DISPLAY STAND

Technical Field

[0001] Embodiments relate generally to a display stand.

Background

[0002] A display stand is typically used as an advertising tool or a promotional tool for providing information in the form of a static display, for example banner stand, posters stand or roll up display stand. The display stand may be placed outside retail stores or businesses, or may be used during trade shows or exhibitions. Generally, display stands are portable and versatile.

[0003] A roll up display stand typically includes a cartridge having a roll of banner or poster retractably kept inside the cartridge, and a telescopic pole or foldable pole. To set up the roll up display stand, a user would be required to manually pull out the banner or poster from the cartridge and at the same time manually prop up the telescopic pole or foldable pole to support the banner or poster from retracting back into the cartridge. However, if the height of the banner or the poster is higher than the height of the user, it may be difficult for the user to manually set up the roll up display stand. Further, as the telescopic pole or foldable pole is separate from the cartridge, the user may forget to bring the pole. The telescopic pole or foldable pole may also be susceptible to damage.

[0004] Accordingly, example embodiments seek to provide a display stand that addresses at least some of the issues identified above.

Summary

[0005] According to various embodiments, there is provided a display stand including a base, a shaft rotatably coupled to the base, a first link with a first end of the first link movably coupled to the shaft, and a second link with a first end of the second link movably coupled to the shaft. The first link and the second link may be pivotably coupled to each other. The shaft may be configured to rotate about a longitudinal axis of the shaft in a first direction to move the first end of the first link and the first end of the second link towards each other along the longitudinal axis of the shaft to cause a second end of the first link and a second end of the second link to

move away from the shaft. The shaft may be further configured to rotate about the longitudinal axis of the shaft in a second direction to move the first end of the first link and the first end of the second link away from each other along the longitudinal axis of the shaft to cause the second end of the first link and the second end of the second link to move towards the shaft.

[0006] According to various embodiments, there is provided a display stand including a base and a shaft rotatably coupled to the base. The shaft may have a first portion with a right-handed external screw thread and a second portion with a left-handed external screw thread. The display stand may further include a first link with a first end of the first link coupled to a first coupling element. The first coupling element may include a right-handed internal screw thread or a right-handed ball nut engaged to the right-handed external screw thread of the first portion of the shaft. The display stand may further include a second link with a first end of the second link coupled to a second coupling element. The second coupling element may include a left-handed internal screw thread or a left-handed ball nut engaged to the left-handed external screw thread of the second portion of the shaft. The first link and the second link may be pivotably coupled to each other.

Brief description of the drawings

[0007] In the drawings, like reference characters generally refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead generally being placed upon illustrating the principles of the invention. In the following description, various embodiments are described with reference to the following drawings, in which:

FIG. 1A shows a schematic diagram of a display stand according to various embodiments;

FIG. 1B shows a schematic diagram of a display stand according to various embodiments;

FIGs. 2A and 2B show a side view and a front view of a display stand in an erected state according to various embodiments;

FIGs. 3A and 3B show a side view and a front view of the display stand of FIGs. 2A and 2B in a collapsed state according to various embodiments;

FIG. 4A shows a shaft of the display stand of FIGs. 2A and 2B according to various embodiments;

FIGs. 4B and 4C show enlarged views of a first portion and a second portion of the shaft of FIG. 4A respectively according to various embodiments.

Detailed description

[0008] Embodiments described below in context of the apparatus are analogously valid for the respective methods, and vice versa. Furthermore, it will be understood that the embodiments described below may be combined, for example, a part of one embodiment may be combined with a part of another embodiment.

[0009] It should be understood that the terms "on", "over", "top", "bottom", "down", "side", "back", "left", "right", "front", "lateral", "side", "up", "down" etc., when used in the following description are used for convenience and to aid understanding of relative positions or directions, and not intended to limit the orientation of any device, or structure or any part of any device or structure. In addition, the singular terms "a", "an", and "the" include plural referents unless context clearly indicates otherwise. Similarly, the word "or" is intended to include "and" unless the context clearly indicates otherwise.

