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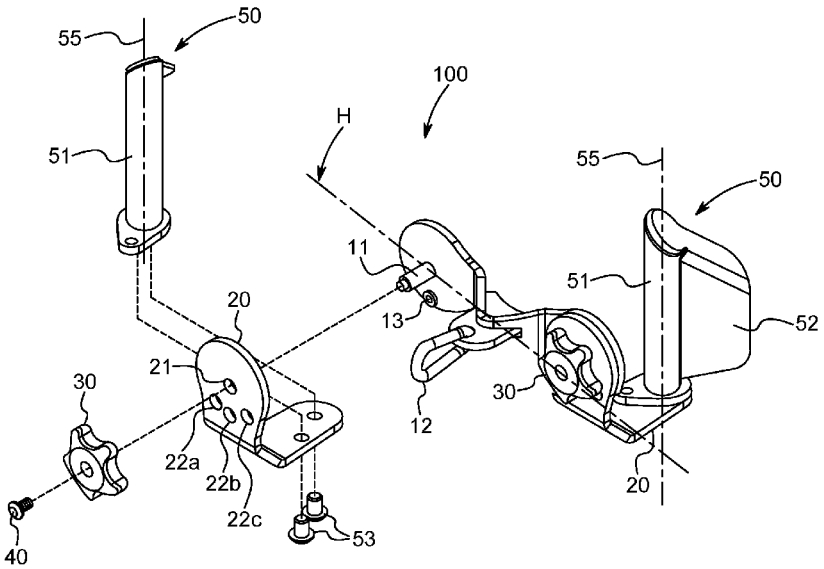

FIG. 1

(57) Abstract: A cable attachment handle for an exercise machine including a main mounting body defining a horizontal axis, a first stud extending from the main mounting body, a first handle mount rotatable about the first stud, a first handle extending from the first handle mount, a second stud extending from the main mounting body, a second handle mount rotatable about the second stud, a second handle extending from the second handle mount, and a cable attachment element affixed to the main mounting body between the first stud and the second stud.

WO 2019/113048 A1

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MULTIPLE HAND ANGLE CABLE ATTACHMENT

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit of U.S. Provisional Patent Application No. 62/594,301, filed on December 4, 2017 and entitled "Multiple Hand Angle Cable Attachment", the disclosure of which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure relates generally to attachment handles for exercise or weight machines and, more particularly, to adjustable attachment handles for cable exercise machines that allow a user to vary his or her hand position for performing an exercise movement.

BACKGROUND

[0003] Exercise machines which employ a cable attached to a counterweight or other resistive element are well known. Conventionally, such exercise machines include a handle fixed or removably attached to an end of the cable. The handle may be, for example, a D-handle, barbell, or rope handle. A user must exert a force on the handle to overcome the resistance of the resistive element and move the cable through a predetermined range of motion.

[0004] When performing pulling movements, a user's grip position may have a significant impact on which muscles are activated and the percentage of those muscles which are activated. Three main categories of grip positions for performing pulling movements are neutral grip postion, in which the user's palms face each other; supinated grip position, in which the user's palms face up; and pronated grip position, in which the user's palms face down. The neutral grip position significantly activates the brachioradialis muscle, the supinated grip position significantly activates the biceps brachii muscle, and the pronated grip position significantly activates the brachialis muscle. Adjusting between these various grip positions allows the user to alter which muscles are activated by an exercise movement and to optimize the activation of those muscles.

[0005] Many conventional exercise machines use a fixed position handle that provides only one grip position. To change grip positions, the user must replace the handle with a different handle configured for the desired grip position. Examples of various exercise handles having different but fixed grip positions are described in U.S. Patent No. 5,761,767 to Barton. Barton also describes

a handle having a wing against which the user's palm rests when performing a pulling movement. Such wings may result in a 10% to 20% increase in pulling force as the load of the exercise machine is transferred from the user's fingers to the user's palms. However, Barton suffers from the deficiency described above in that the user must replace the handle in order to change grip positions.

[0006] U.S. Patent No. 5,334,113 to Roepke and U.S. Patent Application Publication No. 2007/0243977 to Zeien describe exercise handles which are rotatable and thus support multiple grip positions. However, the handles described in Roepke and Zeien are not lockable into a fixed position and, as such, the user must actively maintain the desired grip position throughout the exercise movement. This is undesirable, as the muscle activation used to maintain the grip position may reduce the amount of strength available to perform the desired exercise movement. Additionally, the user may be required to reduce the amount of resistance of the exercise machine in order to maintain the desired grip position.

[0007] U.S. Patent No. 5,399,133 to Haber et al. ("Haber") describes an adjustable handle rotatable about three axes via two yokes. The yokes may be tightened into a set position using tightening knobs. However, the tightening knobs rely on friction to lock the yokes into the set position. As such, the application of too much force to the handle will cause the yokes to move from the set position. Additionally, Haber relies on the user's knowledge of the appropriate position at which to tighten the knobs. Still further, the handle of Haber is intended for attachment to a permanent structure of the exercise machine, rather than attachment to a cable.

[0008] U.S. Patent No. 4,618,143 to Twardosz describes a handle having concentric rings rotatable between several positions. The rings may be locked relative to one another using a screw and nut. However, adjustment of the handle of Twardosz is cumbersome and time consuming as it requires removal of the screw and nut.

[0009] There exists a need for a handle for cable exercise machines which is easily and quickly adjustable between various grip positions to reduce downtime and eliminate the need for multiple fixed position handles.

[0010] If any prior art is referred to herein, such reference does not constitute an admission that the prior art forms a part of the common general knowledge in the art, in Australia or any other country.

2018381299 30 Jun 2020

SUMMARY

[0011] In a first aspect, disclosed is a cable attachment handle for an exercise machine including a main mounting body defining a horizontal axis, a first stud extending from the main mounting body, a first handle mount rotatable about the first stud, a first handle extending from the first handle mount, a second stud extending from the main mounting body, a second handle mount rotatable about the second stud, a second handle extending from the second handle mount, and a cable attachment element affixed to the main mounting body between the first stud and the second stud, a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount, a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount, wherein engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body, and wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body

[0012] In some non-limiting embodiments, the first handle extends substantially perpendicular to the first stud, and wherein the second handle extends substantially perpendicular to the second stud.

[0013] In some non-limiting embodiments, the first handle and the second handle are adjustable between an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount, a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount, and an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount.

[0014] In some non-limiting embodiments, the first handle and the second handle are further adjustable between a fully pronated position in which the first alignment pin is engaged with a

fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

[0015] In some non-limiting embodiments, the cable attachment handle further includes a first alignment pin extending from the first handle mount and configured to removably engage any of a first plurality of alignment holes in the main mounting body, and a second alignment pin extending from the second handle mount and configured to removably engage any of a second plurality of alignment holes in the main mounting body. Engagement of the first alignment pin with any of the first plurality of alignment holes prevents rotation of the first handle mount relative to the main mounting body. Engagement of the second alignment pin with any of the second plurality of alignment holes prevents rotation of the second handle mount relative to the main mounting body.

[0016] In some non-limiting embodiments, the first handle and the second handle are adjustable between a supinated position in which the first alignment pin is engaged with a first of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a first of the second plurality of alignment holes in the main mounting body, a neutral position in which the first alignment pin is engaged with a second of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a second of the second plurality of alignment holes in the main mounting body, and a pronated position in which the first alignment pin is engaged with a third of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a third of the second plurality of alignment holes in the main mounting body.

[0017] In some non-limiting embodiments, the first handle and the second handle are further adjustable between a fully pronated position in which the first alignment pin is engaged with a fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

[0018] In some non-limiting embodiments, the first handle is removably attached to the first handle mount, and the second handle is removably attached to the second handle mount.

[0019] In some non-limiting embodiments, each of the first handle and the second handle include a post having a longitudinal axis, and a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

[0020] In some non-limiting embodiments, the cable attachment handle further includes one or more fasteners securing each of the first and second handles to each of the first and second handle mounts, respectively.

[0021] In some non-limiting embodiments, the one or more fasteners includes two or more fasteners spaced apart to prevent rotation of the first and second handles about an axis parallel to the longitudinal axis of the post.

[0022] In some non-limiting embodiments, the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

[0023] In some non-limiting embodiments, each of the first post and the second post are slidable along the horizontal axis of the main mounting body.

[0024] In some non-limiting embodiments, each of the first post and the second post are lockable at any of a plurality of locations along the horizontal axis of the main mounting body via a popper pin.

[0025] In another aspect, disclosed is a cable attachment handle for an exercise machine including a main mounting body defining a horizontal axis, a first handle mount rotatable relative to the main mounting body, a first handle extending from the first handle mount, a second handle mount rotatable relative to the main mounting body, a second handle extending from the second handle mount, and a cable attachment element affixed to the main mounting body between the first stud and the second stud, a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount, a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount wherein, engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body and wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body.

[0026] In some non-limiting embodiments, each of the first handle and the second handle includes: a post having a longitudinal axis; and a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

[0027] In some non-limiting embodiments, the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

[0028] In some non-limiting embodiments, the first handle and the second handle are adjustable between an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount, a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount, and an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount. Further embodiments of the present disclosure will now be described in the following numbered clauses:

[0029] Clause 1. A cable attachment handle for an exercise machine comprising: a main mounting body defining a horizontal axis; a first stud extending from the main mounting body; a first handle mount rotatable about the first stud; a first handle extending from the first handle mount; a second stud extending from the main mounting body; a second handle mount rotatable about the second stud; a second handle extending from the second handle mount; and a cable attachment element affixed to the main mounting body between the first stud and the second stud, a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount; and a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount, wherein engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body, and wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body.

[0030] Clause 2. The cable attachment handle of clause 1, wherein the first handle extends substantially perpendicular to the first stud, and wherein the second handle extends substantially perpendicular to the second stud.

[0031] Clause 3The cable attachment handle of any of clauses 1 or 2, wherein the first handle and the second handle are adjustable between: an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount; a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount; and an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount.

[0032] Clause 4. The cable attachment handle of any of clauses 1-3, wherein the first handle and the second handle are further adjustable between: a fully pronated position in which the first alignment pin is engaged with a fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

[0033] Clause 5. The cable attachment handle of any of clauses 1-4, further comprising: a first alignment pin extending from the first handle mount and configured to removably engage any of a first plurality of alignment holes in the main mounting body; and a second alignment pin extending from the second handle mount and configured to removably engage any of a second plurality of alignment holes in the main mounting body, wherein engagement of the first alignment pin with any of the first plurality of alignment holes prevents rotation of the first handle mount relative to the main mounting body, and wherein engagement of the second alignment pin with any of the second plurality of alignment holes prevents rotation of the second handle mount relative to the main mounting body.

[0034] Clause 6. The cable attachment handle of any of clauses 1-5, wherein the first handle and the second handle are adjustable between: a supinated position in which the first alignment pin is engaged with a first of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a first of the second plurality of alignment holes in the main mounting body; a neutral position in which the first alignment pin is engaged with a second of the first plurality of alignment holes in the main mounting body and the second alignment pin

is engaged with a second of the second plurality of alignment holes in the main mounting body; and a pronated position in which the first alignment pin is engaged with a third of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a third of the second plurality of alignment holes in the main mounting body.

[0035] Clause 7. The cable attachment handle of any of clauses 1-6, wherein the first handle and the second handle are further adjustable between: a fully pronated position in which the first alignment pin is engaged with a fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

[0036] Clause 8. The cable attachment handle of any of clauses 1-7, wherein the first handle is removably attached to the first handle mount, and wherein the second handle is removably attached to the second handle mount.

[0037] Clause 9. The cable attachment handle of any of clauses 1-8, wherein each of the first handle and the second handle comprise: a post having a longitudinal axis; and a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

[0038] Clause 10. The cable attachment handle of any of clauses 1-9, further comprising one or more fasteners securing each of the first and second handles to each of the first and second handle mounts, respectively.

[0039] Clause 11. The cable attachment handle of any of clauses 1-10, wherein the one or more fasteners comprises two or more fasteners spaced apart to prevent rotation of the first and second handles about an axis parallel to the longitudinal axis of the post.

[0040] Clause 12. The cable attachment handle of any of clauses 1-11, wherein the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

[0041] Clause 13. The cable attachment handle of any of clauses 1-12, wherein each of the first post and the second post are slidable along the horizontal axis of the main mounting body.

[0042] Clause 14. The cable attachment handle of any of clauses 1-13, wherein each of the first post and the second post are lockable at any of a plurality of locations along the horizontal axis of the main mounting body via a popper pin.

