



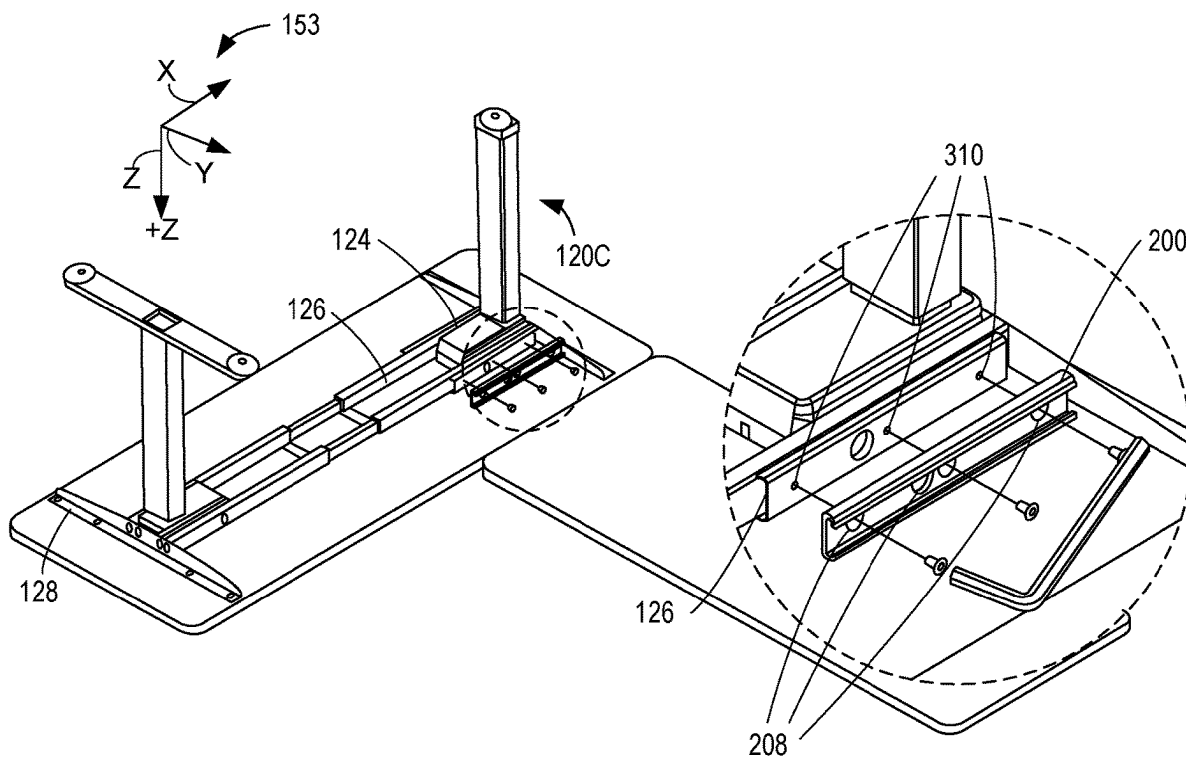
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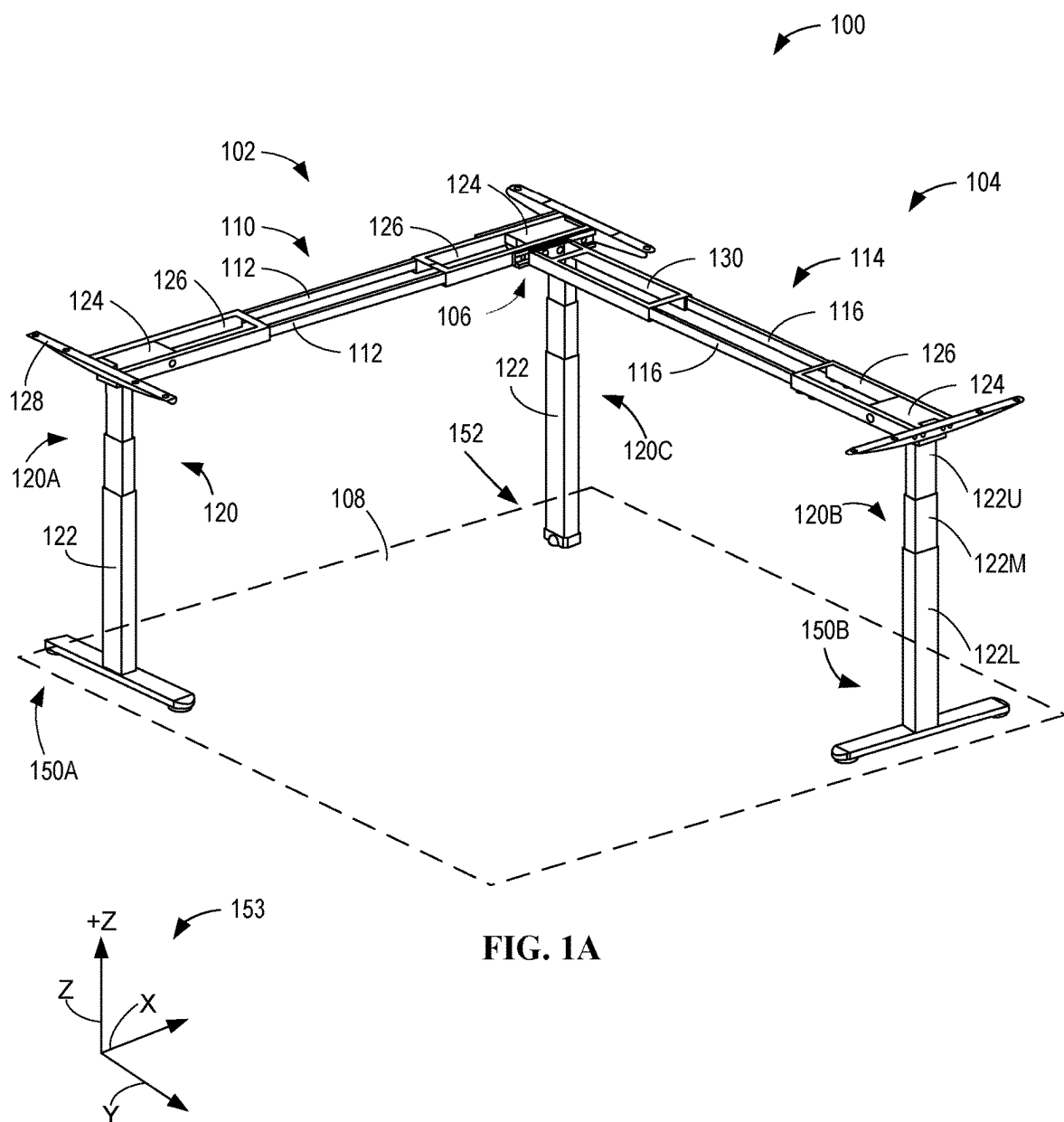
(19) **United States**(12) **Patent Application Publication****Douglas et al.**(10) **Pub. No.: US 2025/0255404 A1**(43) **Pub. Date: Aug. 14, 2025**(54) **ADJUSTABLE FRAME TO SUPPORT A WORKING SURFACE**(71) Applicant: **CKnapp Sales, Inc.**, Goodfield, IL (US)(72) Inventors: **Jakob Douglas**, Washington, IL (US);  
**Micah Fehr**, Danvers, IL (US)(21) Appl. No.: **18/436,858**(22) Filed: **Feb. 8, 2024****Publication Classification**(51) **Int. Cl.***A47B 1/08* (2006.01)*A47B 9/20* (2006.01)*A47B 13/02* (2006.01)(52) **U.S. Cl.**CPC ..... *A47B 1/08* (2013.01); *A47B 9/20*  
(2013.01); *A47B 13/02* (2013.01); *A47B*  
*2200/0051* (2013.01); *A47B 2200/0059*  
(2013.01)

(57)

**ABSTRACT**

Adjustable frames to support working surfaces are disclosed herein. An example adjustable frame includes a first frame, a second frame, and a sliding mechanism connected to the first frame and the second frame, the sliding mechanism including a channel bracket having a slot and a slider configured to move within the slot.





