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(54) **MOUNT SYSTEM UTILIZING ONE MOTOR TO EXTEND/RETRACT AND TILT A MONITOR**

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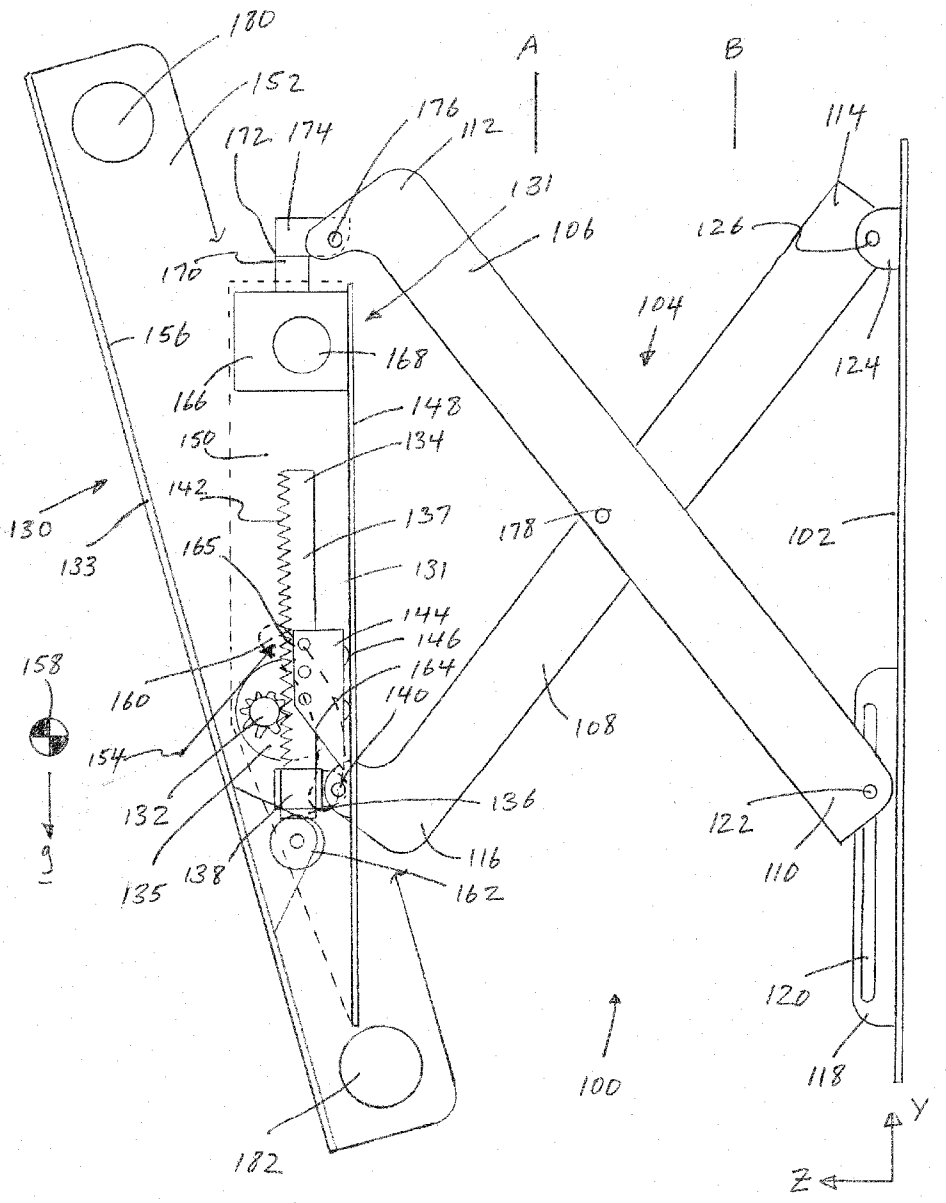
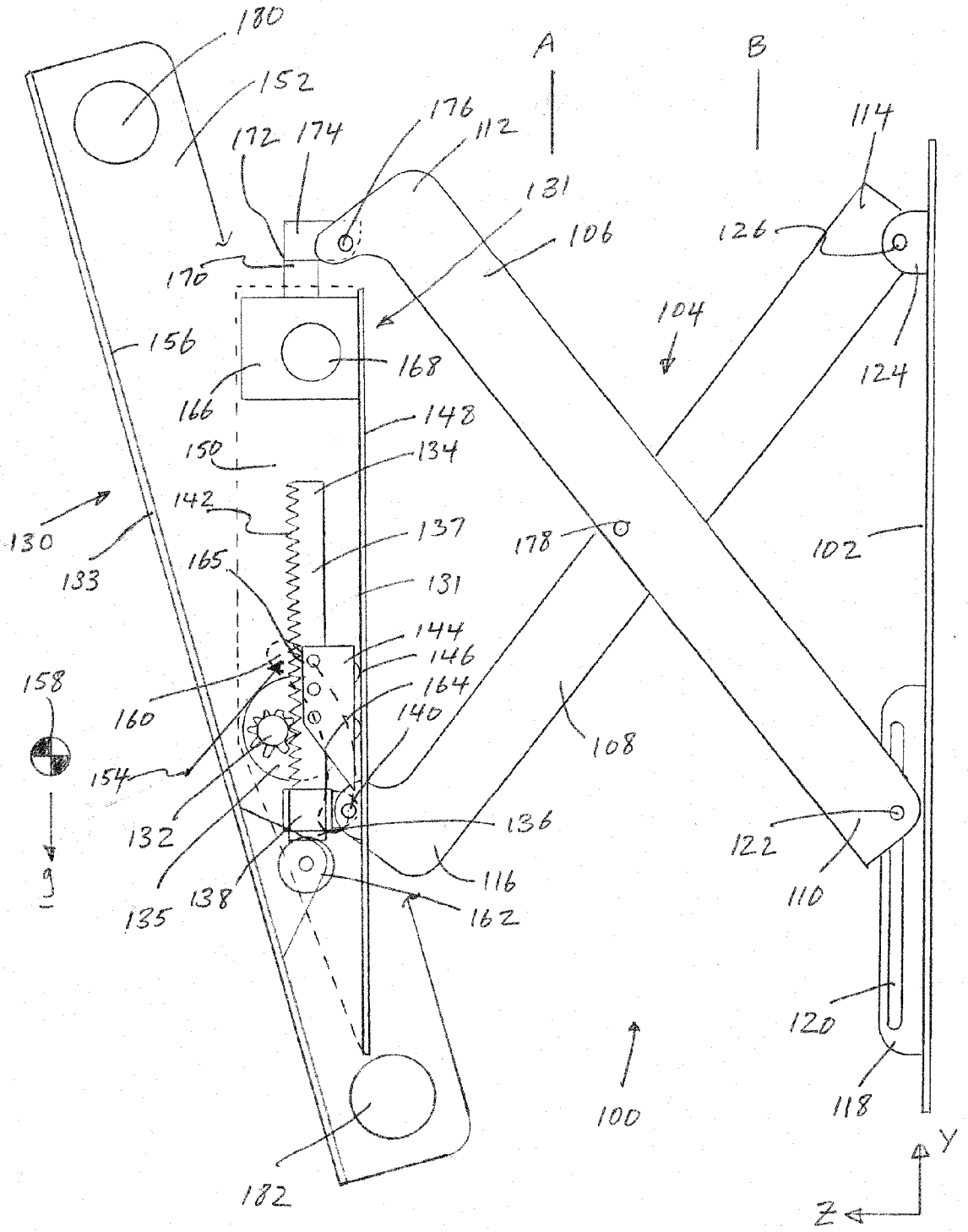
(57) **ABSTRACT**