[0043] Clause 15. A cable attachment handle for an exercise machine comprising: a main mounting body defining a horizontal axis; a first handle mount rotatable relative to the main

mounting body; a first handle extending from the first handle mount; a second handle mount rotatable relative to the main mounting body; a second handle extending from the second handle mount; and a cable attachment element affixed to the main mounting body between the first stud and the second stud, a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount; and a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount, wherein engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body, and wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body.

[0044] Clause 16. The cable attachment handle of clause 15, wherein each of the first handle and the second handle comprises: a post having a longitudinal axis; and a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

[0045] Clause 17. The cable attachment handle of clause 15 or 16, wherein the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

comprising:

[0046] Clause 18. The cable attachment handle of any of clauses 15-17, wherein the first handle and the second handle are adjustable between: an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount; a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount; and an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount.

[0047] These and other features and characteristics of the multiple hand angle cable attachment will become more apparent upon consideration of the following description and the appended claims with reference to the accompanying drawings, all of which form a part of this specification,

wherein like reference numerals designate corresponding parts in the various figures. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the disclosure. As used in the specification and the claims, the singular forms of "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0048] **FIG. 1** is an exploded perspective view of a cable attachment handle according to a non-limiting embodiment of the present disclosure;

[0049] **FIG. 2** is a perspective view of a user using the cable attachment handle of **FIG. 1** in a supinated grip position;

[0050] **FIG. 3** is a perspective view of a user using the cable attachment handle of **FIG. 1** in a neutral grip position;

[0051] **FIG. 4** is a perspective view of a user using the cable attachment handle of **FIG. 1** in a pronated grip position;

[0052] **FIGS. 5A-5B** are rear views of embodiments of the cable attachment handle of **FIG. 1** in a partially supinated grip position;

[0053] **FIGS. 6A-6B** are rear views of embodiments of the cable attachment handle of **FIG. 1** in a neutral grip position;

[0054] **FIGS. 7A-7B** are rear views of embodiments of the cable attachment handle of **FIG. 1** in a partially pronated grip position;

[0055] **FIG. 8** is an exploded perspective view of a cable attachment handle according to another non-limiting embodiment of the present disclosure;

[0056] **FIG. 9A** is a rear view of the embodiment of the cable attachment handle of **FIG. 8** in a partially supinated grip position;

[0057] **FIG. 9B** is a rear view of the embodiment of the cable attachment handle of **FIG. 8** in a neutral grip position;

[0058] **FIG. 9C** is a rear view of the embodiment of the cable attachment handle of **FIG. 8** in a partially pronated grip position;

[0059] **FIG. 9D** is a rear view of the embodiment of the cable attachment handle of **FIG. 8** in a fully pronated grip position;

[0060] **FIG. 10A** is a top view of a non-limiting embodiment of the cable attachment handle according to the present disclosure;

[0061] **FIG. 10B** is a top view of a non-limiting embodiment of the cable attachment handle according to the present disclosure;

[0062] **FIG. 10C** is a top view of a non-limiting embodiment of the cable attachment handle according to the present disclosure;

[0063] **FIG. 11** is a front perspective view of another embodiment of the cable attachment handle according to the present disclosure; and

[0064] **FIG. 12** is a rear perspective view of the cable attachment handle of **FIG. 11**.

DETAILED DESCRIPTION

[0065] For purposes of the description hereinafter, the terms "upper", "lower", "right", "left", "vertical", "horizontal", "top", "bottom", "lateral", "longitudinal", and derivatives thereof shall relate to the disclosure as it is oriented in the figures. However, it is to be understood that the disclosure may assume alternative variations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings and described in the following specification are simply exemplary aspects of the disclosure. Hence, specific dimensions and other physical characteristics related to the aspects disclosed herein are not to be considered as limiting.

[0066] As used hereinafter, the term "substantially parallel" means within plus or minus 5° of parallel. As used hereinafter, the term "substantially perpendicular" means within plus or minus 5° of perpendicular. As used hereinafter, the term "approximately", when used in reference to a recited angle measurement, means the recited angle measurement plus or minus 5°. For example, "approximately 30°" means "30° plus or minus 5°" or "25° to 35°".

[0067] As used hereinafter, the term "supinate" and derivatives thereof mean an arrangement in which a pair of elements are oriented at least partially away from each other in a vertical direction. For example, a first line segment and a second line segment having the same length and occupying the same vertical plane may be referred to as "supinated" if the distance between the base of the first line segment and the base of the second line segment is less than the distance between the top of the first line segment and the top of the second line segment. A person's hand may be referred to as "supinated" if positioned such that the palm of the hand faces at least partially upwardly.

[0068] As used hereinafter, the term "pronate" and derivatives thereof mean an arrangement in which a pair of elements are oriented at least partially toward each other in a vertical direction. For example, a first line segment and a second line segment having the same length and occupying the same vertical plane may be referred to as "pronated" if the distance between the base of the first line segment and the base of the second line segment is greater than the distance between the top of the first line segment and the top of the second line segment. A person's hand may be referred to as "pronated" if positioned such that the palm of the hand faces at least partially downwardly.

[0069] As used hereinafter, the term "neutral" and derivatives thereof mean an arrangement in which a pair of elements are substantially parallel to each other in a vertical direction. For example, a first line segment and a second line segment occupying the same vertical plane may be referred to as "neutral" if the line segments are substantially parallel to each other. A person's hand may be referred to as "neutral" if positioned such that the palm of the hand faces substantially in a left or right direction.

[0070] As used herein, the term "at least one of" is synonymous with "one or more of". For example, the phrase "at least one of A, B, and C" means any one of A, B, and C, or any combination of any two or more of A, B, and C. For example, "at least one of A, B, and C" includes one or more of A alone; or one or more B alone; or one or more of C alone; or one or more of A and one or more of B; or one or more of A and one or more of C; or one or more of B and one or more of C; or one or more of all of A, B, and C. Similarly, as used herein, the term "at least two of" is synonymous with "two or more of". For example, the phrase "at least two of D, E, and F" means any combination of any two or more of D, E, and F. For example, "at least two of D, E, and F" includes one or more of D and one or more of E; or one or more of D and one or more of F; or one or more of E and one or more of F; or one or more of all of D, E, and F.

[0071] The present disclosure relates generally to attachment handles for exercise or weight machines and, more particularly, to adjustable attachment handles for cable exercise machines that allow a user to vary his or her grip position on the handle.

[0072] Referring now to **FIGS. 1-4**, a cable attachment handle **100** adjustable between multiple grip positions is shown in accordance with an embodiment of the present disclosure. The cable attachment handle **100** includes a main mounting body **10** having a cable attachment element **12**

for connecting the cable attachment handle **100** to a cable **300** of an exercise machine. The cable attachment element **12** is located at an approximate midpoint between the two handles **50** to equalize the load on each hand of the user **200** when the user **200** pulls the cable attachment handle **100**. The cable attachment element **12** may be a shackle or clip for removable connection of the cable attachment handle **100** and the cable **300**. The cable attachment element **12** may also be one of any connection devices known in the art suitable for connection with the cable **300**.

[0073] The cable attachment handle **100** includes two handle mounts **20** positioned rotatably about respective studs **11** extending from the main mounting body **10**. Each of the studs **11** may extend through a hole **21** of the respective handle mount **20**, and each of the studs **11** may be threaded such that a torque knob **30** may be fastened onto the stud to secure the handle mount **20** against the main mounting body **10**. A stop bolt **40** may be threaded into a tapped hole in the end of each stud **11** to prevent removal of the torque knob **30** from the stud **11**. Thus, the torque knob **30** may be rotated by a user **200** to loosen the handle mount **20** from the main mounting body **10** such that the handle mount **20** may be rotated relative to the main mounting body **10**. However, due to the presence of the stop bolt **40**, the torque knob **30** may not be completely disconnected from the stud **11** during normal operation.

[0074] Each handle **50** is attached to or integral with one of the handle mounts **20**. Each handle **50** has a post **51** having a longitudinal axis **55** that may be substantially perpendicular to an axis of the respective stud **11**. In some embodiments, each handle may include a paddle **52** extending from the post **51** along a plane substantially parallel to the longitudinal axis **55** of the post **51**. To use the cable attachment handle **100**, the user may wrap one or more fingers of each hand around the respective post **51** and rest the palm of each hand against the respective paddle **52**.

[0075] In some embodiments, each handle **50** may be removable from the respective handle mount **20** so that the handles **50** may be replaced if damaged or worn out. For example, the handles **50** may have a rubber or foam coating which deteriorates with use, such that periodic replacement of the handles **50** is necessary. In such embodiments, each handle **50** may be secured to the respective handle mount **20** via one or more fasteners **53** such as bolts or screws. The one or more fasteners **53** may include two or more fasteners **53** spaced apart from each other so as to prevent rotation of the handle **50** about an axis parallel to the longitudinal axis **55** of the post **51**.

[0076] The main mounting body **10** includes one or more alignment pins **13**, each corresponding to one of the handle mounts **20**. The alignment pin **13** corresponding to each handle mount **20** extends from the main mounting body **10** substantially parallel to the stud **11** corresponding to the same handle mount **20**. The alignment pin **13** is configured to engage any one of a plurality of alignment holes **22a-22c** in the corresponding handle mount **20**. The plurality of alignment holes **22a-22c** are arranged on the handle mount **20** in an arc having a center point coincident with the corresponding stud **11**, such that each of the plurality of alignment holes **22a-22c** are equidistant from the stud **11**. Thus, the handle mount **20** may be rotated about the corresponding stud **11** to align any one of the plurality of alignment holes **22a-22c** with the alignment pin **13**. Engagement of the alignment pin **13** with any of a plurality of alignment holes **22a-22c** creates a physical obstruction preventing rotation of the handle mount **20** relative to the main mounting body **10**.

[0077] The plurality of alignment holes **22a-22c** facilitates adjustment of the handles **50** between several positions. To adjust the handle **50** position, the user **200** first unscrews the torque knob **30** such that the handle mount **20** may be separated from the main mounting body **10** along the axis of the stud **11**, permitting free rotation of the handle mount **20** relative to the main mounting body **10**. Next, the user **200** rotates the handle mount **20** to align the desired one of the plurality of alignment holes **22a-22c** with the alignment pin **13**. The handle mount **20** may then be moved toward the main mounting body **10** along the axis of the stud **11**, engaging the alignment pin **13** with the desired one of the plurality of alignment holes **22a-22c**. The user **200** may then fasten the torque knob **30** against the handle mount **20**, preventing separation of the handle mount **20** from the main mounting body **10**.

[0078] Referring now to **FIGS. 2-4**, the user **200** and the cable attachment handle **100** are shown in various grip positions corresponding to each of the plurality of alignment holes **22a-22c**. **FIG. 2** illustrates a partially supinated grip position in which the alignment pin **13** is engaged with a first alignment hole **22a** of the plurality of alignment holes **22a-22c**. In the partially supinated grip position, the handles **50** may be rotated outwardly from a vertical axis **V** such that the palms of the user **200** face at least partially in an upward direction.

[0079] **FIG. 3** illustrates a neutral grip position in which the alignment pin **13** is engaged with a second alignment hole **22b** of the plurality of alignment holes **22a-22c**. In the neutral grip

position, the handles **50** may be substantially parallel to a vertical axis **V** such that the palms of the user **200** face substantially toward each other.

[0080] **FIG. 4** illustrates a partially pronated grip position in which the alignment pin **13** is engaged with a third alignment hole **22c** of the plurality of alignment holes **22a-22c**. In the partially pronated grip position, the handles **50** may be rotated inwardly from the vertical axis **V** such that the palms of the user **200** face at least partially in a downward direction.

[0081] As engagement of the alignment pin **13** with the desired one of the plurality of alignment holes **22a-22c** locks the cable attachment handle **100** in any of the supinated, neutral, and pronated grip positions, the user **200** is not required to allocate energy to stabilize the handles **50** or maintain a grip position while performing an exercise movement. As such, the entirety of the force exerted by the user **200** on the cable attachment handle **100** may be directed to the exercise movement, and there is no risk of the user **200** losing the desired plane of motion when performing the exercise movement. Additionally, because the supinated, neutral, and pronated grip positions are defined by the fixed locations of the plurality of alignment holes **22a-22c**, there is no risk of the user **200** improperly orienting the handles **50** of the cable attachment handle **100**.