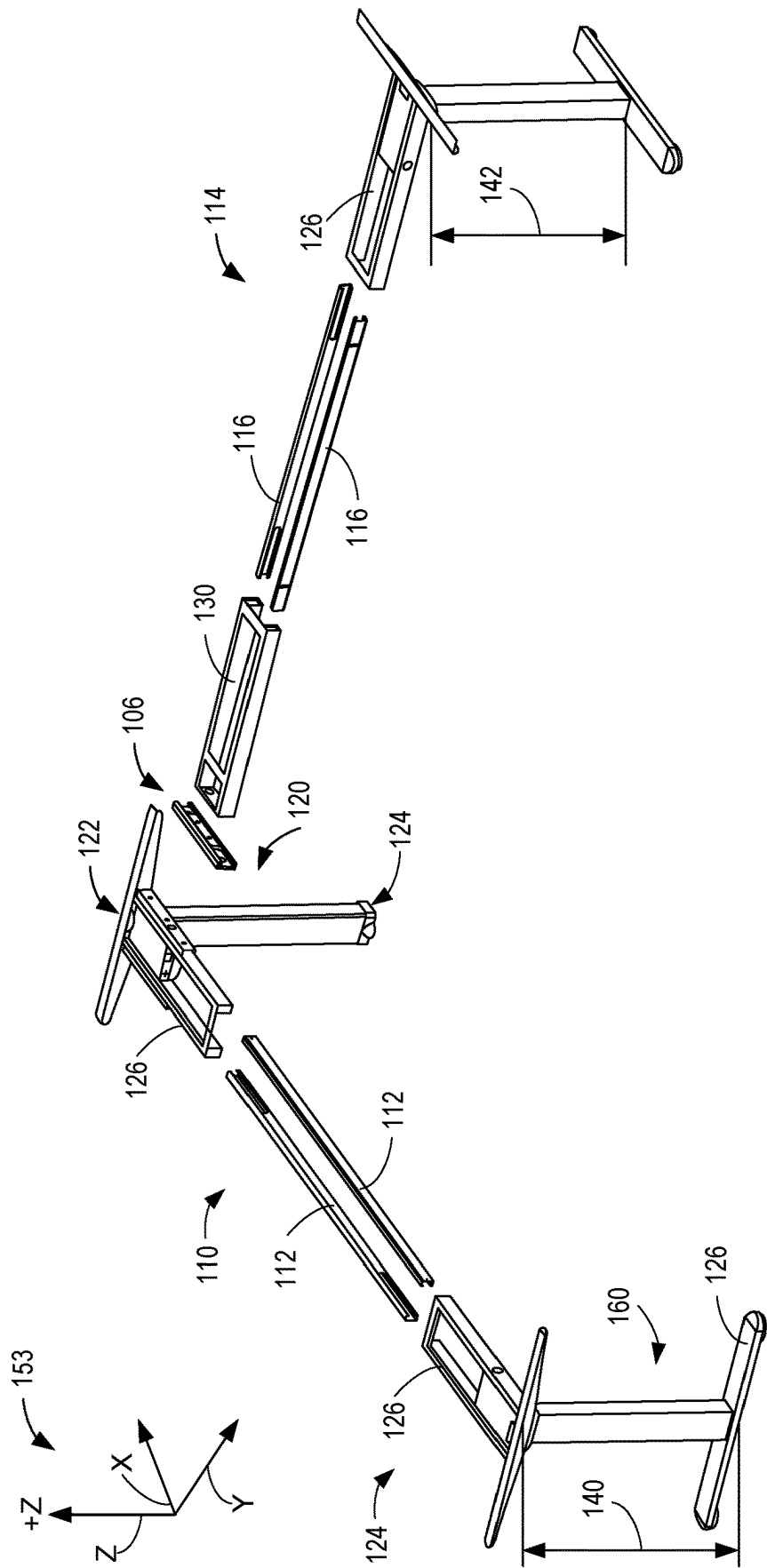


FIG. 1B



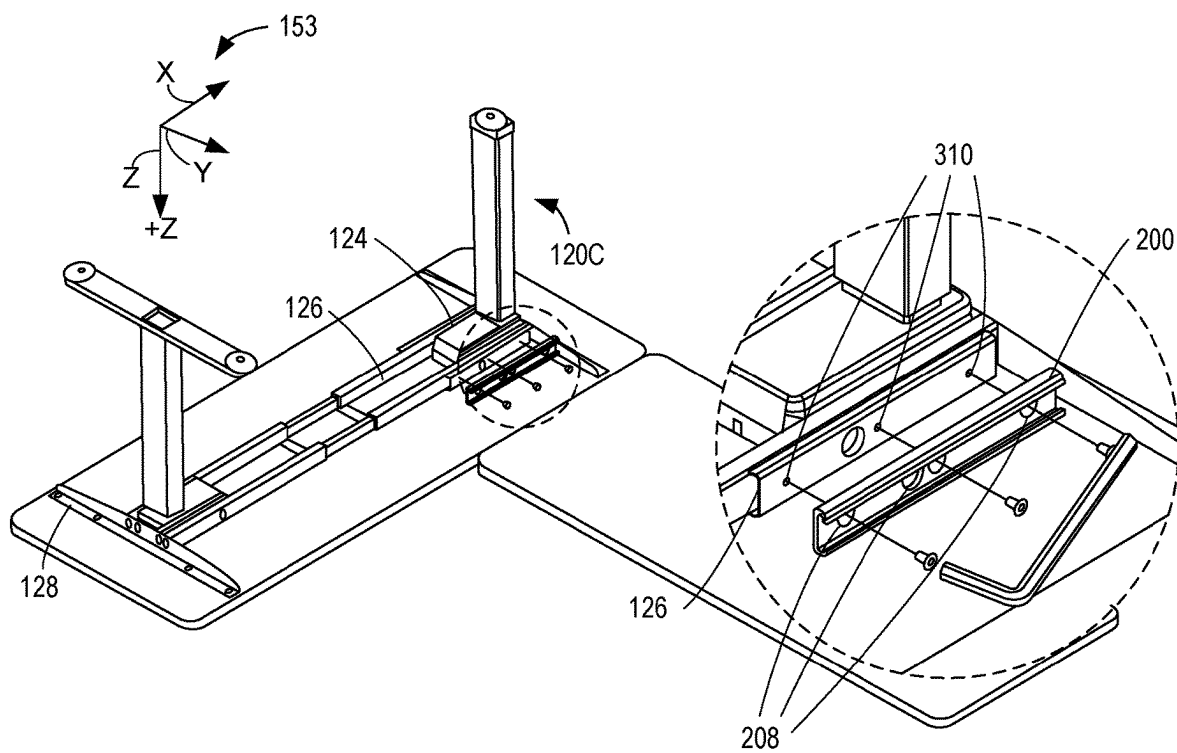


FIG. 3A

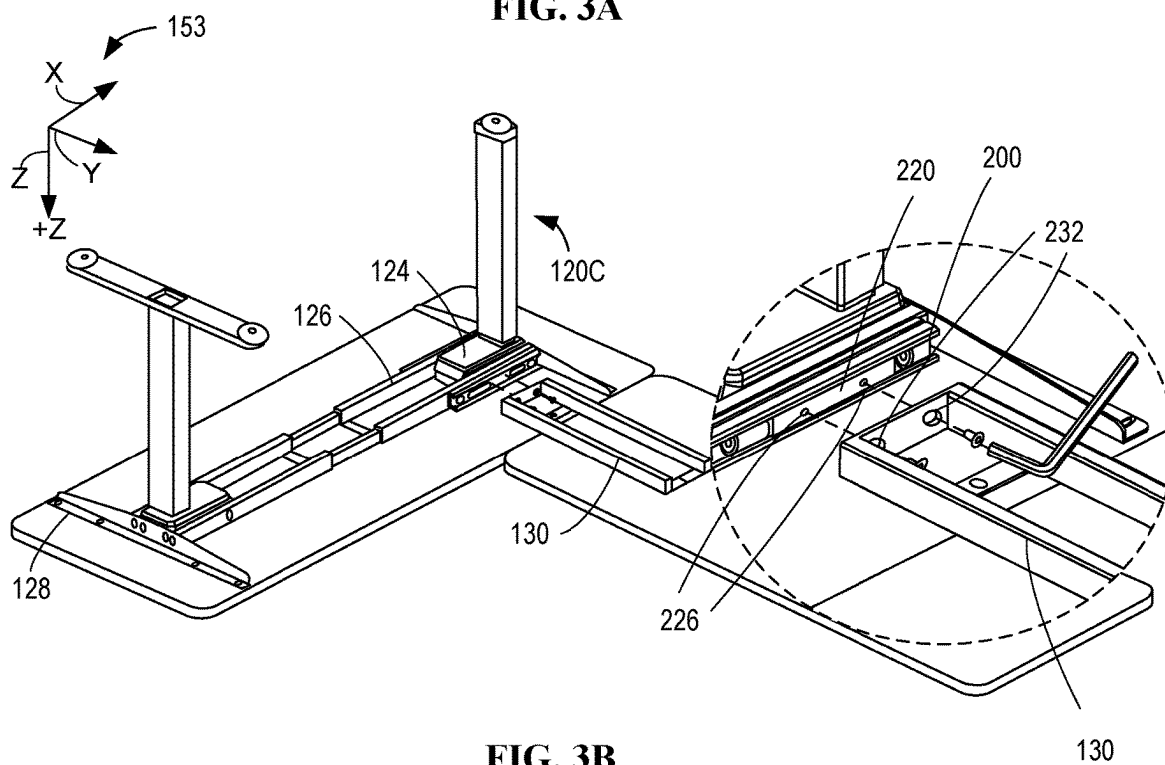


FIG. 3B

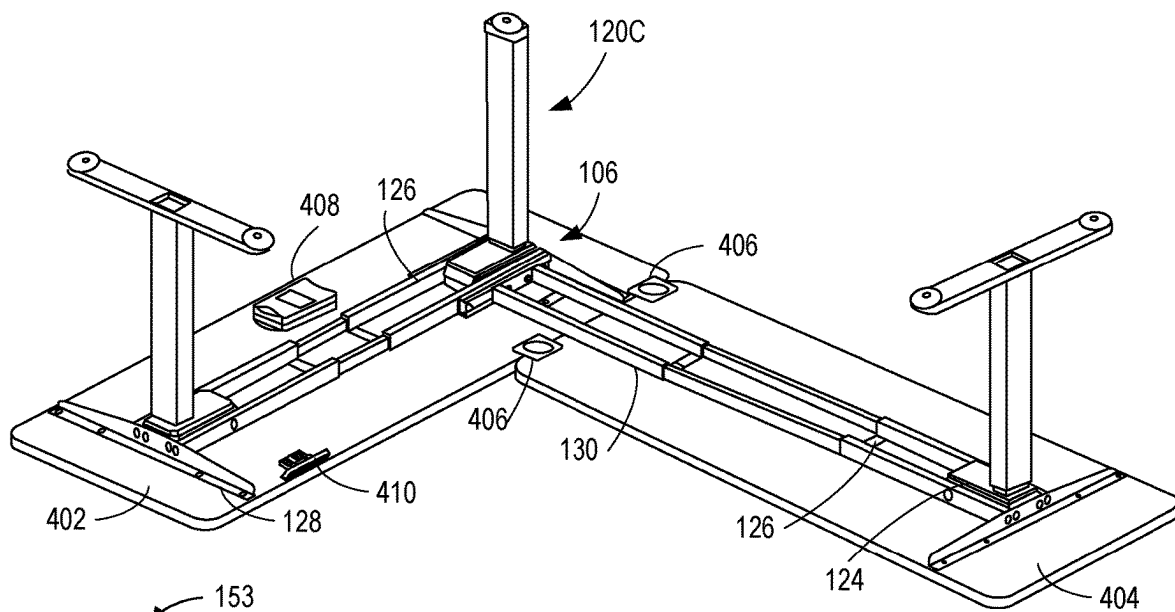


FIG. 4A

