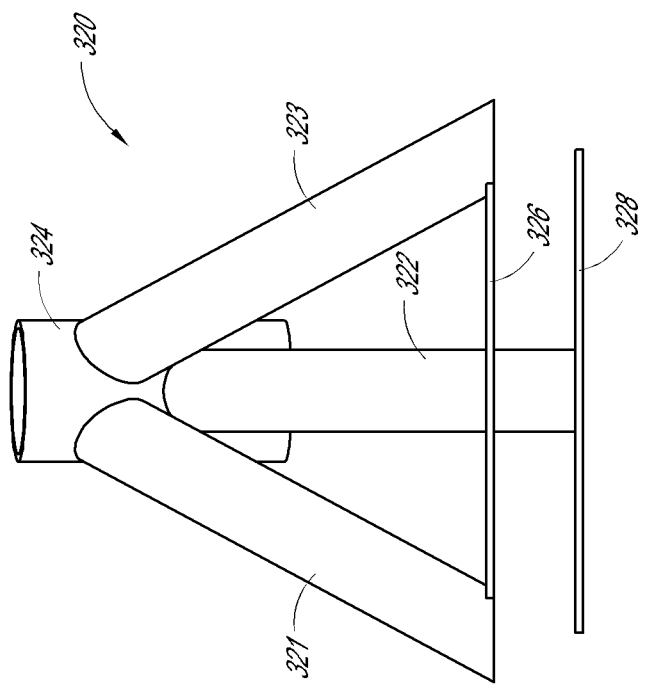


FIG. 20

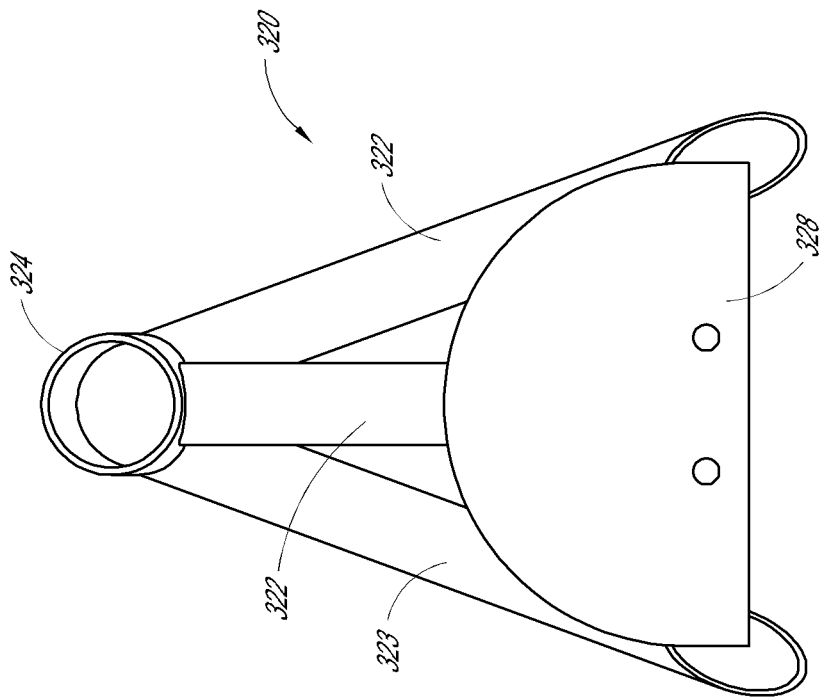


FIG. 21

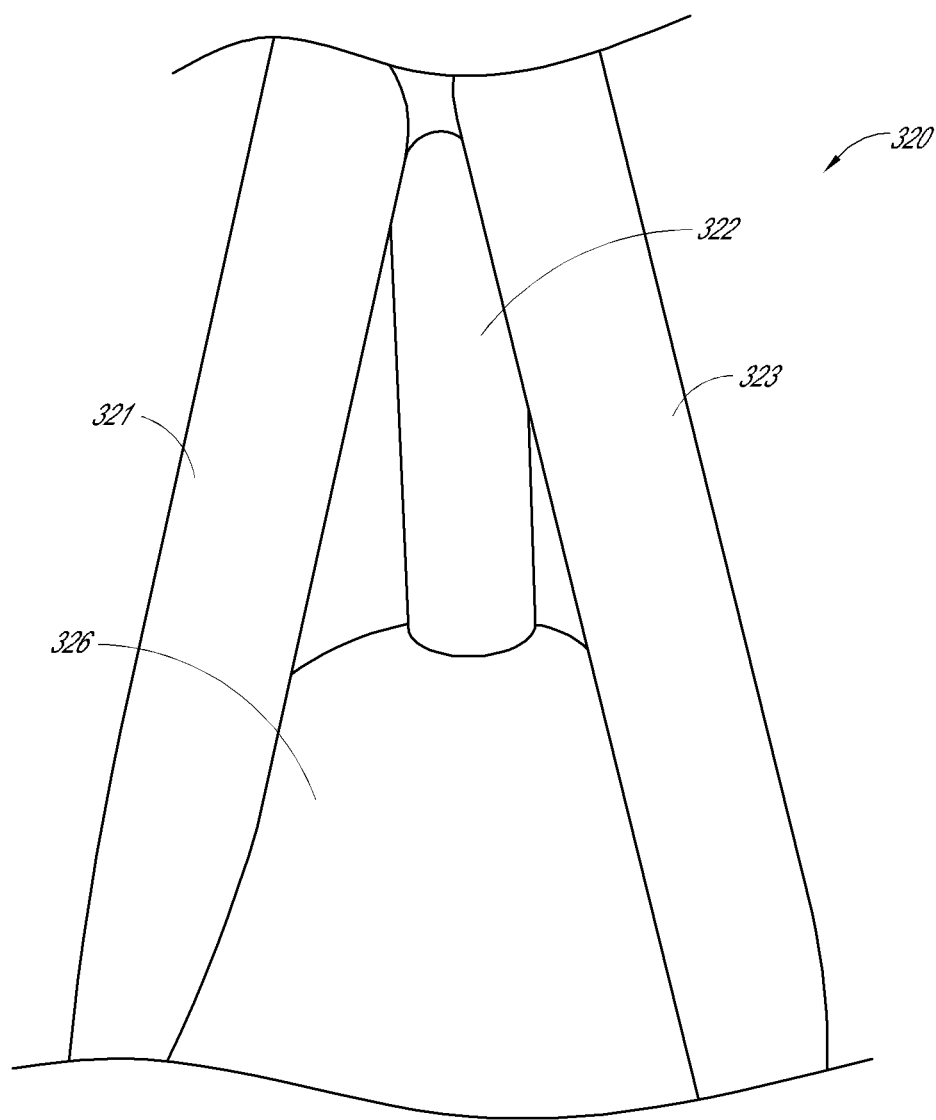


FIG. 22

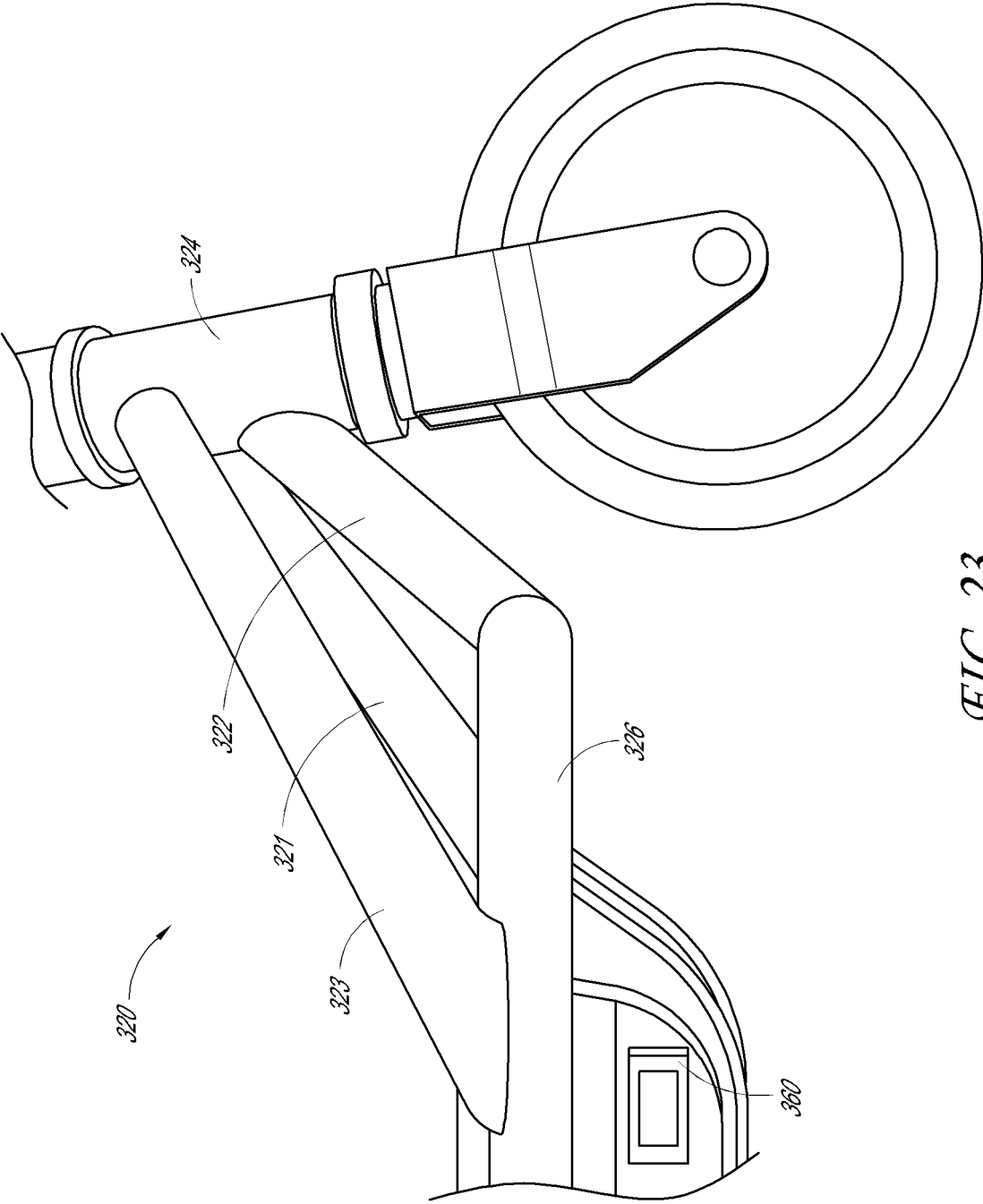
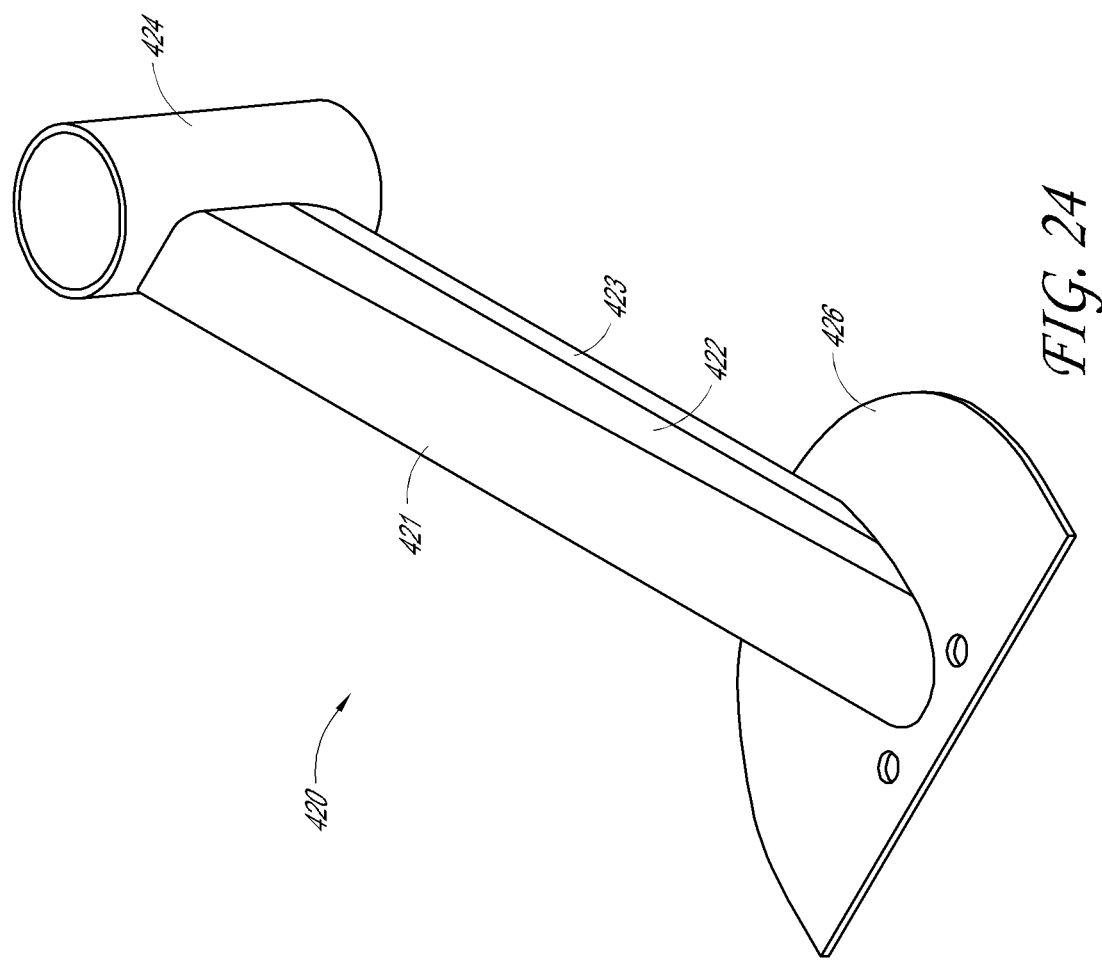