[0082] The partially supinated, neutral, and partially pronated grip positions are shown in greater detail in **FIGS. 5A-7B**. In the partially supinated grip position shown in **FIGS. 5A-5B**, the handles **50** may be rotated outwardly from the vertical axis **V** at a supination angle **A**. To optimize activation of the biceps brachii muscles and comfort through the range of motion of the exercise movement, the supination angle **A** may be approximately 33°. In the neutral grip position shown in **FIGS. 6A-6B**, the handles **50** may be substantially parallel to the vertical axis **V** to optimize activation of the brachioradialis muscles. In the pronated grip position shown in **FIGS. 7A-7B**, the handles **50** may be rotated inwardly from the vertical axis **V** at a pronation angle **B**. To optimize activation of the brachialis muscles and comfort through the range of motion of the exercise movement, the pronation angle **B** may be approximately 45°. Other values for the supination angle **A** and the pronation angle **B** may be selected for comfort of the individual user **200** or to alter the activation of the biceps brachii, brachioradialis, and brachialis muscles as desired.

[0083] **FIGS. 5A-7B** also illustrate various lateral spacings of the handle mounts **20** and the handles **50** along the horizontal axis **H** of the main mounting body **10**. **FIGS. 5A**, **6A**, and **7A**

show a narrow grip configuration in which the studs **11** are spaced apart along the horizontal axis **H** of the main mounting body **10** by a first distance **D1**, which may be, for example, 6 inches. **FIGS. 5B**, **6B**, and **7B** show a wide grip configuration in which the studs **11** are spaced apart along the horizontal axis **H** of the main mounting body **10** by a second distance **D2**, which may be, for example, 14 inches. However, any suitable spacing between the studs **11** may be used, for example, between 6 inches and 28 inches.

[0084] While three grip positions, namely partially supinated, neutral, and partially pronated, are respectively shown in **FIGS. 2-7B**, each handle mount **20** may include additional alignment holes to permit additional grip positions. **FIGS. 8-9D** show another, non-limiting embodiment of the cable attachment **100** in which each handle mount **20** has four alignment holes **22a-22d** to facilitate rotation of the handle mounts **20** relative to the main mounting body **10** into four grip positions. As the features of the embodiment shown in **FIGS. 8-9D** are generally similar to the features of the embodiments of **FIGS. 1-7B**, only the differences will be discussed. As shown in **FIG. 8**, the four alignment holes **22a-22d** are arranged in an arc, with each of the four alignment holes **22a-22d** equidistant from the stud **11**. As with the embodiments of **FIG. 1-7B**, the handle mounts **20** may be rotated about the stud **11** to align the desired one of the four alignment holes **22a-22d** with the alignment pin **13**.

[0085] **FIGS. 9A-9D** show the handle mounts **20** arranged in various grip positions corresponding to each of the four alignment holes **22a-22d**. In **FIG. 9A**, the handle mounts **20** are shown in a partially supinated position, similar to the partially supinated position of **FIGS. 5A-5B**. The supination angle **A** of the longitudinal axes **55** of the posts **51** relative to the vertical axis **V** may be, for example 33°. In the partially supinated position, the alignment pin **13** may be engaged with a first alignment hole **22a** of the four alignment holes **22a-22d**.

[0086] In **FIG. 9B**, the handle mounts **20** are shown in a neutral position, similar to the neutral position of **FIGS. 6A-6B**. The longitudinal axes **55** of the posts **51** may be oriented substantially parallel with the vertical axis **V**. In the neutral position, the alignment pin **13** may be engaged with a second alignment hole **22a** of the four of alignment holes **22a-22d**.

[0087] In **FIG. 9C**, the handle mounts **20** are shown in a partially pronated position, similar to the partially pronated position of **FIGS. 7A-7B**. The pronation angle **B** of the longitudinal axes **55** of the posts **51** relative to the vertical axis **V** may be, for example 45°. In the partially pronated

position, the alignment pin **13** may be engaged with a third alignment hole **22c** of the four alignment holes **22a-22d**.

[0088] In **FIG. 9D**, the handle mounts **20** are shown in a fully pronated position. The pronation angle **B** of the longitudinal axes **55** of the posts **51** relative to the vertical axis **V** may be, for example 90°. In the fully pronated position, the alignment pin **13** may be engaged with a fourth alignment hole **22d** of the four alignment holes **22a-22d**.

[0089] As discussed above with reference to **FIGS. 5A-7B**, non-limiting embodiments of the cable attachment handle **100** may have a variety of widths, i.e. the distance **D1**, **D2** between the studs **11**, for activating different muscle groups and/or for use during different exercise movements. Referring now to **FIGS. 10A-10C**, embodiments of the cable attachment handle **100** are shown, respectively having a first distance **D1** between the studs **11**, a second distance **D2** between the studs **11**, and a third distance **D3** between the studs **11**. The first distance **D1** and the second distance **D2** may be, respectively, approximately 6 inches and approximately 14 inches, as discussed above with reference to **FIGS. 5A-7B**. The third distance **D3** may be approximately 20 inches. However, it is to be understood that the distances **D1**, **D2**, **D3** between the studs **11** in any of the embodiments of the cable attachment handle **100** may be any distance suitable for use with an exercise machine.

[0090] With continue reference to **FIGS. 10A-10C**, the handles **50** of the cable attachment handle **100** may be oriented relative to the handle mounts **20** to achieve a desired wrist flexion angle **X** between a surface of the paddles **52** and a paddle axis **P** perpendicular to the horizontal axis **H** of the main mounting body **10**. In **FIGS. 10A-10C**, the cable attachment handles **100** are shown in the neutral grip position, i.e., with longitudinal axes **55** of the posts **51** extending substantially parallel to the vertical axis **V**, to best illustrate the wrist flexion angle **X**. The wrist flexion angle **X** may be selected to maintain a desired wrist position of the user based on the distance **D1**, **D2**, **D3** between the studs **11**. In particular, the paddles **52** may be oriented such that the flexion angle **X** induces the user to maintain a straight wrist position, with the user's palms being substantially parallel with the user's forearms. That is, the flexion angle **X** may be selected to limit flexion and/or extension of the user's wrist. By maintaining a substantially straight wrist position, the user may maximize the biomechanical force exerted on the cable attachment handle **100** and minimize discomfort and risk of injury.

[0091] As shown in **FIGS. 10A-10C**, the flexion angle **X** necessary to maintain a substantially straight wrist position may be different depending on the distance **D1**, **D2**, **D3** between the studs **11**. Particularly, the greater the distance **D1**, **D2**, **D3** between the studs **11**, the lower the flexion angle **X** necessary to maintain a substantially straight wrist position. In the embodiments of the cable attachment handle **100** shown in **FIG. 10A** and **10B**, in which the distances **D1**, **D2** between the studs **11** is approximately 6 inches and approximately 14 inches, respectively, the flexion angle **X** may be approximately 27°. In the embodiment of the cable attachment handle **100** shown in **FIG. 10C**, in which the distance **D3** between the studs **11** is approximately 20 inches, the flexion angle **X** may be approximately 12°. In other non-limiting embodiments, the flexion angle **X** may be between approximately 10° and approximately 30°.

[0092] Referring now to **FIGS. 11** and **12**, some embodiments of the cable attachment handle **100** provide adjustability of the spacing between the handles **50**. In such embodiments, the main mounting body **10** includes two slide mounts **15** from which the studs **11** respectively extend. The slide mounts **15** are configured to move along a stationary part of the main mounting body **10** in the direction of the horizontal axis **H**. The spacing between the handles **50** may be set by the user **200** by moving the slide mounts **15** such that a pin **16** of each slide mount **15** aligns with one of a plurality of indexing holes **17** in the stationary part of the main mounting body **10**. The pin **16** of each slide mount **15** may then be inserted into the desired one of a plurality of indexing holes **17** to lock the slide mounts **15** into a set position. The pins **16** may be any suitable structure for laterally securing the slide mounts **15** to one of a plurality of indexing holes **17**, such as a spring-loaded popper pin, a cotter pin, or a bolt.

[0093] In other embodiments of the cable attachment handle **100** not shown in the drawings, the alignment pins **13** may be located on the handle mounts **20**, and the plurality of alignment holes **22a-22c** may be located on the main mounting body **10**. Operation and adjustment of the cable attachment handle **100** is otherwise identical to the above-described embodiments. Similarly, in other embodiments of the cable attachment handle **100**, the studs **11** may extend from the respective handle mounts **20** through a hole in the main mounting body **10**. One skilled in the art may appreciate similar alternative arrangements for the various components, including but not limited to the studs **11**, alignment pins **13**, and plurality of alignment holes **22a-22d**, which are to be considered within the scope of the present disclosure.

[0094] While various aspects of the cable attachment handle **100** were provided in the foregoing description, those skilled in the art may make modifications and alterations to these aspects without departing from the scope and spirit of the disclosure. For example, it is to be understood that this disclosure contemplates that, to the extent possible, one or more features of any aspect can be combined with one or more features of any other aspect. Accordingly, the foregoing description is intended to be illustrative rather than restrictive. The disclosure described hereinabove is defined by the appended claims, and all changes to the disclosure that fall within the meaning and the range of equivalency of the claims are to be embraced within their scope.

[0095] In the claims which follow and in the preceding description of the disclosure, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the disclosure.

CLAIMS

1. A cable attachment handle for an exercise machine comprising:

a main mounting body defining a horizontal axis;

a first stud extending from the main mounting body;

a first handle mount rotatable about the first stud;

a first handle extending from the first handle mount;

a second stud extending from the main mounting body;

a second handle mount rotatable about the second stud;

a second handle extending from the second handle mount;

a cable attachment element affixed to the main mounting body between the first stud and the second stud;

a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount; and

a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount,

wherein engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body, and

wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body.

2. The cable attachment handle of claim 1, wherein the first handle extends substantially perpendicular to the first stud, and wherein the second handle extends substantially perpendicular to the second stud.

3. The cable attachment handle of claim 1 or 2, wherein the first handle and the second handle are adjustable between:

an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount;

a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount; and

an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount.

4. The cable attachment handle of any one of the preceding claims, wherein the first handle and the second handle are further adjustable between:

a fully pronated position in which the first alignment pin is engaged with a fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

5. The cable attachment handle of any one of the preceding claims, further comprising:

a first alignment pin extending from the first handle mount and configured to removably engage any of a first plurality of alignment holes in the main mounting body; and

a second alignment pin extending from the second handle mount and configured to removably engage any of a second plurality of alignment holes in the main mounting body,

wherein engagement of the first alignment pin with any of the first plurality of alignment holes prevents rotation of the first handle mount relative to the main mounting body, and

wherein engagement of the second alignment pin with any of the second plurality of alignment holes prevents rotation of the second handle mount relative to the main mounting body.

6. The cable attachment handle of claim 5, wherein the first handle and the second handle are adjustable between:

a supinated position in which the first alignment pin is engaged with a first of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a first of the second plurality of alignment holes in the main mounting body;

a neutral position in which the first alignment pin is engaged with a second of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a second of the second plurality of alignment holes in the main mounting body; and

a pronated position in which the first alignment pin is engaged with a third of the first plurality of alignment holes in the main mounting body and the second alignment pin is engaged with a third of the second plurality of alignment holes in the main mounting body.

7. The cable attachment handle of claim 6, wherein the first handle and the second handle are further adjustable between:

a fully pronated position in which the first alignment pin is engaged with a fourth of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a fourth of the plurality of alignment holes in the second handle mount.

8. The cable attachment handle of any one of the preceding claims, wherein the first handle is removably attached to the first handle mount, and wherein the second handle is removably attached to the second handle mount.

9. The cable attachment handle of any one of the preceding claims, wherein each of the first handle and the second handle comprise:

a post having a longitudinal axis; and

a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

10. The cable attachment handle of claim 9, further comprising one or more fasteners securing each of the first and second handles to each of the first and second handle mounts, respectively.

11. The cable attachment handle of claim 9, wherein the one or more fasteners comprises two or more fasteners spaced apart to prevent rotation of the first and second handles about an axis parallel to the longitudinal axis of the post.

12. The cable attachment handle of claim 9, wherein the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

13. The cable attachment handle of any one of the preceding claims, wherein each of the first post and the second post are slidable along the horizontal axis of the main mounting body.

14. The cable attachment handle of claim 13, wherein each of the first post and the second post are lockable at any of a plurality of locations along the horizontal axis of the main mounting body via a popper pin.

15. A cable attachment handle for an exercise machine comprising:

a main mounting body defining a horizontal axis;

a first handle mount rotatable relative to the main mounting body;

a first handle extending from the first handle mount;

a second handle mount rotatable relative to the main mounting body;

a second handle extending from the second handle mount; ~~and~~

a cable attachment element affixed to the main mounting body between the first stud and the second stud;

a first alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the first handle mount; and

a second alignment pin extending from the main mounting body and configured to removably engage any of a plurality of alignment holes in the second handle mount,

wherein engagement of the first alignment pin with any of the plurality of alignment holes in the first handle mount prevents rotation of the first handle mount relative to the main mounting body, and

wherein engagement of the second alignment pin with any of the plurality of alignment holes in the second handle mount prevents rotation of the second handle mount relative to the main mounting body.

