



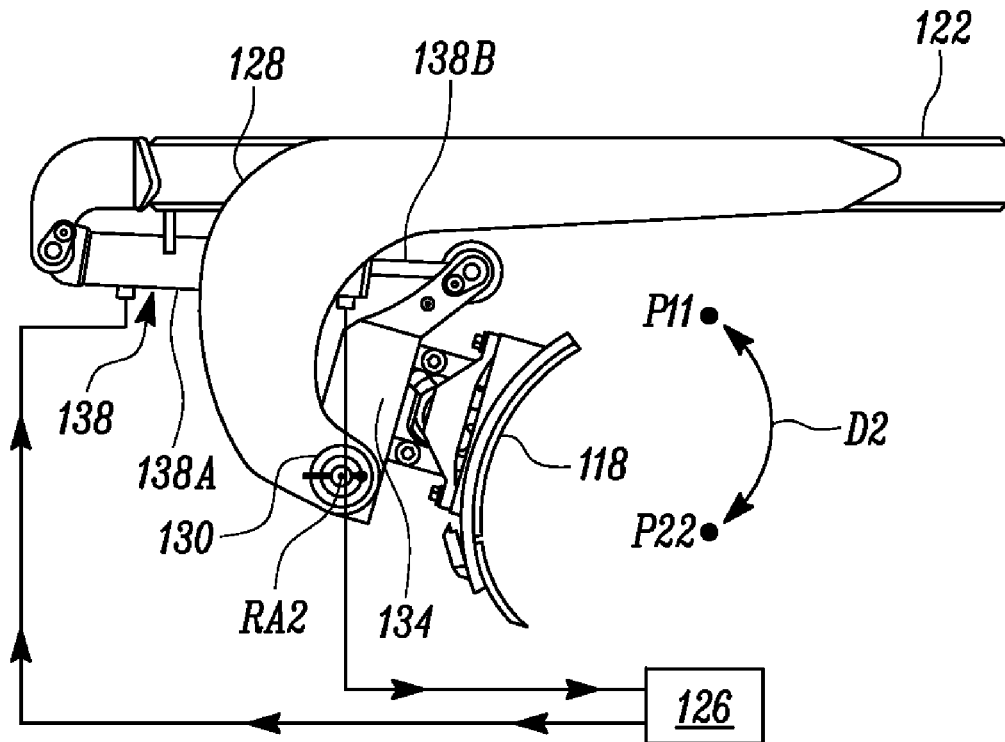
US 20170037595A1

(19) **United States**(12) **Patent Application Publication**
Sharma(10) **Pub. No.: US 2017/0037595 A1**(43) **Pub. Date: Feb. 9, 2017**(54) **ASSEMBLY FOR A MOTOR GRADER**(71) Applicant: **Caterpillar Inc.**, Peoria, IL (US)(72) Inventor: **Nikhil Sharma**, Forsyth, IL (US)(73) Assignee: **Caterpillar Inc.**, Peoria, IL (US)(21) Appl. No.: **14/820,826**(22) Filed: **Aug. 7, 2015****Publication Classification**(51) **Int. Cl.****E02F 3/84** (2006.01)**E02F 3/76** (2006.01)(52) **U.S. Cl.**CPC **E02F 3/844** (2013.01); **E02F 3/7663**
(2013.01); **E02F 3/7668** (2013.01); **E02F**
3/7686 (2013.01); **E02F 3/7672** (2013.01)

(57)

ABSTRACT

An assembly for a motor grader is disclosed. The assembly includes a blade operatively attached to a frame of the motor grader and configured to engage a ground surface. The blade includes a first segment and a second segment. The assembly further includes a movement actuator for moving the blade with respect to the frame in a first direction. The movement actuator includes a rod member having a first portion and a second portion. The first portion is secured to the first segment of the blade and the second portion is secured to the second segment of the blade.



