A support apparatus is needed that can permit a user to easily adjust the vertical position of multiple objects held by the support apparatus. Preferably, the support apparatus has a wide range of design options that are not limited by a requirement for springs or cables to help support an object.

SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided ~~A~~ a support apparatus ~~may include~~comprising a first elongated substantially vertical member having at least one ~~or more~~ thread~~s~~ and a second elongated substantially vertical member having at least one ~~or more~~ thread~~s~~. A first collar is moveably attached to the first elongated vertical member and a second collar is moveably attached to the second elongated vertical member. Rotation of the first collar in a first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the first collar in a second direction that is opposite the first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction. Rotation of the second collar in the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the second collar in the second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally downward direction. ~~Each collar is rotatable such that the collar moves along the at least one thread of the substantially vertical member to which it is attached in a generally upwards direction when rotated in one direction and in a generally downwards direction when rotated in the opposite direction.~~ A first substantially horizontal member is positioned adjacent to the first and second substantially vertical members, the first substantially horizontal member having a front side and a rear side and having a channel formed in the rear side, the first substantially horizontal member being supported on or attached to the first and second collars such that movement of the first and second collars adjusts a vertical position of the first

substantially horizontal member, the channel sized and configured to receive wiring for display devices. ~~A rear side of the first substantially horizontal member has a channel formed in its rear side that is sized and configured to retain wiring, such as cables or wires. The first substantially horizontal member is supported or attached to the first and second collars so that movement of the first and second collars adjusts a vertical position of the substantially horizontal member.~~

The one or more threads may be, for example, one or more grooves formed in the substantially vertical member or one or more beads formed on the substantially vertical member. Preferably, the one or more threads extend to define a spiral path for one or more collars.

The substantially vertical members may each be a member such as a rod, bar, or rail that is arranged so that the length of the members extend in a mostly vertical direction, such as a member that is arranged to extend normal to a floor or work surface, or a member that

In some embodiments, each substantially vertical member may be attached to a respective attachment mechanism, such as a clamp, for attaching the substantially vertical member to a work surface or other structure.

Preferably, embodiments of the support apparatus include sleeves. Each sleeve may be positioned on or attached to a respective collar. The sleeves may be configured to receive a portion of the substantially vertical member so that the sleeve is vertically moveable along that member and also be configured to receive and attach to the substantially horizontal member to attach the substantially horizontal member to the collar or to ensure that the substantially horizontal member is supported on that collar.

According to a second aspect of the present invention, there is provided a support apparatus comprising:

a first elongated substantially vertical member having at least one thread;

a second elongated substantially vertical member having at least one thread;

a first collar moveably attached to the first elongated vertical member, rotation of the first collar in a first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the first collar in a second direction that is opposite the first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction;

a second collar moveably attached to the second elongated vertical member, rotation of the second collar in the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the second collar in the second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally downward direction;

a first substantially horizontal member positioned adjacent to the first and second elongated substantially vertical members, the first substantially horizontal member having a front side and a rear side and having a channel formed in the rear side, the first substantially horizontal member being supported on or attached to the first and second collars such that movement of the first and second collars adjusts a vertical position of the first substantially horizontal member, the channel sized and configured to receive wiring for display devices;

at least one quick release attachment mechanism attached to the first substantially horizontal member, each quick release attachment mechanism sized and configured to connect a display device to the first substantially horizontal member; and

wherein each of the at least one quick release attachment mechanisms is comprised of a substantially horizontal member mounting portion that has an upper portion configured to engage an upper portion of the first substantially horizontal member and a moveable member moveable from a first position to a second position, the moveable member being biased to the first position, the moveable member engaging a bottom rear portion of the first substantially horizontal member located below the channel when in the first position and being moved away from the first substantially horizontal member when in the second position to permit the quick release attachment mechanism to be removed from the first substantially horizontal member when the moveable member is in the second position, movement of the moveable member from the first position to the second position being actuated by a user without using a mechanical tool.

~~A quick release attachment mechanism sized and configured to attach a display device to a support arm or elongated member of a display device holding device is also provided. The quick release attachment mechanism includes a display device mounting portion comprising a mounting plate having an outer peripheral portion that is rotatable about an inner portion. The~~

~~mechanism also includes a member attachment portion sized and configured to attach to a support arm or elongated member of a display device holding device. A vertical adjustment mechanism is also included. The vertical adjustment mechanism has a connector that is moveable within a slot of the member attachment portion. The connector has a first side and a second side opposite the first side. The first side of the connector is attached to the display device mounting portion and the second side of the connector is positioned through the slot and is moveably attached to the member attachment portion.~~