16. The cable attachment handle of claim 15, wherein each of the first handle and the second handle comprises:

a post having a longitudinal axis; and

a paddle extending from the post along a plane parallel to a longitudinal axis of the post.

17. The cable attachment handle of claim 16, wherein the paddle extends from the post at an angle of between approximately 10° and approximately 30° relative to a paddle axis perpendicular to the horizontal axis of the main mounting body.

18. The cable attachment handle of any one of claims 15 - 17, wherein the first handle and the second handle are adjustable between:

an at least partially supinated position in which the first alignment pin is engaged with a first of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a first of the plurality of alignment holes in the second handle mount;

a neutral position in which the first alignment pin is engaged with a second of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a second of the plurality of alignment holes in the second handle mount; and

an at least partially pronated position in which the first alignment pin is engaged with a third of the plurality of alignment holes in the first handle mount and the second alignment pin is engaged with a third of the plurality of alignment holes in the second handle mount.

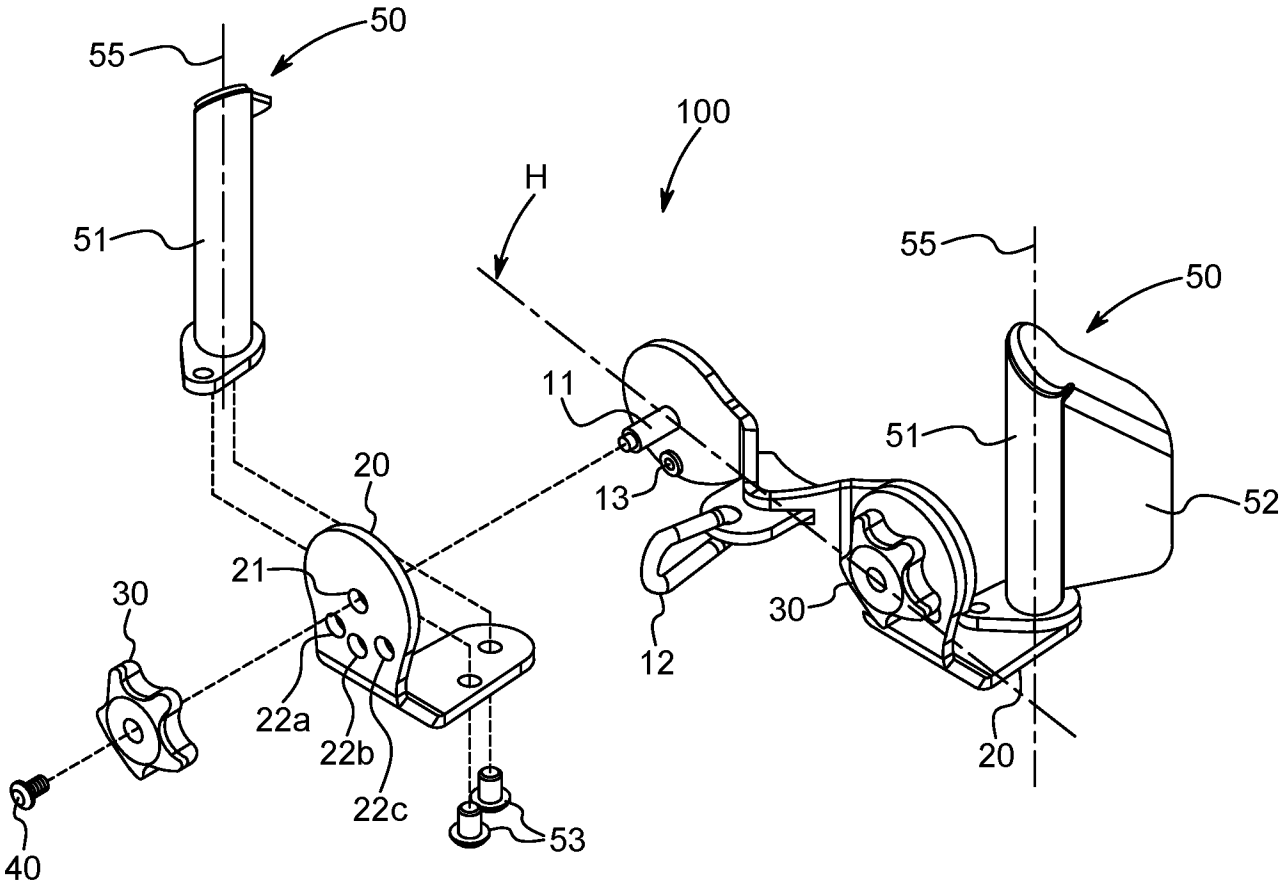


FIG. 1

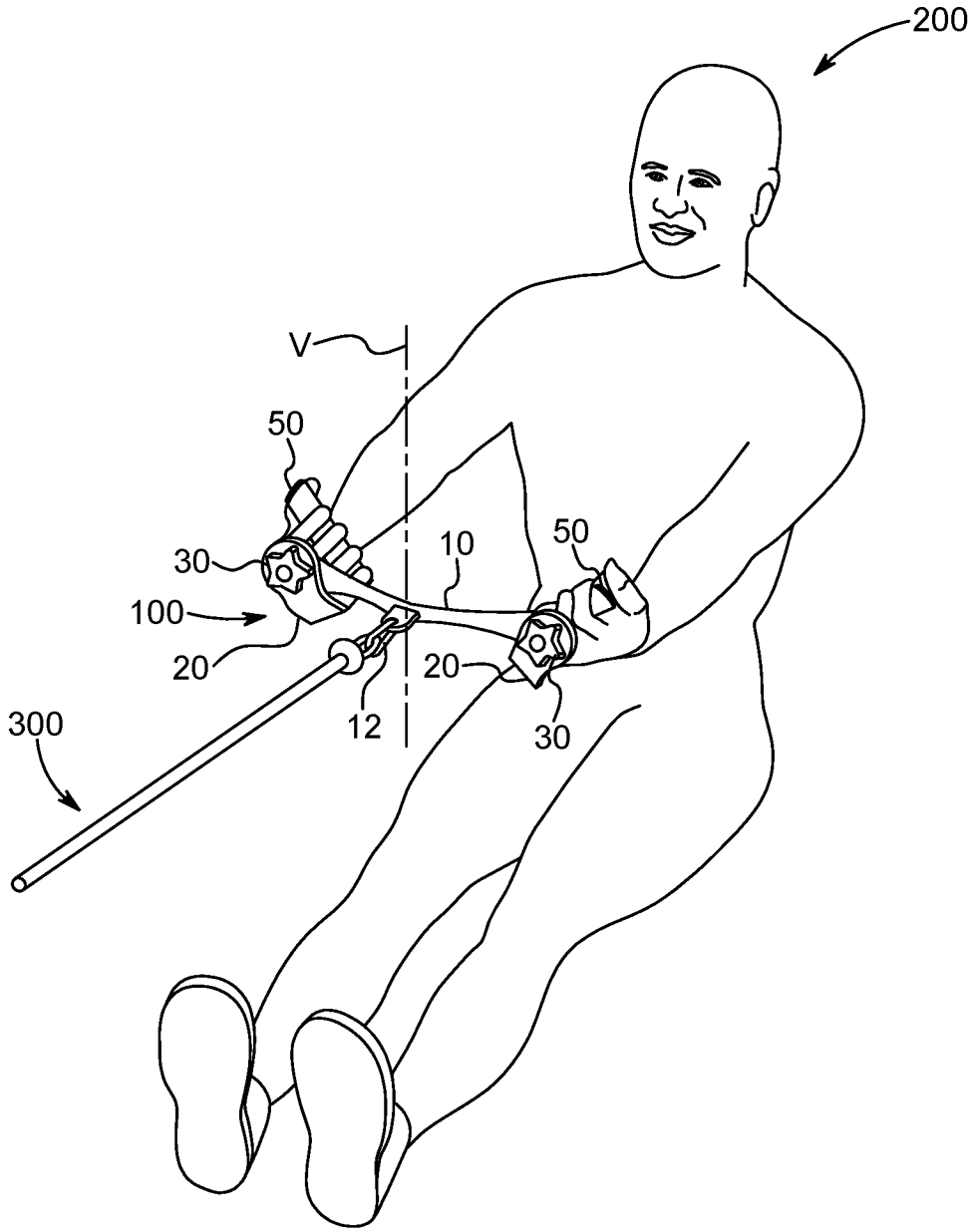


FIG. 2

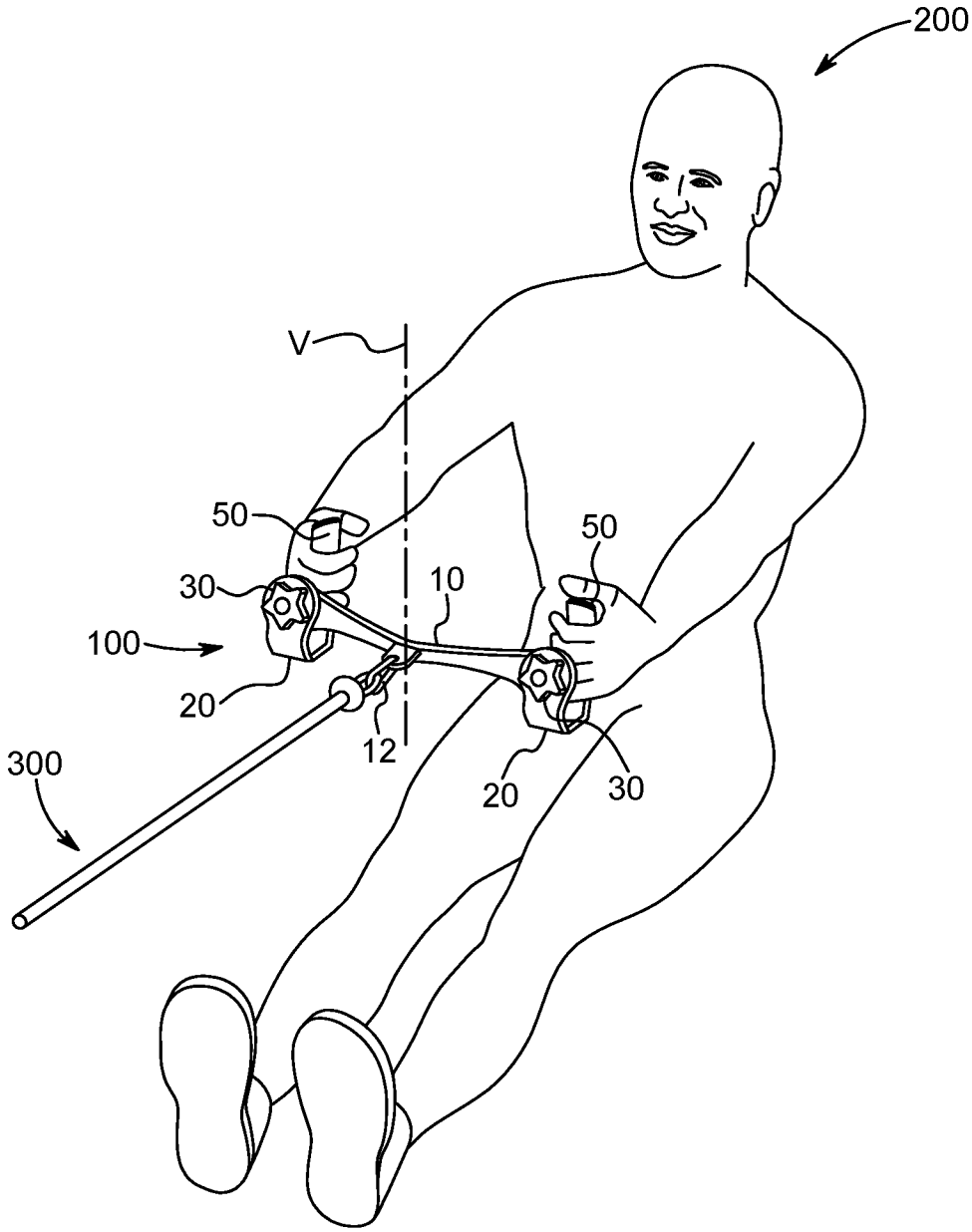


FIG. 3

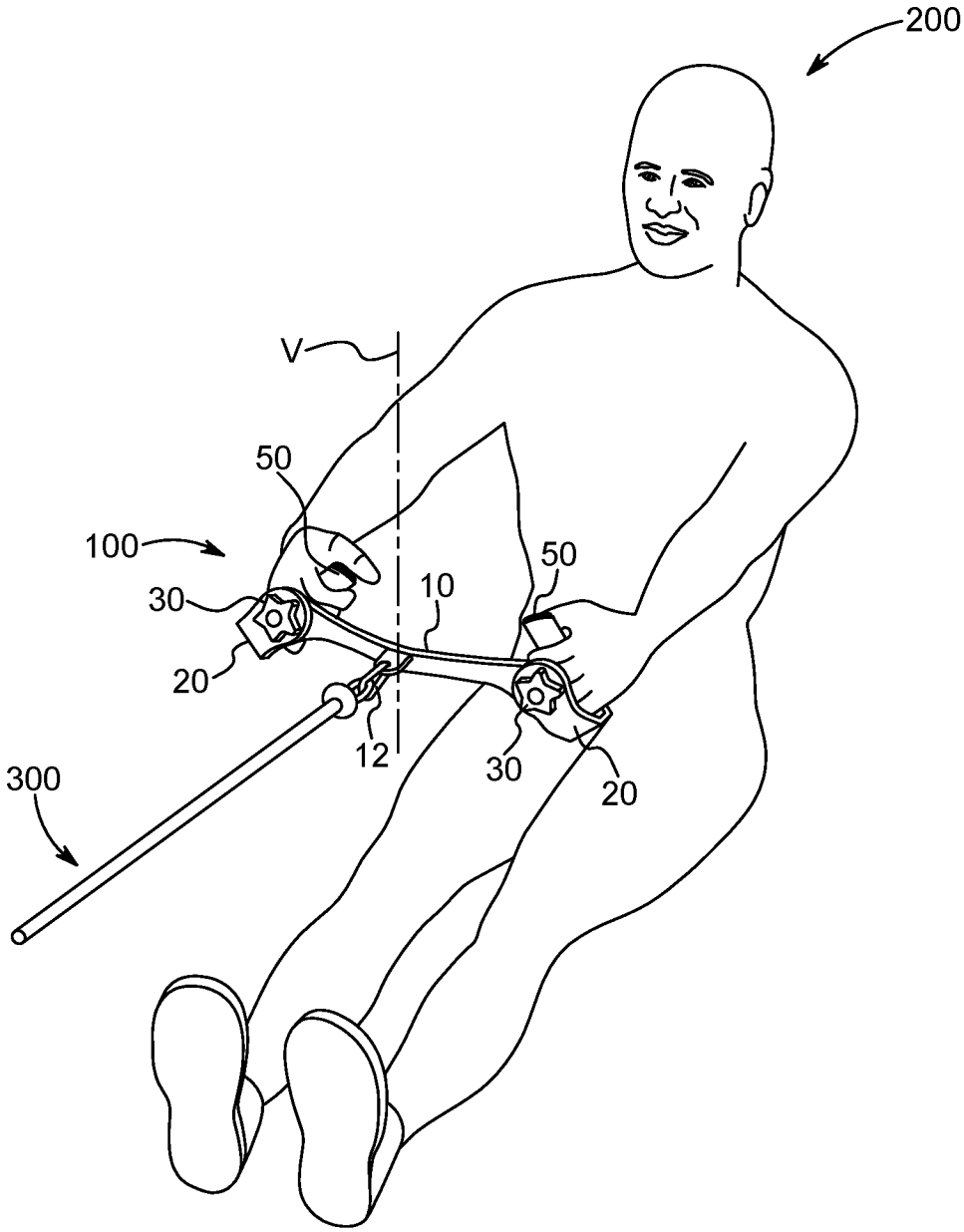
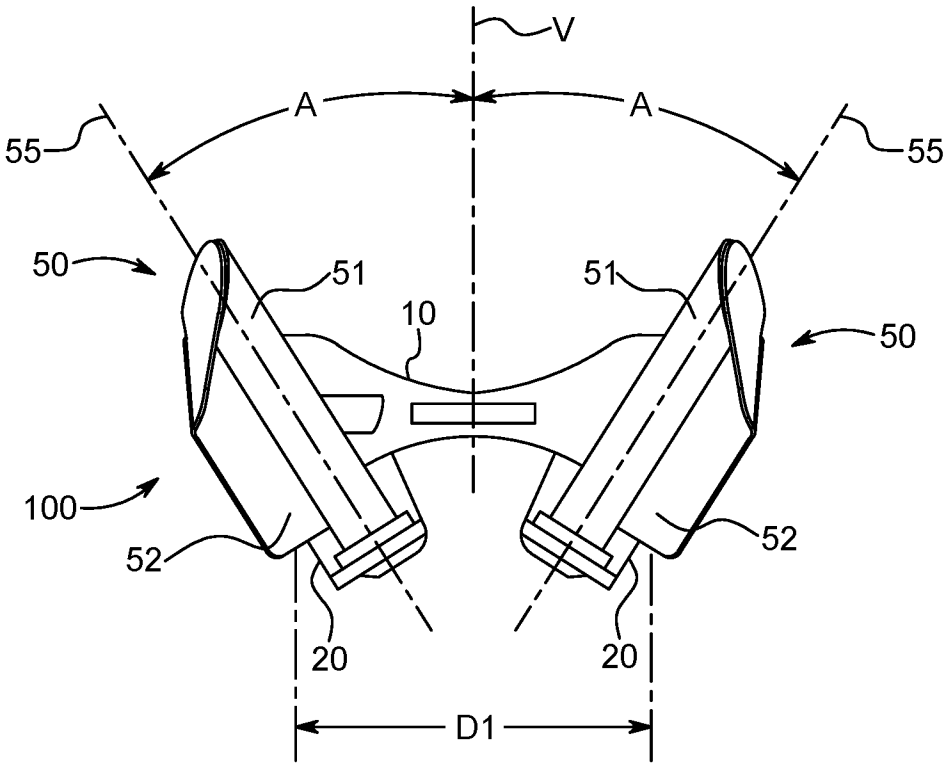


FIG. 4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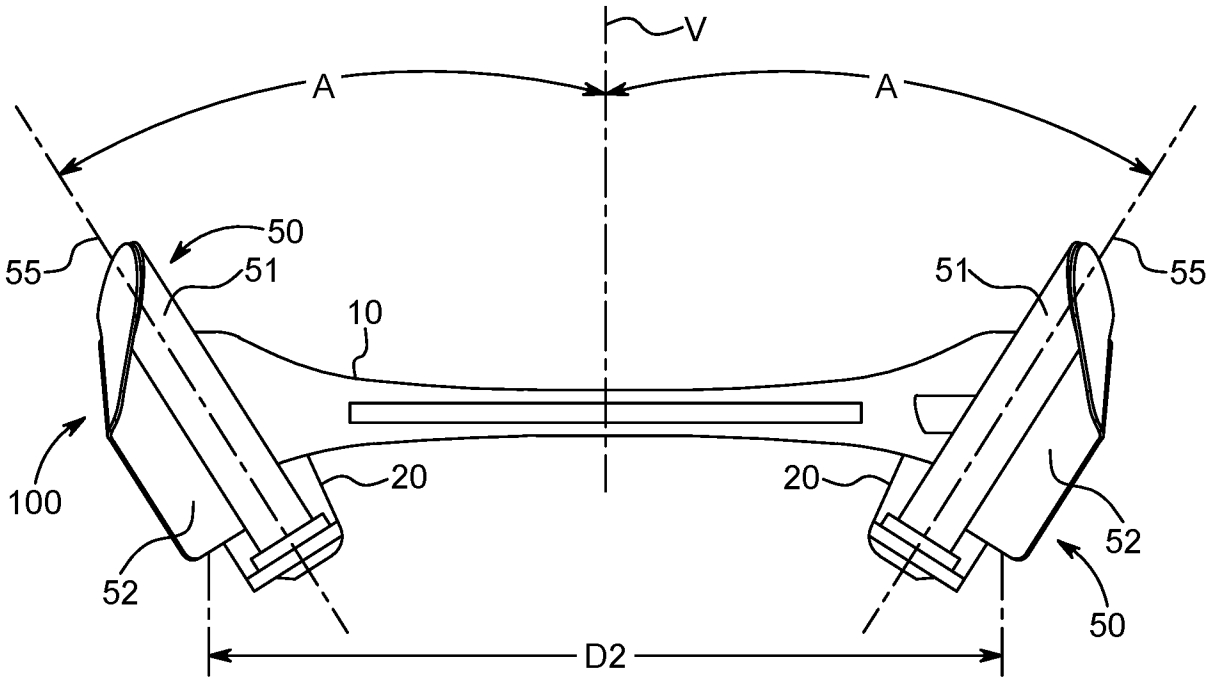
A
A
55
55
50
51
51
10
50
100
52
52
20
20
D1

FIG. 5A


V
A
A
50
55
51
51
55
10
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20
20
52
52
50
D2

FIG. 5B

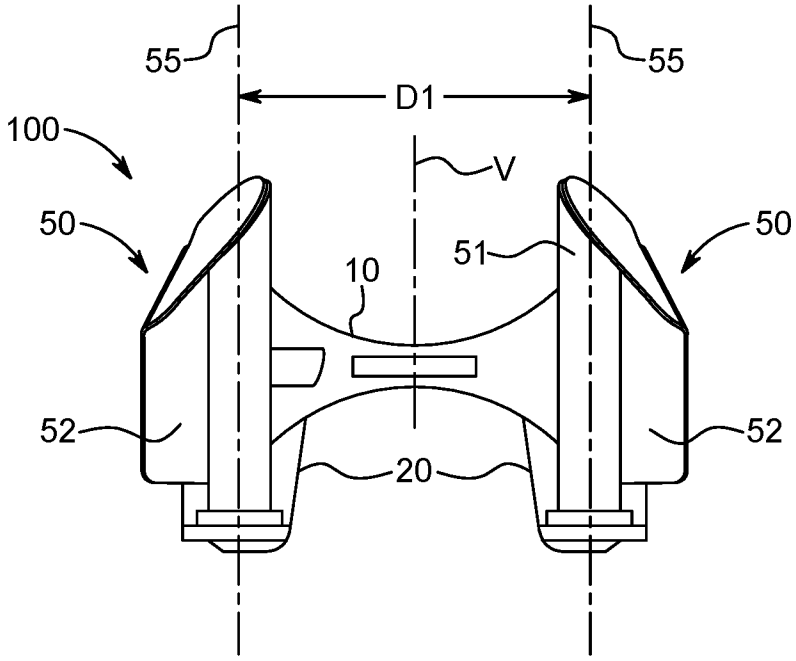
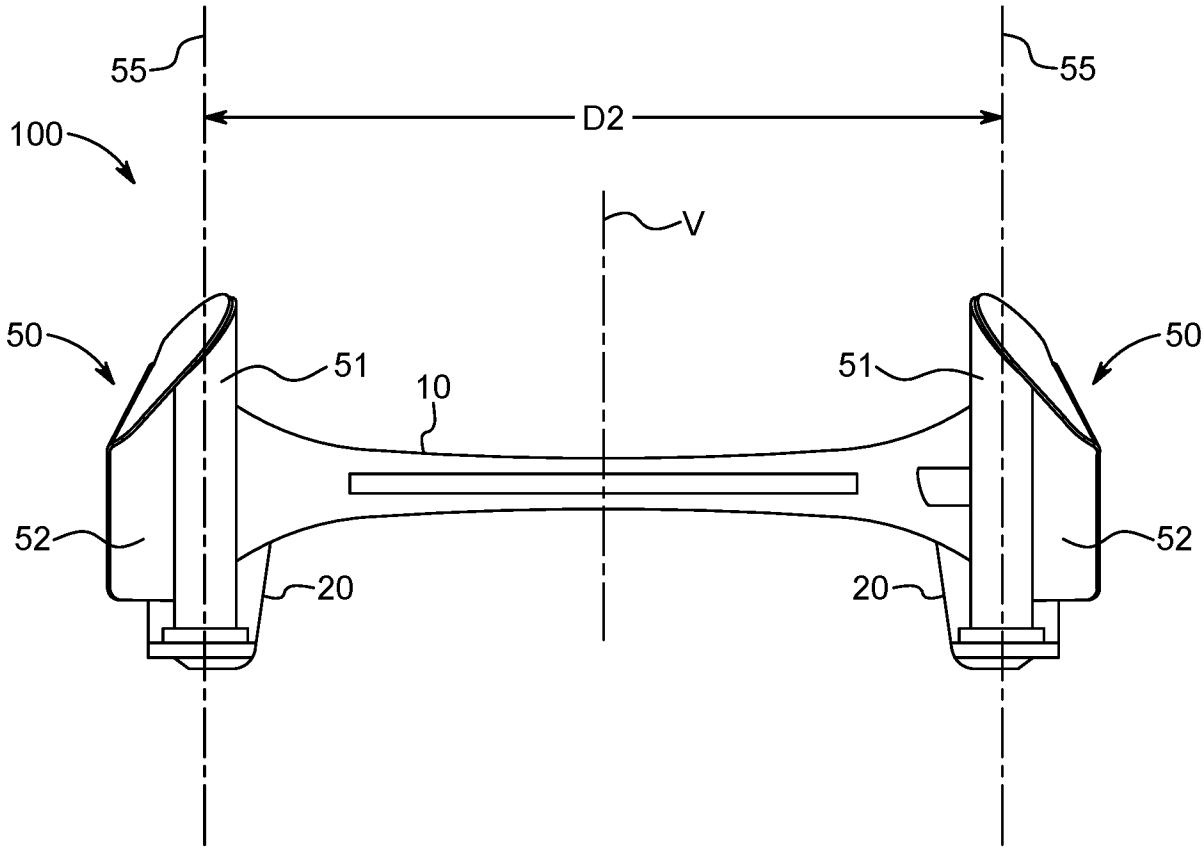