[0010] FIG. 1A shows a schematic diagram of a display stand 100 according to various embodiments. The display stand 100 may include a base 110 and a shaft 120 rotatably coupled to the base 110. Accordingly, the base 110 may include one or more support structures configured to receive the shaft 120 such that the shaft 120 may be rotatable about a longitudinal axis of the shaft 120. The display stand 100 may further include a first link 130 with a first end 132 of the first link 130 movably coupled to the shaft 120. The display stand 100 may also include a second link 140 with a first end 142 of the second link 140 movably coupled to the shaft 120. The first link 130 and the second link 140 may be a rod, a pole, a bar or the like. The first link 130 and the second link 140 may be pivotably coupled to each other. According to various embodiments, a second end of the first link 130 may be pivotably coupled to a second end of the second link 140. According to various embodiments, a mid portion of the first link 130 may be pivotably coupled to a mid portion of the second link 140 such that the first link 130 and the second link 140 may form a criss-cross arrangement similar to that of a scissors mechanism.

[0011] According to various embodiments, the shaft 120 may be configured to rotate about a longitudinal axis of the shaft 120 in a first direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 towards each other along the longitudinal axis of the shaft 120 to cause a second end 134 of the first link 130 and a second end 144 of the second link 140 to move away from the shaft 120. The shaft 120 may further be configured to rotate about the longitudinal axis of the shaft 120 in a second direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 away from each other along the longitudinal axis of the shaft 120 to cause the second end 134 of the first link 130 and the second end 144 of the second link 140 to move towards the shaft 120.

[0012] In other words, the display stand 100 may include an elongated rod mounted on a main body. The elongated rod may be mounted such that the elongated rod is rotatable about a longitudinal axis of the elongated rod relative to the main body. Further, the display stand 100 may include two poles connected to each other via a pivot joint. An end of each of the two poles may be connected to the elongated rod such that the end of each of the two poles may be movable along the longitudinal axis of the elongated rod relative to the elongated rod. Further, the end of each of the two poles may be connected to the elongated rod such that rotating the elongated rod in a first direction about the longitudinal axis of the elongated rod may drive or move the ends of the two poles towards each other and rotating the elongated rod in a second direction about the longitudinal axis of the elongated rod may drive or move the ends of the two poles away from each other. In this manner, another end of each of the two poles may be moved away from the elongated rod when the elongated rod is rotating in the first direction and moved towards the elongated rod when the elongated rod is rotating in the second direction.

[0013] FIG. 1B shows a schematic diagram of a display stand 101 according to various embodiments. The display stand 101, similar to the display stand 100 of FIG. 1A, may include a base 110 and a shaft 120 rotatably coupled to the base 110. The display stand 101 may, similar to the display stand 100 of FIG. 1A, further include a first link 130 with a first end 132 of the first link 130 movably coupled to the shaft 120. The display stand 101 may, similar to the display stand 100 of FIG. 1A, also include a second link 140 with a first end 142 of the second link 140 movably coupled to the shaft 120. The first link 130 and the second link 140 may be pivotably coupled

to each other. According to various embodiments, the shaft 120 may be configured to rotate about a longitudinal axis of the shaft 120 in a first direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 towards each other along the longitudinal axis of the shaft 120 to cause a second end 134 of the first link 130 and a second end 144 of the second link 140 to move away from the shaft 120. The shaft 120 may further be configured to rotate about the longitudinal axis of the shaft 120 in a second direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 away from each other along the longitudinal axis of the shaft 120 to cause the second end 134 of the first link 130 and the second end 144 of the second link 140 to move towards the shaft 120.

[0014] According to various embodiments, the shaft 120 may include a first portion 122 with a right-handed external screw thread 124 and a second portion 126 with a left-handed external screw thread 128. The right-handed external screw thread 124 may include a helix of thread twisted or oriented such that when view from an end of the shaft 120, the shaft 120 moves away from the viewer when rotating clockwise about the longitudinal axis of the shaft 120 and moves towards the viewer when rotating counterclockwise about the longitudinal axis of the shaft 120. The left-handed external screw thread 128 may include a helix of thread twisted or oriented in the opposite direction from the right-handed external screw thread 124. The shaft 120 may further include a mid portion 125 with a smooth external surface. The first portion 122 may be on one side of the mid portion 125, and the second portion 126 may be on another side of the mid portion 125. According to various embodiments, the first portion 122, the mid portion 125 and the second portion 126 may be separate pieces joined together to form the shaft 120. According to various embodiments, the first portion 122, the mid portion 125 and the second portion 126 may be integrally formed.