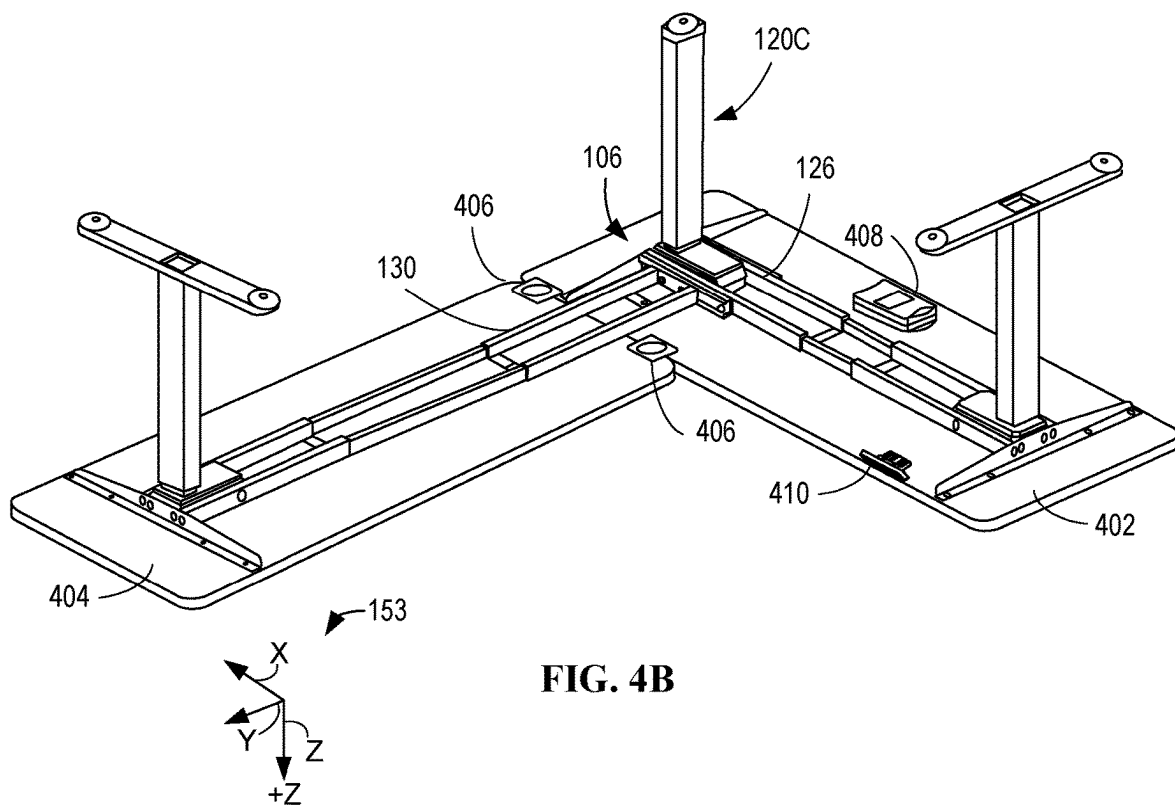


FIG. 4B

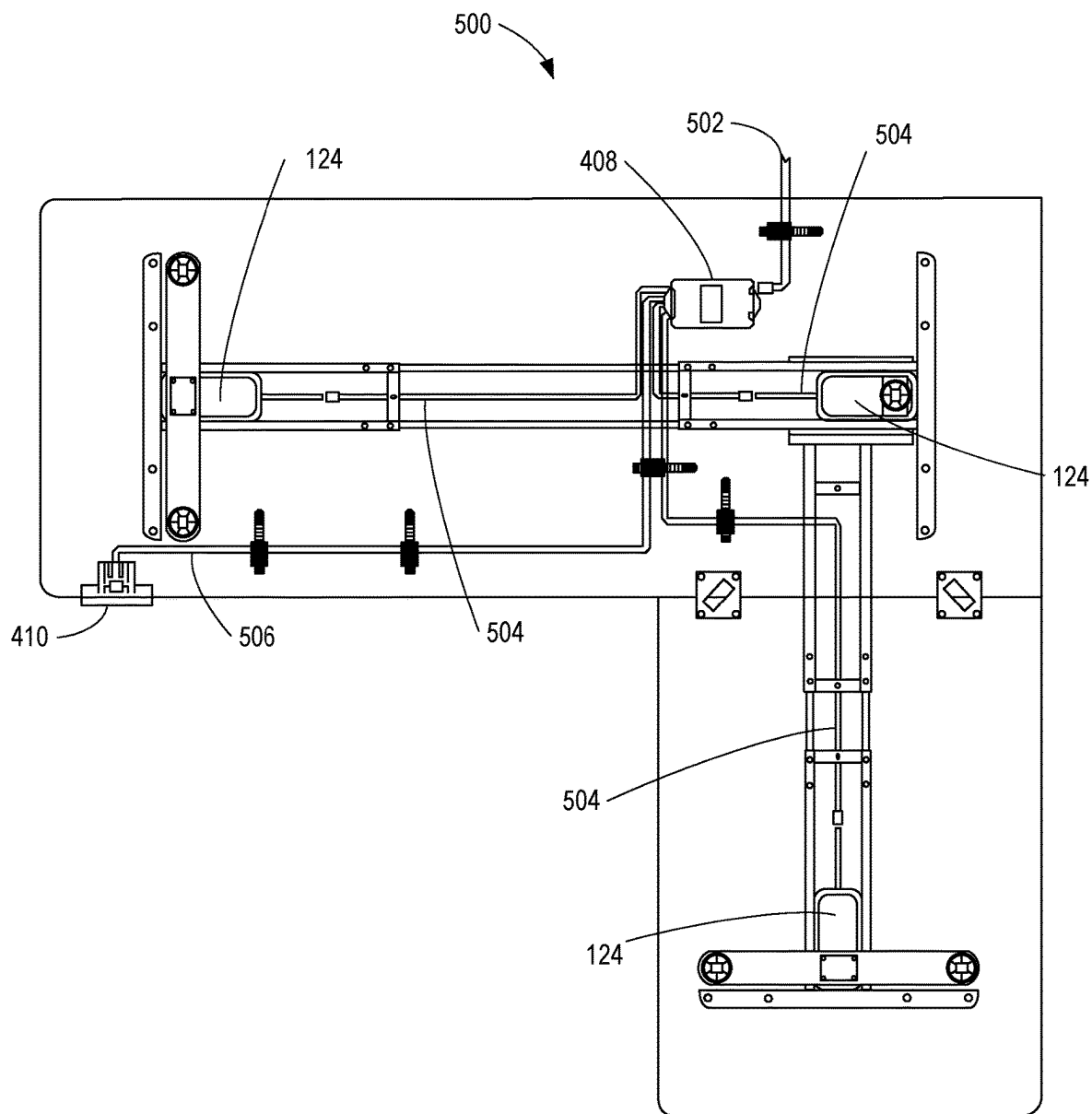


FIG. 5

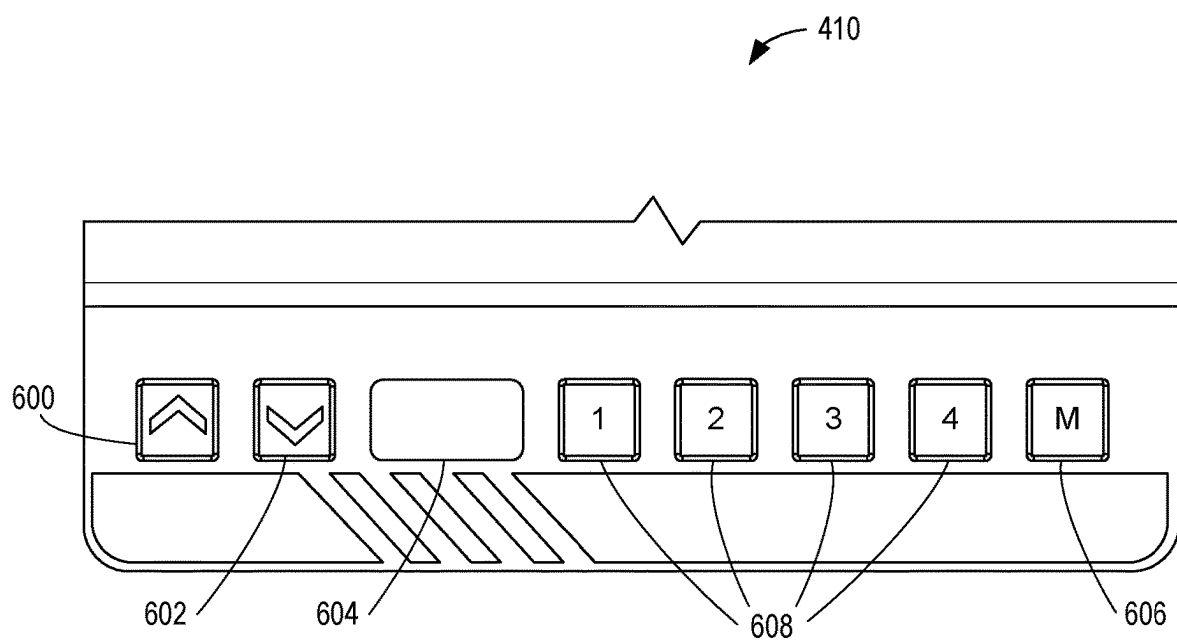


FIG. 6



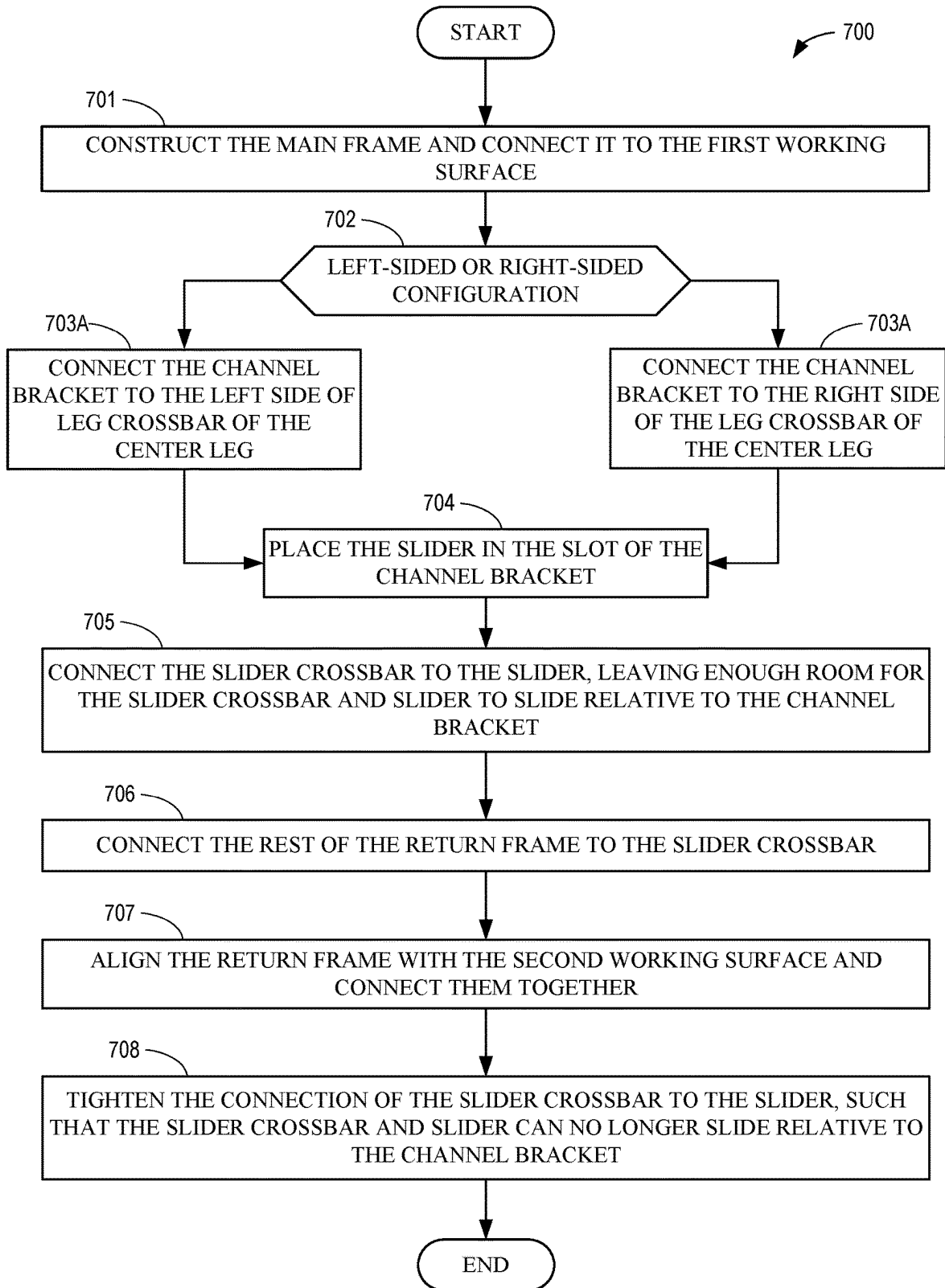


FIG. 7

## ADJUSTABLE FRAME TO SUPPORT A WORKING SURFACE

### FIELD OF THE DISCLOSURE

[0001] This disclosure relates generally to working surfaces and, more particularly, to an adjustable frame to support a working surface.