55
55
D1
100
V
50
51
50
10
52
52
20

FIG. 6A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55
D2
100
V
50
51
51
50
10
52
52
20
20

FIG. 6B

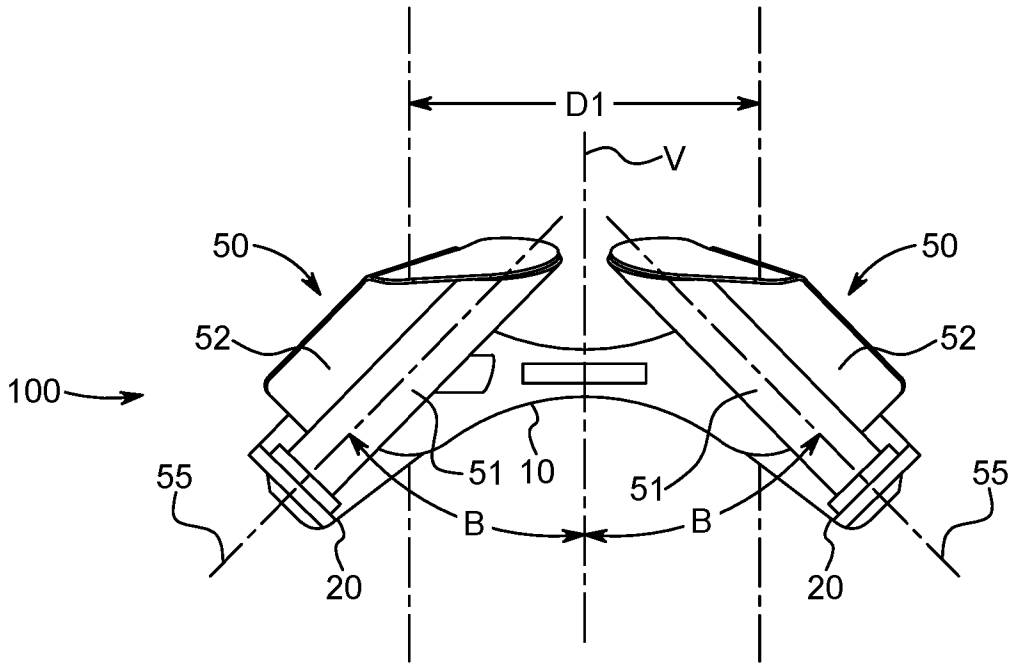
D1
V
50
50
52
52
100
51
10
51
55
55
B
B
20
20

FIG. 7A

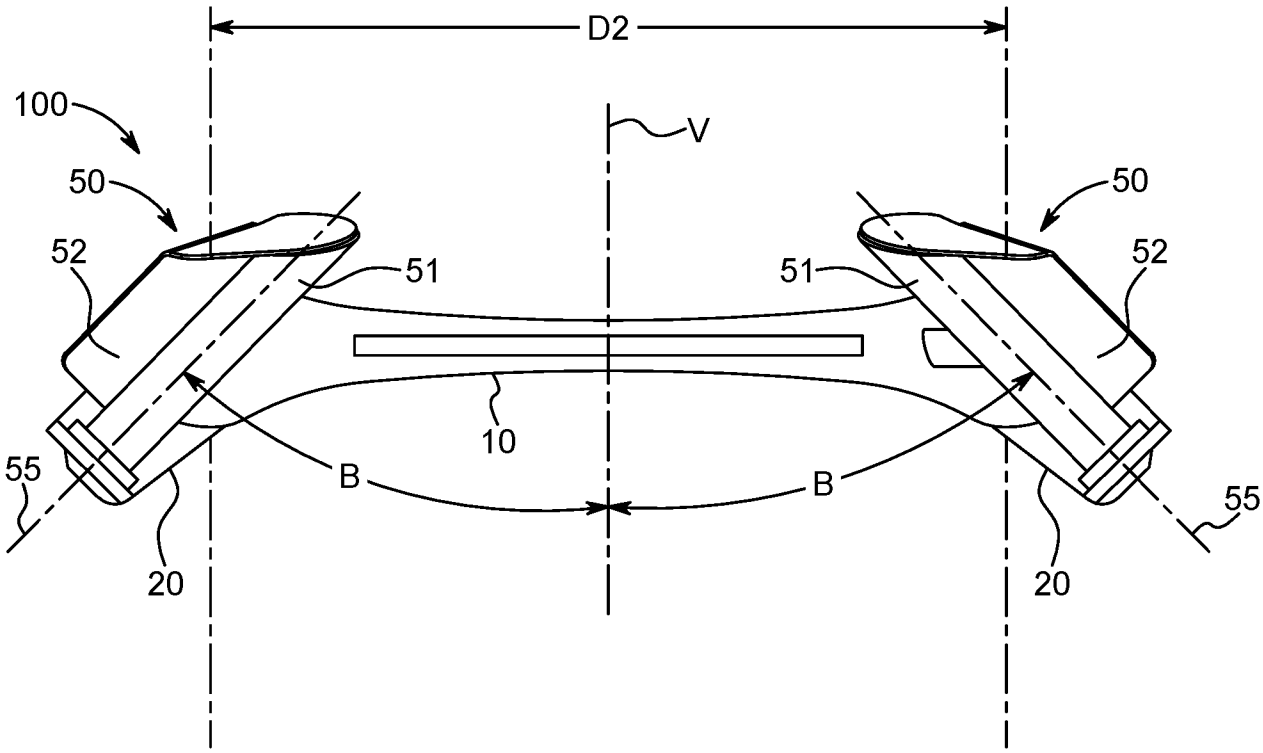
D2
100
V
50
50
52
52
51
51
10
55
55
B
B
20
20

FIG. 7B

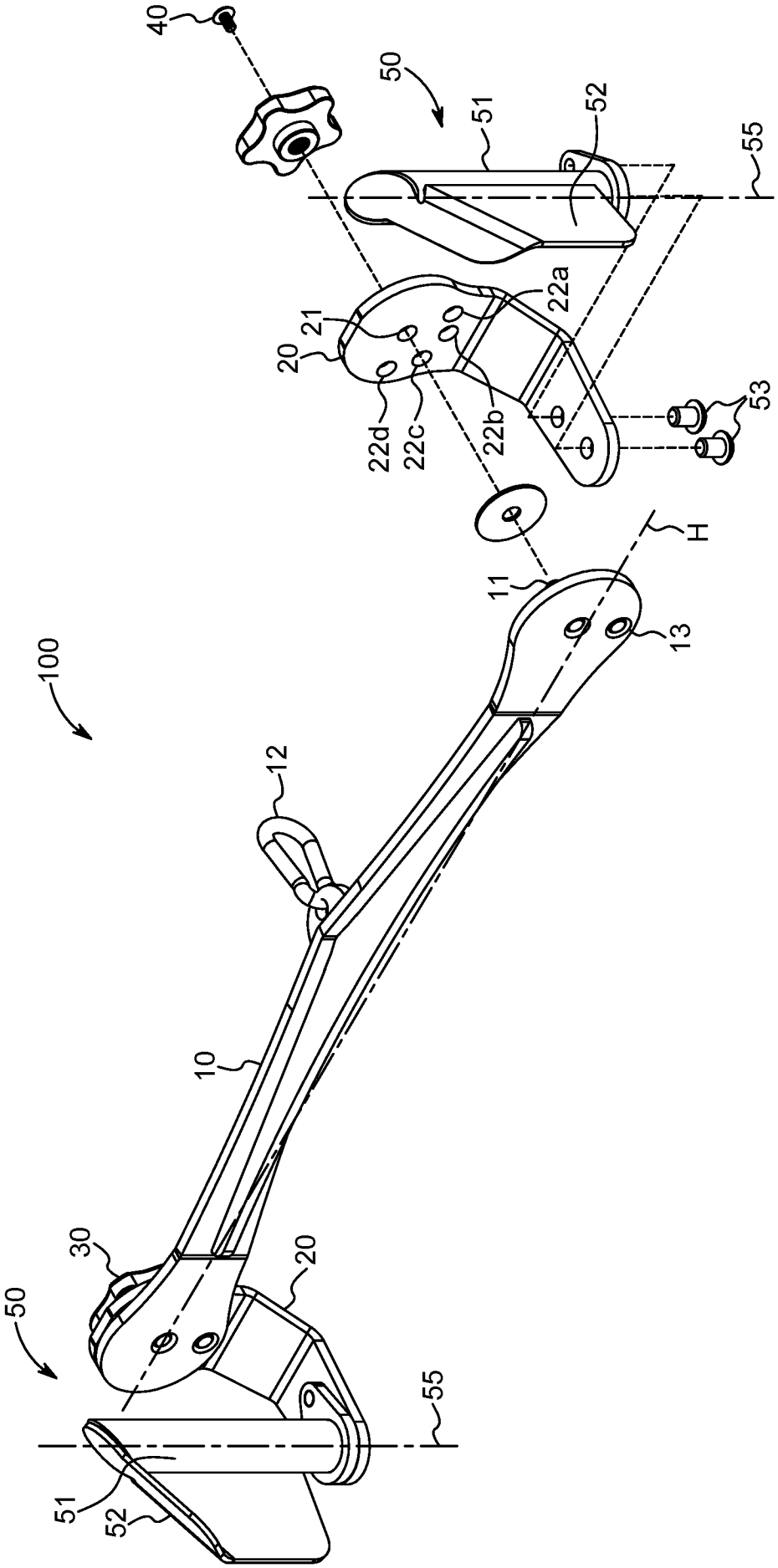
40
50
51
52
55
22a
21
20
22d
22c
22b
53
H
11
13
100
12
10
30
20
50
55
51
52

FIG. 8

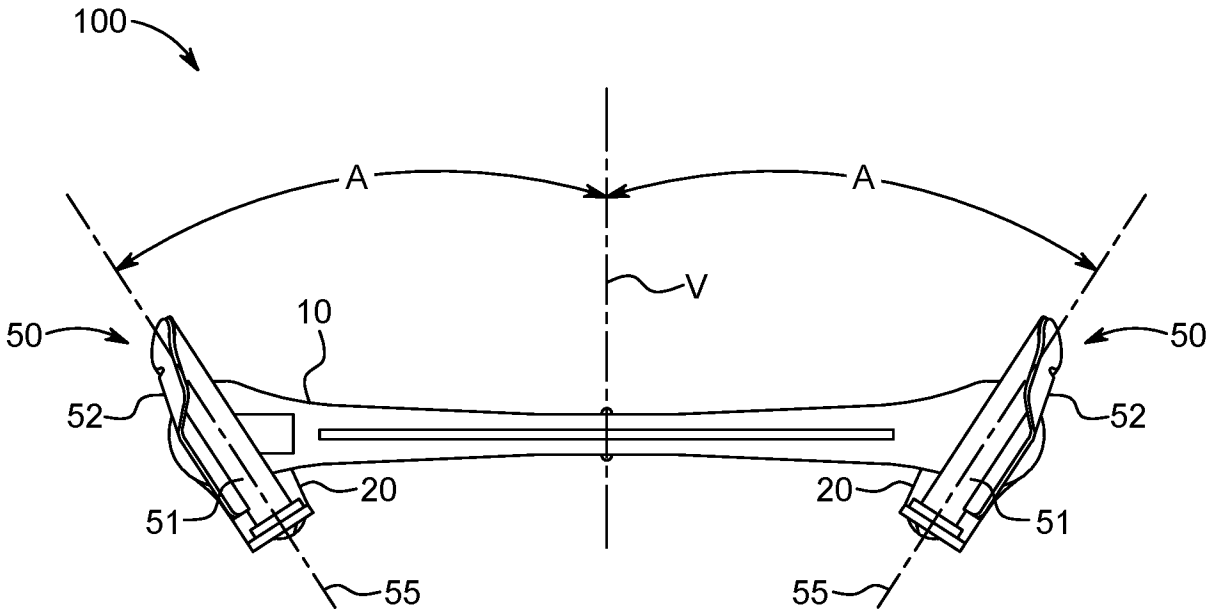
100
A
A
V
10
50
50
52
52
20
20
51
51
55
55