FIG. 23



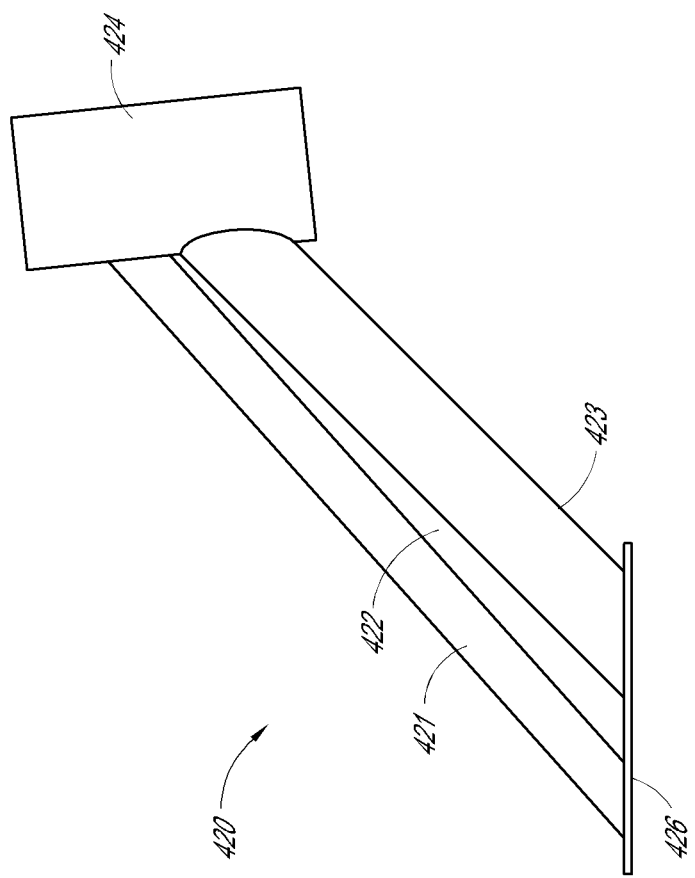


FIG. 25

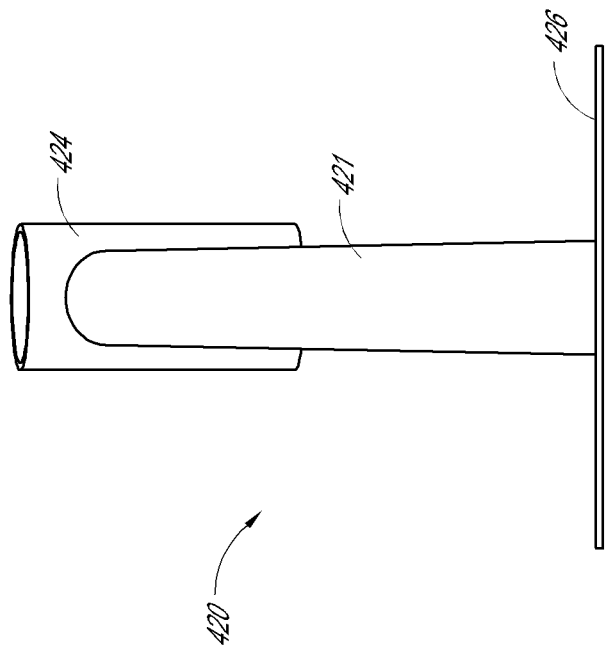


FIG. 26

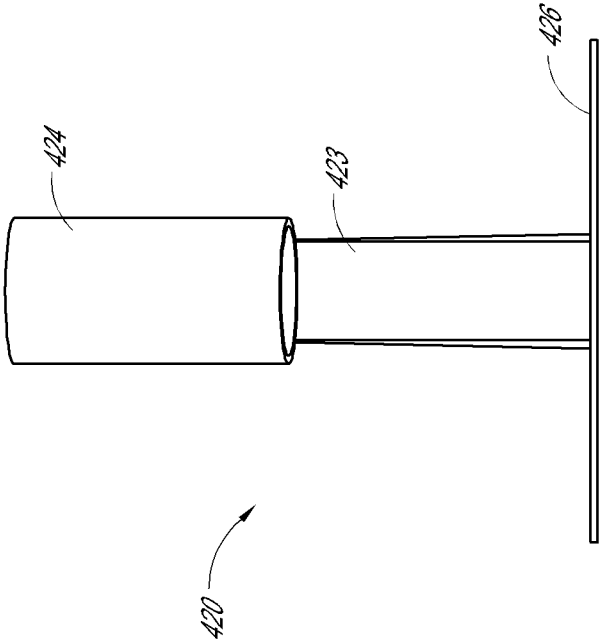


FIG. 27

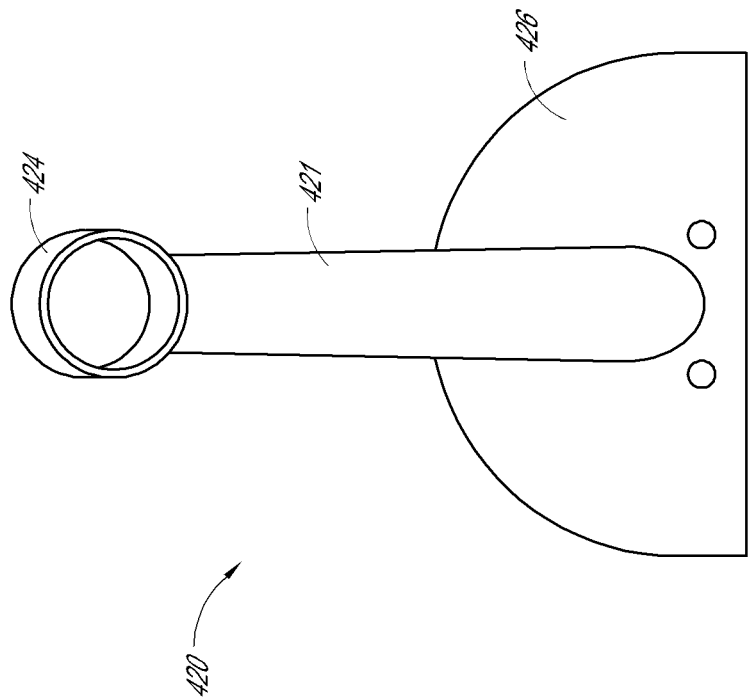


FIG. 28

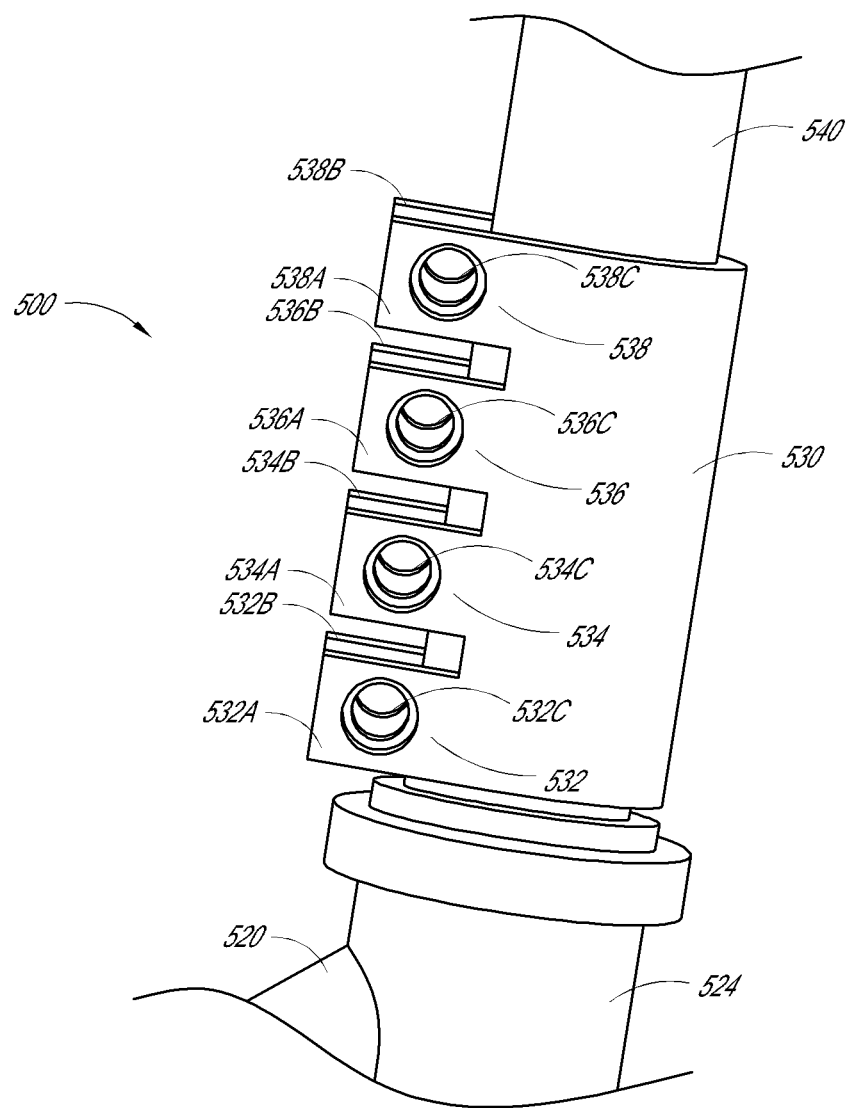


FIG. 29

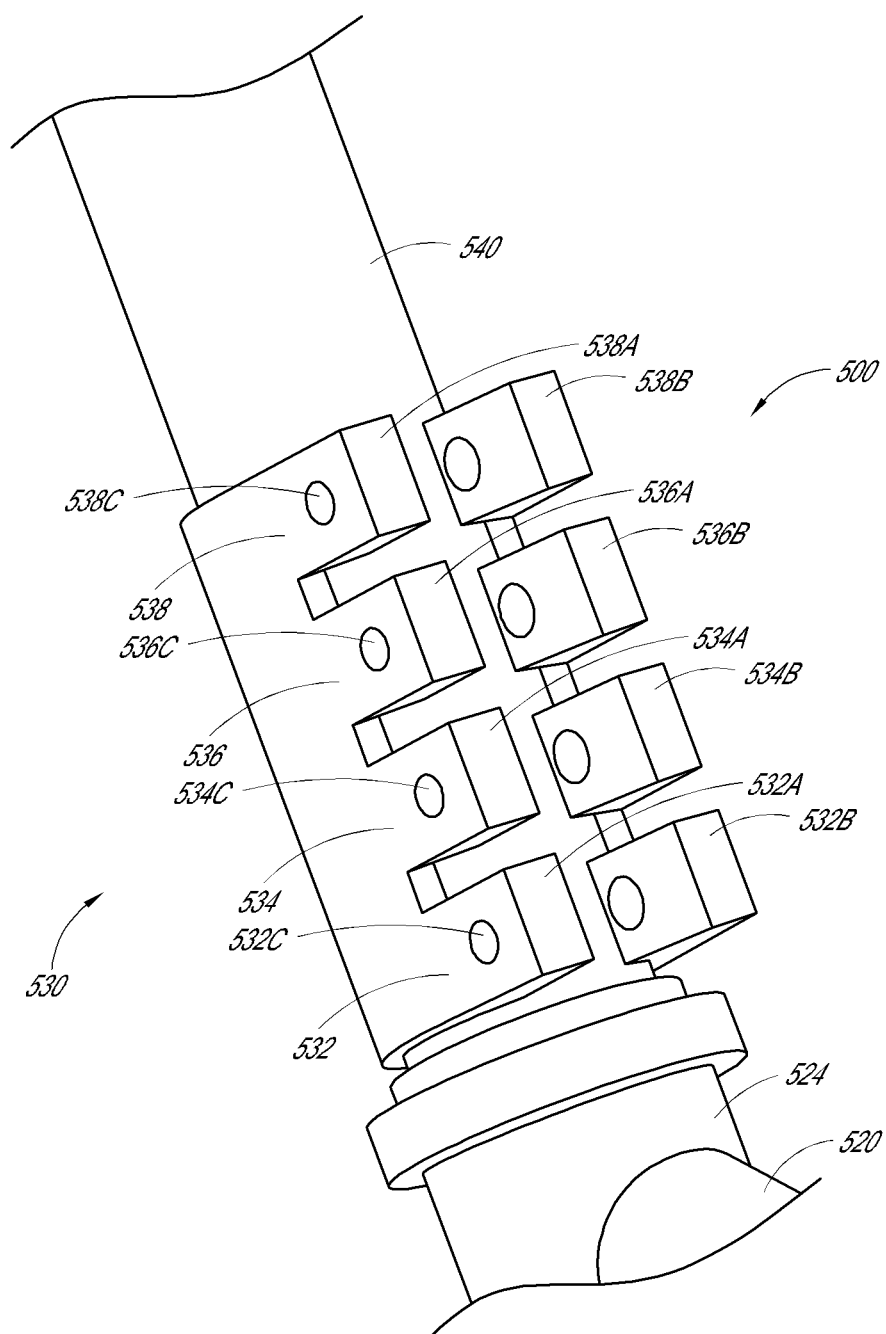


FIG. 30

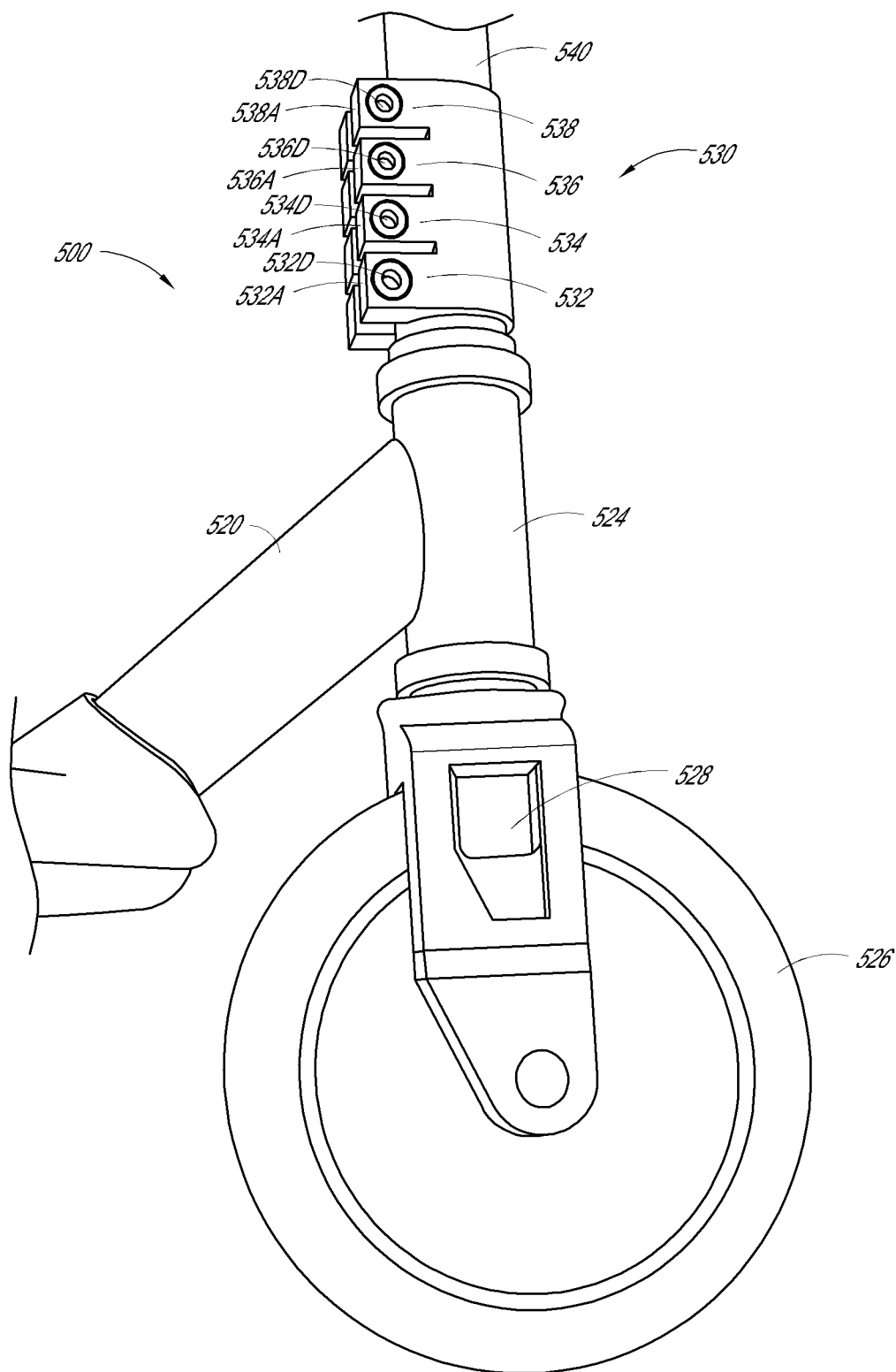


FIG. 31

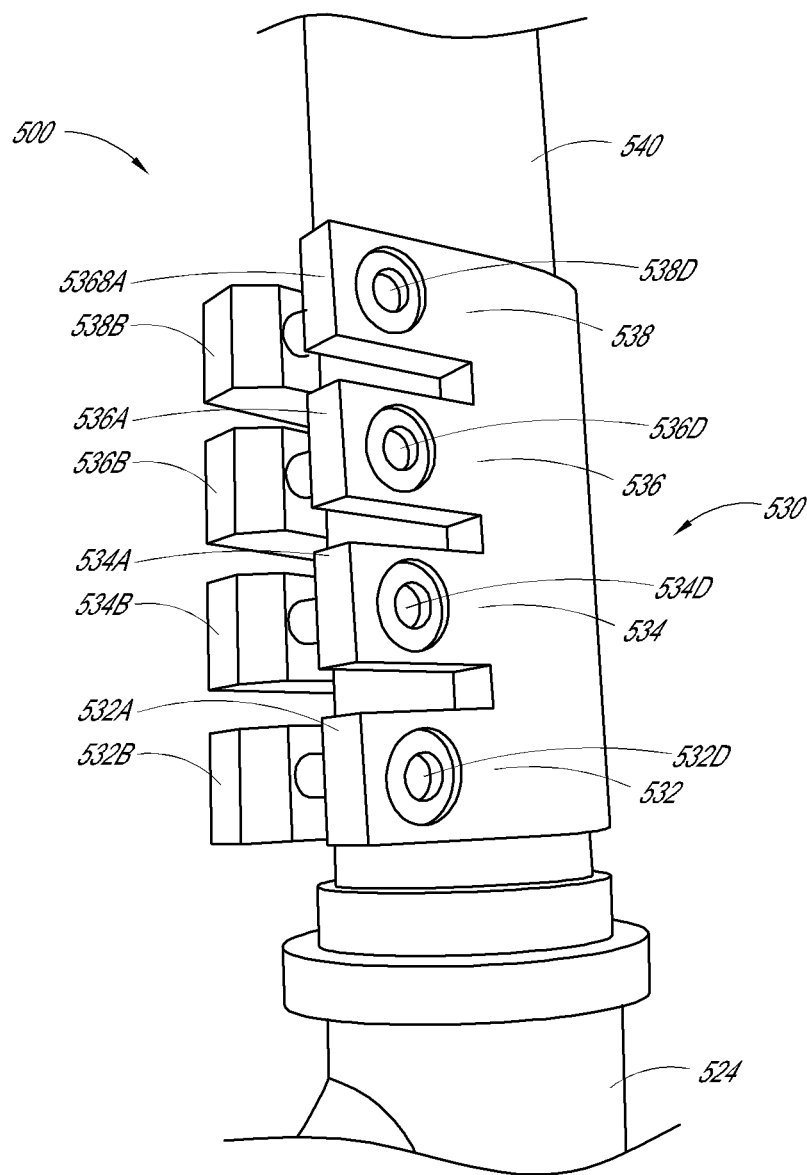


FIG. 32

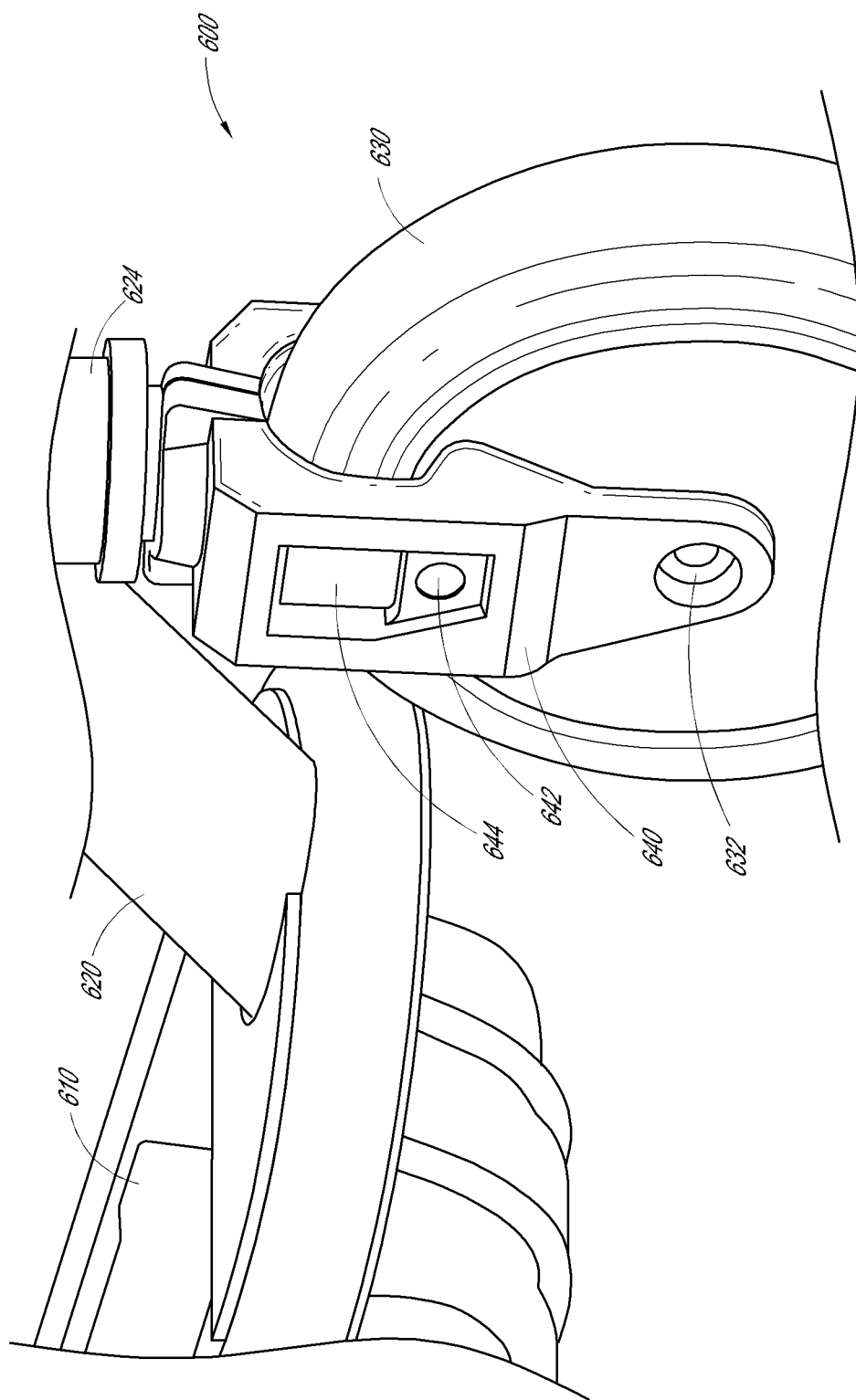


FIG. 33

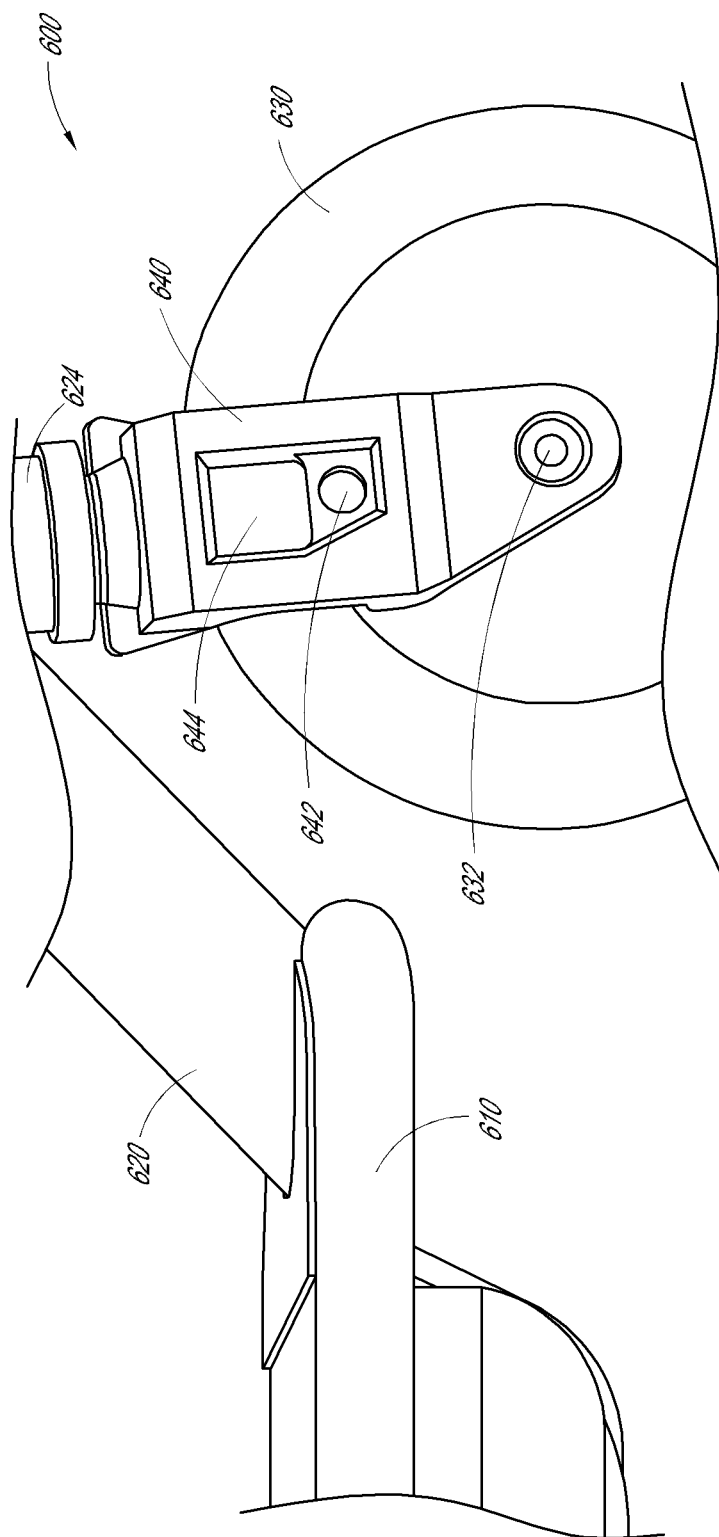


FIG. 34

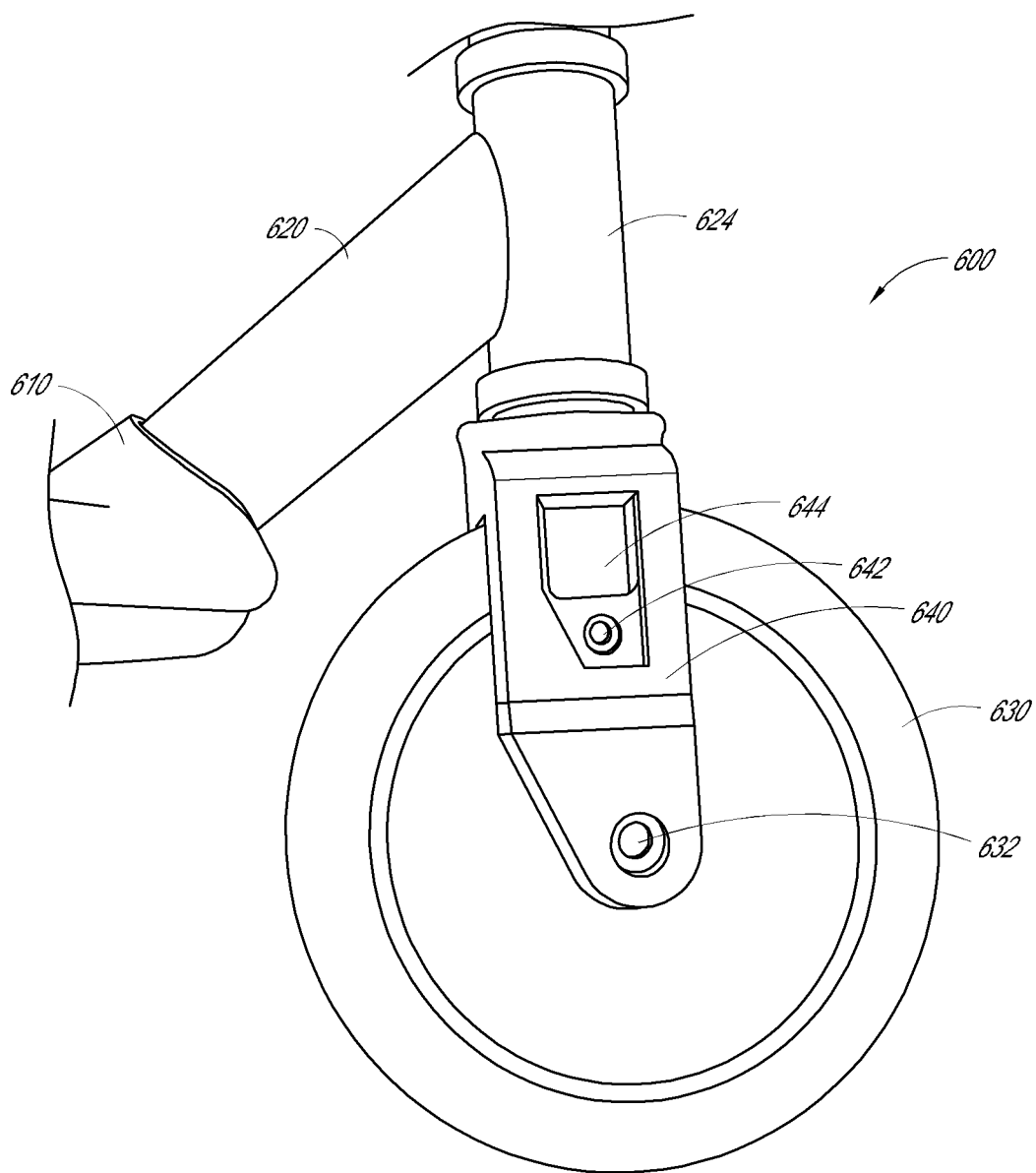


FIG. 35

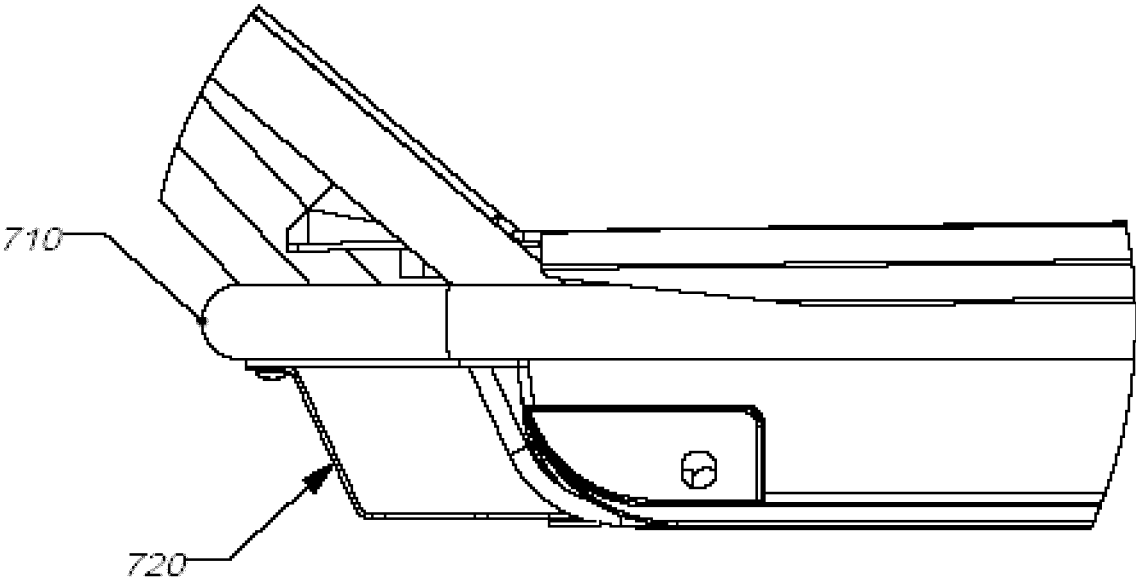


FIG. 36

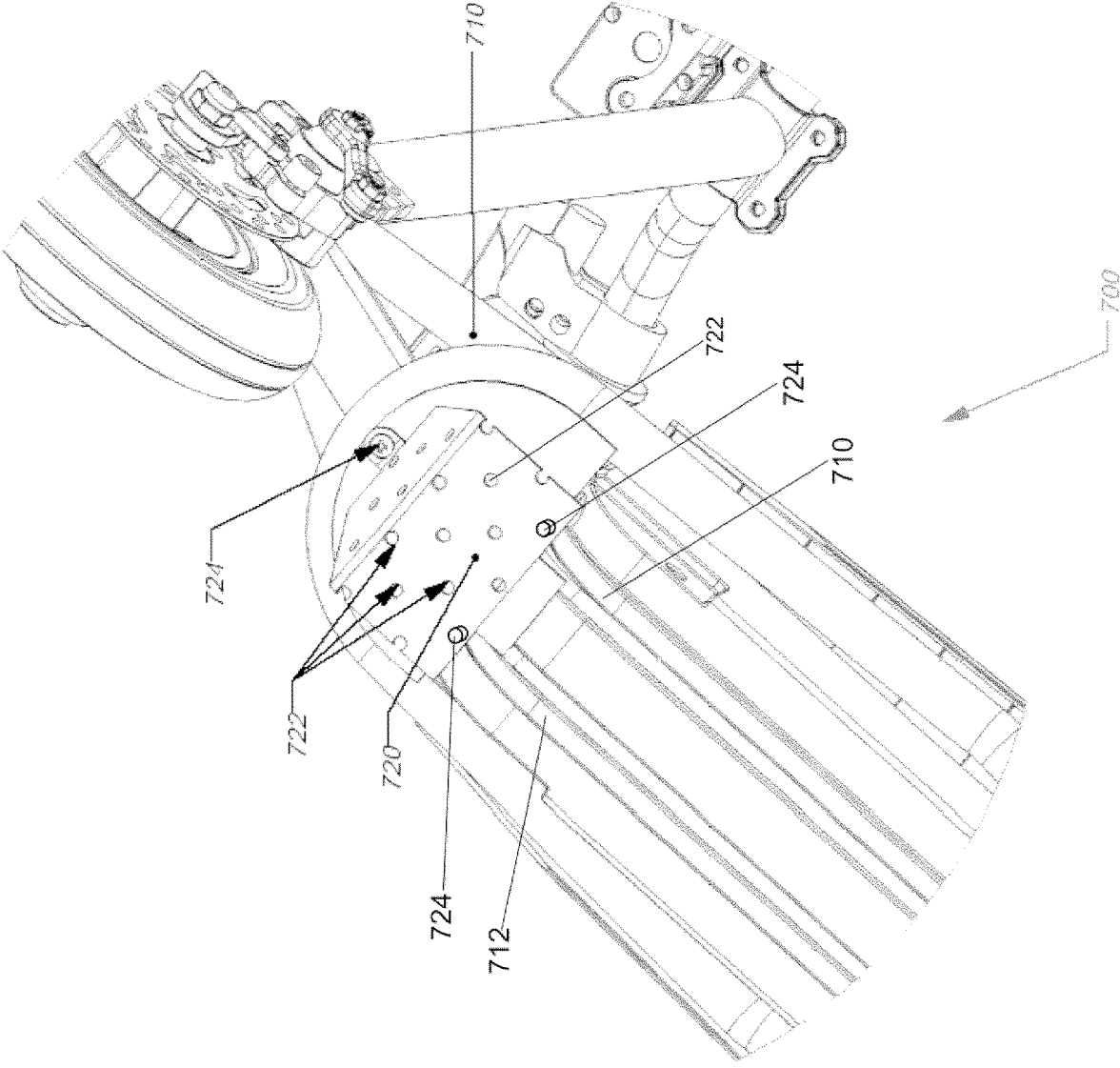


FIG. 37

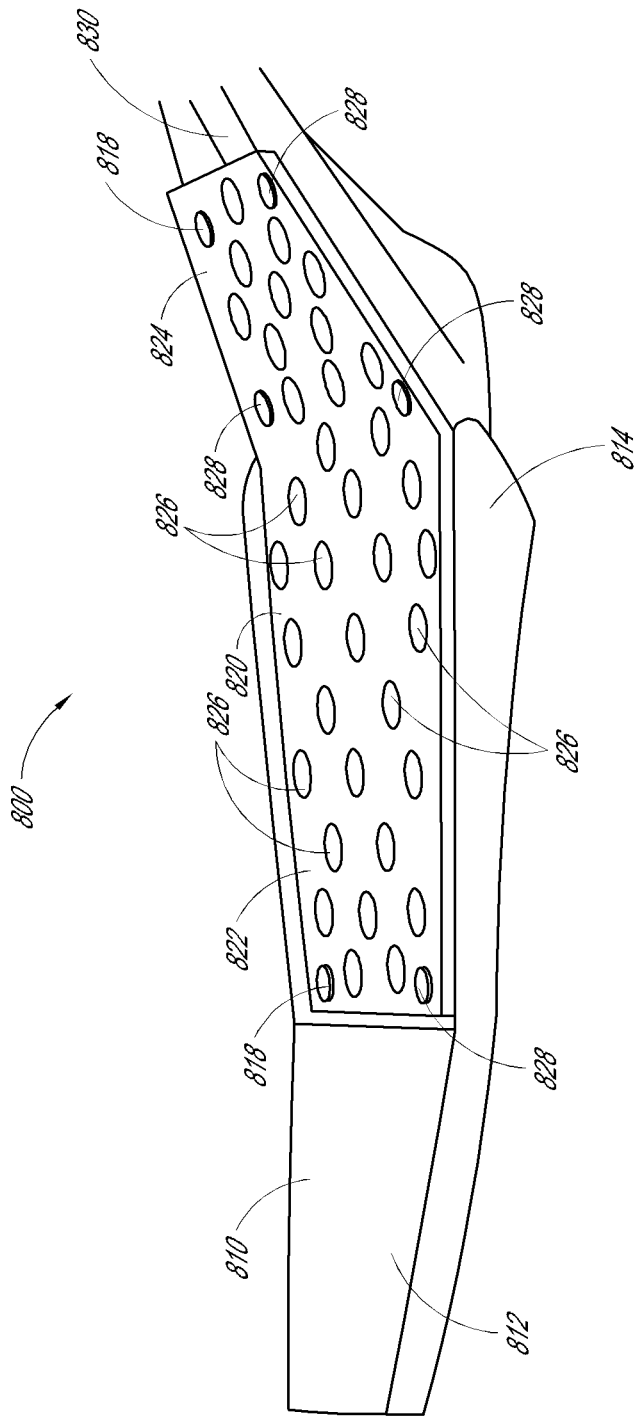


FIG. 38

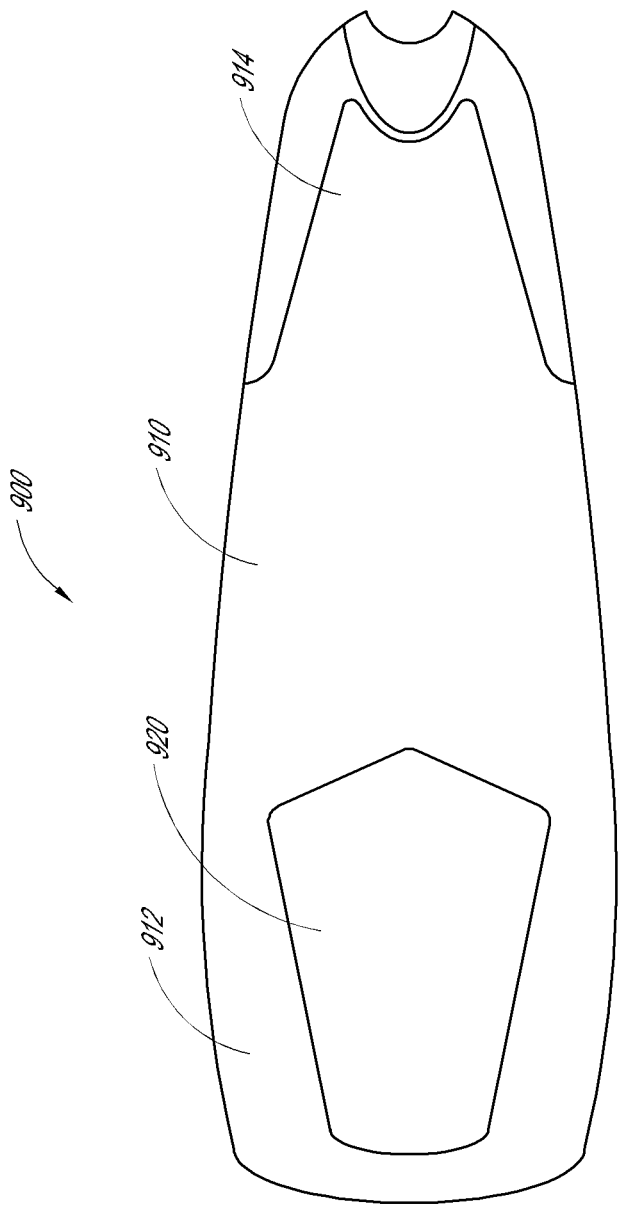


FIG. 39

SCOOTER ASSEMBLIES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of U.S. patent application Ser. No. 16/002,937 filed Jun. 7, 2018, which is a continuation of U.S. patent application Ser. No. 14/723,892 filed May 28, 2015 and issued on Jun. 12, 2018 as U.S. Pat. No. 9,994,278, which is a continuation of U.S. patent application Ser. No. 14/043,625 filed Oct. 1, 2013 and issued on Jun. 2, 2015 as U.S. Pat. No. 9,045,189, which claims the priority benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application No. 61/708,996 filed Oct. 2, 2012. The entireties of all the foregoing are hereby incorporated by reference herein. Any and all applications for which a foreign or domestic priority claim is identified in the Application Data Sheet as filed with the present application are hereby incorporated by reference and made a part of the present disclosure.

BACKGROUND

Field

[0002] The inventions disclosed herein relate generally to scooter assemblies.

SUMMARY

[0003] In some embodiments, a scooter comprises a deck configured to support a rider; a front wheel and a rear wheel; a steering column comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; and a foot brake, wherein the foot brake is configured to apply a braking force to the rear wheel when the foot brake is pressed down.

[0004] In some embodiments, the foot brake is further configured to rotate about a pivot axis when the foot brake is pressed down. In addition, the foot brake can be further configured to return to its un-pivoted position when the foot brake is no longer pressed down. In some embodiments, a rear portion of the deck comprises the foot brake. In other embodiments, the foot brake and the deck are separate. The foot brake can comprise a plurality of ridges configured to enhance a traction of the foot brake. In some embodiments, the foot brake comprises plastic. In other embodiments, the foot brake comprises metal.