A mount system utilizes one motor to extend/retract and tilt a monitor. The mount system may include a second motor to swivel the monitor.




180
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137
130
178
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133
165
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158
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162
120
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Y
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FIG. 1

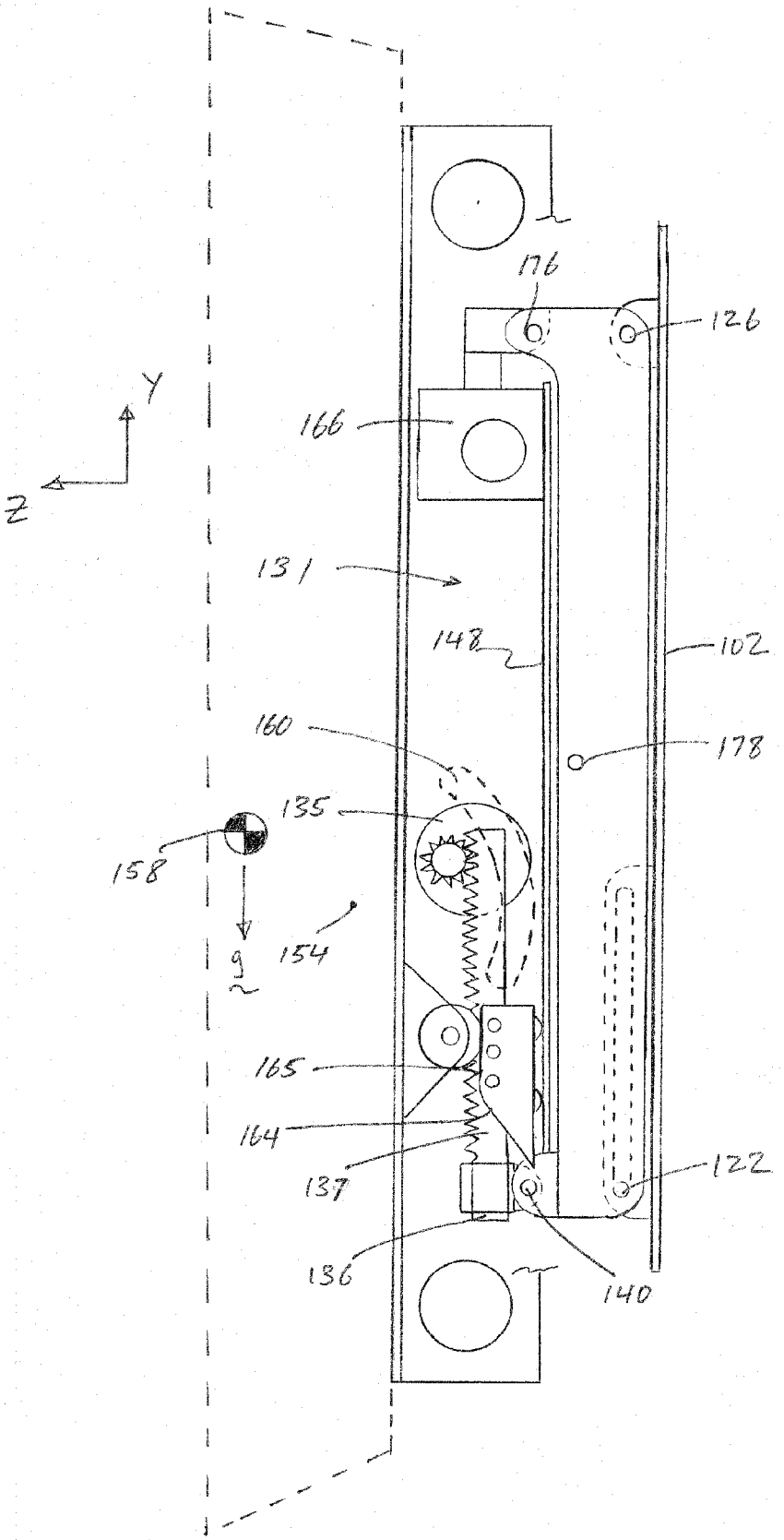
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FIG. 2