FIG. 9A

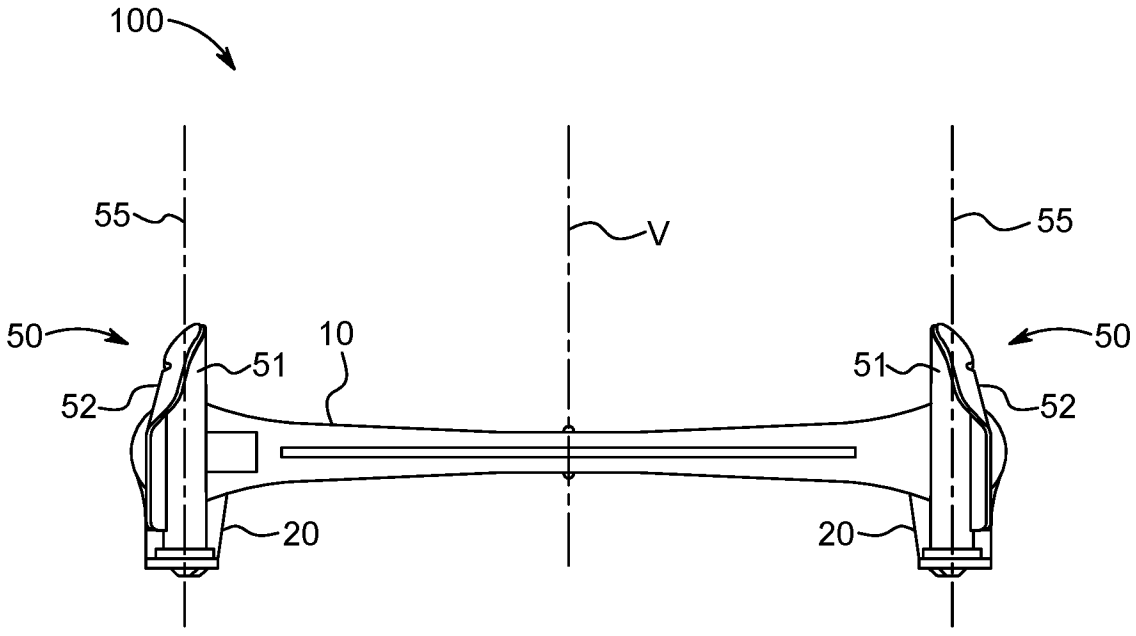
100
55
V
55
50
10
51
51
50
52
52
20
20

FIG. 9B

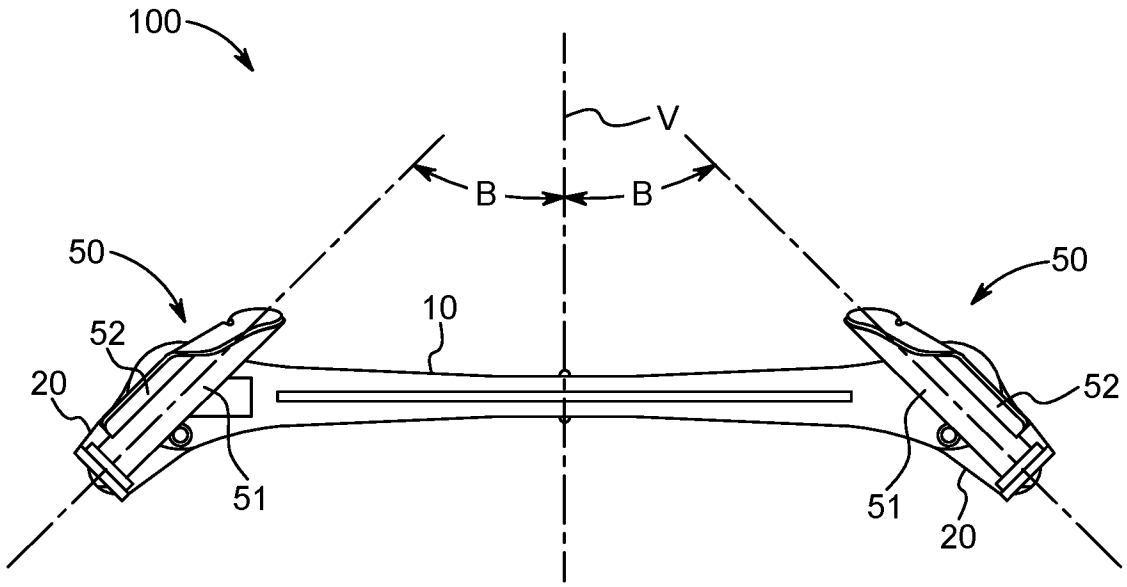

FIG. 9C

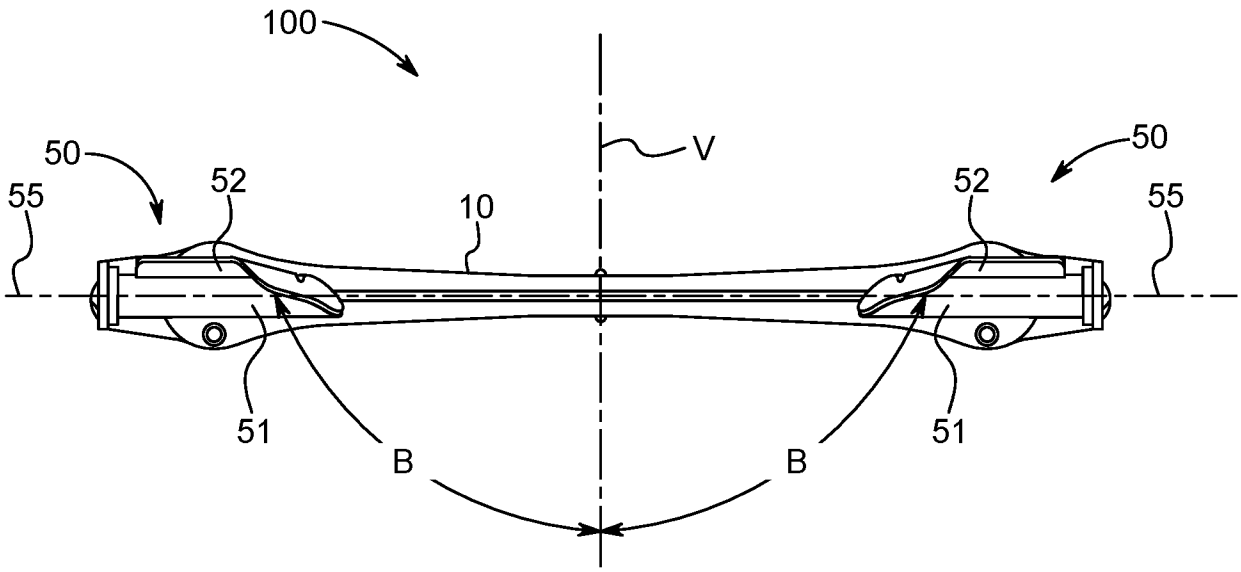

FIG. 9D

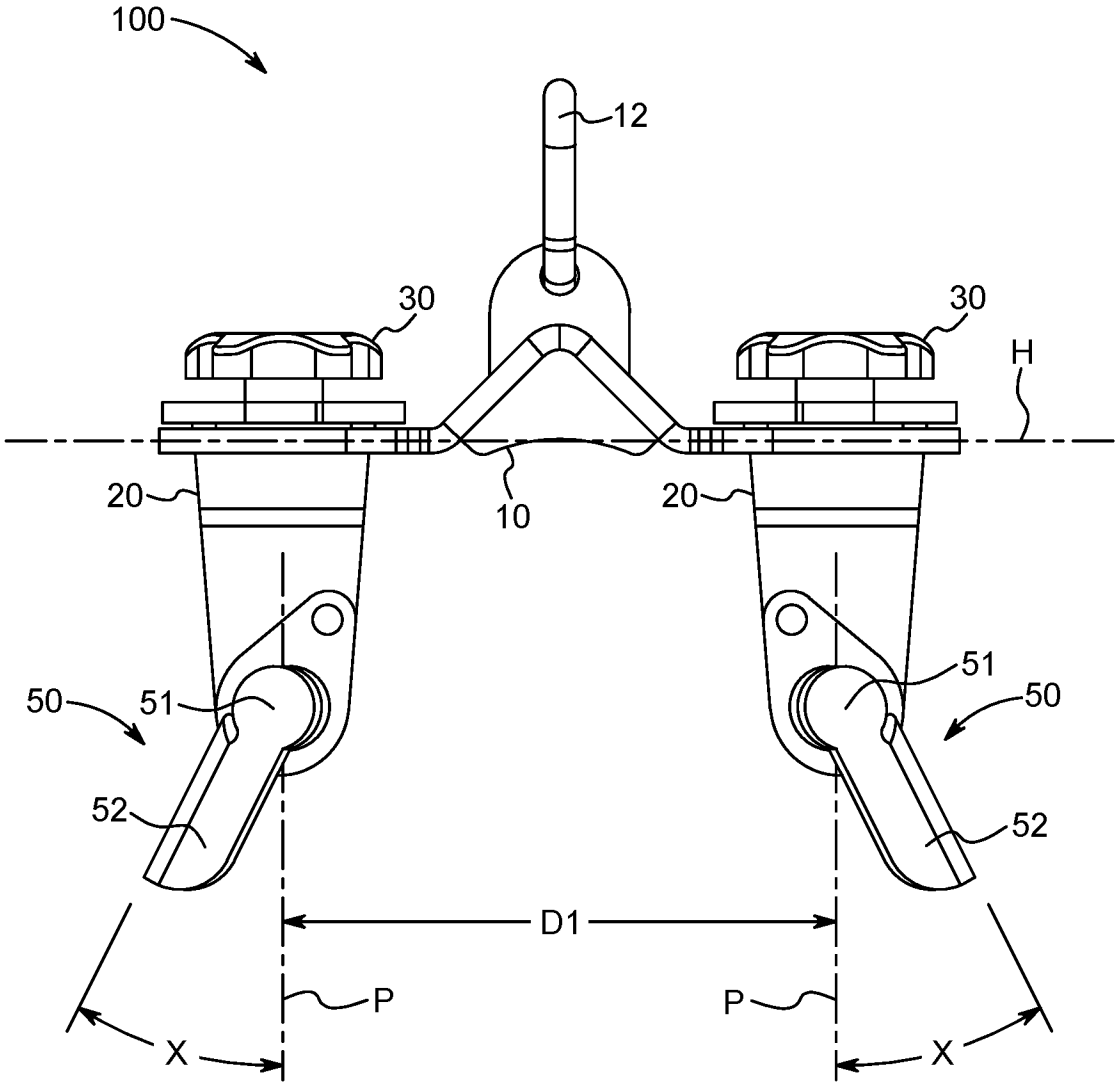

FIG. 10A

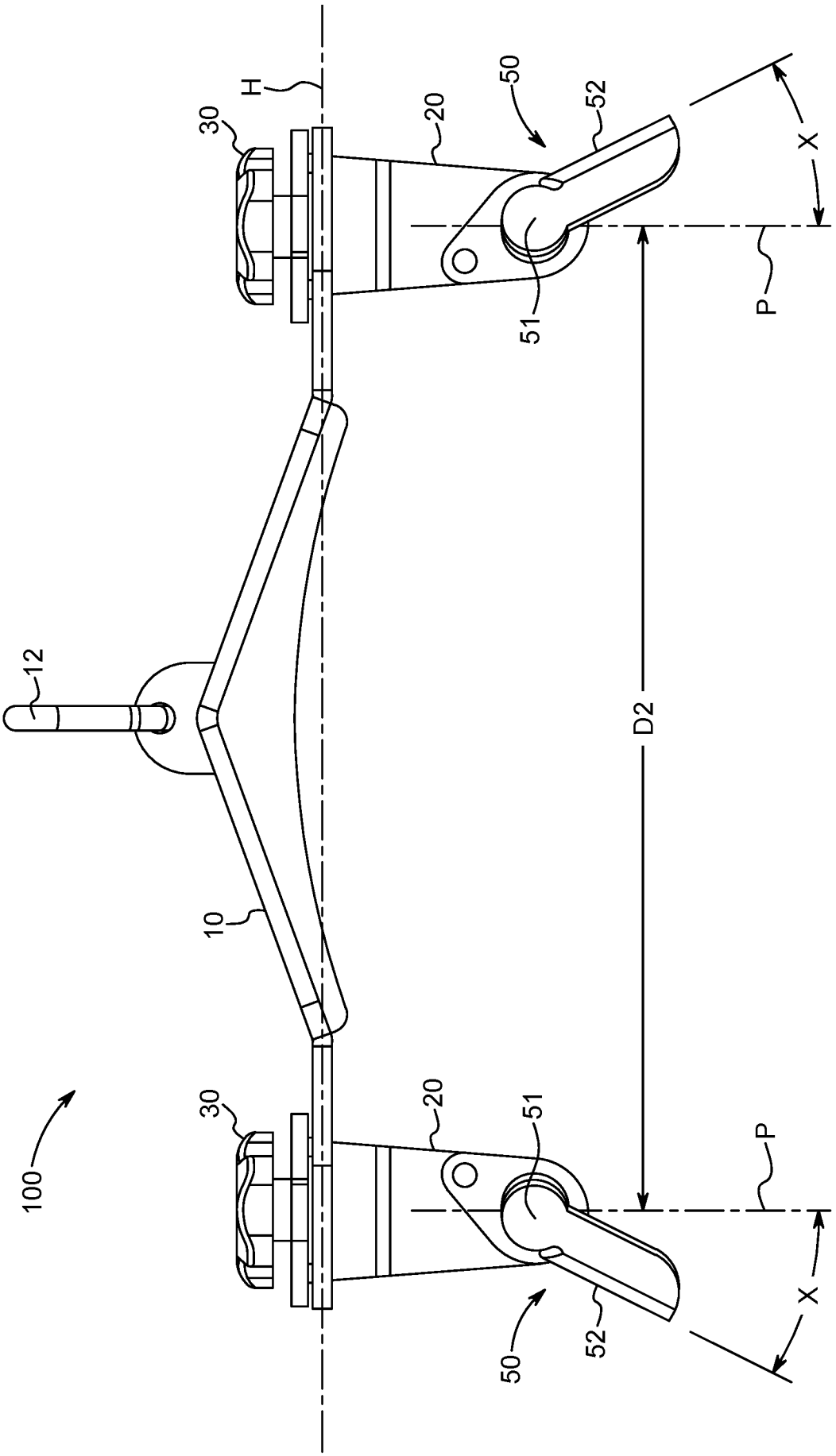