[0005] In some embodiments, a method of operating a scooter comprises pressing down on a foot brake to apply a braking force to a rear wheel. The method can further comprise identifying a location of the foot brake by sensing a plurality of ridges on the foot brake.

[0006] In some embodiments, a scooter comprises a deck configured to support a rider; a front wheel and a rear wheel; a head tube; and a steering column supported for rotation relative to the head tube and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; the scooter further comprises a plurality of neck members that couple the head tube to the deck. In some configurations, at least some of the plurality of neck members are coupled to the deck at spaced lateral locations. In some configurations, two neck members are provided and are vertically stacked relative to one another. In other

configurations, three neck members are provided, with two extending laterally and one being centrally positioned. In some configurations, the plurality of neck members are coupled to one or the other of an upper base section and a lower base section, which receive a portion of the deck between them.

[0007] In some embodiments, a scooter comprises a frame configured to support a rider; a front wheel and a rear wheel connected to the frame; a steering column supported for rotation relative to the frame and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; the scooter further comprises a fork assembly that couples the front wheel to the steering tube, wherein the fork assembly includes a structural fork member and a cover, which surrounds a portion of the structural fork member. In some configurations, the cover comprises one or both of a front surface and a rear surface, which preferably closely follow a contour of the front wheel. In some configurations, the cover comprises a first portion and a second portion, which can be provided on respective first and second sides of the structural fork member. In some configurations, the cover can comprise an opening on each side, which exposes a portion of the structural fork member.

[0008] In some embodiments, a scooter comprises a frame configured to support a rider; a front wheel and a rear wheel connected to the frame; a steering column supported for rotation relative to the frame and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; the scooter further comprises a clamp for the steering column, which comprises at least three clamping sections, wherein each clamping section includes a clamp bolt. In some configurations, the clamp includes four clamping sections.