[0015] According to various embodiments, a first coupling element 150 may be configured to couple the first end 132 of the first link 130 to the shaft 120, and a second coupling element 160 may be configured to couple the first end 142 of the second link 140 to the shaft 120. Accordingly, the first end 132 of the first link 130 may be attached to the first coupling element 150 and the first coupling element 150 may include an engagement element 152 to engage with the shaft 120 such that the first coupling element 150 may be movable relative to the shaft 120 along the

longitudinal axis of the shaft 120. Similarly, the first end 142 of the second link 140 may be attached to the second coupling element 160 and the second coupling element 160 may include an engagement element 162 to engage with the shaft 120 such that the second coupling element 160 may be movable relative to the shaft 120 along the longitudinal axis of the shaft 120. In this manner, the first end 132 of the first link 130 and the first end 142 of the second link 140 may be movable relative to the shaft 120 along the longitudinal axis of the shaft 120 since the first link 130 and the second link 140 are attached to the first coupling element 150 and the second coupling element 160 respectively.

[0016] According to various embodiments, the first coupling element 150 may include a right-handed internal screw thread to engage the first portion 122 of the shaft 120, and the second coupling element 160 may include a left-handed internal screw thread to engage the second portion 126 of the shaft 120. According to various embodiments, the first coupling element 150 may include a right-handed ball nut to engage the first portion 122 of the shaft 120, and the second coupling element 160 may include a left-handed ball nut to engage the second portion 126 of the shaft 120.

[0017] According to various embodiments, the base 110 may include an elongated guide element 112 configured to be parallel to the shaft 120. The elongated guide element 112 may be an elongated guide rod, an elongated guide groove, an elongated guide slots or the like. The first coupling element 150 may include a first slider element 154 engaged to the elongated guide element 112, and the second coupling element 160 may include a second slider element 164 engaged to the elongated guide element 112. The first slider element 154 and the second slider element 164 may include a roller, a slide pin, a slide block or the like.

[0018] According to various embodiments, the first end 132 of the first link 130 may be pivotably attached to the first coupling element 150, and the first end 142 of the second link 140 may be pivotably attached to the second coupling element 160. Accordingly, the first end 132 of the first link 130 may be connected to the first coupling element 150 via a pivot joint. The first end 142 of the second link 140 may be connected to the second coupling element 160 via a pivot joint.

[0019] According to various embodiments, the shaft 120 may be configured to be coupled to an actuator 170. Accordingly, the shaft 120 may include a coupler 121 configured to couple to a drive shaft 172 of the actuator 170. According to various

embodiments, the actuator 170 may be a separate component from the display stand 101. Accordingly, the actuator 170 may be coupled to the shaft 120 when it is required to rotate the shaft 120. When not in use, the actuator 170 may be decoupled from the shaft 120. According to various embodiment, the actuator 170 may include a motor.

[0020] According to various embodiments, the actuator 170 may be integrated into the display stand 101 such that the display stand 101 may include the actuator 170 as one of its component. Accordingly, the actuator 170 may be installed in a part of the display stand 101 and may always be coupled to the shaft 120.

[0021] According to various embodiments, the base 110 may be configured to receive the actuator 170 coupled to the shaft 120. Accordingly, the base 110 may include a receiving structure in the form of a recess or protruding walls that may house or accommodate the actuator 170. The receiving structure of the base 110 may be configured to temporary receive the actuator 170 when the actuator 170 is not part of the display stand 101. The receiving structure of the base 110 may be configured to permanently receive the actuator 170 when the actuator 170 is integrated into the display stand 101.

[0022] According to various embodiments, the actuator 170 may be configured to be connected to a power source 180. The power source 180 may be a battery such that the display stand 101 may be battery operated. Accordingly, the actuator 170 may include connectors for connecting to the power source 180. According to various embodiments, the power source 180 may be a separate component from the display stand 101. Accordingly, the power source 180 may be coupled to the actuator 170 when it is required to power up the actuator 170.

[0023] According to various embodiments, the power source 180 may be integrated into the display stand 101 such that the display stand 101 may include the power source 180 as one of its component. Accordingly, when the actuator 170 is a separate component from the display stand 101, the actuator 170 may be coupled to the shaft 120 and connected to the power source 180 to rotate the shaft 120 as required. When the actuator 170 is not in use, the actuator 170 may be decoupled from the shaft 120 and may be disconnected from the power source 180. When the actuator 170 is integrated into the display stand 101, the power source 180 may be permanently connected to the actuator 170.

[0024] According to various embodiments, the base 110 may be configured to receive the power source 180. Accordingly, the base 110 may include a receiving structure in the form of a recess or protruding walls that may house or accommodate the power source 180. The receiving structure of the base 110 may be configured to temporary receive the power source 180 when the power source 180 is not part of the display stand 101. The receiving structure of the base 110 may be configured to permanently receive the power source 180 when the power source 180 is integrated into the display stand 101.