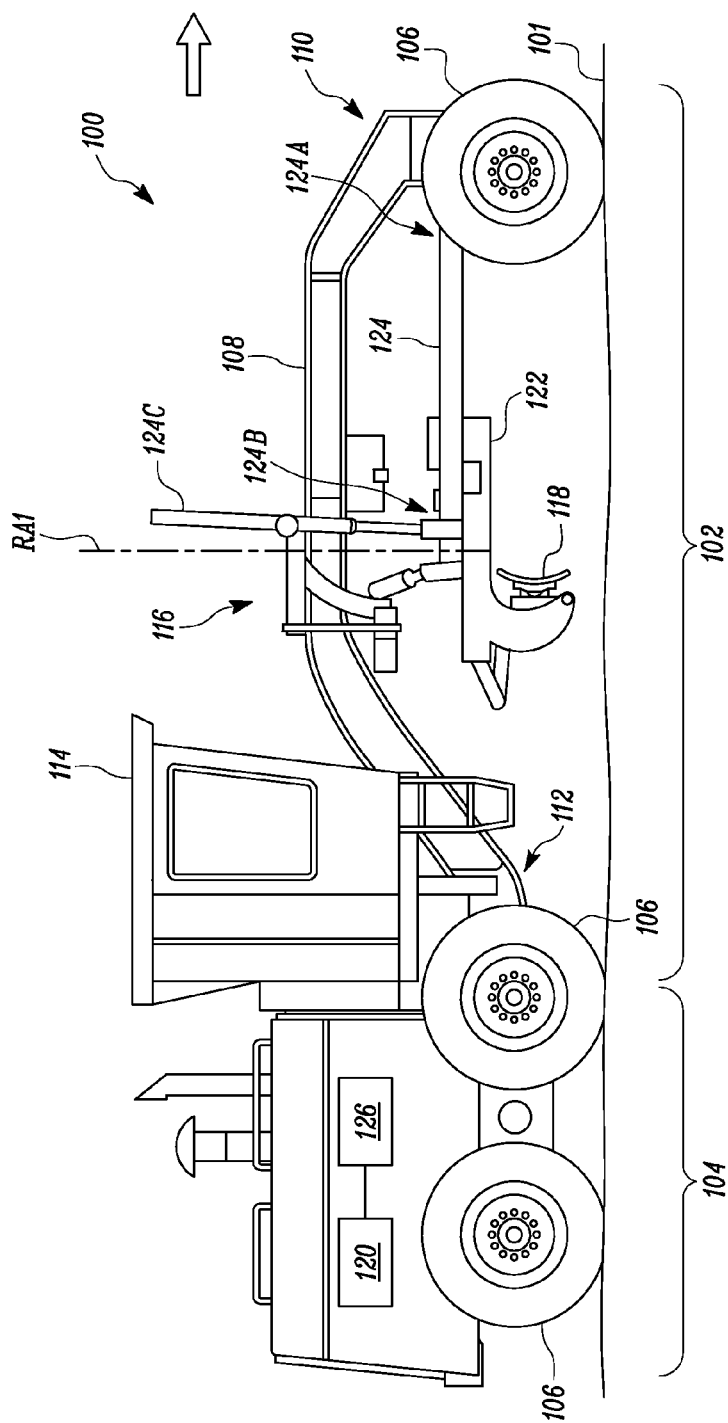


FIG. 1

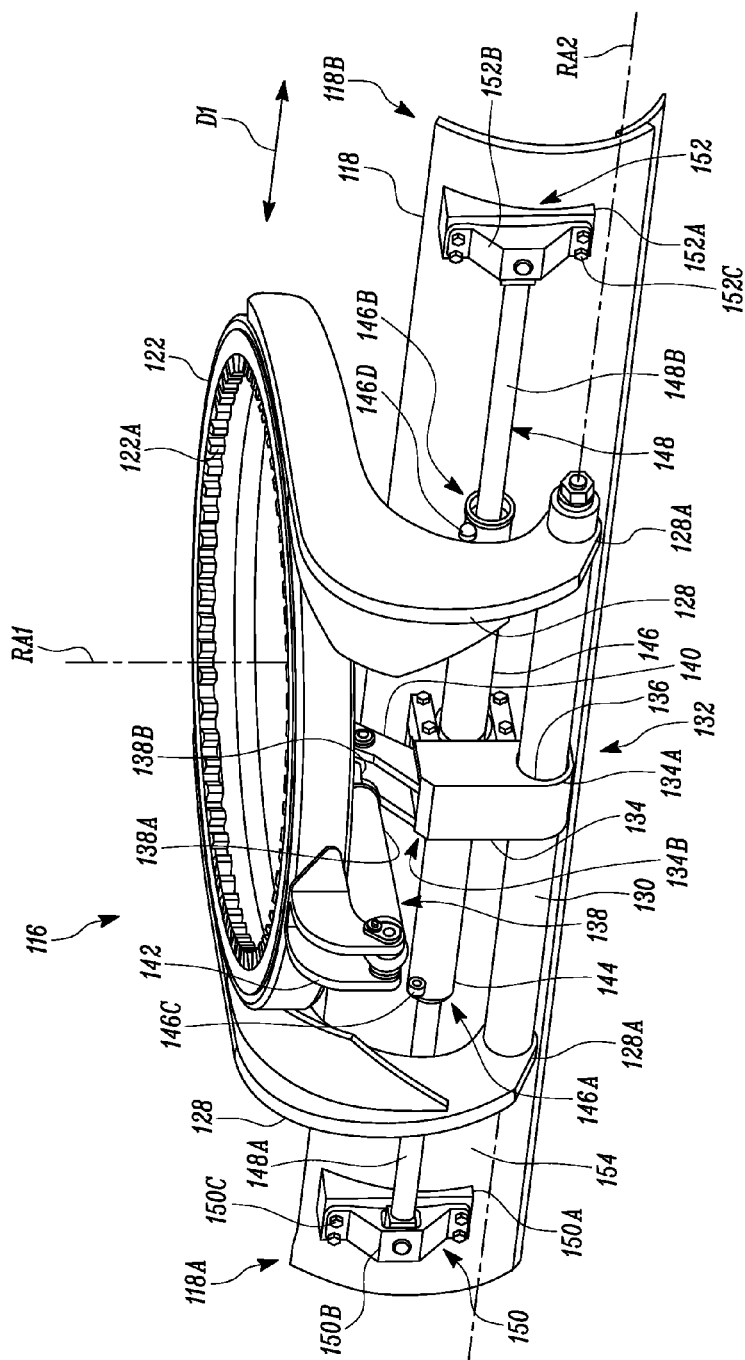


FIG. 2

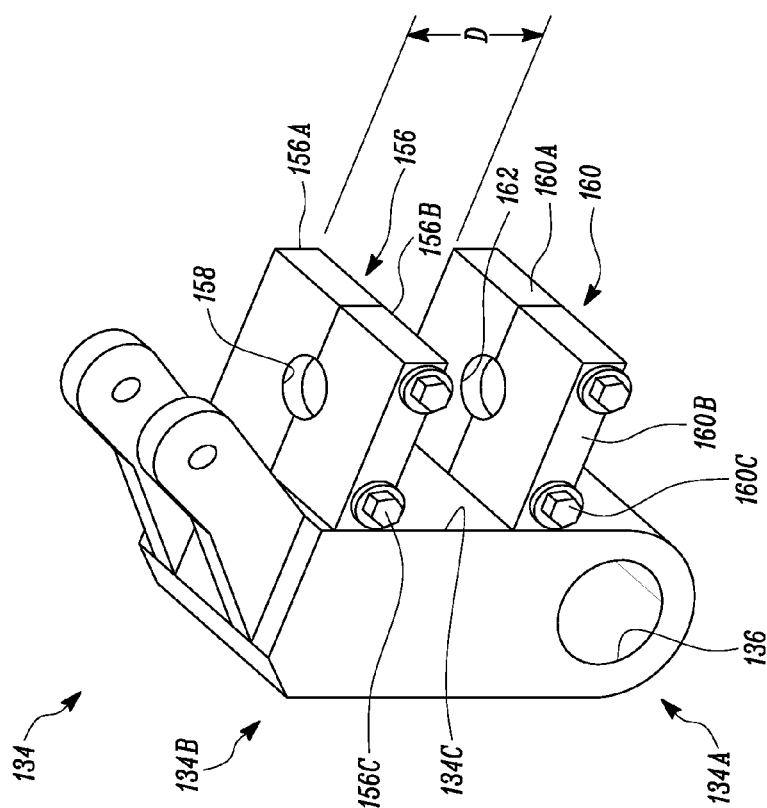


FIG. 3

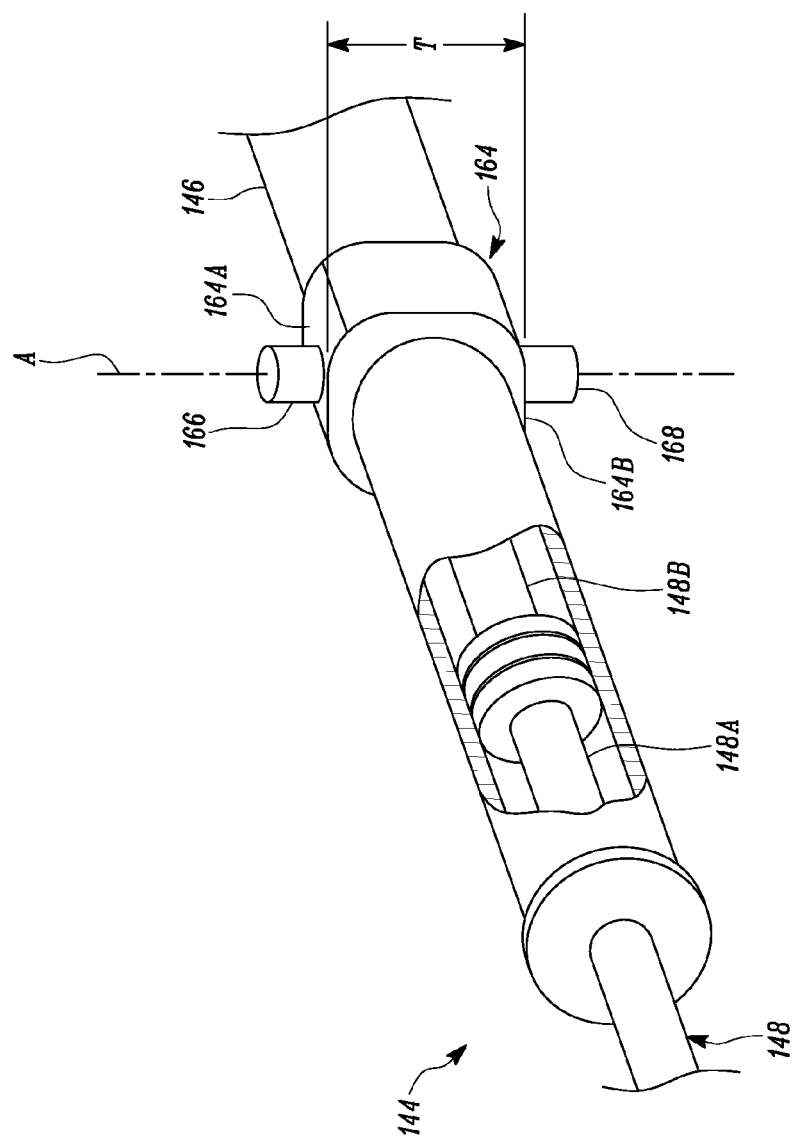


FIG. 4

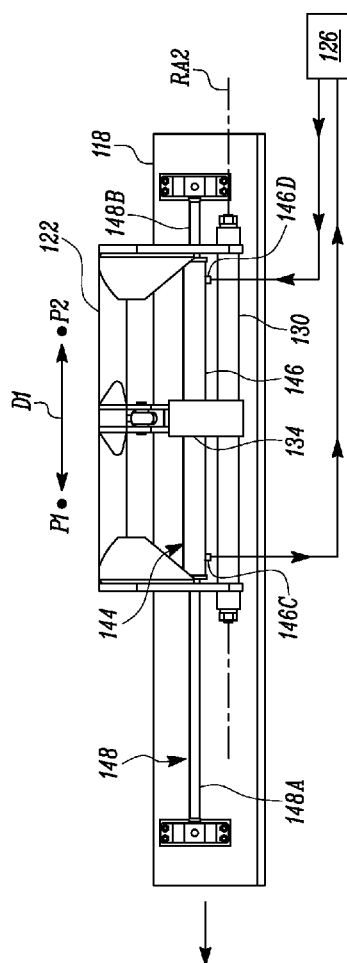


FIG. 5A

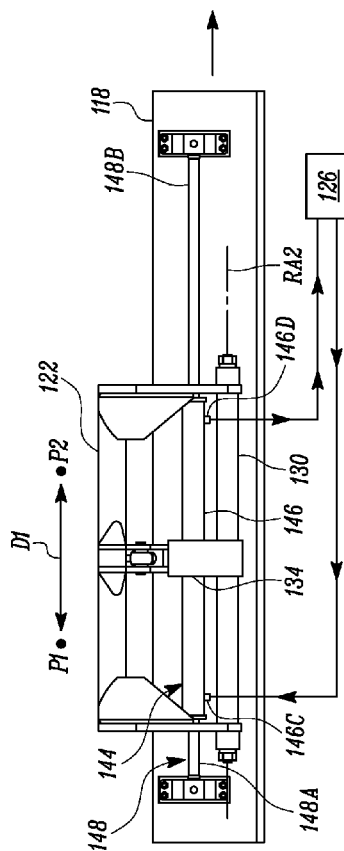


FIG. 5B

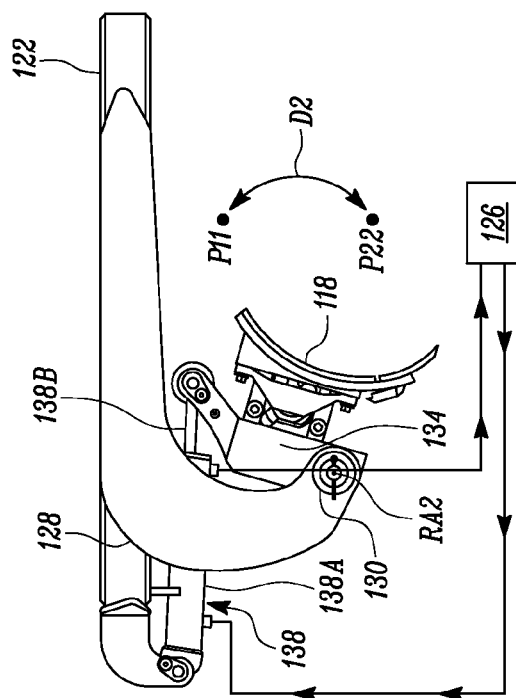


FIG. 6B

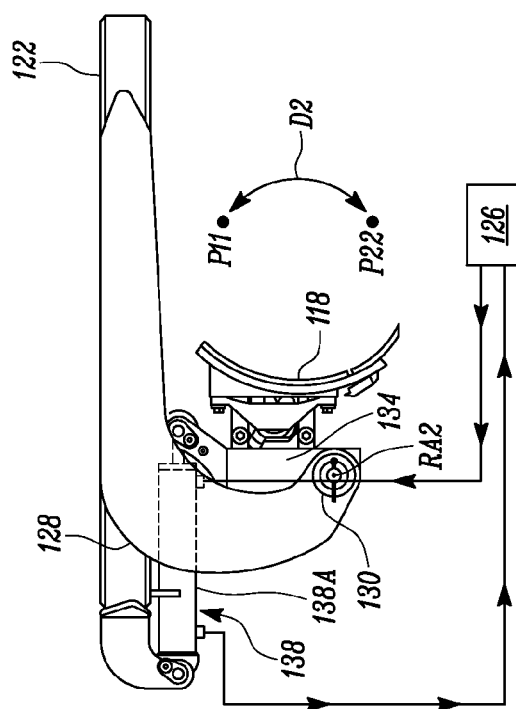


FIG. 6A

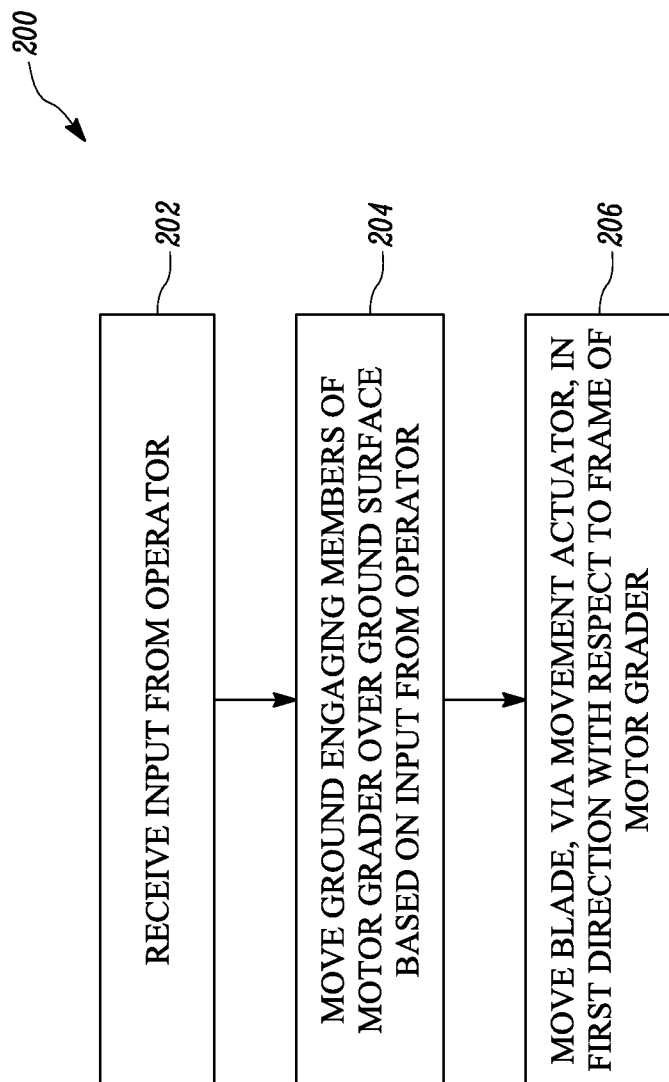


FIG. 7

ASSEMBLY FOR A MOTOR GRADER

TECHNICAL FIELD

[0001] The present disclosure relates to an assembly for mounting a blade of a motor grader.

BACKGROUND

[0002] Motor grader includes a front frame and a rear frame rotatably coupled to the front frame. The motor grader further includes a blade coupled to the front frame to perform various earth moving operations, such as cutting and leveling of a ground surface. The blade is coupled to a circle member for rotating the blade with respect to the frame about a rotational axis of the circle member. The circle member is further coupled to the frame via a drawbar member for raising and lowering the blade relative to the frame. A hydraulic actuator is coupled to the blade and the circle member to move the blade in a side-to-side direction with respect to the front frame. Further, guide rails are mounted on the blade to support the blade with wear strips mounted on the circle member and facilitate movement of the blade in the side-to-side direction. As the blade moves, the rails