[0009] In some embodiments, a scooter comprises a frame assembly comprising a deck configured to support a rider; a front wheel and a rear wheel connected to the frame; a steering column supported for rotation relative to the frame and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; the scooter further comprises a bash guard coupled to the frame assembly and extending toward the front wheel at a location below the deck. In some configurations, the bash guard includes a lower planar portion and a front planar portion. The lower planar portion can be substantially parallel with the deck and the front planar portion can be angled with an upper edge closer to the front wheel than a lower edge. In some configurations, the bash guard comprises a plurality of openings.

[0010] In some embodiments, a scooter comprises a frame configured to support a rider; a front wheel and a rear wheel connected to the frame; a steering column supported for rotation relative to the frame and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel; the scooter further comprises a deck supported on the frame, wherein the deck has a first portion and a second portion. In some configurations, the first portion is constructed from a first material and the second portion is constructed from a second material. The materials may be plastic and metal, respectively. In some configurations, second portion comprises a plurality of openings. A grip

layer can be positioned underneath the second portion and the material of the grip layer can protrude through the plurality of openings of the second portion. In some configurations, the first portion and the second portion have different frictional properties. In such configurations, the first portion and the second portion can be the same material or different materials.

BRIEF DESCRIPTION OF DRAWINGS

[0011] Embodiments of various inventive features will now be described with reference to the following drawings. Throughout the drawings, reference numbers may be reused to indicate correspondence between referenced elements. The drawings are provided to illustrate example embodiments described herein and are not intended to limit the scope of the disclosure.

[0012] FIG. 1 is a right side view of a portion of an embodiment of a scooter assembly.

[0013] FIG. 2 is a perspective view of another portion of the scooter assembly of FIG. 1.

[0014] FIG. 3 is a perspective view of a handlebar assembly of the scooter assembly of FIG. 1, with portions of one of the handlebar sections cut-away to show underlying structure.