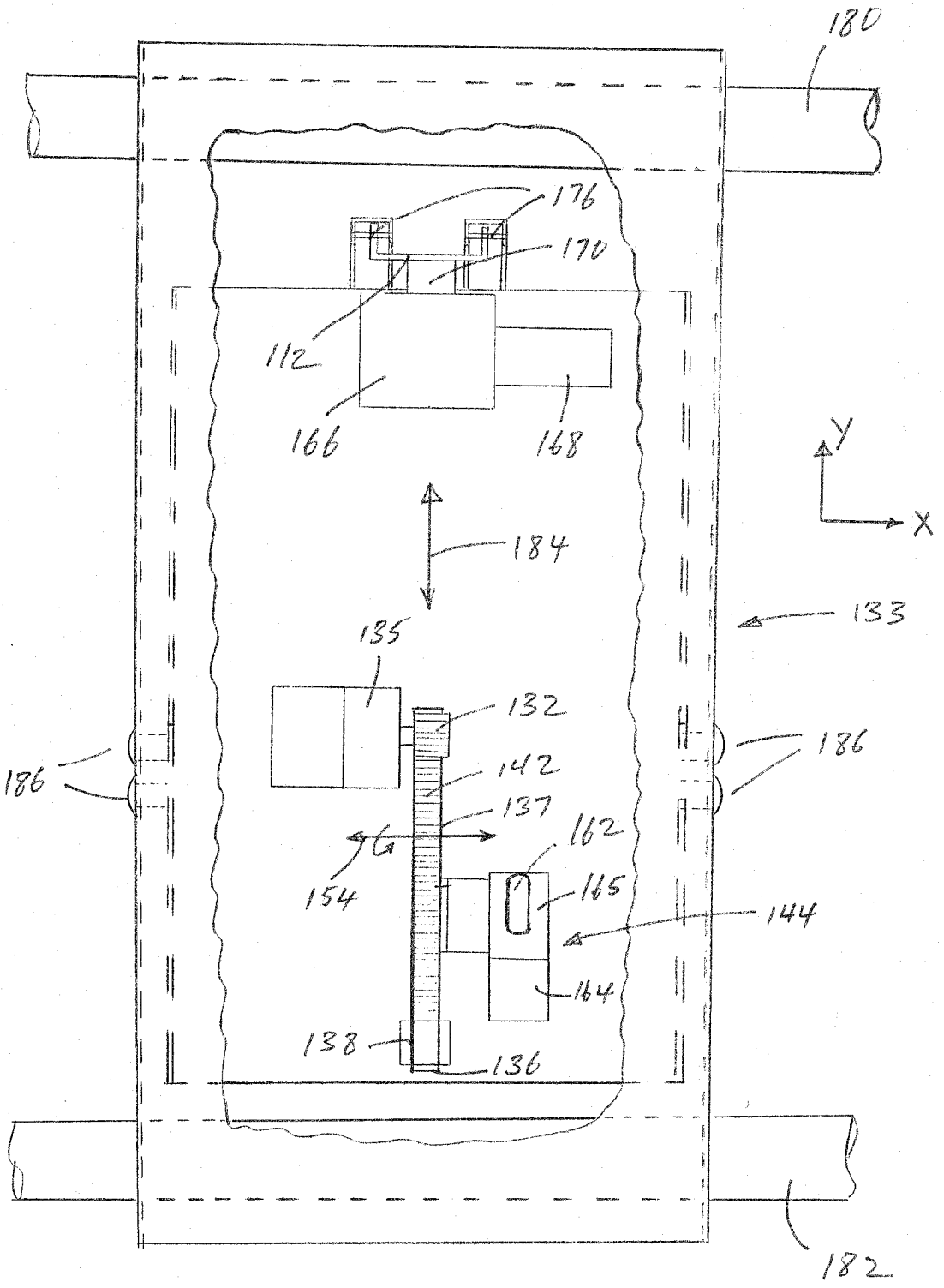
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FIG. 3