slide over the wear strips and cause wear damages to mounting assembly of the blade. Such wear damages lead to frequent maintenance and servicing of the mounting assembly. Further, the wear damages lead to high maintenance cost.

[0003] U.S. Pat. No. 2,799,099 (the '099 patent) discloses a moldboard mounting for motor graders. The moldboard mounting includes the hydraulic ram for laterally shifting the moldboard assembly relative to the support. The ram includes the piston and the piston rod for moving the moldboard assembly relative to the support. The '099 patent also discloses a sliding arrangement including the slide brackets and the guide rail for mounting the moldboard assembly with the support and facilitating movement of the moldboard assembly, which may require frequent maintenance. Therefore, a need remains for a moldboard mounting that will require minimum maintenance and is less complex to design and develop.

SUMMARY OF THE DISCLOSURE

[0004] In one aspect of the current disclosure, an assembly for a motor grader is provided. The assembly includes a blade configured to be operatively attached to a frame of the motor grader and to engage a ground surface. The blade includes a first segment and a second segment. The assembly further includes a movement actuator configured for moving the blade with respect to the frame in a first direction. The movement actuator includes a rod member having a first portion and a second portion. The first portion is secured to the first segment of the blade and the second portion is secured to the second segment of the blade.

[0005] In another aspect of the current disclosure, a motor grader is provided. The motor grader includes a frame and a bracket member movably coupled to the frame. The motor grader further includes a blade configured to be operatively attached to the bracket member and to engage a ground surface. The blade includes a first segment and a second segment. The motor grader further includes a movement actuator supported by the bracket member and configured for moving the blade with respect to the frame in a first direction. The movement actuator includes a rod member

having a first portion and a second portion. The first portion is secured to the first segment of the blade and the second portion is secured to the second segment of the blade.

[0006] In yet another aspect of the current disclosure, a method of operating a blade of a motor grader is provided. The method includes receiving an input from an operator and moving ground engaging members of the motor grader over a ground surface based on the input from the operator. The method further includes moving the blade, via a movement actuator, in a first direction with respect to a frame of the motor grader. The movement actuator includes a cylinder supported by a bracket member of the frame and a rod member slidably disposed within the cylinder. The rod member includes a first portion and a second portion coupled to the blade.