[0025] According to various embodiment, the base 110 may be configured to provide an electronic power port 190. The electronic power port 190 may be connected to the power source 180. The electronic power port 190 may be a USB port. Accordingly, the electronic power port 190 may serve as a power charging point for personal electronic devices such as smart phones, tablets or the like.

[0026] According to various embodiments, the actuator 170 may be coupled to a processor 192. The processor 192 may be configured to control the actuator 170 so as to actuate the shaft 120 based on an electronic control signal from the processor 192. For example, the electronic control signal may include control signal to rotate in a first direction, control signal to rotate in a second direction, control signal to increase rotational speed, control signal to decrease rotational speed, control signal to stop, etc. The processor 192 may include a user interface for the user to provide commands to the processor 192. The user interface may be in the form of a keypad, a touch button, a lever, a switch, a touch screen, etc. The processor 192 may include a receiver for example an infra-red receiver, a Bluetooth receiver, a wireless receiver etc. The receiver may be configured to communicate with an external device such as a remote controller, a smart phone, a tablet, etc. to receive a command from the user.

[0027] According to various embodiments, the shaft 120 may be configured to be coupled to a spiral spring 174. Accordingly, the spiral spring 174 may be coiled around and onto the shaft 120. According to various embodiments, the display stand 101 may include a spiral spring 174 connected to and coiled around the shaft 120 at an end of the shaft 120. According to various embodiments, the display stand 101 may include two spiral springs 174, each spiral spring 174 may be connected to and coiled around the shaft 120 at the respective ends of the shaft 120. According to various embodiments, the display stand 101 may include a spiral spring 174

connected to and coiled around the shaft 120 at the mid portion 125 of the shaft 120. In the various embodiments, the spiral spring 174 may be wound up when the shaft 120 is rotated to move the first end 132 of the first link 130 and the first end 142 of the second link 140 away from each other such that the second end 134 of the first link 130 and the second end 144 of the second link 140 may move towards the shaft 120. After the first link 130 and the second link 140 are retracted, the spiral spring 174 may be locked such that torsion may be maintained in the spiral spring 174. When the spiral spring 174 is unlocked such that the torsion is released, the spiral spring 174 may rotate the shaft 120 to move the first end 132 of the first link 130 and the first end 142 of the second link 140 towards each other such that the second end 134 of the first link 130 and the second end 144 of the second link 140 may move away from the shaft 120 to extend the first link 130 and the second link 140. According to various embodiments, the spiral spring 174 may be operated independently from the actuator 170 to extend the first link 130 and the second link 140. According to various embodiments, the spiral spring 174 may be complementary to the actuator 170 such that the spiral spring 174 may provide additional torque on top of the torque provided by the actuator 170 to overcome the initial inertia to begin extending the first link 130 and the second link 140.

[0028] According to various embodiments, the display stand 101 may include a biasing element between the first link 130 and the first coupling element 150. The display stand 101 may also include a biasing element between the second link 140 and the second coupling element 160. The biasing element may provide a biasing force to overcome the initial inertia to begin extending the first link 130 and the second link 140.

[0029] According to various embodiments, the shaft 120 may be configured to be coupled to a hand crank 176. The hand crank 176 may provide a manual means for rotating the shaft 120. The hand crank 176 may be coupled to the shaft 120 when required to rotate the shaft 120 manually. The hand crank 176 may be decoupled from the shaft 120 when not in use.

[0030] According to various embodiments, the base 110 may be configured to receive a roll of sheet material 194. The roll of sheet material may include a roll and a sheet material rolled up or wound up on the roll. The sheet material may be a banner, a poster or any advertising material. The roll may be rotatably mounted to the base

110. Accordingly, the base 110 may include mounting brackets to receive the roll such that the roll may be rotatable about the longitudinal axis of the roll when mounted. In this manner, the sheet material rolled up or wound up on the roll may be pulled out from the roll and may be retracted back onto the roll. According to various embodiments, the roll of sheet material may be contained in a cartridge. Accordingly, the mounting brackets of the base 110 may be configured to receive the cartridge containing the roll of sheet material 194. The cartridge may include a winding mechanism for automatic winding of the sheet of material onto the roll. Accordingly, when the sheet of material is being pulled out from the cartridge, the winding mechanism may provide a torsion force in the opposite direction of the pulling force such that the sheet of material has the tendency to retract back into the cartridge upon removal of the pulling force.