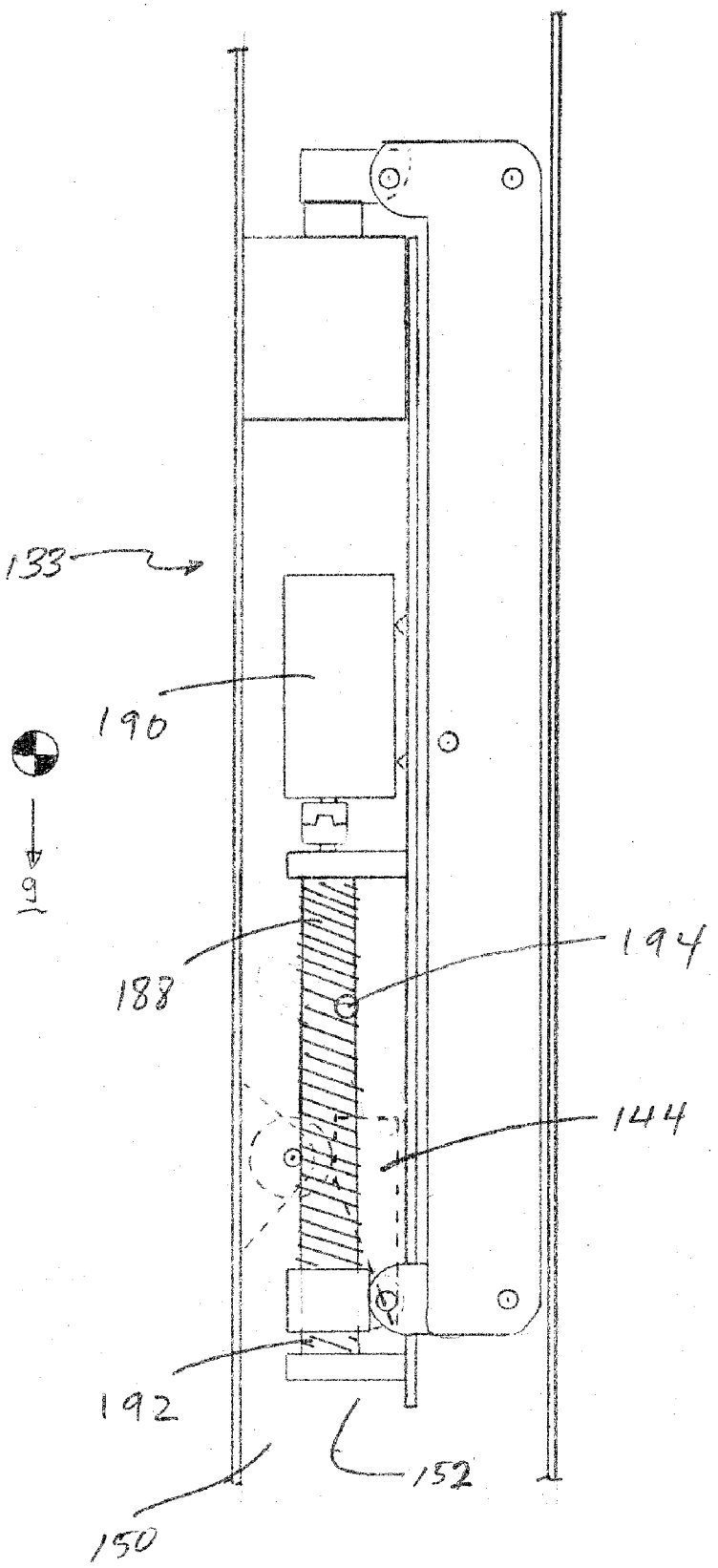

FIG. 4

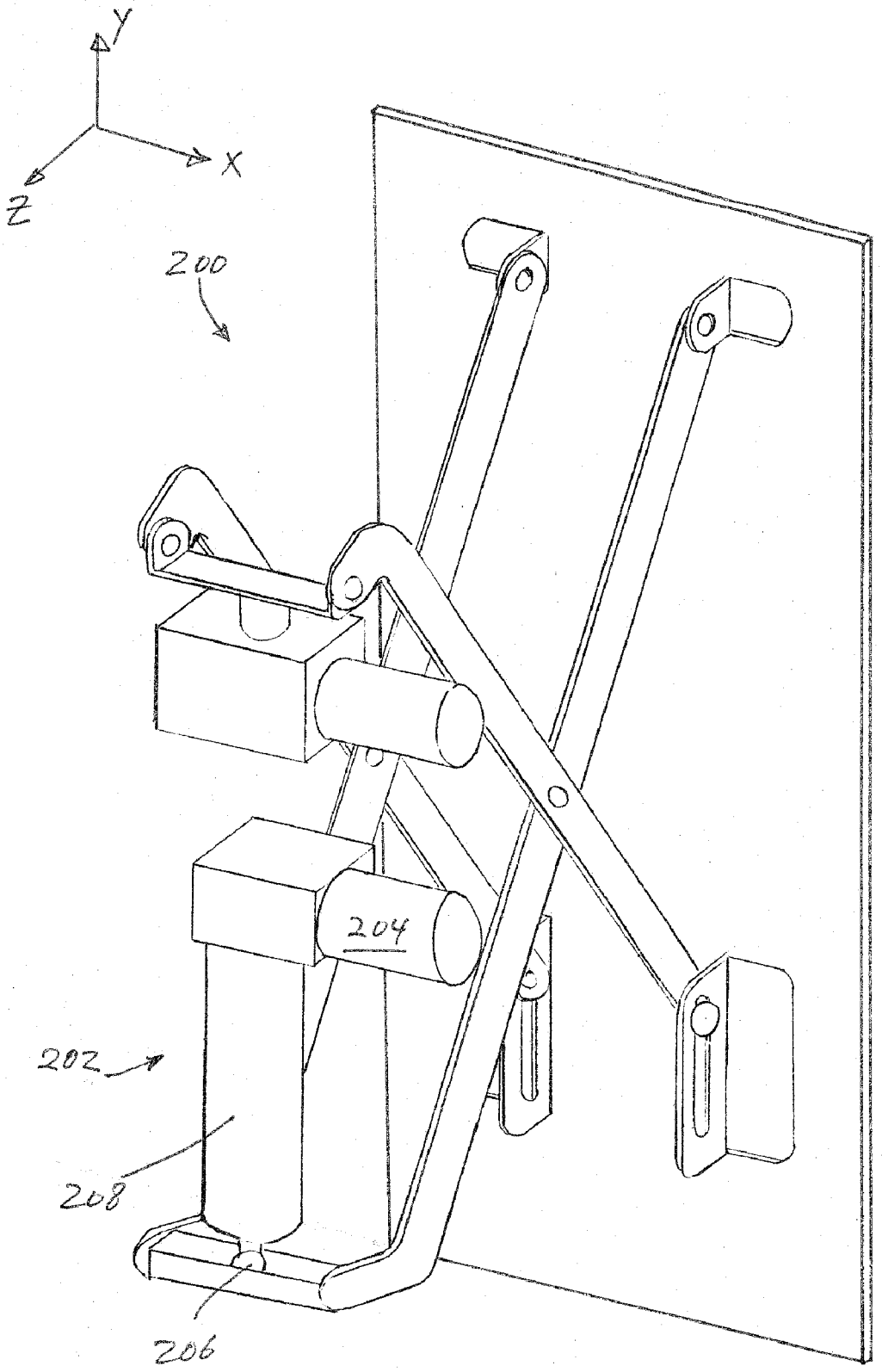

FIG. 5

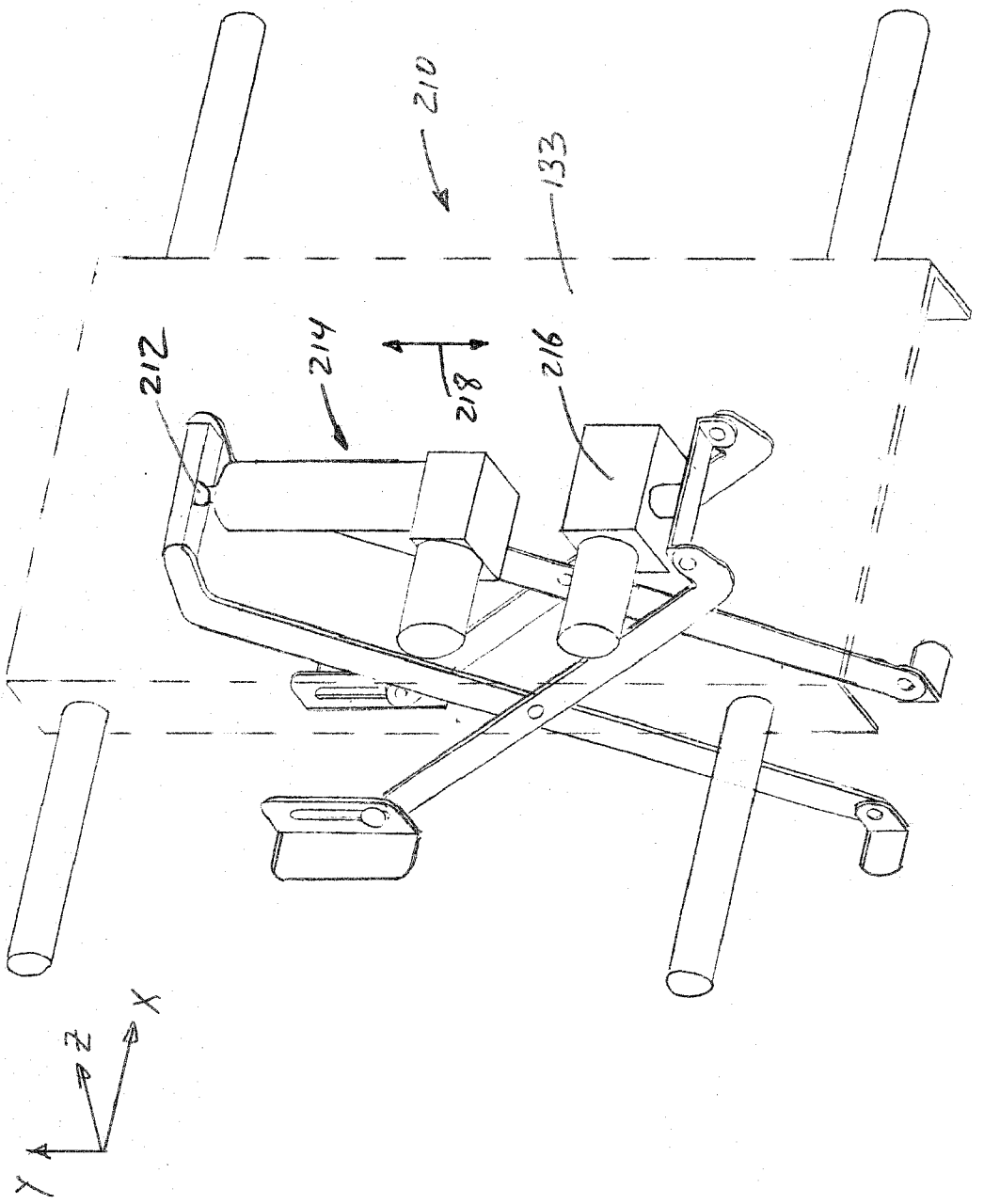

FIG. 6

MOUNT SYSTEM UTILIZING ONE MOTOR TO EXTEND/RETRACT AND TILT A MONITOR

BACKGROUND

[0001] 1. Related Applications

[0002] This application claims priority to a U.S. Provisional application Ser. No. 61/0152,277, filed Dec. 20, 2007, entitled "Mount System For Adjusting The Viewing Angle Of A Monitor," which is hereby incorporated by reference.

[0003] 2. Field of the Invention

[0004] This invention is directed to a mount system that is adapted to couple to a back side of a monitor, and adjust the viewing angle of the monitor through one or more motorized actions.

[0005] 3. Background of the Invention

[0006] Flat panel monitors such as computer monitors, LCD, plasma, slim televisions, and the like (collectively referred to as "monitor(s)") are becoming popular because they can be mounted onto a wall to save floor space and for their aesthetically pleasing appearance. In many applications, a monitor is attached to a wall with a mount bracket between the monitor and the wall. In order to reposition the monitor, an articulating mount is used to attach the monitor to the wall. The articulating mounts that are available