[0007] Other features and aspects of this disclosure will be apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a side view of a motor grader having a blade for engaging with a ground surface.

[0009] FIG. 2 is a view of an implement system including an assembly for coupling the blade to a frame of the motor grader.

[0010] FIG. 3 is a perspective view of a bracket member of the assembly of FIG. 2.

[0011] FIG. 4 is a partial perspective view of a movement actuator of the assembly of FIG. 2.

[0012] FIGS. 5A and 5B are rear views of the implement system of FIG. 2 showing movement of the blade in a first direction.

[0013] FIGS. 6A and 6B are side views of the implement system of FIG. 2 showing movement of the blade in a second direction.

[0014] FIG. 7 is a flowchart of a method of operating the blade of the motor grader.

DETAILED DESCRIPTION

[0015] Reference will now be made in detail to specific aspects or features, examples of which are illustrated in the accompanying drawings. Wherever possible, corresponding or similar reference numbers will be used throughout the drawings to refer to the same or corresponding parts.

[0016] FIG. 1 illustrates a side view of a motor grader 100 used for leveling a ground surface 101. The motor grader 100 includes a front frame 102 and a rear frame 104 movably coupled with the front frame 102. The front frame 102 is pivotally coupled with the rear frame 104 such that the front frame 102 may rotate relative to the rear frame 104. The front frame 102 and the rear frame 104 are supported on ground engaging members 106. The ground engaging members 106 contact with the ground surface 101 to move the motor grader 100 over the ground surface 101. The front frame 102 includes a beam 108 defining a front end 110 supported on a pair of the ground engaging members 106 and a rear end 112 pivotally coupled with the rear frame 104. In an example, the ground engaging members 106 disposed at the front end 110 of the beam 108 and the ground engaging members 106 disposed in the rear frame 104 may be wheels. Alternatively, the ground engaging members 106 disposed in the rear frame 104 may be a pair of tracks. The

front frame 102 is hereinafter referred as 'the frame 102' for illustration purposes of the present disclosure.

[0017] The motor grader 100 further includes an operator cab 114 supported in the frame 102 adjacent to the rear end 112 of the beam 108. The operator cab 114 may include an operator interface (not shown) having control levers, switches and display, such that an operator may control movement of the motor grader 100 and perform various operations of the motor grader 100. The motor grader 100 further includes an implement system 116 configured for performing various earth moving operations, such as cutting and leveling of the ground surface 101. The implement system 116 is configured to be operatively attached to the beam 108 of the frame 102. The implement system 116 includes a blade 118 configured to engage the ground surface 101 to perform the earth moving operations. The motor grader 100 may further include a power source, such as an engine 120 to supply power to various components including, but not limited to, the ground engaging members 106 and the implement system 116. The engine 120 may be disposed at any location in the rear frame 104. In another embodiment, the engine 120 may be coupled with a generator to propel the motor grader 100 based on electric power.

[0018] The implement system 116 includes a circle member 122 movably coupled to the frame 102. Specifically, the circle member 122 is coupled to a drawbar member 124. The drawbar member 124 includes a first end 124A pivotally coupled to the front end 110 of the beam 108 and a second end 124B movably supported on the beam 108. The second end 124B of the drawbar member 124 may be coupled to the beam 108 via one or more hydraulic actuators 124C. The hydraulic actuators 124C may raise or lower the drawbar member 124 with respect to the frame 102. The circle member 122 is further rotatably supported adjacent to the second end 124B of the drawbar member 124. The circle member 122 includes a ring gear 122A (shown in FIG. 2) that may be engaged with an electric motor (not shown) disposed in the drawbar member 124. Upon actuation of the electric motor, the circle member 122 may rotate about a rotational axis 'RA1' with respect to the drawbar member 124. The blade 118 is operatively attached to the circle member 122 to engage the ground surface 101. Thus the blade 118 is raised and lowered with respect to the frame 102, based on actuation of the hydraulic actuators 124C. Further, the blade 118 is rotated about the rotational axis 'RA1' with respect to the frame 102 based on the actuation of the electric motor.

[0019] The hydraulic actuators 124C may be configured to be in communication with a hydraulic system 126 of the motor grader 100. The hydraulic system 126 is in communication with the engine 120 to receive the power therefrom to supply hydraulic fluid to the hydraulic actuators 124C. The hydraulic system 126 may be configured to actuate the hydraulic actuators 124C based on an input from the operator. The hydraulic system 126 may also be configured to provide hydraulic power to various systems of the motor grader 100, such as a steering system.

[0020] Referring to FIG. 2, the implement system 116 includes a pair of arms 128 extending from the circle member 122. Each of the pair of arms 128 extends from an outer surface of the circle member 122 and spaced apart from each other. A connecting member 130 is rotatably disposed between the pair of arms 128. Specifically, the

connecting member 130 is rotatably coupled adjacent to an end 128A of each of the pair of arms 128. In the illustrated embodiment, the connecting member 130 has a circular cross section. In other embodiments, the cross section of the connecting member 130 may be a square, a rectangular, an elliptical, a polygonal, or any other shape known in the art.

[0021] The implement system 116 further includes an assembly 132 for operatively attaching the blade 118 with the circle member 122. The assembly 132 includes a bracket member 134 having a first end 134A coupled to the connecting member 130. The first end 134A includes a hole 136 configured to receive the connecting member 130 there-through. The connecting member 130 may be rigidly engaged with the hole 136 such that the bracket member 134 may move as the connecting member 130 rotates relative to the pair of arms 128. The bracket member 134 further includes a second end 134B movably coupled to the circle member 122. An actuating member 138 is coupled between the circle member 122 and the second end 134B of the bracket member 134 to move the bracket member 134 about a rotational axis 'RA2' defined by the connecting member 130.

[0022] The actuating member 138 includes a cylinder 138A and a piston rod 138B slidably disposed within the cylinder 138A. The actuating member 138 is configured to be in communication with the hydraulic system 126. The piston rod 138B may move between an extended position and a retracted position to move the bracket member 134 about the rotational axis 'RA2'. In the illustrated embodiment, a coupling member 140 is provided adjacent to the second end 134B of the bracket member 134 to pivotally couple with the piston rod 138B of the actuating member 138. In another embodiment, the second end 134B of the bracket member 134 may be configured to pivotally couple to the piston rod 138B. The cylinder 138A is coupled to the circle member 122 via a mounting member 142. The mounting member 142 may be fastened or welded to the outer surface of the circle member 122. It may also be contemplated that the piston rod 138B may be coupled to the mounting member 142 and the cylinder 138A may be coupled to the coupling member 140.