[0015] FIG. 4 is a perspective view of another portion of the scooter assembly of FIG. 1, with portions of a steering column cut away to reveal underlying structure.

[0016] FIG. 5 is a view of a removable portion of the scooter assembly of FIG. 1 containing one or more batteries removed from the scooter and positioned in a charging device.

[0017] FIG. 6 is a top view of an embodiment of a foot brake of the scooter assembly of FIG. 1 separate from the scooter assembly.

[0018] FIG. 7 is a left side view of the scooter assembly of FIG. 1.

[0019] FIG. 8 is a perspective view of a rear portion of the scooter assembly of FIG. 1.

[0020] FIG. 9 is another perspective view of a rear portion of the scooter assembly of FIG. 1.

[0021] FIG. 10 is a left side view of a rear portion of the scooter assembly of FIG. 1.

[0022] FIG. 11 is another perspective view of a rear portion of the scooter assembly of FIG. 1.

[0023] FIG. 12 is a perspective view of an embodiment of a scooter frame assembly.

[0024] FIG. 13 is a top view of the scooter frame assembly of FIG. 12.

[0025] FIG. 14 is another perspective view of the scooter frame assembly of FIG. 12.

[0026] FIG. 15 is a right side view of the scooter frame assembly of FIG. 12.

[0027] FIG. 16 is a perspective view of an embodiment of a scooter neck section.

[0028] FIG. 17 is a top view of the scooter neck section of FIG. 16.

[0029] FIG. 18 is a front view of the scooter neck section of FIG. 16.

[0030] FIG. 19 is a right side view of the scooter neck section of FIG. 16.

[0031] FIG. 20 is a rear view of the scooter neck section of FIG. 16.

[0032] FIG. 21 is a bottom view of the scooter neck section of FIG. 16.

[0033] FIG. 22 is a perspective view of another embodiment of a scooter neck section.

[0034] FIG. 23 is a left side view of a lower-front portion of an embodiment of a scooter assembly.

[0035] FIG. 24 is a perspective view of an embodiment of a scooter neck section.

[0036] FIG. 25 is a left side view of the scooter neck section of FIG. 24.

[0037] FIG. 26 is a rear view of the scooter neck section of FIG. 24.

[0038] FIG. 27 is a front view of the scooter neck section of FIG. 24.

[0039] FIG. 28 is a top view of the scooter neck section of FIG. 24.

[0040] FIG. 29 is a left side view of a portion of an embodiment of a scooter assembly comprising a clamp assembly.

[0041] FIG. 30 is a perspective view of the portion of the scooter assembly of FIG. 29.

[0042] FIG. 31 is a left side view of a portion of an embodiment of a scooter assembly comprising a clamp assembly.