today, however, are difficult to use because they have a tendency to move laterally left and right rather than moving straight in and out of the wall as the monitor is pushed and pulled, respectively. In situations where the monitor is recessed into a wall or a cabinet, the lateral movement of the monitor adds to the difficulty of extending and retracting the monitor from its recessed position. Moreover, with manual mounts, in order to reposition the monitor, the viewer needs to walk over to the monitor and physically move the monitor to a new position.

[0007] Some mounts incorporate one or more motors to move the mount through motorized action. These motorized mounts incorporate a motor for every degree of movement such as: a first motor for extending and retracting the mount relative to a wall, a second motor for swiveling the mount side to side; and perhaps a third motor for a tilt movement. As such, for three degrees of movement, three motors are used. Every motor, however, adds to the cost of the mount. In addition, adding a motor increases the complexities of controlling the motors. Accordingly, there is a need to adjust the viewing angle of the monitor in a cost effective way and to simplify the control mechanism.

INVENTION SUMMARY

[0008] This invention is directed to a mount system adapted to extend and retract a monitor from the wall, and tilt the monitor with one motor. The mount system may also include a second motor to swivel the monitor. The mount system may have a scissor type actuator that extends and retracts the monitor in a substantially perpendicular manner.

[0009] Other systems, methods, features, and advantages of the invention will be, or will become, apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the invention, and be protected by the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The invention can be better understood with reference to the following drawings and description. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the figures, like referenced numerals designate corresponding parts throughout the different views.

[0011] FIG. **1** shows a side view of a mount system in an extended position along a YZ plane.

[0012] FIG. **2** shows the mount system of FIG. **1** in a retracted position along a YZ plane.

[0013] FIG. **3** shows a cutout front view of the mount system of FIG. **1** along a XY plane.

[0014] FIG. **4** shows another embodiment of the invention.

[0015] FIG. **5** shows a perspective view of yet another mount system in an extended position along X, Y, and Z coordinates.