### BACKGROUND

[0002] In recent years, an increasing number of people have begun working from home which has led to an increase in the need for working surfaces. Standalone working surface frames have become popular alternatives to traditional tables and desks sold with both the frame and the working surface because they allow the user to customize their working experience by choosing frames and working surfaces that match their functional and aesthetic needs and desires. The user can utilize standalone working surface frames with a variety of custom-made or manufactured working surfaces.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1A illustrates an example adjustable frame constructed in accordance with teachings of this disclosure.

[0004] FIG. 1B is an exploded view of the example adjustable frame of in accordance with teachings of this disclosure.

[0005] FIG. 2 is an exploded part perspective view of an example sliding mechanism in accordance with teachings of this disclosure.

[0006] FIG. 3A is an isometric view illustrating the connection of the example channel bracket to the example leg of the adjustable frame in accordance with teachings of this disclosure.

[0007] FIG. 3B is an isometric view illustrating the connection of the example crossbar to the example slider of the adjustable frame in accordance with teachings of this disclosure.

[0008] FIG. 4A is an isometric view illustrating the example adjustable frame of FIGS. 1A-B connected to example working surfaces in accordance with teachings of this disclosure.

[0009] FIG. 4B illustrates another example configuration of the example adjustable frame of FIGS. 1A-B connected to example working surfaces in accordance with teachings of this disclosure.

[0010] FIG. 5 is a down-up view of the example adjustable frame of FIGS. 1A-1B in accordance with teachings of this disclosure.

[0011] FIG. 6 is a part view of an example control panel in accordance with the teachings of this disclosure.

[0012] FIG. 7 is a flowchart representative of an example method of constructing the adjustable frame of FIGS. 1A-1B in accordance with teachings of this disclosure.

[0013] In general, the same reference numbers will be used throughout the drawing(s) and accompanying written description to refer to the same or like parts. The figures are not to scale. Instead, the thickness of the layers or regions may be enlarged in the drawings. Although the figures show layers and regions with clean lines and boundaries, some or all of these lines and/or boundaries may be idealized. In reality, the boundaries and/or lines may be unobservable, blended, and/or irregular.

[0014] As used herein, unless otherwise stated, the term “above” describes the relationship of two parts relative to Earth. A first part is above a second part, if the second part has at least one part between Earth and the first part. Likewise, as used herein, a first part is “below” a second part when the first part is closer to the Earth than the second part. As noted above, a first part can be above or below a second part with one or more of: other parts therebetween, without other parts therebetween, with the first and second parts touching, or without the first and second parts being in direct contact with one another.

[0015] As used in this patent, stating that any part (e.g., a layer, film, area, region, or plate) is in any way on (e.g., positioned on, located on, disposed on, or formed on, etc.) another part, indicates that the referenced part is either in contact with the other part, or that the referenced part is above the other part with one or more intermediate part(s) located therebetween.

[0016] As used herein, connection references (e.g., attached, coupled, connected, and joined) may include intermediate members between the elements referenced by the connection reference and/or relative movement between those elements unless otherwise indicated. As such, connection references do not necessarily infer that two elements are directly connected and/or in fixed relation to each other. As used herein, stating that any part is in “contact” with another part is defined to mean that there is no intermediate part between the two parts.

[0017] Unless specifically stated otherwise, descriptors such as “first,” “second,” “third,” etc., are used herein without imputing or otherwise indicating any meaning of priority, physical order, arrangement in a list, and/or ordering in any way, but are merely used as labels and/or arbitrary names to distinguish elements for ease of understanding the disclosed examples. In some examples, the descriptor “first” may be used to refer to an element in the detailed description, while the same element may be referred to in a claim with a different descriptor such as “second” or “third.” In such instances, it should be understood that such descriptors are used merely for identifying those elements distinctly that might, for example, otherwise share a same name.

[0018] As used herein, “approximately” and “about” modify their subjects/values to recognize the potential presence of variations that occur in real world applications. For example, “approximately” and “about” may modify dimensions that may not be exact due to manufacturing tolerances and/or other real world imperfections as will be understood by persons of ordinary skill in the art. For example, “approximately” and “about” may indicate such dimensions may be within a tolerance range of  $\pm 5\%$  unless otherwise specified in the below description.

[0019] Various terms are used herein to describe the orientation of features. In general, the attached figures are annotated with a set of axes including the x-axis X, the y-axis Y, and the z-axis Z. As disclosed herein, the z-axis runs orthogonal relative to a surface on which the adjustable frame resides.

[0020] As used herein, the phrase “in communication,” including variations thereof, encompasses direct communication and/or indirect communication through one or more intermediary components, and does not require direct physical (e.g., wired) communication and/or constant communication, but rather additionally includes selective communi-

cation at periodic intervals, scheduled intervals, aperiodic intervals, and/or one-time events.

**[0021]** “Including” and “comprising” (and all forms and tenses thereof) are used herein to be open ended terms. Thus, whenever a claim employs any form of “include” or “comprise” (e.g., comprises, includes, comprising, including, having, etc.) as a preamble or within a claim recitation of any kind, it is to be understood that additional elements, terms, etc., may be present without falling outside the scope of the corresponding claim or recitation. As used herein, when the phrase “at least” is used as the transition term in, for example, a preamble of a claim, it is open-ended in the same manner as the term “comprising” and “including” are open ended. The term “and/or” when used, for example, in a form such as A, B, and/or C refers to any combination or subset of A, B, C such as (1) A alone, (2) B alone, (3) C alone, (4) A with B, (5) A with C, (6) B with C, or (7) A with B and with C. As used herein in the context of describing structures, components, items, objects and/or things, the phrase “at least one of A and B” is intended to refer to implementations including any of (1) at least one A, (2) at least one B, or (3) at least one A and at least one B. Similarly, as used herein in the context of describing structures, components, items, objects and/or things, the phrase “at least one of A or B” is intended to refer to implementations including any of (1) at least one A, (2) at least one B, or (3) at least one A and at least one B. As used herein in the context of describing the performance or execution of processes, instructions, actions, activities and/or steps, the phrase “at least one of A and B” is intended to refer to implementations including any of (1) at least one A, (2) at least one B, or (3) at least one A and at least one B. Similarly, as used herein in the context of describing the performance or execution of processes, instructions, actions, activities and/or steps, the phrase “at least one of A or B” is intended to refer to implementations including any of (1) at least one A, (2) at least one B, or (3) at least one A and at least one B.

**[0022]** As used herein, singular references (e.g., “a”, “an”, “first”, “second”, etc.) do not exclude a plurality. The term “a” or “an” object, as used herein, refers to one or more of that object. The terms “a” (or “an”), “one or more”, and “at least one” are used interchangeably herein. Furthermore, although individually listed, a plurality of means, elements or method actions may be implemented by, e.g., the same entity or object. Additionally, although individual features may be included in different examples or claims, these may possibly be combined, and the inclusion in different examples or claims does not imply that a combination of features is not feasible and/or advantageous.

#### DETAILED DESCRIPTION

**[0023]** In recent years, standalone frames for supporting varieties of working surfaces have grown in popularity due to the ability to tailor the functionality and appearance of the adjustable frame and the working surface to individual needs. While standalone frames allow users to tailor their working areas, pre-made working surfaces come with pre-drilled holes in a variety of layouts and standalone frames are rarely compatible with working surfaces made by other manufacturers. As a result, users are often forced to drill their own holes into the working surfaces to enable the frame to connect to the working surface. This may cause unintended damage to the working surfaces and/or the frame and

can result in uneven or unstable connections between the frame and the working surface, as well as a loss of structural integrity in the working surface. Certain examples provide adjustable frames to support working surfaces by allowing the user to align the frame to a variety of pre-drilled hole configurations on a variety of working surfaces. The adjustable frame can then be connected to a variety of working surfaces without a need for the user to drill new holes into the working surface. In some examples, the adjustable frame improves assembly efficiency and accuracy, as well as maintaining structural integrity of the working surfaces.