[0043] FIG. 32 is a perspective view of the portion of the scooter assembly of FIG. 31.

[0044] FIG. 33 is a perspective view of a portion of an embodiment of a scooter assembly comprising a front fork.

[0045] FIG. 34 is a left side view of the portion of the scooter assembly of FIG. 33.

[0046] FIG. 35 is another left side view of the portion of the scooter assembly of FIG. 33.

[0047] FIG. 36 is a side view of a portion of an embodiment of a scooter assembly comprising a bash guard.

[0048] FIG. 37 is a perspective view of a bottom of the scooter assembly comprising a bash guard of FIG. 36.

[0049] FIG. 38 is a perspective view of an embodiment of a deck assembly for a scooter assembly.

[0050] FIG. 39 is a top view of another embodiment of a deck assembly for a scooter assembly.

DETAILED DESCRIPTION

[0051] For the purpose of understanding particular embodiments, reference will be made to the drawings.

[0052] FIGS. 1-11 generally relate to embodiments related to scooters comprising a deck, front and rear wheels, and a foot brake, wherein the foot brake is in proximity to the rear of the deck and can apply a braking force to the rear wheel. FIGS. 1-11 also generally relate to embodiments related to electric scooters comprising a frame comprising tubular members, wherein batteries can be located within the tubular members.

[0053] FIG. 1 shows a side view of an embodiment of a scooter assembly 200 that comprises a deck 210, a neck 220, a head tube 224, a clamp assembly 250, a steering tube 260, a front wheel 230, a rear wheel 234, and a foot brake 240. In some embodiments, the scooter assembly 200 can be an electric scooter. The neck 220 can be joined to the deck 210 at or near a front end 212 of the deck 210. The deck 210 is a component of the scooter assembly 200 on which a rider can stand during use. The neck 220 can serve to connect the deck 210 to the front wheel and the handlebar assemblies. In some embodiments, the neck 220 can be coupled to the deck 210. In addition, the head tube 224 can be fixedly attached to the neck 220. The neck 220 and head tube 224 can be made of various metals, plastic, carbon fiber, or other

materials that impart sufficient structural strength. The steering tube **260** can extend through the head tube **224** and be rotatable relative thereto. At a top portion of the steering tube **260** a handlebar assembly (not shown) can be attached. The handlebar assembly can comprise a left handle and a right handle for the rider to grip and steer the scooter **200**. Turning the handlebar assembly can cause the steering tube **260** to turn the front wheel **230**. A front fork **232** can be coupled to a bottom portion of the steering tube **260** and can rotatably support the front wheel **230**. The rear wheel **234** can be a fixed position wheel. The rear wheel **234** can be configured to rotate about a rear-wheel axle **236**.

[0054] The foot brake **240** can be attached in proximity to a rear portion **214** of the deck **210**. The foot brake **240** can comprise a plurality of ridges **244** to enhance traction of the foot brake **240** and facilitate location of the foot brake **240** by a rider. In preferred embodiments, the foot brake **240** can comprise plastic. In other embodiments, the foot brake **240** can comprise metals, carbon fiber, or any other suitable material. The foot brake **240** can be configured to pivot about a pivot axis **242**. By pivoting downward, the foot brake **240** can provide a braking pressure to the rear wheel **234**. The foot brake **240** can be biased to return to its natural un-pivoted position after a user has finished applying braking pressure, such as by a biasing member (e.g., a spring).

[0055] In some embodiments, the foot brake can be formed as a rear portion of the deck. For example, a rear portion of the deck can be configured to pivot about an axis to provide a braking pressure to the rear wheel.

[0056] FIG. 2 shows a top perspective view of the scooter assembly **200** that comprises the deck **210**, a front deck portion **212**, a rear deck portion **214**, the front wheel **230**, the front fork **232**, the rear wheel **234**, and the foot brake **240**. As discussed, the foot brake **240** can comprise the plurality of ridges **244** to enhance traction of the foot brake **240** and for ease of location of the foot brake **240** for a rider. The foot brake **240** can be configured to pivot about the pivot axis **242**. By pivoting downward, the foot brake **240** can provide a braking pressure to the rear wheel **234**. With reference to FIGS. 4 and 9, the foot brake **240** can be of a multi-component structure having an inner member (shown in FIG. 4 and visible in FIG. 9) that directly contacts the rear wheel **234** and the outer foot brake member **240** comprising the ridges **244** and visible in FIGS. 1-3 and 6-11. In this manner, the inner member can be constructed of a suitable material, such as a high-friction or long-wearing material (e.g., metal), and the outer foot brake member **240** can be constructed from a material that is easily formed (e.g., to provide the ridges **244**) and/or capable of being formed in a desired color (e.g., plastic). Thus, each of the inner and outer member is capable of optimization for its intended purpose.

[0057] FIG. 3 shows a top view of the scooter assembly **200** that comprises the deck **210**, the front deck portion **212**, the rear deck portion **214**, the rear wheel **234**, the foot brake **240**, the steering tube **260**, and the handlebar assembly **270**. The handlebar assembly **270** can comprise a left handle **272**, a right handle **274**, a left handlebar mount **276**, and a right handlebar mount **278**.

[0058] In some embodiments, the scooter assembly **200** is an electric scooter powered by one or more batteries. In particular, the scooter assembly **200** can be adapted to receive electric power from one or more batteries **273** located within a tubular member or within multiple tubular members of the scooter frame. For example, interiors of the

left handle **272** and/or the right handle **274** can be configured to receive one or more batteries **273**. The batteries can be any type of batteries. In preferred embodiments, the batteries can be lithium ion rechargeable batteries. In other embodiments, the batteries can be nickel-cadmium, nickel-metal hydride, nickel-zinc, or other rechargeable batteries. The batteries can be any size and shape that fit within a scooter frame or other tubular component. For example, for scooter frames with tubular members, any batteries that can fit within the tubular members can be used. These may include standard battery sizes, including AAA, AA, C, D, 1/2AA, AAAA, A, B, F, N, A23, A27, 4SR44, 523, 531, CR123A, CR2, CR-V3, 10180, 10280, 10440, 14250, 14500, 14650, 15270, 16340, RCR123A, 17500, 17670, 18350, 18500, 18650, 19670, 25500, 26650, and 32600 batteries. For scooter frames with rectangular members, any batteries that can fit within the rectangular members can be used. These can include 4.5V, 9-V, and Lantern batteries. In addition, the batteries can be custom-shaped to be configured to fit within the members of the scooter frame. For example, the batteries can be custom-shaped round/cylindrical lithium-ion rechargeable batteries.

[0059] In some embodiments, the frame members are configured so that internal batteries can be removed from the frame members for charging. In other embodiments, the frame members themselves can comprise battery packs configured for charging, and the internal battery elements of the battery packs are not configured to be removable. For example, as described further below, in various embodiments the left handle **272** and right handle **274** can comprise detachable battery packs, the steering tube **260** can comprise a detachable battery pack, and/or the handlebar assembly **270** can comprise a detachable battery pack.

[0060] In some embodiments, the left handle **272** and right handle **274** are configured to be detachable. As such, when the batteries are depleted, a user can detach either or both of the left handle **272** and right handle **274** for recharging of its batteries and, with minimal interruption of scooter use, replace them with another left handle **272** and/or right handle **274** that are already partially or fully charged. To facilitate ease and speed of removal and replacement of left handle **272** and right handle **274**, the left handle **272** and right handle **274** can be configured to attach to the left handlebar mount **276** and the right handlebar mount **278** through a clip-in or snap-on mechanism. For example, any known clip-in or snap-on mechanism can be used to removably attach the left handle **272** and right handle **274** to the left handlebar mount **276** and the right handlebar mount **278**, such as push-pin connections often used on scooter handles or other types of interlocking arrangements. As such, the left handle **272** and right handle **274** battery packs can be detachable, preferably without removal of any covers or other disassembly, and quickly swappable with replacement left handle and right handle battery packs, thereby allowing for near-continuous operation of an electric scooter with little or almost no downtime due to recharging.

[0061] The scooter assembly can comprise wiring to electrically connect the batteries with the other electrical elements of the scooter assembly **200**, such as an electric motor and an on-off switch (e.g., switch **360** shown in FIG. 23). For example, in some embodiments, the scooter assembly can comprise wiring within the left handlebar mount **276** and the right handlebar mount **278** that is adapted to make an electrical connection with the left handle **272** and right

handle 274 battery packs. The wiring can continue through the left handlebar mount 276 and the right handlebar mount 278, down through the steering column 260, through the head tube 232 and/or neck 230, and through the deck 210 (e.g., through tubular deck member 312 a second tubular deck member 314 as shown in FIG. 15), and continue so that the wiring can make electrical connections with the electric motor and the on-off switch. In preferred embodiments, the wiring is located within the members of the scooter frame. In other embodiments, the wiring can be external to the scooter frame and run along the frame, or some combination of internal and external. The batteries within the left handle 272 and right handle 274 can be wired together in series or parallel, or any combination of series and parallel configurations.

[0062] Once depleted and detached from the scooter frame, the left handle 272 and right handle 274 battery packs can be placed into a charger for charging. The charger can be specially configured to charge the left and right handle battery packs. In other embodiments, the batteries can be removed from within the left handle 272 and right handle 274 and placed into a standard or otherwise suitable battery charger or otherwise connected to a battery charger arrangement (e.g., a plug-in charger). Once charged, the batteries can be reinserted into the left handle 272 and right handle 274 before the left handle 272 and right handle 274 is re-attached back on to the handlebar assembly of the scooter.

[0063] In some embodiments, other tubular member(s) of the scooter assembly can also be configured to receive one or more batteries. For example, in some embodiments, any one or more of the steering tube 260 and handlebar assembly 270, comprising left handle 272, right handle 274, left handlebar mount 276, and right handlebar mount 278, can be configured to receive one or more batteries. Together, the steering tube 260 and handlebar assembly 270 can comprise a steering column. In some embodiments, the steering column is configured to be detachable. As such, when the batteries 273 within the steering column (FIG. 4) are depleted, a user can detach the steering column for recharging its batteries and, with minimal interruption of scooter use, replace them with another steering column that is already fully charged. Alternatively, a user can place the steering column in a charger 275 (FIG. 5) or connect to a charger and wait for the batteries to be charged. To facilitate ease and speed of removal and replacement of the steering column, the steering column can be configured to attach to the rest of the scooter assembly through a clip-in, snap-on, lever lock arrangement or other suitable mechanisms. For example, any known clip-in, snap-on, lever lock or other suitable mechanism can be used to removably attach the steering column. In addition or in the alternative, the clamp assembly 250 or a lower portion of the steering column can be configured to include a lever that provides a locked position in which the steering column or upper portion of the steering column is not removable and an unlocked position in which the steering column or upper portion of the steering column is removable. As such, the steering column battery pack can be detachable, without removal of any covers or other disassembly, and quickly swappable with a replacement steering column battery pack, thereby allowing for near-continuous operation of an electric scooter with almost no downtime due to recharging. Because the steering column, which includes the left and right handles, has greater volume for holding more batteries than the left and right

handles alone, the steering column can store more electrical energy and provide for longer scooter operation times between recharging.

[0064] Once depleted and detached from the scooter frame, the steering column battery pack can be placed into a charger or connected to a charger for charging. The charger can be specially configured to charge the steering column battery pack. In other embodiments, the batteries can be removed from within the steering column and placed into a standard or otherwise suitable battery charger. Once charged, the batteries can be reinserted into the steering column before the steering column is re-attached back on to the scooter frame.

[0065] As described above, the scooter assembly 200 can comprise wiring to electrically connect the batteries with the other electrical elements of the scooter assembly 200, such as an electric motor and an on-off switch (e.g., switch 360 shown in FIG. 23). For example, in embodiments in which the steering column comprises a battery pack, the scooter assembly 200 can comprise wiring from the steering column, through the head tube 232 and/or neck 230, and through the deck 210 (e.g., through tubular deck member 312 and/or a second tubular deck member 314 as shown in FIG. 12), and continue so that the wiring can make electrical connections with the electric motor and the on-off switch. In preferred embodiments, the wiring is located within the members of the scooter frame. In other embodiments, the wiring can be external to the scooter frame and run along the frame, or some combination of internal and external. In the event of multiple batteries, the batteries within the steering column can be wired together in series or parallel, or any combination of series and parallel configurations.