FIG. 10B

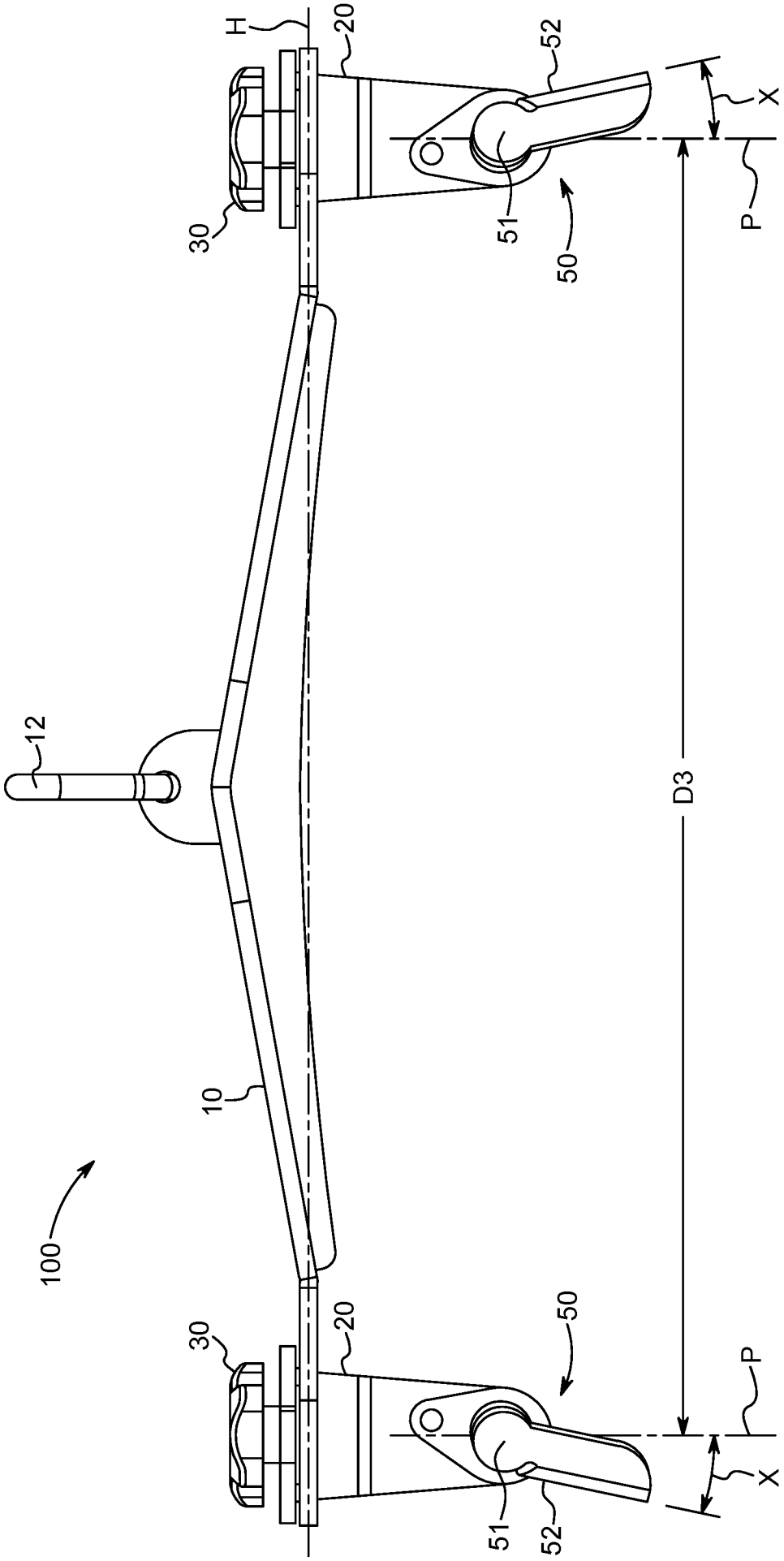

FIG. 10C

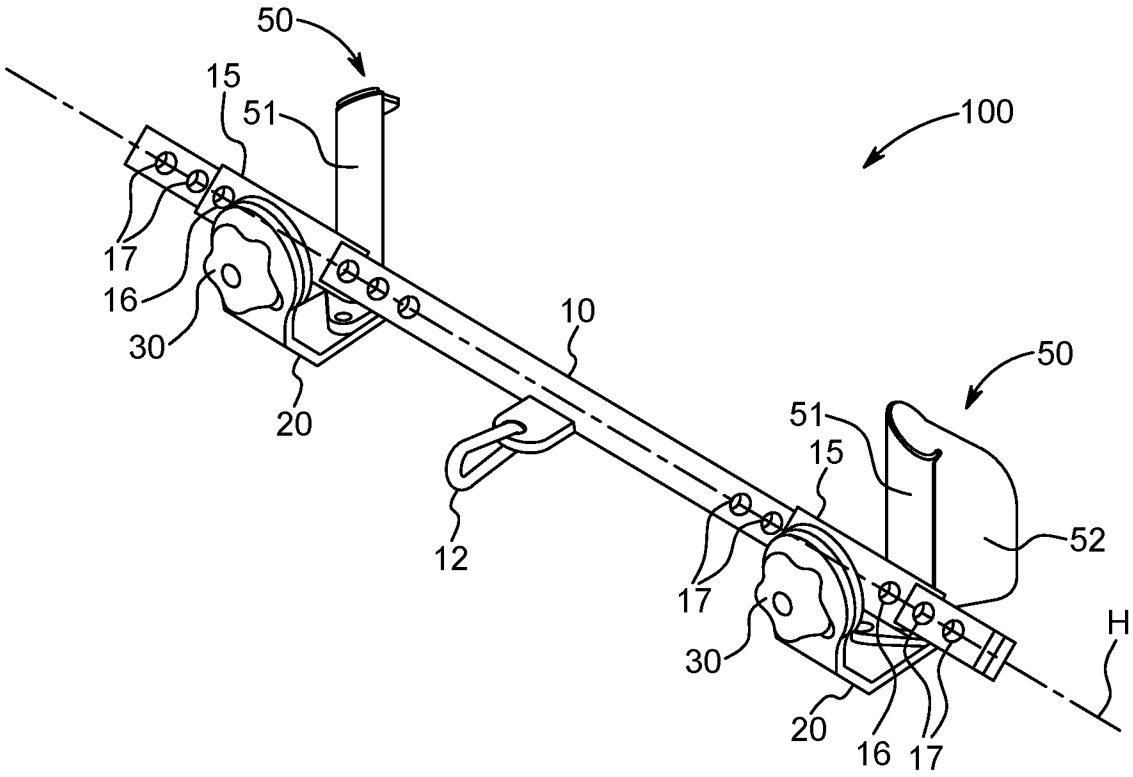
50
15
51
100
17
16
30
20
10
50
51
15
52
12
17
30
H
20
16
17

FIG. 11

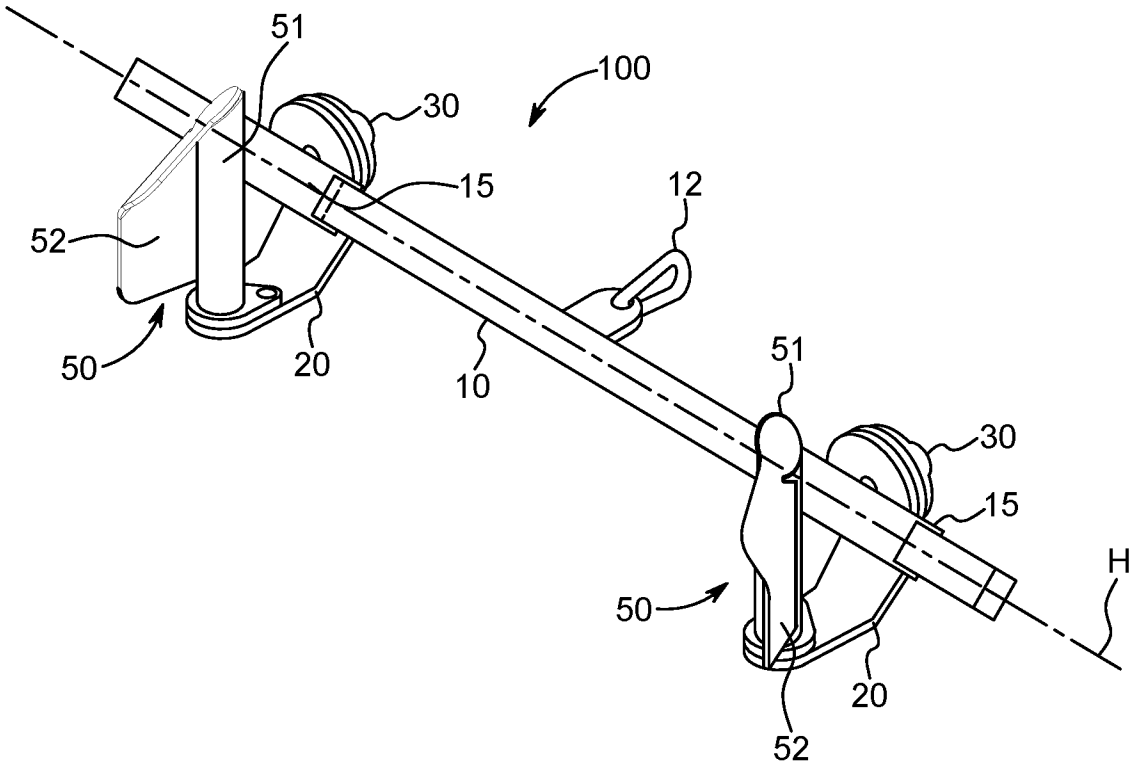
51
100
30
15
12
52
50
20
10
51
30
15
H
50
20
52

FIG. 12