[0031] According to various embodiments, the roll of sheet material 194 or the cartridge may be a separate component of the display stand 101. Accordingly, a user may change the roll of sheet material 194 or the cartridge depending on what is to be displayed. According to various embodiments, the roll may be integrated into the display stand 101. Accordingly, the display stand 101 may include the roll as one of its components for receiving a sheet material. According to various embodiments, the roll of sheet material or the cartridge may be integrated into the display stand 101. Accordingly, the display stand 101 may include the roll of sheet material or the cartridge as one of its components.

[0032] According to various embodiments, the second end 134 of the first link 130 and the second end 144 of the second link 140 may be configured to receive an edge of the sheet material. Accordingly, as the second end 134 of the first link 130 and the second end 144 of the second link 140 extend from the shaft 120 when the shaft 120 rotates in the first direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 towards each other, the sheet material may be pulled out from the roll of sheet material 194. Further, as the second end 134 of the first link 130 and the second end 144 of the second link 140 retract towards the shaft 120 when the shaft 120 rotates in the second direction to move the first end 132 of the first link 130 and the first end 142 of the second link 140 away from each other, the sheet material may be wound back onto the roll.

[0033] According to various embodiments, the base 110 may include a roller 114. The roller 114 may be mounted to a bottom surface of the base 110. Accordingly, the display stand 101 may be towed or pulled along the ground when moving the display stand 101.

[0034] According to various embodiments, the display stand 101 may further include one or more further links 136 coupled in series to the first link 130 and one or more further links 146 coupled in series to the second link 140. Each link 136 in series to the first link 130 may be pivotably coupled to the next link 136 in series to the first link 130 at the respective ends. Each link 146 in series to the second link 140 may be pivotably coupled to the next link 146 in series to the second link 140 at the respective ends. Further, each link 136 in series with the first link 130 may be pivotably coupled to a corresponding link 146 in series with the second link 140. Accordingly, this configuration may provide an extendable framework having a series of jointed and pivoted links forming series of criss-cross scissorslike pair similar to a lazy tongs mechanism.

[0035] According to various embodiments, there may be provided a display stand 101 including a base 110 and a shaft 120 rotatably coupled to the base 110. The shaft 120 may have a first portion 122 with a right-handed external screw thread 124 and a second portion 126 with a left-handed external screw thread 128. The display stand 101 may further include a first link 130 with a first end 132 of the first link 130 coupled to a first coupling element 150. The first coupling element 150 may include a right-handed internal screw thread or a right-handed ball nut engaged to the right-handed external screw thread 124 of the first portion 122 of the shaft 120. The display stand 101 may further include a second link 140 with a first end 142 of the second link 140 coupled to a second coupling element 160. The second coupling element 160 may include a left-handed internal screw thread or a left-handed ball nut engaged to the left-handed external screw thread 128 of the second portion 126 of the shaft 120. The first link 130 and the second link 140 may be pivotably coupled to each other.

[0036] According to various embodiments, there may be provided a method of setting up the display stand as described herein. The method may include rotating the shaft of the display stand in the first direction.

[0037] According to various embodiments, there may be provided a method of collapsing the display stand as described herein. The method may include rotating the shaft of the display stand in the second direction.

[0038] According to various embodiments, rotating the shaft of the display stand, in the first direction or the second direction, may include rotating the shaft via an actuator, rotating the shaft via a hand crank, or rotating the shaft via the spiral spring.

[0039] FIGs. 2A and 2B show a side view and a front view of a display stand 200 in an erected state according to various embodiments. As shown, the display stand 200 may include a base 210 and a shaft 220 rotatably coupled to the base 210. The shaft 220 may have a first portion 222 with a right-handed external screw thread 224 and a second portion 226 with a left-handed external screw thread 228. The right-handed external screw thread 224 may include a helix of thread twisted or oriented such that when view from an end of the shaft 220, the shaft 220 moves away from the viewer when rotating clockwise about the longitudinal axis of the shaft 220 and moves towards the viewer when rotating counterclockwise about the longitudinal axis of the shaft 220. The left-handed external screw thread 228 may include a helix of thread twisted or oriented in the opposite direction from the right-handed external screw thread 224. The shaft 220 may further include a mid portion 225 with a smooth external surface. The first portion 222 may be on one side of the mid portion 225, and the second portion 226 may be on another side of the mid portion 225. According to various embodiments, the first portion 222, the mid portion 225 and the second portion 226 may be separate pieces joined together to form the shaft 220. According to various embodiments, the first portion 222, the mid portion 225 and the second portion 226 may be integrally formed. FIG. 4A shows a shaft 220 of the display stand 200 according to various embodiments. FIGs. 4B and 4C show enlarged views of a section of the first portion 222 and a section of the second portion 226 of the shaft 220 respectively according to various embodiments.