[0066] In some embodiments, another tubular member or other members of the scooter assembly 200 can also or alternatively be configured to receive one or more batteries. For example, in some embodiments, the handlebar assembly 270, comprising left handle 272, right handle 274, left handlebar mount 276, and right handlebar mount 278 can be configured to receive one or more batteries. In some embodiments, the handlebar assembly 270 is configured to be detachable. As such, when the batteries within the handlebar assembly 270 are depleted, a user can detach the handlebar assembly 270 for recharging its batteries and, with minimal interruption of scooter use, replace them with another handlebar assembly 270 that is already fully charged. Alternatively, a scooter user can place the handlebar assembly 270 in a charger or connect to a charger and wait for the batteries to be charged. To facilitate ease and speed of removal and replacement of the handlebar assembly 270, the handlebar assembly 270 can be configured to attach to the steering tube 260 through a clip-in, snap-on, or other lever mechanism. For example, any known clip-in, snap-on, or other lever mechanism can be used to removably attach the handlebar assembly 270. In addition, a lever can be provided at the junction between the steering tube 260 and the handlebar assembly 270 that can provide a locked position in which the handlebar assembly 270 is not removable and an unlocked position in which the handlebar assembly 270 is removable. As such, the handlebar assembly battery pack can be detachable, without removal of any covers or other disassembly, and quickly swappable with a replacement handlebar assembly battery pack, thereby allowing for near-continuous operation of an electric scooter with almost no downtime due to recharging.

[0067] Once depleted and detached from the scooter frame, the handlebar assembly battery pack can be placed into a charger or connected to a charger for charging. The charger can be specially configured to charge the handlebar assembly battery pack. In other embodiments, the batteries can be removed from within the handlebar assembly 270 and placed into a standard or suitable battery charger. Once charged, the batteries can be reinserted into the handlebar assembly 270 before the handlebar assembly 270 is re-attached back on to the steering tube 260.

[0068] The scooter assembly can comprise wiring to electrically connect the batteries with the other electrical elements of the scooter assembly, such as an electric motor and an on-off switch (e.g., switch 360 shown in FIG. 23). For example, in embodiments in which the handlebar assembly 270 comprises a battery pack, the scooter assembly can comprise wiring from the handlebar assembly 270, through the steering tube 260, through the head tube 232 and/or neck 230, and through the deck 210 (e.g., through tubular deck member 312 and/or a second tubular deck member 314 as shown in FIG. 12), and continue so that the wiring can make electrical connections with the electric motor and the on-off switch. In preferred embodiments, the wiring is located within the members of the scooter frame. In other embodiments, the wiring can be external to the scooter frame and run along the frame, or some combination of internal and external. If multiple batteries are provided, the batteries within the handlebar assembly 270 can be wired together in series or parallel, or any combination of series and parallel configurations.

[0069] In some embodiments, multiple components of the scooter assembly that contain batteries are detachable. For example, in some embodiments, both the left and right handles and the steering column can be separately detachable. By having each of the left and right handles and the steering column be separately detachable, a user is provided with more control and choices with respect to charging options and interchanging charged components. In some other embodiments, an one or more of the left and right handles, the handlebar assembly, the steering column, and the steering tube can be separately detachable.

[0070] In some other embodiments, any other tubular member of the scooter assembly 200 can also or alternatively be configured to receive one or more batteries. For example, the left handlebar mount 276 and the right handlebar mount 278 can each be adapted to receive one or more rechargeable batteries, including lithium-ion batteries. Other tubular members that can be adapted to receive one or more rechargeable batteries include the head tube 232. In addition, as pictured in FIG. 12, other tubular members that can be adapted to receive one or more rechargeable batteries include a first tubular deck member 312, a second tubular deck member 314, a first tubular neck member 321, a second tubular neck member 322, and a third tubular neck member 323. In these other embodiments, the scooter assembly 200 can include all appropriate wiring to deliver electric power from the one or more batteries, at any location, to an electric motor, which can be located underneath a rear portion 214 of the deck 210.

[0071] Some portions of the scooter assembly that can be configured to receive one or more batteries are easily detachable, including the left handle 272 and right handle 274. For sections that are detachable, recharging of the one or more batteries can be accomplished while the portions are

detached. Other portions of the scooter assembly that can be configured to receive one or more batteries are not as easily detachable, such as the first tubular deck member 312, the second tubular deck member 314, the first tubular neck member 321, the second tubular neck member 322, and the third tubular neck member 323. In order to recharge the one or more batteries located in tubular portions of the scooter assembly that are not easily detachable, the scooter frame can be provided with an electrical input socket 325 and a wiring system to deliver electrical power from the input socket to each of the one or more batteries.

[0072] FIGS. 6 and 8-11 show the foot brake 240 that is configured for use at or near a rear portion of the deck of the scooter assembly 200. As described, the foot brake 240 can comprise the plurality of ridges 244 to enhance traction of the foot brake 240 and provide ease of location of the foot brake 240 for a rider. As shown, the foot brake 240 comprises three ridges, which preferably protrude significantly higher from the surrounding surface than any other protrusions near the rearward end of the scooter deck 210 to facilitate location by feel without the user needing to visually identify the foot brake 240. In addition, the foot brake 240 can otherwise be relatively continuous with the surrounding portions of the deck 210 and the deck 210 in general to provide an attractive appearance to the foot brake 240. Thus, the foot brake 240 preferably defines an upper surface that extends rearwardly in a substantially continuous fashion and along a substantially continuous path from an upper surface of the portion of the deck 210 forward of the foot brake 240. With reference to FIG. 1, for example, the rearward portion 214 of the deck 210 and the foot brake 240 define a continuous upper surface, which in the illustrated arrangement rises up relative to the front portion 212 of the deck 210 and is slightly curved. Thus, the foot brake 240 can be considered as a portion of the upper deck surface and, preferably, defines a rearward most upper surface of the overall deck of the scooter 200. In other words, the foot brake 240 extends rearwardly from a rearward edge of the deck 210. In alternative embodiments, the foot brake 240 can comprise fewer or more ridges. In preferred embodiments, the foot brake 240 can comprise plastic. In other embodiments, the foot brake 240 can comprise metals, carbon fiber, or any other suitable material. The foot brake 240 can be configured to pivot about the pivot axis 242. By pivoting downward, the foot brake 240 can provide a braking pressure to the rear wheel 234.

[0073] FIGS. 12-15 generally relate to an embodiment of a scooter frame comprising a deck, a neck, and a head tube, wherein the neck comprises two or more tubular members connecting the deck to the head tube. The frame is suitable for use with any scooter described herein.

[0074] FIGS. 12-15 show a rear side perspective view of an embodiment of a scooter frame assembly 300 that generally comprises a deck frame section 310 and a neck section 320. The deck frame section 310 can comprise a first tubular deck member 312 and a second tubular deck member 314. The neck section 320 can comprise a first tubular neck member 321, a second tubular neck member 322, a third tubular neck member 323, a head tube 324, and a base section 326. The first tubular neck member 321 can securely attach the second tubular deck member 314 and base section 326 with the head tube 324. The second tubular neck member 322 can securely attach the base section 326 with the head tube 324. The third tubular neck member 323 can

securely attach the first tubular deck member 312 and the base section 326 with the head tube 324.

[0075] The first tubular deck member 312, the second tubular deck member 314, the first tubular neck member 321, the second tubular neck member 322, and the third tubular neck member 323 each comprise a tubular member having an approximately circular cross section. In other embodiments, the first tubular deck member 312, the second tubular deck member 314, the first tubular neck member 321, the second tubular neck member 322, and the third tubular neck member 323 can comprise any other cross sectional shapes, including square, triangular, rectangular, and oval. The plurality of tubular neck members connecting the deck frame section with the head tube enhances the strength of the connection. In addition to enhancing the strength of the connection, the connection comprising a plurality of tubular neck members can provide ergonomic and riding style options not present in a connection comprising a single member. In addition, the connection comprising a plurality of tubular members can facilitate the attachment of additional accessories, for the riding deck surface, or other attachments.

[0076] As shown in FIG. 12, the scooter frame assembly 300 comprises three tubular neck members 321, 322, and 323. In other embodiments, the scooter frame assembly can comprise two tubular neck members connecting the deck frame section 310 and head tube 324. In other alternative embodiments, the scooter frame assembly can comprise four or more tubular neck members connecting the deck frame section 310 and the head tube 324.

[0077] FIGS. 16-21 illustrate the scooter neck sub-assembly comprising the neck and the head tube separate from the frame assembly of FIGS. 12-15. As described, the neck comprises two or more tubular members connecting to the head tube.

[0078] FIGS. 16-21 show various views of the scooter neck section 320 that generally comprises the first tubular neck member 321, the second tubular neck member 322, the third tubular neck member 323, the head tube 324, a first base section 326, and a second base section 328. The first tubular neck member 321 and third tubular neck member 323 can securely attach the first base section 326 with the head tube 324. The second tubular neck member 322 can securely attach the second base section 328 with the head tube 324. As apparent in FIG. 15, for example, the first base section 326 is positioned above the deck frame section 310 and the second base section 328 is positioned below the deck frame section 310. A forward portion of the first base section 326 can include a cut-out to accommodate the second neck member 322, as shown in FIG. 16, for example. The base sections 326, 328 can be coupled to the deck frame section 310 by any suitable arrangement, such as by welding, for example. The base sections 326, 328 can be coupled to the deck frame section 310 along the entire forward surface, which is generally U-shaped in the illustrated arrangement. The base sections 326, 328 spaced vertically as illustrated and preferably sandwiching the deck frame section 310 (e.g., forward portion 316) therebetween advantageously provide a strong and rigid arrangement for supporting the head tube 324 relative to the deck frame section 310.

[0079] FIGS. 22 and 23 illustrate a modification of the scooter neck section 320 that generally comprises a first tubular neck member 321, a second tubular neck member 322, a third tubular neck member 323, a head tube 324, and

a base section 326. In the illustrated arrangement, each neck member 321, 322, 323 extends between the head tube 324 and the base section 326 and, preferably, connects to each of the head tube 324 and the base section 326. The base section 326 can be a frame tube arrangement of the frame assembly 300, such as the deck frame section 310 (e.g., frame tubes 312 and 314 and/or a front frame tube portion 316 that couples forward ends of the frame tubes 312, 314). Thus, in the neck section 320 of FIGS. 22 and 23, the two separate base sections are omitted and the multiple neck members 321, 322, 323 preferably are coupled directly to the deck frame section 310.

[0080] Preferably, the base or lower ends of the multiple neck members 321, 322, 323 are spaced from one another in a lateral direction of the frame assembly 300 or scooter 200. In the illustrated arrangement, the neck member 321 is coupled to one frame tube 314 and the neck member 323 is coupled to the other frame tube 312. Such a lateral spacing advantageously provides increased rigidity and reduces flex between the head tube 324 and the deck frame section 310. The neck member 322 can be substantially centrally located in a lateral direction of the frame assembly 300. The neck members 321, 322, 323 can be coupled to the head tube 324 at different heights or different axial locations. For example, the side neck members 321, 323 can be coupled at one axial location and the central neck member 322 can be coupled at a different axial location on the head tube 324. The side neck members 321, 323 can be coupled at a higher location or axial location closer to the upper end of the head tube 324 relative to the central neck member 322. Alternatively, this arrangement can be reversed, each neck member can be coupled at a different axial position or all of the neck members can be coupled at substantially the same axial location. An on-off switch 360 is also illustrated that can connect to the wiring arrangement of the scooter 200 and can be used to turn the electric scooter on and off.

[0081] FIGS. 24-28 generally relate to alternative embodiments of a scooter neck assembly comprising a neck and a head tube, wherein the neck comprises a generally centered arrangement in the lateral direction of the associated scooter 200. FIG. 24 illustrates a neck assembly having a singular neck member 421, which has a greater vertical dimension than its width or lateral dimension. FIGS. 25-28 illustrate an embodiment that comprises at least two tubular members connecting to the head tube 424 in a substantially centralized configuration or stacked in a vertical direction.

[0082] FIG. 24 shows a top side perspective view of a scooter neck section 420 that generally comprises a first or upper neck portion 421, a second or intermediate neck portion 422, a third or lower neck portion 423, a head tube 424, and a base section 426. The first neck portion 421 is generally rounded or semi-cylindrical (semi-circular in cross-section) in shape. The second neck portion 422 generally comprises side wall portions that connect ends of the first neck portion 421 to ends of the third neck portion 423, which is shaped similar to the first neck portion 421. In other words, the third neck portion 423 is generally rounded or semi-cylindrical (semi-circular in cross-section) in shape. The neck section 420 of FIG. 24 can securely attach the base section 426 with the head tube 424 and, due to the increased vertical dimension relative to a circular tube, can provide increased resistance to torsional flex between the deck section or base section 426 and the head tube 424.

[0083] FIG. 25 shows a left side perspective view of an embodiment of a scooter neck section 420 that generally comprises a first tubular neck member 421, a space 422, a third tubular neck member 423, a head tube 424, and a base section 426. The first tubular neck member 421 and third tubular neck member 423 are separated by the space 422 and can be configured to be aligned along a midsection of the base section 426. The ends of the neck members 421, 423 connected to the head tube 424 are closer than the ends of the neck members 421, 423 connected to the base section 426. That is, the space 422 is smaller near the head tube 424 and is larger near the base section 426. Alternatively, this arrangement could be reversed or the neck members 421, 423 could be substantially parallel to one another.