[0023] In the illustrated embodiment, the bracket member 134 is formed from multiple metal plates through a fabrication process. The multiple metal plates may be welded together to define an elongate body having the first end 134A and the second end 134B. The bracket member 134 has a rectangular cross section and defines a front surface 134C (shown in FIG. 3). In another embodiment, the bracket member 134 may be manufactured through a casting process. In other embodiments, the bracket member 134 may be developed through any manufacturing process known in the art.

[0024] The assembly 132 further includes a movement actuator 144 supported by the bracket member 134. The movement actuator 144 is further configured to be operatively coupled with the bracket member 134 and the blade 118 to move the blade 118 with respect to the frame 102 in a first direction 'D1' (explained in FIGS. 5A and 5B). The movement actuator 144 includes a cylinder 146 defining a first end 146A and a second end 146B. The cylinder 146 is configured to be coupled with the bracket member 134. The movement actuator 144 further includes a rod member 148 slidably disposed within the cylinder 146. The rod member 148 includes a first portion 148A extending through the first

end **146A** of the cylinder **146** and a second portion **148B** extending through the second end **146B** of the cylinder **146**. The first portion **148A** of the rod member **148** is coupled adjacent to a first end **118A** of the blade **118** and the second portion **148B** of the rod member **148** is coupled to a second end **118B** of the blade **118**.

[0025] The cylinder **146** further includes a first fluid port **146C** defined adjacent to the first end **146A** and a second fluid port **146D** defined adjacent to the second end **146B** thereof. The first and second fluid ports **146C**, **146D** may be fluidly coupled with the hydraulic system **126**. Upon actuation of the hydraulic system **126**, based on an input from the operator, the movement actuator **144** moves the blade **118** with respect to the frame **102** in the first direction 'D1'.

[0026] The first portion **148A** is coupled to a first segment **150** of the blade **118** and the second portion **148B** is coupled to a second segment **152** of the blade **118**. The first and second segments **150**, **152** are disposed adjacent to the first and second ends **118A**, **118B** of the blade **118**, respectively. In the illustrated embodiment, the first segment **150** includes a first support member **150A** mounted on an outer surface **154** of the blade **118**. The first support member **150A** is welded to the outer surface **154** of the blade **118**. Alternatively, the first support member **150A** may be mounted on the blade **118** via fastening members, such as bolts and nuts. The first segment **150** further includes a first mounting member **150B** configured to be coupled with the first support member **150A**. The first mounting member **150B** is further configured to be coupled with the first portion **148A** of the rod member **148**. The first mounting member **150B** is coupled with the first support member **150A** via fastening members **150C**, such as bolts. In an embodiment, the first mounting member **150B** may have a mating surface configured to engage with a corresponding mating surface defined in the first support member **150A**. In other embodiments, the first mounting member **150B** may be configured to couple with the outer surface **154** of the blade **118**.

[0027] Similarly, the second segment **152** includes a second support member **152A** mounted on the outer surface **154** of the blade **118**. The second segment **152** further includes a second mounting member **152B** configured to be coupled with the second support member **152A**. The second mounting member **152B** is further configured to be coupled with the second portion **148B** of the rod member **148**. The second mounting member **152B** is coupled with the second support member **152A** via fastening members **152C**, such as bolts. The second segment **152** may be disposed on the blade **118** similar to the way the first segment **150** is disposed on the blade **118**.

[0028] Referring to FIG. 3, the bracket member **134** includes a first projection member **156** defined adjacent to the second end **134B** thereof. The first projection member **156** extends from the front surface **134C** of the bracket member **134** and configured to define a first aperture **158** therein. In the illustrated embodiment, the first projection member **156** includes a base member **156A** extending from the front surface **134C** of the bracket member **134**. The base member **156A** may be welded or fastened to the front surface **134C** of the bracket member **134**. The first projection member **156** further includes a clamp member **156B** coupled to the base member **156A** via fastening members **156C**, such as bolts. The base member **156A** and the clamp member **156B** are together configured to define the first aperture **158**.

In an alternative embodiment, one of the base member **156A** and the clamp member **156B** may define the first aperture **158**.

[0029] Further, the bracket member **134** includes a second projection member **160** spaced apart from the first projection member **156**. The first and second projection members **156**, **160** are configured to receive the cylinder **146** of the movement actuator **144** therebetween. Moreover, the cylinder **146** is coupled between the first and second projection members **156**, **160**. The second projection member **160** extends from the front surface **134C** of the bracket member **134** and configured to define a second aperture **162** therein. In the illustrated embodiment, the second projection member **160** includes a base member **160A** extending from the front surface **134C** of the bracket member **134** and a clamp member **160B** coupled to the base member **160A** via fastening members **160C**, such as bolts. The base member **160A** and the clamp member **160B** are together configured to define the second aperture **162**. Each of the first and second apertures **158**, **162** has a circular cross section. However, it may be contemplated that each of the first and second apertures **158**, **162** may have a square, a rectangular, a polygonal, or any other cross section known in the art.

[0030] In another embodiment, the first and second projection members **156**, **160** may be integrally formed with the elongate body of the bracket member **134**. Further, the first and second apertures **158**, **162** may be defined in the first and second projection members **156**, **160**, respectively, via a machining process, such as drilling, boring, reaming, or any other machining process known in the art. In yet another embodiment, at least one of the first and second projection members **156**, **160** may be integrally formed with the elongate body of the bracket member **134**.

[0031] Referring to FIG. 4, the cylinder **146** includes a stepped portion **164** defined around an outer surface thereof. The stepped portion **164** has a first surface **164A** and a second surface **164B** opposite to the first surface **164A**. The stepped portion **164** defines a thickness 'T' between the first and second surfaces **164A**, **164B** thereof. The thickness 'T' is less than or equal to a distance 'D' defined between the first and second projection members **156**, **160**. In other embodiments, the stepped portion **164** may have any shape or dimensional specification to dispose the cylinder **146** between the first and second projection members **156**, **160**.