[0040] Referring to FIGs. 2A and 2B, the display stand 200 may further include a first link 230 with a first end 232 of the first link 230 coupled to a first coupling element 250. The first coupling element 250 may include a right-handed internal screw thread or a right-handed ball nut engaged to the right-handed external screw thread 224 of the first portion 222 of the shaft 220. The display stand 200 may further include a second link 240 with a first end 242 of the second link 240 coupled to a

second coupling element 260. The second coupling element 260 may include a left-handed internal screw thread or a left-handed ball nut engaged to the left-handed external screw thread 228 of the second portion 226 of the shaft 220. The first link 230 and the second link 240 may be pivotably coupled to each other via a pivot joint 239 at respective mid portion of the first link 230 and the second link 240.

[0041] In the configuration as shown, the shaft 220 may rotate about a longitudinal axis of the shaft 220 in a first direction to move the first end 232 of the first link 230 and the first end 242 of the second link 240 towards each other along the longitudinal axis of the shaft 220 to cause a second end 234 of the first link 230 and a second end 244 of the second link 240 to move away from the shaft 220. The shaft 220 may further rotate about the longitudinal axis of the shaft 220 in a second direction to move the first end 232 of the first link 230 and the first end 242 of the second link 240 away from each other along the longitudinal axis of the shaft 220 to cause the second end 234 of the first link 230 and the second end 244 of the second link 240 to move towards the shaft 220.

[0042] The display stand 200 may further include one or more further links 236 coupled in series to the first link 230 and one or more further links 246 coupled in series to the second link 240. Each link 236 in series to the first link 230 may be pivotably coupled to the next link 236 in series to the first link 230 at the respective ends 237. Each link 246 in series to the second link 240 may be pivotably coupled to the next link 246 in series to the second link 240 at the respective ends 247. Further, each link 236 in series with the first link 230 may be pivotably coupled to a corresponding link 246 in series with the second link 240 via pivot joints 249. Accordingly, this configuration may provide an extendable framework having a series of jointed and pivoted links forming series of criss-cross scissorslike pair similar to a lazy tongs mechanism.

[0043] The base 210 of the display stand 200 may include mounting brackets 216 configured to receive a roll of sheet material 294. The roll of sheet material 294 may include a roll 293 and a sheet material 295 rolled up or wound up on the roll 293. The sheet material 295 may be a banner, a poster or any advertising material. The roll 293 may be rotatably mounted to the base 210. Accordingly, the roll 293 may be rotatable about a longitudinal axis of the roll 293 when mounted. In this manner, the sheet material 295 rolled up or wound up on the roll 293 may be pulled out from the roll

293 and may be retracted back onto the roll 293. According to various embodiments, the roll of sheet material 294 may be contained in a cartridge. Accordingly, the mounting brackets 216 of the base 210 may be configured to receive the cartridge containing the roll of sheet material 294. The cartridge may include a winding mechanism for automatic winding of the sheet material 295 onto the roll 293. Accordingly, when the sheet material 295 is being pulled out from the cartridge, the winding mechanism may provide a torsion force in the opposite direction of the pulling force such that the sheet material 295 may have the tendency to retract back into the cartridge upon removal of the pulling force.

[0044] According to various embodiments, the roll of sheet material 294 or the cartridge may be a separate component of the display stand 200. Accordingly, a user may change the roll of sheet material 294 or the cartridge depending on what is to be displayed. According to various embodiments, the roll 293 may be integrated into the display stand 200. Accordingly, the display stand 200 may include the roll 293 as one of its components for receiving a sheet material 295. According to various embodiments, the roll of sheet material 294 or the cartridge may be integrated into the display stand 200. Accordingly, the display stand 200 may include the roll of sheet material 294 or the cartridge as one of its components.