[0084] FIGS. 29-32 generally relate to embodiments related to scooters comprising a deck, head tube, steer tube, and clamp assembly, wherein the clamp assembly comprises three or more bolt clamp portions. The additional bolt clamp portions advantageously provide increased clamp force and/or an increased clamp force area.

[0085] FIGS. 29 and 30 show an embodiment of a portion of a scooter assembly 500 that comprises a neck 520, a head tube 524, a clamp assembly 530, and a steering tube 540. The clamp assembly 530 is coupled to the steering tube 540 at or near a bottom portion of the steering tube 540 above the head tube 524 and secures the fork 528 (FIG. 31) relative to the head tube 524. FIGS. 31 and 32 show a side view of the scooter assembly 500 with clamp bolts in place in the clamp assembly 530. In some embodiments, the clamp assembly 530 comprises a first bolt section 532, a second bolt section 534, a third bolt section 536, and a fourth bolt section 538. The first bolt section 532 can comprise a first ear 532A, a second ear 532B, and an opening 532C configured to receive a bolt. The second bolt section 534 can comprise a first ear 534A, a second ear 534B, and an opening 534C configured to receive a bolt. The third bolt section 536 can comprise a first ear 536A, a second ear 536B, and an opening 536C configured to receive a bolt. The fourth bolt section 538 can comprise a first ear 538A, a second ear 538B, and an opening 538C configured to receive a bolt. The bolt sections are vertically (or axially) stacked and can be equidistant from one another. In other embodiments, the clamp assembly comprises three or less bolt sections. In other alternative embodiments, the clamp assembly can comprise five or more bolt sections. As used herein, the term bolt can include bolts, screws, or any other suitable fastening member unless otherwise indicated either explicitly or by the context of the disclosure.

[0086] FIGS. 33-35 generally relate to embodiments related to scooters comprising a deck, front wheel, a neck, a head tube, a steer tube, a front fork connecting the front wheel to the steer tube, and a front fork cover, wherein the front fork cover generally surrounds the front fork as a protective exterior. The illustrated scooter assembly 600 comprises a deck section 610, a neck 620, a head tube 624, a front wheel 630, and a front fork cover 640. The front fork can provide a means by which the front wheel 630 is mounted to a steering tube. In some embodiments, the front fork comprises a formed (e.g., bent) metal (e.g., steel) member, as shown, for example, in FIGS. 1, 4, 7 and 23. The front fork of FIGS. 33-35 preferably also comprises the same or a similar formed metal front fork member (partially visible through opening 644) that is partially or substantially

completely enclosed by the fork cover 640. In addition, the front wheel 630 can be configured to rotate about a front-wheel axle 632.

[0087] As described, the cover 640 can be provided to cover some, a substantial portion or essentially all exterior surfaces (i.e., surfaces other than those facing the front wheel 630) of the front fork. The cover 640 can serve as a protective exterior to the front fork. In some embodiments, the cover 640 can comprise a plastic, such as a hard plastic. In other embodiments, the cover 640 can comprise metal. The cover 640 can be secured to the front fork by a fastening member 642, such as a bolt, screw or other threaded (e.g., removable) fastener. Other fastening members/arrangements (e.g., permanent or semi-permanent) could also or alternatively be used, such as rivets for example.

[0088] The fork cover 640 can comprise a pair of cover portions on each side of the front wheel 630. Front and/or rear portions of the fork cover 640 can extend towards the sides of the front wheel 630 and be shaped similarly to the front wheel 630. Thus, the fork cover 640, or cooperating cover portions, can define a cut-out or space that accommodates, but preferably closely follows, the shape of the front wheel 630 in either or both of the front and rear portions of the front fork. Such an arrangement inhibits the entry of foreign objects (e.g., small stones or pebbles) from entering into a space between the front fork and the front wheel 630. The provision of the fork cover 640 allows the underlying (e.g., structural) portion of the front fork to be a relatively simple shape, which can be suitable for forming from a bent metal work piece and, thus, be relatively inexpensive to manufacture. The fork cover 640 can be formed from, for example, a plastic material that can be made via, for example, a molding process (e.g., injection-molding) or other suitable process that permits inexpensive manufacture of more intricate shapes. Thus, the combination of the front fork and fork cover 640 provides suitable structural properties and also allows the fork assembly to closely follow the shape of the front wheel 630 in a relatively inexpensive arrangement.

[0089] In some embodiments, the cover 640 can comprise an opening 644 that allows a portion of the underlying fork structure or another underlying structure. The opening 644 can be provided for ornamental reasons or the underlying fork structure can include a protrusion that mates with the opening 644 to provide coupling of the fork cover 640 to the underlying fork structure in addition or in alternative to the fastening member 642.

[0090] FIGS. 36 and 37 generally relate to an embodiment of a scooter 700 comprising a deck, front and rear wheels, a neck, a head tube, a steer tube, and a bash guard, wherein the bash guard 720 is provided underneath the deck and can serve a protective function and/or occupy a space between the front wheel and a forward surface of a lower frame portion to facilitate the scooter sliding over obstacles that could otherwise enter into the space between the front wheel and a forward surface of a lower frame portion.

[0091] FIG. 37 shows a perspective view of the bottom of the scooter assembly 700 including the bash guard 720. The scooter assembly 700 can be of any suitable arrangement, such as shown in FIG. 1 or otherwise shown or described herein. The scooter assembly 700 can generally comprise a deck 210, a neck 220, a head tube 224, a clamp assembly 250, a steering tube 260, a front wheel 230, and a rear wheel 234. In some embodiments, the scooter assembly can be an

electric scooter. In addition, an electric motor (not shown) can be provided underneath approximately a rear portion 214 of the scooter assembly.

[0092] To protect the underside of the scooter assembly 700 and components of the scooter assembly 700, such as the electric motor, a bash guard 720 can be provided. In some embodiments, the bash guard 720 is provided at a location in front of the rear wheel. In preferred embodiments, the bash guard 720 can comprise a metal. In other embodiments, the bash guard 720 can comprise a hard plastic. The bash guard 720 can be an angled piece having a bottom portion and a front portion, each of which can be substantially planar in some configurations. Alternatively, the bash guard 720 can be a curved shape, preferably still having bottom and front portions. The bash guard 720 can have any suitable width, such as substantially the same width as the scooter frame. In the illustrated arrangement, the bash guard 720 is somewhat narrower than the width of the scooter frame or at least the deck section of the scooter frame.

[0093] The bash guard 720 can comprise a plurality of openings 722. The openings 722 advantageously serve many functions. For example, the openings 722 allow for weight reduction of the bash guard 720. In addition, the openings 722 provide for metal forming options to present the bash guard in a solid sheet. Also, the openings 722 allow airflow to a battery box, and provide a draining mechanism so that the scooter assembly does not retain water in wet conditions. Furthermore, the underside of the scooter assembly can comprise a first rail 710 and a second rail 712. The bash guard 720 can be fixedly attached to the first rail 710 and the second rail 712 via fastening members 724 and/or can be fixedly attached to the scooter frame (e.g., the base section 426) at or near a front portion of the bash guard 720 via a fastening member 724. Other suitable arrangements can also be used to secure the bash guard 720 to the scooter frame or other portion of the scooter 700.

[0094] FIG. 38 generally relates to embodiments related to scooters comprising a deck, a first section on the deck comprising a first material, such as plastic, and a second section on the deck comprising a second material, such as metal (e.g., steel or aluminum). In some configurations, the first section and the second section can comprise the same or different materials, but can be configured to provide different frictional and/or ornamental features. For example, one section can have a relatively smooth deck surface and the other section can have a non-smooth deck surface, which can include grip features, rough surface portions or openings (which can be void or occupied by another member), for example.

[0095] FIG. 38 shows a perspective view of an embodiment of a deck assembly 800 for a scooter assembly. In particular, the deck assembly 800 can comprise a first deck portion 810 and a second deck portion 820. In some embodiments, the first deck portion 810 comprises a type of plastic and the second deck portion 820 comprises metal. In alternative embodiments, the first deck portion 810 can comprise any plastic, metal, or other suitable material, and the second deck portion 820 can comprise any plastic, metal, or other suitable material, which can be the same as or different from the material of the first deck portion.

[0096] The first deck portion 810 can comprise a rear first deck portion 812 and a front first deck portion 814, and the second deck portion 820 can comprise a rear second deck

portion 822 and a front second deck portion 824. The first deck portion 810 can be arranged such that the rear first deck portion 812 is uncovered by the second deck portion 820, but the front first deck portion 814 is at least partially covered by the rear second deck portion 822 of the second deck portion 820. In the illustrated arrangement, lateral side portions of the first deck portion 814 are uncovered and extend along opposite sides of the second deck portion 820 (e.g., the rear second deck portion 822). The front second deck portion 824 of the second deck portion 820 can extend up a neck portion 830 of the scooter assembly. The first deck portion 810 and/or the second deck portion 820 can be securely fixed to the deck assembly 800 via fastening members 828 or other suitable fastening arrangements.

[0097] The second deck portion 820 can comprise a plurality of openings 826. In addition, an insert comprising a gripping material, such as rubber or a rubber-like material, can be provided between the second deck portion 820 and the first deck portion 810. Furthermore, portions of a rubber insert can be configured to protrude through the openings 826 of the second deck portion 820. Such portions of the rubber insert can be substantially even with the deck surface of the second deck portion 820 surrounding the openings 826 or can protrude so as to be raised above the deck surface of the second deck portion 820 surrounding the openings 826. As such, the second deck portion 820 can provide a surface that can deliver improved gripping ability to a rider of the scooter assembly. In addition, a rider can recognize a difference in surface texture between the first deck portion 810 and the second deck portion 820, preferably by feel and without looking at the deck surface.

[0098] FIG. 39 generally relates to embodiments related to scooters comprising a deck, a first section on the deck comprising a material (e.g., plastic) configured to provide a first level of traction or frictional characteristics, and a second section on the deck comprising the same material (e.g., plastic) and configured to provide a second level of traction or frictional characteristics (e.g., coefficient of friction).

[0099] FIG. 39 shows a top view of an embodiment of a deck assembly 900 for a scooter assembly. In particular, the deck assembly 900 can comprise a first deck portion 910 and a second deck portion 920. In preferred embodiments, the first deck portion 910 comprises a type of plastic having a first surface texture and the second deck portion 920 comprises a type of plastic having a second surface texture. In alternative embodiments, the first deck portion 910 can comprise any plastic, metal, or other suitable material having a first surface texture, and the second deck portion 920 can comprise any plastic, metal, or other suitable material having a second surface texture. In some embodiments, the first surface texture and second surface texture are different such that the deck assembly 900 is provided with different modular grip surfaces. The different modular grip surfaces can assist a scooter rider in locating various positions of the deck assembly 900 by feeling the texture of the deck assembly surface with the scooter rider's feet. In alternative arrangements, different materials can be used for the different portions 910, 920.

[0100] In different embodiments, the relative location of the first deck portion 910 and the second deck portion 920 can vary. For example, as shown in FIG. 39, the first deck portion 910 comprises a rear first deck portion 912 and a front first deck portion 914. The second deck portion 920 can

be situated in proximity to the rear first deck portion **912**. In alternative embodiments, the second deck portion can be situated in proximity to any other part of the first deck portion **910**, including the front first deck portion **914** and a center part of the first deck portion **910**. In other alternative embodiments, the deck assembly can comprise three or more deck portions, each of which can have the same or different surface texture of any of the other deck portions, thereby assisting a scooter rider in locating any section of the deck assembly by feeling the texture of the deck assembly with the scooter rider's feet.

[0101] In some embodiments, the second deck portion **920** can function as a foot brake. For example, in some scooter assembly embodiments, such as described in connection with FIG. 1, the scooter assembly comprises a foot brake formed as a part of a rear portion of the deck assembly. A rear portion of the deck assembly can be configured to pivot about an axis to provide a braking pressure to a rear wheel. By providing a second deck portion **920** with a differently textured surface, a scooter rider can be assisted in easily locating the foot brake. A second deck portion **920** with a differently textured surface can also assist a scooter rider in differentiating between the foot brake and the rest of the deck assembly in order to avoid inadvertent pressing of the foot brake.

[0102] The features and attributes of the specific embodiments disclosed above may be combined in different ways to form additional embodiments, all of which fall within the scope of the present disclosure. Although this invention has been described in terms of certain preferred embodiments, other embodiments that are apparent to those of ordinary skill in the art, including embodiments which do not provide all of the benefits and features set forth herein, are also within the scope of this invention. Accordingly, the scope of the present invention is defined only by reference to the appended claims.

What is claimed is:

1. A scooter, comprising:

a deck configured to support a rider;

a front wheel;

a rear wheel;

a head tube;

a steering column supported for rotation relative to the head tube and comprising a steering tube and a handlebar assembly, the steering column configured to steer the scooter by controlling a direction of the front wheel;

a plurality of neck members that couple the head tube to the deck, wherein the plurality of neck members are coupled to the deck at spaced lateral locations.

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