**[0024]** In certain examples, an adjustable frame includes a main frame with a plurality of legs (e.g., bars, columns, arms, etc.) that can support a first working surface (e.g., tabletop, table board, etc.) and a return frame, having a slider crossbar and a leg, to connect to the main frame and support a second working system. The adjustable frame may include a height adjustment system to enable height adjustment of the adjustable frame. The height adjustment system may be powered manually, such as using a lever that releases a pneumatic mechanism to allow the desk to be pushed to a desired position (common with desk converters) or a crank that moves the desk to various heights, and/or can be electronically driven, such as with an input interface having controls to allow the user to move the desk up or down or move the desk to saved heights using one or more motors. In certain examples, the adjustable frame with height adjustment system includes three retractable (e.g., telescopic) legs that are driven by three respective motors to raise or lower the adjustable frame.

**[0025]** The adjustable frame and associated working surface(s) can be implemented in a variety of configurations. For example, the adjustable frame can support two parallel working surfaces. In another configuration, the adjustable frame can support two perpendicular working surfaces (e.g., an L-shaped adjustable frame can support one or more working surfaces arranged in an L shape).

**[0026]** Examples disclosed herein enable manufacture of an adjustable frame (e.g., table frame, desk frame) that includes a sliding mechanism (e.g., assembly) configured to allow for adjustment of the return frame relative to the main frame. Example adjustable frames disclosed herein include a channel bracket to couple to the main frame and a slider to couple to the return frame to provide the sliding mechanism.

**[0027]** Example adjustable frames disclosed herein include telescoping legs. Example telescoping legs disclosed herein include actuators to enable lengthening and shortening of the telescoping legs to cause height adjustment of the example adjustable frame. As such, the height of the adjustable frame can be varied.

**[0028]** Example adjustable frames disclosed herein include a height adjustment system. Certain example height adjustment systems include a controller and a control panel to control the example height adjustment system. Example adjustable frames disclosed herein provide for synchronous height adjustment of three or more telescoping legs through the cooperation of the controller and the motors of the telescoping legs.

**[0029]** Certain example adjustable frames are configurable, enabling different arrangements of the adjustable frame. Such structural arrangement is not only convenient for installation and transportation, but also convenient for customers to install and use in different environments.

[0030] FIGS. 1A-1B illustrate an example adjustable frame 100 to support a working surface (e.g., an adjustable table frame, an adjustable desk frame, etc.) structured in accordance with teachings of this disclosure to provide an angled adjustable frame to support one or more working surfaces (e.g., table tops, desk tops, etc.). The working surfaces themselves are not shown in the view of FIG. 1A. FIG. 1A is a perspective view of the example adjustable frame 100, which includes an example main frame 102 (also referred to as a first frame) and an example return frame 104 (also referred to as a second frame) adjustably coupled to the main frame 102 via a sliding mechanism 106. The adjustable frame 100 supports and positions the working surfaces with respect to a floor 108. The floor 108 can be any suitable surface that can hold or otherwise support the adjustable frame 100 such as, but not limited to, the ground, a platform, hardwood floor, carpet, tile, etc.

[0031] The example main frame 102 of FIGS. 1A-1B includes an example connection system 110 and two example legs 120 that carry and support the main frame 102. The example legs 120 include an extendable portion 122, a motor 124, and a leg crossbar 126. The example connection system enables connection of different components of the main frame 102. For example, the connection system enables the two legs 120 to be connected as a whole, forming an integrated unit to support a working surface. In some examples, the connection system provides increased support for the legs 120, more generally, the adjustable frame 100, and/or a working surface. The connection system 110 of FIG. 1A, components of which are illustrated in FIG. 1B, includes a plurality of example crossbar(s) (e.g., cross beams, connection rods, etc.) 112 to connect the leg crossbars 126 of the legs 120. However, the connection system can include more or less components and/or different components in additional or alternative examples.

[0032] The crossbars 112 of FIGS. 1A-1B are configured to couple the legs 120 to form the main frame 102. The example crossbars 112 are used to couple the leg crossbars 126 of the legs 120 and/or to provide increased structural support. In some examples, one set of crossbars 112 may extend to couple two legs 120. In other examples, a first set of crossbars 112 may extend from a first leg 120 and a second set of crossbars 112 may extend from a second leg 120, and a crossbar connector may couple the first and second sets of crossbars 112. In some examples, the crossbars 112 and the leg crossbars 126 are telescopic such that the crossbars 112 can nest within a leg crossbar 126 of a first leg 120 at first ends of the crossbars 112 and within a leg crossbar 126 of a second leg 120 at second ends of the crossbars 112, enabling different configurations of the adjustable frame 100 by adjustment of the crossbars 112.

[0033] The example return frame 104 includes a slider crossbar 130, an example connection system 114, and a leg 120 that carry and support the return frame 104. The slider crossbar 120 engages the connection system 114 and the sliding mechanism 106 (as shown in FIG. 1B). The example connection system 114 of the return frame 104 of FIGS. 1A-1B enables connection of different components (e.g., crossbars 116) of the return frame 104 similar to the example connection system 110 of the main frame 102 described above. In some examples, the connection system 114 of the return frame 104 may be configured differently than the connection system 110 of the main frame 102. For example, the connection system 110 may include two sets of crossbars

112 coupling a crossbar connector as described above and the connection system 114 may include only one set of crossbars 116.

[0034] It is understood that the connection systems 110 and 114 can take on different configurations in other examples. In some examples, one or more components of the connection systems 110 and 114 may be integrally formed. In some examples, one or more components of the connection systems 110 and 114 may be omitted. Further, it is understood that the connection systems 110 and 114 may couple with the legs 120 in other configuration(s) to provide support to a working surface. In some examples, the legs 120 may not include leg crossbars 126. In those examples, the connection systems 110 and 114 may connect to a different portion of the legs 120.

[0035] FIG. 2 illustrates an example implementation of the sliding mechanism 106 to enable adjustment of the return frame 104 relative to the main frame 102. The example sliding mechanism 106 includes an example channel bracket 200 and an example slider (e.g., rail) 210. The example channel bracket 200 includes a plate 202 to connect to the leg crossbar 126 of a leg 120 of the main frame 102. As shown in more detail in FIG. 3A, the plate 202 and the leg crossbar 126 connect via screws, aligning the holes 208 of the channel bracket 200 with the holes 210 of the leg crossbar 126. The example channel bracket 200 also includes top and bottom lips (e.g., overhangs, ledges) 204, the plate 202 and the lips 204 providing a slot 206.

[0036] The example slider 220 includes a plate 222 to connect to a plate 230 of the slider crossbar 130 of the return frame 104. The example slider 220 also includes arms 224 configured to fit the slot 206 of the channel bracket 200. As shown in more detail in FIG. 3B, the slider 220 sits within the slot 206 of the channel bracket 200. The plate 230 of the slider crossbar 130 is connected to the plate 222 of the slider 220 via screws, aligning the holes 232 of the slider crossbar 130 with the holes 226 of the slider 220, such that the lips 204 of the channel bracket 200 sit between the plate 230 of the slider crossbar 130 and the arms 224 of the slider 220. Thus, the slider crossbar 130, the slider 220, and the channel bracket 200 provide a clamping mechanism.

[0037] The screws joining the slider crossbar 130 and the slider 220 can be tightened a sufficient amount to fix the slider crossbar 130 to the slider 220, but not enough to cause the plate 230 of the slider crossbar 130 and the arms 224 of the slider 220 to clamp down on the lips 204 of the channel bracket 200. This allows the arms 224 of the slider 220 to slide within the slot 206 of the channel bracket 200. Therefore, the slider crossbar 130 and the slider 220 can slide relative to the channel bracket 200 and, as a result, the return frame 104 can slide relative to the main frame 102 along the slot 206 provided by the channel bracket 200. When the screws joining the slider crossbar 130 and the slider 220 are tightened further, the plate 230 of the slider crossbar 130 and the arms 224 of the slider 220 clamp down on the lips 204 of the channel bracket 200, restricting the movement of the slider crossbar 130 and the slider 220 relative to the channel bracket 200 and, therefore, restricting the movement of the return frame 104 relative to the main frame 102.