[0045] As shown, an end 238 of the last further link 236 in series with the first link 230 and an end 248 of the last further link 246 in series with the second link 240 may be configured to receive an edge of the sheet material 295. Accordingly, as the end 238 of the last further link 236 in series with the first link 230 and the end 248 of the last further link 246 in series with the second link 240 extend from the shaft 220 when the shaft 220 rotates in the first direction to move the first end 232 of the first link 230 and the first end 242 of the second link 240 towards each other, the sheet material may be pulled out from the roll of sheet material 294. FIGs. 2A and 2B show the display stand 200 in an erected state according to various embodiments. Further, as the end 238 of the last further link 236 in series with the first link 230 and the end 248 of the last further link 246 in series with the second link 240 retract towards the shaft 220 when the shaft 220 rotates in the second direction to move the first end 232 of the first link 230 and the first end 242 of the second link 240 away from each other, the sheet material 295 may be wound back onto the roll 293. FIGs. 3A and 3B show a

side view and a front view of the display stand 200 in a collapsed state according to various embodiments.

[0046] As shown, the shaft 220 may be configured to be coupled to an actuator 270. According to various embodiments, the shaft 220 may include a coupler configured to couple to a drive shaft 272 of the actuator 270. According to various embodiments, the actuator 270 may be a separate component from the display stand 200. Accordingly, the actuator 270 may be coupled to the shaft 220 when it is required to rotate the shaft 220. When not in use, the actuator 270 may be decoupled from the shaft 220. According to various embodiments, the actuator 270 may include a motor.

[0047] According to various embodiments, the actuator 270 may be integrated into the display stand 200 such that the display stand 200 may include the actuator 270 as one of its component. Accordingly, the actuator 270 may be installed in a part of the display stand 200 and may always be coupled to the shaft 220.

[0048] According to various embodiments, the base 210 may be configured to receive the actuator 270 coupled to the shaft 220. Accordingly, the base 210 may include a receiving structure in the form of a recess or protruding walls that may house or accommodate the actuator 270. The receiving structure of the base 210 may be configured to temporary receive the actuator 270 when the actuator 270 is not part of the display stand 200. The receiving structure of the base 210 may be configured to permanently receive the actuator 270 when the actuator 270 is integrated into the display stand 200.

[0049] According to various embodiments, the actuator 270 may be configured to be connected to a power source. The power source may be a battery. Accordingly, the actuator 270 may include connectors for connecting to the power source. According to various embodiments, the power source may be a separate component from the display stand 200. Accordingly, the power source may be coupled to the actuator 270 when it is required to power up the actuator 270.

[0050] According to various embodiments, the power source may be integrated into the display stand 200 such that the display stand 200 may include the power source as one of its component. Accordingly, when the actuator 270 is a separate component from the display stand 200, the actuator 270 may be coupled to the shaft 220 and connected to the power source to rotate the shaft 220 as required. When the

actuator 270 is not in use, the actuator 270 may be decoupled from the shaft 220 and may be disconnected from the power source. When the actuator 270 is integrated into the display stand 200, the power source may be permanently connected to the actuator 270.

[0051] According to various embodiments, the base 210 may be configured to receive the power source. Accordingly, the base 210 may include a receiving structure in the form of a recess or protruding walls that may house or accommodate the power source. The receiving structure of the base 210 may be configured to temporary receive the power source when the power source is not part of the display stand 200. The receiving structure of the base 210 may be configured to permanently receive the power source when the power source is integrated into the display stand 200.

[0052] According to various embodiment, the base 210 may be configured to provide an electronic power port. The electronic power port may be connected to the power source. The electronic power port may be a USB port. Accordingly, the electronic power port may serve as a power charging point for personal electronic devices such as smart phones, tablets or the like.

[0053] According to various embodiments, the actuator 270 may be coupled to a processor. The processor may be configured to control the actuator 270 so as to actuate the shaft 220 based on an electronic control signal from the processor. For example, the electronic control signal may include control signal to rotate in a first direction, control signal to rotate in a second direction, control signal to increase rotational speed, control signal to decrease rotational speed, control signal to stop, etc. The processor may include a user interface for the user to provide commands to the processor. The user interface may be in the form of a keypad, a touch button, a lever, a switch, a touch screen, etc. The processor may include a receiver for example an infra-red receiver, a Bluetooth receiver, a wireless receiver etc. The receiver may be configured to communicate with an external device such as a remote controller, a smart phone, a tablet, etc. to receive a command from the user.

[0054] Various embodiments have provided a display stand that may be easy to set up regardless of the relative height of the display stand to the user, and that may allow a hassle free set up with the use of a single touch or remote control. Various embodiments have also provided an all-in-one automatic roll up display stand that is simple to erect and collapse.