[0016] FIG. **6** shows a perspective view of still another mount system in an extended position along X, Y, and Z coordinates.

DETAILED DESCRIPTION OF THE INVENTION

[0017] FIG. **1** shows a mount system **100** adapted to extend and retract a monitor, and as the monitor is being extended/retracted, the mount system **100** also tilts the monitor; and adapted to swivel the monitor along YZ coordinates. The mount system **100** includes a mounting plate **102** adapted to support a first actuator **104**. The first actuator **104** may be a scissor type mechanism having a first link **106** and a second link **108**. The first link **106** may have a proximal end **110** and a distal end **112**; and the second link **108** may have a proximal end **114** and a distal end **116**. The mounting plate **102** may have a first flange **118** with an elongated opening **120**, and a second flange **124**. The proximal end **110** of the first link **106** may be pivotably coupled to the opening **120** about a first pivot axis **122** to allow the first pivot axis **122** to slide along the elongated opening **120**. The proximal end **114** may be pivotably coupled to the second flange **124** to pivot about a second pivot axis **126**.

[0018] The mount system **100** includes a second actuator system **130** having a housing **131** and a monitor mounting bracket **133**. The monitor mounting bracket **133** may have two cross-pipes **180** and **182** adapted to couple to the rear side of a monitor. The housing **131** may have a motor **135** mechanically coupled to a gear **132** to rotate the gear **132**. The housing **131** may include a shaft **137** with a first end **134** and a second end **136**. The second end **136** may be adapted to couple to a sleeve **138** adapted to rotate about the longitudinal axis of the shaft **134**. The sleeve **138** may be adapted to pivotably couple to the distal end **116** of the second link **108** to pivot about a third pivot axis **140**. The sleeve **138** may be coupled to the second end **136** of the shaft **134** such that as the second end **136** moves along the longitudinal axis of the shaft **134**, the third pivot axis **140** moves along Y-axis as well, which may be substantially parallel with the longitudinal axis of the shaft **134**.

[0019] The shaft **134** may have gear teeth **142** along the longitudinal axis of the shaft **134** on one side. The gear **132** may be adapted to engage with the teeth **142** of the shaft **134** such that as the motor **135** rotates the gear **132**, the shaft **134**

may move along its longitudinal axis, thereby moving the distal end **116** along the Y-axis which is substantially parallel with the longitudinal axis of the shaft **134** while pivoting about the third pivot axis **140**.

[0020] A moving block **144** may be coupled to the shaft **134** so that the moving block **144** moves along the longitudinal axis of the shaft **134** as well. In this example, the moving block **144** may be coupled to the side of the shaft **134**. The moving block **144** may have one or more rollers **146** adapted to roll along a base plate **148** of the housing **131**. The housing **131** may have side walls **150** adapted to pivotably engage with the side walls **152** of the monitor mounting bracket **133** so that the monitor mounting bracket **133** may pivot about a sixth pivot axis **154**, which is located between the base **156** of the monitor mounting bracket **133** and the approximate location **158** of the center of gravity of a monitor. One of the side walls **150** or **152** may have a curvature opening **160** defined by a radius of curvature "R" with its focal point at the sixth pivot axis **154**. Having the monitor mounting bracket **133** pivot about the sixth pivot axis **154**, which is closer to the center of gravity **158**, minimizes the torque needed from the motor to tilt the monitor. Note that it is within the scope of this invention to utilize a pivot axis within the two side walls **150** and **152** to pivot the monitor mounting bracket **133** relative to the housing **131**.

[0021] The monitor mounting bracket may have a wheel **146** adapted to engage with the moving block **144** to pivot the monitor mounting bracket **133** about the sixth pivot axis **154**. The moving block **144** may have a first surface **164** that may be sloped relative to the XY plane. The moving block **144** may also include a second surface **165** that is substantially parallel with the XY plane or the base **148**. The moving block **144** may be positioned relative to the wheel **162** so that the first surface **164** of the moving block **144** engages with the wheel **162** at a predetermined distance from the fully extended position of the monitor mounting bracket **133**. As such, as the first actuator **104** retracts the monitor from the extended position, the monitor mounting bracket **133** begins to tilt the monitor to the upright position as the base **148** of the housing **131** reaches a first predetermined position A and fully tilts the monitor to the upright position as the base **148** reaches a second predetermined position B, which is before the first actuator **104** is at a fully retracted position. In other words, the wheel **162** engages the first surface **164** of the moving block **144** as the base **148** moves between the predetermined positions A and B so that the monitor mounting bracket **133** tilts the monitor up and down relative to the base **148**; and the wheel engages the second surface **165** of the moving block **144** between the predetermined position B and the fully retracted position. The length of the second surface **165** may be sufficiently long along the Y-axis to support the wheel **162** as the base **148** moves from the predetermined position B to the fully retracted position. This minimizes the torque required by the motor **135** because there may be an inrush of current necessary to extend the monitor from the fully retracted position and an inrush of current may be necessary to retract the monitor from the fully extended position. As such, by tilting the monitor between the predetermined locations A and B, less current or torque may be required for the motor **135** to extend or retract, and at the same time tilt the monitor.