[0038] It is understood that the channel bracket 200 and the slider 220 can have different configurations in other examples. For example, the channel bracket 200 and the slider 220 may have different shapes (e.g., the channel bracket 200 may provide a curved slot and the slider 220

may be shaped to engage the curved slot, the slider 220 may be a simple rectangular prism to fit within the slot 206, etc.). Further, it is understood that the channel bracket 200 and the slider 220 may have other configurations that also enable connection of the return frame 104 to the main frame 102 to allow sliding of the return frame 104 relative to the main frame 102 and provide a mechanism to restrict movement of the return frame 104 relative to the main frame 102. For example, the channel bracket 200 may connect to the return frame 104, and the slider may connect to the main frame 102.

[0039] The example slider 220 is composed of cast aluminum but may be any other suitable material capable of retaining its shape and durable enough to withstand the forces inherent in the sliding mechanism 106 as described herein. The example channel bracket 200 is composed of powder-coated steel but may be any other suitable material capable of retaining its shape and durable enough to withstand the forces inherent in the sliding mechanism 106 as described herein.

[0040] Returning to FIGS. 1A-1B, the example legs 120 of the main frame 102 and the return frame 104 include an extendable portion 122, a motor 124, and a leg crossbar 126. As shown in the example of FIGS. 1A-1B, the example extendable portions 122 are implemented as telescoping columns (e.g., retractable legs, lift columns, etc.), but can be implemented as another structure that can hold or otherwise support the main frame 102. The extendable portions 122 of FIGS. 1A-1B are vertical columns positioned substantially orthogonal (e.g., approximately 90 degrees) relative to the floor 108 but may be associated with an angle in some examples. Each extendable section 122 includes two or more example telescoping leg sections, such as an example upper (e.g., inner) section 122U, an example middle section 122M, and an example lower (outer) section 122L. Such a configuration enables the upper section(s) 122U and middle section(s) 122M of the extendable portions 122 to slide relative to the lower section(s) 122L, allowing the extendable portion(s) 122 to change length.

[0041] The example adjustable frame 100 includes an example height adjustment system 134, which is configured to cause the legs 120 to rise or fall substantially simultaneously (e.g., concurrently, all together, at the same time accounting for some delay in human reaction or motorized movement) to adjust the height 140 of the adjustable frame 100 (e.g., from a sitting height to a standing height or vice versa). The height adjustment system 134 includes a plurality of example motors 124 and a plurality of actuators (e.g., actuator(s) 160). The motors 124 drive the actuators 160 which generate linear motion to lengthen and shorten the extendable portions 122 of the legs 120.

[0042] In some examples, the motors 124 are silent motors to reduce an amount of noise generated by the adjustable frame 100 during operation. In other examples, the height adjustment system 134 may include a single motor 124 coupled to a gear assembly to drive the actuators to increase or decrease the height 140 of the adjustable frame 100.

[0043] Each of the legs 120A-C includes or otherwise implements a respective actuator 160. In some examples, the lower section(s) 122L of the legs 120A-C are configured to implement the actuators 160 and the upper section(s) 122U of the legs 120A-C implement cover(s) for the actuators 160. For example, each lower section(s) 122L may include a lead screw assembly that converts rotational motion provided by

a gear assembly into linear motion that drives the top ends 122 of the legs 120A-C in an upward or downward direction while the bottom ends 124 of the legs 120A-C remain stationary. As the legs 120A-C raise or lower, a working surface coupled to the legs 120A-C raise or lower accordingly.

[0044] It is understood that the legs 120 can take on different configurations in other examples. In some examples, the legs 120 may have a fixed height and the extendable portions 122 may be of a fixed length. In those examples, the height adjustment system 134 and included components may be omitted. In those examples, the legs 120 may omit extendable portions 122. In other examples, the legs 120 may be of a different style (e.g. foldable, hairpin, etc.)

[0045] In the illustrated example of FIG. 1A, the legs 120 are arranged in an L-shaped format to provide support for the adjustable frame 100. For example, an example first leg 120A and an example second leg 120B of the three legs 120 may be positioned at example end points 150 of the adjustable frame 100 and an example third leg 120C of the legs 120 may be positioned at an example point of interconnection 152 (e.g., interconnection point). In some examples, the first leg 120A implements an example first end point 150A. In some examples, the second leg 120B implements an example second end point 150B. In some examples, the third leg 120C implements the point of interconnection 152.

[0046] In some examples, the lower section 122L of the leg 120C at the point of interconnection 152 defines an example set of coordinates 153 that includes the x-axis X, the y-axis Y, and the z-axis Z. In illustrated examples the z-axis is defined to run parallel relative to a length of the lower section 122L of the leg 120C. The x-axis is defined to run parallel to a direction of the point of interconnection 152 to the first end point 150A, and the y-axis is defined to run parallel to a direction of the point of interconnection 152 to the second end point 150B. However, the coordinates 153 may be defined differently in additional or alternative examples.

[0047] The end points 150A, 150B extend in different directions relative to the point of interconnection 152 such that the adjustable frame 100 defines a substantially right angle (e.g., approximately 90 degrees). Such an arrangement enables a working surface to be larger relative to traditional desks with two legs, enabling higher space utilization. For example, positioning the adjustable frame 100 in a corner of a room can increase an amount of leg space under a working surface and an amount of workspace on a working surface. However, the adjustable frame 100 can be configured in other structural forms apart from the L-shape. For example, the adjustable frame 100 can include more or fewer legs 120 as needed or desired to increase or decrease the area of a working surface to be placed on the adjustable frame 100 (e.g., 2 legs, 4 legs, 5 legs, etc.). In some examples, the adjustable frame 100 can define a different angle (e.g., an acute angle, an obtuse angle) and/or be associated with another shape (e.g., a T-shape, an H-shape, etc.).

[0048] Each leg 120A-C includes an example first (e.g., top) end 122 (illustrated in FIGS. 1B and 1C) that is to interface with a working surface and an example second (e.g., bottom) end 124 (illustrated in FIG. 1C) that is to interface with the floor 108. In some examples, the bottom end(s) 124 is provided with example an example base support(s) 126 such as (but not limited to) a foot, a foot pad,

a castor wheel, etc., at least in part to increase a level of stability of the adjustable frame 100. The base support(s) 126 may be positioned between the second end(s) 124 of the leg(s) 120A-C and the floor 108. In some examples, the base support(s) 126 may be coupled to or otherwise include an additional base support(s) 126. For example, a base support(s) 126 in the form of a foot may include a pad(s) to prevent or otherwise limit damage to the floor 108 or a castor(s) to enable easy transport of the adjustable frame 100 from a first location to a second location.

[0049] The adjustable frame 100 is associated with an example frame height 140 (illustrated in FIG. 1A) measured from a first (e.g., bottom or lower) endpoint of the leg(s) 120A-C (e.g., a bottom end 124 of the leg(s) 120, a bottom of a base support 126, etc.) to a second (e.g., top or higher) endpoint of the leg(s) 120A-C (e.g., a top end 122 of the leg(s) 120, a top of a side bracket 128, etc.). The legs 120A-C are associated with an example length 142 (illustrated in FIG. 1B) defined by a distance between the first ends 122 and respective second ends 124. Thus, the frame height 140 of the adjustable frame 100 at a given moment in time may correspond to a length 142 of the legs 120A-C at the moment of time plus the vertical size of a base support(s) 126. The extendable portions 122 of the legs 120A-C are adjustable columns. As noted above, each extendable portion 122 of legs 120A-C includes two or more telescoping leg sections 122U, 122M, and 122L that enable the extendable portions 122 to extend and retract to change in length 142 and raise or lower the adjustable frame 100. The height adjustment of the adjustable frame 100 is implemented by simultaneously (or at least substantially simultaneously, accounting for some delay in human reaction or motorized movement) changing the lengths 142 of the legs 120.