According to a third aspect of the present invention, there is provided a support apparatus comprising:

a first elongated substantially vertical member having at least one thread;

a second elongated substantially vertical member having at least one thread;

a first collar moveably attached to the first elongated vertical member, rotation of the first collar in a first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the first collar in a second direction that is opposite the first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction;

a second collar moveably attached to the second elongated vertical member, rotation of the second collar in the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the second collar in the second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally downward direction;

a first substantially horizontal member positioned adjacent to the first and second elongated substantially vertical members, the first substantially horizontal member having a front side and a rear side and having a channel formed in the rear side, the first substantially horizontal member being supported on or attached to the first and second collars such that movement of the first and second collars adjusts a vertical position of the first substantially horizontal member, the channel sized and configured to receive wiring for display devices;

a third collar and a fourth collar and a second substantially horizontal member;

the third collar moveably attached to the first elongated substantially vertical member, rotation of the third collar in the first direction moves the third collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the third collar in the second direction that is opposite the first direction moves the third collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction;

the fourth collar moveably attached to the second elongated substantially vertical member, rotation of the fourth collar in the first direction moves the fourth collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the fourth collar in the second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated vertical member in a generally downward direction; and

the second substantially horizontal member positioned adjacent to the first and second elongated substantially vertical member, the second substantially horizontal member having a front side and a rear side, the second substantially horizontal member being supported on or

attached to the third and fourth collars such that movement of the third and fourth collars adjusts a vertical position of the second substantially horizontal member;

at least one quick release attachment mechanism attached to the first substantially horizontal member, and at least one quick release attachment mechanism attached to the second substantially horizontal member, each quick release attachment mechanism sized and configured to connect a display device to the first substantially horizontal member or the second substantially horizontal member; and

wherein each of the quick release attachment mechanisms is comprised of a substantially horizontal member mounting portion that has an upper portion configured to engage an upper portion of the first substantially horizontal member or the second substantially horizontal member and a moveable member attached to the substantially horizontal member mounting portion, the moveable member moveable from a first position to a second position, the moveable member being biased to the first position, the moveable member engaging a bottom rear portion of the first substantially horizontal member or the second substantially horizontal member when in the first position and being moved away from the first substantially horizontal member or the second substantially horizontal member when in the second position such that the quick release attachment mechanism is removable from the first substantially horizontal member or second substantially horizontal member when the moveable member is in the second position, movement of the moveable member from the first position to the second position being actuated by a user without using a mechanical tool.

According to a fourth aspect of the present invention, there is provided a support apparatus comprising:

a first elongated substantially vertical member having at least one thread;

a second elongated substantially vertical member having at least one thread;

a first collar moveably attached to the first elongated vertical member, rotation of the first collar in a first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the first collar in a second direction that is opposite the first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction;

a second collar moveably attached to the second elongated vertical member, rotation of the second collar in the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the second collar in the second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally downward direction;

a first substantially horizontal member positioned adjacent to the first and second elongated substantially vertical members, the first substantially horizontal member having a front side and a rear side and having a channel formed in the rear side, the first substantially horizontal member being supported on or attached to the first and second collars such that movement of the first and second collars adjusts a vertical position of the first substantially horizontal member, the channel sized and configured to receive wiring for display devices; and

at least one quick release attachment mechanism, each of the at least one quick release attachment mechanisms having a monitor mounting portion attached to a horizontal member mounting portion, the monitor mounting portion having a height adjustment mechanism sized and configured such that the display device is vertically adjustable via the height adjustment mechanism without movement of the first and second collars;

the horizontal member mounting portion having an upper portion configured to engage an upper portion of the first substantially horizontal member and a moveable member moveable from a first position to a second position, the moveable member being biased to the first position, the moveable member engaging a bottom rear portion of the first substantially horizontal member below the channel when in the first position to attach the at least one quick release attachment mechanism to the first substantially horizontal member and being moved away from the first substantially horizontal member when in the second position such that the quick release attachment mechanism is separable from the first substantially horizontal member when the moveable member is in the second position, movement of the moveable member being actuated by a user without using a mechanical tool.

According to a fifth aspect of the present invention, there is provided a support apparatus for supporting display devices above a work surface comprising:

a first elongated substantially vertical member having at least one thread extending from adjacent a first end of the first elongated substantially vertical member to adjacent a second end of the first elongated substantially vertical member;

a second elongated substantially vertical member having at least one thread extending from adjacent a first end of the second elongated substantially vertical member to adjacent a second end of the second elongated substantially vertical member;

a first collar moveably attached to the first elongated vertical member, rotation of the first collar in a first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally upwards direction and rotation of the first collar in a second direction that is opposite the first direction moves the first collar along the at least one thread of the first elongated substantially vertical member in a generally downward direction;

a second collar moveably attached to the second elongated vertical member, the second collar configured such that rotation of the second collar in a first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally upwards direction and rotation of the second collar in a second direction that is opposite the first direction moves the second collar along the at least one thread of the second elongated substantially vertical member in a generally downward direction;

a first substantially horizontal member positioned adjacent to the first and second elongated substantially vertical members, the first substantially horizontal member having a front side and a rear side, the first substantially horizontal member being supported on or attached to the first and second collars such that movement of the first and second collars adjusts a vertical position of the first substantially horizontal member, the first substantially horizontal member sized for attachment to a plurality of display devices.

Embodiments of the quick release attachment mechanism may include a pin that passes through a hole in the connector and an opening in the display device mounting portion to moveably attach the connector to the display device mounting portion.