[0022] The second actuator system **130** may include a second motor mechanism **166** having a second motor **168** adapted to rotate a second shaft **170** about its longitudinal axis. The distal end **172** of the second shaft **170** may be coupled to a bracket **174** adapted to pivotably couple to the distal end **112** of the first link **106** about a fourth pivot axis **176**. The second motor mechanism **166** may be coupled to the base **148** of the housing **131** so that the longitudinal axis of the second shaft **170** may aligned with the longitudinal axis of the first shaft **134**. As the second motor **168** rotates the second motor mechanism **166** about the longitudinal axis of the second shaft **170**, the second actuator system **130** may rotate about the longitudinal axis of the second shaft **170** to rotate the monitor as well.

[0023] The first and second links **106** and **108** may be pivotably coupled together about a fifth pivot axis **178**, which may be a midpoint between the pivot axes **122** and **176**, and midpoint between the pivot axes **126** and **140**. As illustrated in FIG. **2**, with such pivot arrangements, as the first motor **135** moves the second end **136** of the first shaft **134** along its longitudinal axis, the fourth pivot axis **176** extend and retract substantially along the Z-axis or perpendicular relative to the mounting plate **102**. Moreover, a first line defined by two pivot axes **176** and **140** may move substantially parallel with a second line defined by two pivot axes **126** and **122**. In this example, the base **148** of the housing **131** may support or couple to the second motor mechanism **166** and the first shaft **137** such that base **148** moves along the Z-axis substantially parallel with the mounting plate **102** as the first motor moves the first shaft **134** along its longitudinal axis.

[0024] FIG. **3** shows the mount system **100** in reference to XY plane in a fully retracted position. As discussed above, the moving block **144** may be coupled the first shaft **134** onto side of the first shaft **134**. The wheel **162** may be coupled to the monitor mounting bracket **133** so that the wheel **162** may engage with the moving block in a manner described above. The first shaft **134** and the second shaft **170** may be aligned along a longitudinal axis **184**. As the second motor **148** rotates the second motor mechanism **166** about the second shaft **170**, the sleeve **138** rotates about the second end **136** of the first shaft **138** so that the housing **131** and the monitor mounting bracket **133** rotates about the longitudinal axis **184**. The monitor mounting bracket **133** may be pivotably coupled to the housing **131** through one or more rollers **186** to tilt the monitor up and down along the pivot axis **154**. Accordingly, the mount system **100** may perform three functions with two motors: (1) extend and retract the monitor along the Z-axis; (2) swivel the monitor around the Y-axis; and (3) tilt the monitor along the YZ-plane.

[0025] FIG. **4** shows alternative mechanism for moving the sleeve **138** along the Y-axis. In this example, a threaded screw **188** may be rotatably coupled to a motor **190** to rotate the screw to move the threaded sleeve **138** along the Y-axis. The moving block **144** may be coupled to the sleeve **138** to tilt the monitor as described above. In this example, a pivot axis **194** may be formed within the two side walls **150** and **152** to pivot the monitor mounting bracket **133** relative to the housing **131**.

[0026] FIG. **5** shows a mount system **200** in reference to X, Y, and Z coordinates having a piston type actuator **202** for extending and retracting a monitor. The actuator **202** has a motor **204** that extends and retracts a distal end **206** relative to a piston housing **208**, which in turn retracts and extends, respectively, the monitor.

[0027] FIG. **6** shows a mount system **210** in reference to X, Y, and Z coordinates. In this example, by coupling the monitor mounting bracket **133** to a distal end **212** of an actuator **214**, and coupling the bracket **131** to a second motor mecha-

nism **216** so that it slides along the longitudinal axis **218**, the bracket **133** may extend and retract along the Z-axis and move up and down along the Y-axis as the actuator **21** extends and retracts the distal end **212**. By coupling a moving block to the distal end **212** as described above, the mount system **210** may perform four functions with two motors: (1) extend and retract the monitor along the Z-axis; (2) swivel the monitor around the Y-axis; (3) tilt the monitor along the YZ-plane; and (4) lift and lower the monitor along the Y-axis.

What is claimed is:

1. A method of adjusting a viewing angle of a monitor, the method comprising:

extending a monitor mounting bracket from a retracted position to an extended position and tilting the monitor mounting bracket from a retracted position to a tilted position using a first motor; and

retracting the monitor mounting bracket from the extended position to a retracted position and tilting the monitor mounting bracket from the tilted position to a retracted position using the first motor.

2. The method according to claim **1**, including:

swiveling the monitor mounting bracket using a second motor.

3. The method according to claim **1**, including:

waiting a predetermined time to tilt the monitor mounting bracket from the retracted position to tilted position as the first motor extends the monitor mounting bracket from the retracted position to the extended position using the first motor.

4. The method according to claim **1**, including:

waiting a predetermined time to tilt the monitor mounting bracket from the tilted position to the retracted position as the first motor retracts the monitor mounting bracket from the extended position to the retracted position using the first motor.

* * * * *