[0032] The cylinder **146** further includes a first leg portion **166** extending from the first surface **164A** of the stepped portion **164**. The first leg portion **166** is configured to be received within the first aperture **158** of the first projection member **156**. The cylinder **146** further includes a second leg portion **168** extending from the second surface **164B** of the stepped portion **164** diametrically opposite to the first leg portion **166** along an axis 'A' defined by the first leg portion **166**. The second leg portion **168** is configured to be received within the second aperture **162** of the second projection member **160**. In the illustrated embodiment, the first and second leg portions **166**, **168** has a circular cross section configured to be received within the first and second apertures **158**, **162**, respectively. However, it may be contemplated that each of the first and second leg portions **166**, **168** may have a square, a rectangular, a polygonal, or any other cross section known in the art.

[0033] In the illustrated embodiment, the first and second leg portions **166**, **168** are integrally formed with the cylinder **146**. In another embodiment, the first and second leg por-

tions 166, 168 may be separately coupled to the stepped portion 164 of the cylinder 146. In yet another embodiment, at least one of the first and second leg portions 166, 168 may be separately coupled to the stepped portion 164. Each of the first and second leg portions 166, 168 may have a thickness greater than or equal to a thickness of the first and second projection members 156, 160, respectively.

[0034] In the illustrated embodiment, during assembly of the movement actuator 144 with the bracket member 134, the stepped portion 164 of the cylinder 146 may be disposed within the base members 156A and 160A of the first and second projection members 156, 160. The first and second leg portions 166, 168 may be aligned with a portion of the first and second apertures 158, 162, respectively. Further, the clamp members 156B and 160B may be aligned with the base members 156A and 160A to receive the first and second leg portions 166, 168 within the first and second apertures 158, 162, respectively. The clamp members 156B and 160B may be further coupled to the base members 156A and 160A via the fastening members 156C and 160C, respectively. In an embodiment, the cylinder 146 may be rigidly coupled to the bracket member 134 to prevent rotation of the movement actuator 144 with respect to the bracket member 134 about the axis 'A'. In yet another embodiment, a surface of the stepped portion 164 may be configured to abut the front surface 134C of the bracket member 134 to prevent rotation of the movement actuator 144 about the axis 'A'.

[0035] Referring to FIGS. 5A and 5B, the movement actuator 144 is configured to move the blade 118 with respect to the frame 102 in the first direction 'D1'. The first direction 'D1' may correspond to a linear direction defined by the movement of the blade 118 along the rotational axis 'RA2' defined by the connecting member 130. The hydraulic system 126 may actuate the movement actuator 144 based on an input from the operator to move the blade 118 between a first position 'P1' (shown in FIG. 5A) and a second position 'P2' (shown in FIG. 5B) in the first direction 'D1'. In an exemplary embodiment, the hydraulic system 126 may include a reservoir for containing hydraulic fluid. The hydraulic fluid contained in the reservoir may be used for actuating various components, such as the hydraulic actuators 124C, and the steering system of the motor grader 100. The hydraulic system 126 may include one or more pumps to supply pressurized hydraulic fluid to the various components and the systems. Further, one or more direction control valves may be used to control direction of flow of the hydraulic fluid. Further, additional control valves, such as check valves, pressure relief valves, pressure regulating valves, and the like may be used for generating required hydraulic power for actuation of the components and the systems.

[0036] Referring to FIG. 5A, during operation of the motor grader 100, based on the input from the operator, the hydraulic system 126 may communicate the pressurized hydraulic fluid with the second fluid port 146D of the cylinder 146 such that the second portion 148B of the rod member 148 is actuated to move the blade 118 towards the first position 'P1' in the first direction 'D1'. Simultaneously, the hydraulic fluid available in the cylinder 146 at the first portion 148A of the rod member 148 may drain through the first fluid port 146C to communicate with the reservoir. Similarly, referring to FIG. 5B, based on the input from the operator, the hydraulic system 126 may communicate the pressurized hydraulic fluid with the first fluid port 146C such

that the first portion 148A of the rod member 148 is actuated to move the blade 118 towards the second position 'P2' in the first direction 'D1'. Simultaneously, the hydraulic fluid available in the cylinder 146 at the second portion 148B of the rod member 148 may drain through the second fluid port 146D to communicate with the reservoir. Thus, the blade 118 is moved between first position 'P1' and the second position 'P2' in the first direction 'D1' by the actuation of the movement actuator 144 based on the input from the operator. [0037] Referring to FIGS. 6A and 6B, the actuating member 138 is configured to move the blade 118 with respect to the frame 102 in a second direction 'D2'. The second direction 'D2' may correspond to an angular direction defined by the movement of the blade 118 about the rotational axis 'RA2' defined by the connecting member 130. The hydraulic system 126 may actuate the actuating member 138 based on an input from the operator to move the blade 118 between a first position 'P11' (shown in FIG. 6A) and a second position 'P22' (shown in FIG. 6B) in the second direction 'D2'. Referring to FIG. 6A, the hydraulic system 126 may communicate the pressurized hydraulic fluid with the cylinder 138A of the actuating member 138 such that the piston rod 138B may move to the retracted position thereof to move the blade 118 towards the first position 'P11' in the second direction 'D2'. Similarly, referring to FIG. 6B, based on the input from the operator, the hydraulic system 126 may communicate the pressurized hydraulic fluid with the cylinder 138A of the actuating member 138 such that the piston rod 138B may move to the extended position thereof to move the blade 118 towards the second position 'P22' in the second direction 'D2'. Thus, the blade 118 is moved between the first position 'P11' and the second position 'P22' in the second direction 'D2' by the actuation of the actuating member 138 based on the input from the operator.

INDUSTRIAL APPLICABILITY

[0038] The present disclosure relates to the assembly 132 for coupling the blade 118 with the frame 102. The assembly 132 includes the bracket member 134 for fixedly coupling the cylinder 146 of the movement actuator 144. The cylinder 146 is configured to couple with the bracket member 134 to provide rigid support of the blade 118 with the frame 102. Further, the first and second portions 148A, 148B of the rod member 148 are secured to the first and second segments 150, 152 of the blade 118, respectively, to further enhance coupling strength of the blade 118 with the frame 102. The present disclosure further relates to a method 200 of operating the blade 118.

[0039] FIG. 7 illustrates a flowchart of the method 200 of operating the blade 118. At step 202, the method 200 includes receiving the input from the operator. The operator may provide the input through the operator interface disposed in the operator cab 114. The operator may decide the inputs based on various operating parameters of the motor grader 100, such as a speed and earth moving operations of the motor grader 100. At step 204, the method 200 includes moving the ground engaging members 106 over the ground surface 101 based on the input from the operator. Based on the earth moving operation and terrain of the ground surface 101, the operator may control movement of the motor grader 100 over the ground surface 101.