[0055] While the invention has been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the scope of the invention as defined by the appended claims. The scope of the invention is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced.

Claims

1. A display stand comprising:

a base;

a shaft rotatably coupled to the base;

a first link with a first end of the first link movably coupled to the shaft; and

a second link with a first end of the second link movably coupled to the shaft, wherein the first link and the second link are pivotably coupled to each other, and

wherein the shaft is configured to rotate about a longitudinal axis of the shaft in a first direction to move the first end of the first link and the first end of the second link towards each other along the longitudinal axis of the shaft to cause a second end of the first link and a second end of the second link to move away from the shaft, and further configured to rotate about the longitudinal axis of the shaft in a second direction to move the first end of the first link and the first end of the second link away from each other along the longitudinal axis of the shaft to cause the second end of the first link and the second end of the second link to move towards the shaft.

2. The display stand as claimed in claim 1, wherein the shaft comprises a first portion with a right-handed external screw thread and a second portion with a left-handed external screw thread.

3. The display stand as claimed in claim 2, further comprising a first coupling element configured to couple the first end of the first link to the shaft, and a second coupling element configured to couple the first end of the second link to the shaft.

4. The display stand as claimed in claim 3, wherein the first coupling element comprises a right-handed internal screw thread to engage the first portion of the shaft, and the second coupling element comprises a left-handed internal screw thread to engage the second portion of the shaft.

5. The display stand as claimed in claim 3 or 4, wherein the first coupling element comprises a right-handed ball nut to engage the first portion of the shaft, and

the second coupling element comprises a left-handed ball nut to engage the second portion of the shaft.

6. The display stand as claimed in any one of claims 3 to 5, wherein the base comprises an elongated guide element configured to be parallel to the shaft, the first coupling element comprises a first slider element engaged to the elongated guide element, and the second coupling element comprises a second slider element engaged to the elongated guide element.

7. The display stand as claimed in any one of claims 3 to 6, wherein the first end of the first link is pivotably attached to the first coupling element, and the first end of the second link is pivotably attached to the second coupling element.

8. The display stand as claimed in any one of claims 1 to 7, wherein the shaft is configured to be coupled to an actuator.

9. The display stand as claimed in claim 8, wherein the base is configured to receive the actuator coupled to the shaft.

10. The display stand as claimed in claims 8 or 9, wherein the actuator is configured to be connected to a power source.

11. The display stand as claimed in claim 10, wherein the base is configured to receive the power source.

12. The display stand as claimed in claim 11, wherein the base is configured to provide an electronic power port.

13. The display stand as claimed in any one of claims 8 to 12, wherein the actuator is coupled to a processor.

14. The display stand as claimed in any one of claims 1 to 13, wherein the shaft is configured to be coupled to a spiral spring.

15. The display stand as claimed in any one of claims 1 to 14, wherein the shaft is configured to be coupled to a hand crank.

16. The display stand as claimed in any one of claims 1 to 15, wherein the base is configured to receive a roll of sheet material.

17. The display stand as claimed in claim 16, wherein the second end of the first link and the second end of the second link are configured to receive an edge of the sheet material.

18. The display stand as claimed in claim 17, wherein the base is configured to receive a cartridge containing the roll of sheet material.

19. The display stand as claimed in any one of claims 1 to 18, wherein the base comprises a roller.

20. The display stand as claimed in any one of claims 1 to 19, further comprising one or more further links coupled in series to the first link and one or more further links coupled in series to the second link, wherein each link is pivotably connected to the next link at the ends, and each link in series with the first link is pivotably coupled to a corresponding link in series with the second link.

21. A display stand comprising:

a base;

a shaft rotatably coupled to the base, the shaft having a first portion with a right-handed external screw thread and a second portion with a left-handed external screw thread;

a first link with a first end of the first link coupled to a first coupling element, the first coupling element comprising a right-handed internal screw thread or a right-handed ball nut engaged to the right-handed external screw thread of the first portion of the shaft; and

a second link with a first end of the second link coupled to a second coupling element, the second coupling element comprising a left-handed internal screw thread or a left-handed ball nut engaged to the left-handed external screw thread of the second portion of the shaft,

wherein the first link and the second link are pivotably coupled to each other.

22. A method of setting up the display stand of any one of claims 1 to 21, the method comprising rotating the shaft of the display stand in the first direction.

23. A method of collapsing the display stand of any one of claims 1 to 21, the method comprising rotating the shaft of the display stand in the second direction.