[0050] FIG. 4A illustrates the example adjustable frame 100 of FIGS. 1A-1B with example working surfaces 402, 404 fixed thereto. The example main frame 102 connects to example working surface 402 (e.g., first working surface) and example return frame 104 connects to example working surface 404 (e.g., second working surface). The example adjustable frame 100 connects to the working surfaces 402 and 404 via screws connecting various components of the example adjustable frame 100 to the working surfaces 402 and 404. For example, the example side brackets 128 of legs 120, example leg crossbars 126 of legs 120, and example slider crossbar 130 are configured to be screwed to the working surfaces 402 and 404. The example adjustable frame 100 includes connecting plates 406 to join working surface 402 and working surface 404 together.

[0051] Example working surfaces 402 and 404 are rectangular with filleted corners and of similar shape and size, however the adjustable frame 100 may be configured to connect to working surfaces of varying shapes (e.g., triangular, circular, etc.) and sizes. In some examples, working surface 402 and working surface 404 may be a single working surface.

[0052] The example adjustable frame 100 of FIG. 4A is configured in a left-sided configuration. The sliding mechanism 206 connects to the left side of the leg crossbar 126 of leg 120C of the main frame 102, when viewed from above the upright working frame 100 along the x-axis. The example adjustable frame 100 of FIG. 4B is configured in a right-sided configuration. The sliding mechanism 206 connects to the right side of the leg crossbar 126 of the leg 120C

of the main frame 102, when viewed from above the upright working frame 100 along the x-axis.

[0053] In the example adjustable frame 100 of FIGS. 4A-4B, the height adjustment system 134 includes an example controller 408, which may be communicatively coupled to the motors 124. For example, the controller 408 may be in communication with the motors 124 through a wired connection as shown in FIG. 5 and/or wireless (e.g., BLUETOOTH®, WIFI, cellular, etc.) connection. The controller 408 is configured to control the motors 124 to control the height 140 of the adjustable frame 100. The height adjustment system 134 of FIGS. 4A-4B includes a control panel 410 that allows a user to control the height 140 of the adjustable frame 100, as discussed below in relation to FIG. 6. In other examples, the controller 408 may include an input interface, such as a touch screen, buttons, etc., that allow a user to control the height 140 of the adjustable frame 100.

[0054] FIG. 5 illustrates an example wired connection system 500. The example wired connection system 500 includes an example wire 502 connecting the example controller 408 to a power supply (not shown in the view of FIG. 5). The example wires 504 connect the example controller 408 to the example motors 124 of the legs 120. The example wires 506 connect the example controller 408 to the example control panel 410. The wired connection system 500 allows the motor 124 to communicatively couple the other components of the wired connection system 500.

[0055] FIG. 6 illustrates an example user interface of an example control panel 410. The control panel 410 includes an upward movement button 600 and a downward movement button 602 which allow the user to adjust the height 140 of the example adjustable frame 100 up or down. The example control panel 410 includes a display 604 to display to the user the height 140 of the adjustable frame 100. The example control panel 410 also includes a memory button 606 that allows the user to save the current height 140 of the adjustable frame 100 to memory preset buttons 608. The user may then press one of memory preset buttons 608 to automatically adjust the height 140 of the adjustable frame 100 to the saved height assigned to that button. The example control panel 410 has 4 memory presets but may include more or less memory presets. In some examples, the control panel 410 may omit some components entirely.

[0056] FIG. 7 illustrates an example method 700 of constructing the adjustable frame 100. At step 701, the user constructs the main frame 102 of the adjustable frame 100 and connects it to the working surface 402. The user then determines whether the adjustable frame 100 will be in the left-sided or right-sided configuration of FIGS. 4A-4B. For left-sided configurations, the user connects the channel bracket 200 to the left side of the leg crossbar 126 of leg 120C in step 703A. For right-sided configurations, the user connects the channel bracket 200 to the right side of the leg crossbar 126 of leg 120C in step 703B. In step 704, the user connects the slider crossbar 130 and the slider 220, leaving room such that the slider crossbar 130 and the slider 220 can still slide relative to the channel bracket 200. In step 706, the user connects the rest of the return frame 104 to the slider crossbar 130. In step 707, the user aligns the return frame 104 with the working surface 404 and connects them. Finally, in step 708, the user tightens the connection of the slider crossbar 130 and the slider 220, such that the slider crossbar 130 and the slider 220 can no longer slide relative to the channel bracket 200.

**[0057]** Systems, apparatus, articles of manufacture, and methods disclosed herein allow users to connect an adjustable frame to a variety of working surfaces by aligning the adjustable frame to various pre-drilled hole configurations. Users can avoid drilling their own holes into working surfaces, as they have with existing frames, which can cause unintended damage to the working surfaces and/or the frame and result in uneven or unstable connections between the frame and the working surface and/or a loss of structural integrity in the working surface. The following claims are hereby incorporated into this Detailed Description by this reference. Although certain example systems, apparatus, articles of manufacture, and methods have been disclosed herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all systems, apparatus, articles of manufacture, and methods fairly falling within the scope of the claims of this patent.

What is claimed is:

1. A frame comprising:  
a first frame including a leg;  
a second frame; and  
a sliding mechanism connected to the first frame and the second frame, the sliding mechanism including:  
a channel bracket having a slot; and  
a slider configured to move within the slot.
2. The frame of claim 1, the leg having a first side and a second side opposite the first side, first and second sides of the leg configured to connect to the sliding mechanism.
3. The frame of claim 2, wherein the sliding mechanism connects to the first side of the leg.
4. The frame of claim 2, wherein the sliding mechanism connects to the second side of the leg.
5. The frame of claim 1, wherein the first frame is connected to a first working surface.
6. The frame of claim 1, wherein the second frame is connected to a second working surface.
7. The frame of claim 1, the channel bracket including a plate and lips, the plate and the lips providing the slot.
8. The frame of claim 1, the slider including a plate and arms, the arms to engage the slot.
9. The frame of claim 1, wherein the channel bracket is powder-coated steel and the slider is cast aluminum.
10. The frame of claim 1, wherein the channel bracket is connected to the first frame, and the slider is connected to the second frame.
11. The frame of claim 10, wherein the connection between the slider the second frame is tightened, restricting movement of the slider within the slot.
12. The frame of claim 10, the second frame including a crossbar, the slider connected to the crossbar.
13. The frame of claim 12, the first frame including a first leg and a second leg connected to the first leg, the second frame further including a third leg connected to the crossbar.

14. The frame of claim 13, wherein the crossbar is a first crossbar, the second leg connected to the first leg via second crossbars, the third leg connected to the first crossbar via third crossbars.

15. The frame of claim 13, wherein the first leg includes a first motor to increase or decrease a first height of the first leg, the second leg includes a second motor to increase or decrease a second height of the second leg, and the third leg includes a third motor to increase and decrease a third height of the third leg.

16. The frame of claim 15, further including a controller connected to the first, second, and third motors, the controller to adjust a fourth height of the frame.

17. The frame of claim 16, further including a control panel coupled to the controller, the control panel to receive an input from a user to increase or decrease the respective first, second, and third heights of the first, second, and third legs, and the controller to execute the input by driving the first, second, and third motors.

18. The frame of claim 17, the controller including a memory to store at least one saved height of the frame, the control panel to receive an input from the user to save the fourth height of the frame in the memory, and the controller to execute the input.

19. An adjustable desk frame comprising:

- a first frame having a first leg and a second leg;
- a second frame having a third leg and a crossbar; and
- a sliding mechanism connecting the second leg and the crossbar, including:
  - a channel bracket having a plate and lips providing a slot, the channel bracket connected to the second leg; and
  - a slider within the slot, the slider connected to the crossbar, wherein the slider is to slide within the slot when the connection between the slider and the crossbar is tightened to a first stage and wherein the slider and the crossbar are to clamp the lips of the channel bracket when the connection is tightened to a second stage, such that the slider can no longer slide within the slot of the channel bracket.

20. The adjustable desk frame of claim 19, wherein the first leg includes a first motor to increase or decrease a first height of the first leg, the second leg includes a second motor to increase or decrease a second height of the second leg, and the third leg includes a third motor to increase and decrease a third height of the third leg, and further including a controller connected to the first, second, and third motors, the controller to adjust a fourth height of the adjustable desk frame.

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