[0040] At step 206, the method 200 includes moving the blade 118 in the first direction 'D1' with respect to the frame 102. The operator may provide input through the operator

interface to actuate the hydraulic system 126. The hydraulic system 126 may control direction of flow of the hydraulic fluid to actuate either the first portion 148A or the second portion 148B of the rod member 148. Based on the input from the operator, the movement actuator 144 moves the blade 118 in the first direction 'D1' between the first position 'P1' and the second position 'P2'. Further, the operator may actuate the hydraulic system 126 to move the blade 118 in the second direction 'D2' between the first position 'P11' and the second position 'P22'. Thus the assembly 132 coupled between the blade 118 and the frame 102 may facilitate movement of the blade 118 in the first direction 'D1' and the second direction 'D2' with respect to the frame 102.

[0041] According to the present disclosure, the movement actuator 144 is fixedly coupled to the blade 118 and the bracket member 134 and facilitates movement of the blade 118 in the first direction 'D1'. The assembly 132 further includes less components compare to the existing blade mounting arrangement having guide rails and slide brackets. Further, the assembly 132 may require less maintenance compare to the existing blade mounting arrangement as the blade 118 is supported and moved by the movement actuator 144.

[0042] While aspects of the current disclosure have been particularly shown and described above, it will be understood by those skilled in the art that various additional aspects may be contemplated by the modification of the disclosed machines, systems and methods without departing from the spirit and scope of what is disclosed. Such aspects should be understood to fall within the scope of the current disclosure as determined based upon the claims and any equivalents thereof.

What is claimed is:

1. An assembly for a motor grader, comprising:
 - a blade configured to be operatively attached to a frame of the motor grader and to engage a ground surface, the blade including a first segment and a second segment; and
 - a movement actuator configured for moving the blade with respect to the frame in a first direction, the movement actuator including a rod member having a first portion and a second portion, the first portion being secured to the first segment of the blade and the second portion being secured to the second segment of the blade.
2. The assembly of claim 1 further comprising a bracket member movably coupled to the frame, wherein the movement actuator is supported by the bracket member.
3. The assembly of claim 2 further comprising an actuating member coupled to the bracket member and the frame, the actuating member configured for moving the blade with respect to the frame in a second direction.
4. The assembly of claim 3, wherein the bracket member is coupled to a connecting member rotatably disposed between a pair of arms extending from the frame, and wherein the blade moves in the second direction about a rotational axis defined by the connecting member.
5. The assembly of claim 2, wherein the movement actuator comprises a cylinder coupled to the bracket member, and wherein the rod member is slidably disposed within the cylinder to move the blade in the first direction.
6. The assembly of claim 5, wherein the bracket member comprises:

- a first projection member defining a first aperture therein; and
 - a second projection member spaced apart from the first projection member, the second projection member defining a second aperture therein,
- wherein the first projection member and the second projection member are configured to receive the cylinder of the movement actuator therebetween.
7. The assembly of claim 6, wherein the cylinder of the movement actuator comprises:
 - a first leg portion configured to be received within the first aperture of the first projection member; and
 - a second leg portion disposed opposite to the first leg portion, the second leg portion configured to be received within the second aperture of the second projection member.
 8. The assembly of claim 1, wherein the first segment comprises:
 - a first support member disposed adjacent to a first end of the blade; and
 - a first mounting member configured to be coupled with the first support member and the first portion of the rod member.
 9. The assembly of claim 1, wherein the second segment comprises:
 - a second support member disposed adjacent to a second end of the blade; and
 - a second mounting member configured to be coupled with the second support member and the second portion of the rod member.
 10. A motor grader comprising:
 - a frame;
 - a bracket member movably coupled to the frame;
 - a blade configured to be operatively attached to the bracket member to engage a ground surface, the blade including a first segment and a second segment; and
 - a movement actuator supported by the bracket member and configured for moving the blade with respect to the frame in a first direction, the movement actuator including a rod member having a first portion and a second portion, the first portion being secured to the first segment of the blade and the second portion being secured to the second segment of the blade.
 11. The motor grader of claim 10 further comprising an actuating member coupled to the bracket member and the frame, the actuating member configured for moving the blade with respect to the frame in a second direction.
 12. The motor grader of claim 11, wherein the bracket member is coupled to a connecting member rotatably disposed between a pair of arms extending from the frame, and wherein the blade moves in the second direction about a rotational axis defined by the connecting member.
 13. The motor grader of claim 10, wherein the movement actuator comprises a cylinder coupled to the bracket member, and wherein the rod member is slidably disposed within the cylinder to move the blade in the first direction.
 14. The motor grader of claim 13, wherein the bracket member comprises:
 - a first projection member defining a first aperture therein; and
 - a second projection member spaced apart from the first projection member, the second projection member defining a second aperture therein,

wherein the first projection member and the second projection member are configured to receive the cylinder of the movement actuator therebetween.

15. The motor grader of claim **14**, wherein the cylinder of the movement actuator comprises:

- a first leg portion configured to be received within the first aperture of the first projection member; and
- a second leg portion disposed opposite to the first leg portion, the second leg portion configured to be received within the second aperture of the second projection member.

16. The motor grader of claim **10**, wherein the first segment comprises:

- a first support member disposed adjacent to a first end of the blade; and
- a first mounting member configured to be coupled with the first support member and the first portion of the rod member.

17. The motor grader of claim **10**, wherein the second segment comprises:

- a second support member disposed adjacent to a second end of the blade; and
- a second mounting member configured to be coupled with the second support member and the second portion of the rod member.

18. The motor grader of claim **10**, wherein the movement actuator is configured to be in communication with a hydraulic system of the motor grader to move the blade in the first direction based on an input from an operator.

19. A method of operating a blade of a motor grader, the method comprising:

receiving an input from an operator;

moving ground engaging members of the motor grader over a ground surface based on the input from the operator; and

moving the blade, via a movement actuator, in a first direction with respect to a frame of the motor grader, wherein the movement actuator comprises a cylinder supported by a bracket member of the frame and a rod member slidably disposed within the cylinder, the rod member comprise a first portion and a second portion being coupled to the blade.

20. The method of claim **19** further comprising moving the blade, via an actuating member, in a second direction with respect to the frame, wherein the actuating member is coupled with the bracket member and the frame.

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