A mounting member for a frame assembly of a machine is provided. The mounting member includes a first lobe portion having an opening. The first lobe portion includes a first shoulder portion and a plurality of first mounting holes adapted to mount a drive hub. The mounting member includes a second lobe portion having a cavity. The second lobe portion includes a second shoulder portion and a plurality of second mounting holes adapted to mount a pivot shaft. The mounting member also includes a neck portion connecting the first lobe portion and the second lobe portion. The mounting member includes a reinforcement portion extending from the first lobe portion to the second lobe portion along the neck portion. The reinforcement portion at least partially surrounds the second lobe portion. The reinforcement portion, the first lobe portion, and the second lobe portion are coupled to the frame assembly of the machine.
MOUNTING MEMBER FOR FRAME ASSEMBLY OF MACHINE

TECHNICAL FIELD

[0001] The present disclosure relates to a frame assembly of a machine, and more specifically to a mounting member for the frame assembly of the machine.

BACKGROUND

[0002] In general, vehicles, such as track-type machines, are employed for various construction or earthmoving tasks. Typically, a track-type machine includes a main frame for supporting an engine and a transmission system. The main frame includes a pair of side rails attached to a housing member that supports the transmission system. For high-drive track-type machines where the sprocket is elevated and a rear idler is present, the main frame includes a pair of peanut shaped castings connected to the pair of side rails through welding connections. The peanut shaped castings form an interface between a final drive of a transmission system and a pivot shaft. The final drive is engaged with the track-type machine through the sprocket segments for driving the track-type machine on a ground surface. The pivot shaft is provided to keep the tracks of the track-type machine inline with the ground surface while allowing the track frames to oscillate on an equalizer bar. During operation of the track-type machine, both the final drive housing and the pivot shaft experience fluctuating loads. Due to such fluctuating loads entering the main frame through the final drive housing and the pivot shaft, the welding connections between the peanut shaped castings and the pair of side rails experience various damaging stresses. These damaging stresses contribute to fatigue of the structure of the peanut shaped castings.

[0003] J.P. Patent Application Number 2015/150904, hereinafter referred to as '904 application, discloses a reinforcement plate comprising an adjacent part adjacent to the front end part of the cross member and an extension part extending from this adjacent part to the front side of the cross member. The cross member is jointed with the peripheral part of a junction part with the front end of the cross member of each side plate. The extension part of each reinforcement plate formed into a shape in which its extending side gets narrower and which has an opening for stress dispersion. However, the reinforcement member of the '904 application has a complex structure that leads to higher production cost of the reinforcement member.

SUMMARY OF THE DISCLOSURE

[0004] In one aspect of the present disclosure, a mounting member for a frame assembly of a machine is provided. The mounting member includes a first lobe portion having an opening. The first lobe portion includes a first shoulder portion extending from a first surface to a second surface. The first lobe portion also includes a plurality of first mounting holes adapted to mount a drive hub. The mounting member includes a second lobe portion having a cavity. The second lobe portion includes a second shoulder portion extending from a third surface to a fourth surface. The second lobe portion also includes a plurality of second mounting holes adapted to mount a pivot shaft. The mounting member also includes a neck portion connecting the first lobe portion and the second lobe portion. Further, the mounting member includes a reinforcement portion extending from the first lobe portion to the second lobe portion along the neck portion. The reinforcement portion at least partially surrounds the second lobe portion. The reinforcement portion, the first lobe portion, and the second lobe portion are coupled to the frame assembly of the machine.

[0005] Other lead aspects of this disclosure will be apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a perspective view of a machine, according to one embodiment of the present disclosure;
[0007] FIG. 2 is a perspective view of a frame assembly of the machine of FIG. 1;
[0008] FIG. 3 is an exploded view of the frame assembly of FIG. 2 with mounting members;
[0009] FIG. 4 is a top view of a mounting member; and
[0010] FIG. 5 is a sectional view of the mounting member of FIG. 4 taken along a line A-A'.

DETAILED DESCRIPTION

[0011] Wherever possible, the same reference numbers will be used throughout the drawings to refer to same or like parts. Moreover, references to various elements described herein are made collectively or individually when there may be more than one element of the same type. However, such references are merely exemplary in nature. Any reference to elements in the singular is also to be construed to relate to the plural and vice-versa without limiting the scope of the disclosure to the exact number or type of such elements unless set forth explicitly.

[0012] FIG. 1 illustrates a perspective view of a machine 10, according to one embodiment of the present disclosure. The machine 10 is embodied as a tractor. The machine 10 may include, but is not limited to, a machine that performs operations associated with industries, such as mining, construction, farming, transportation, or any other industry known in the art.

[0013] The machine 10 includes a frame assembly 12, an operator cabin 14 for accommodating an operator, a compartment 16 for accommodating a power source 18 (shown in FIG. 2), a pair of track assemblies 20 for propelling the machine 10, and a pair of implement systems 22 connected to the frame assembly 12. The machine 10 can alternatively or additionally include other components and is not limited to those described herein.

[0014] The operator cabin 14 is supported on the frame assembly 12 of the machine 10. The operator cabin 14 includes a number of input devices (not shown) for controlling and monitoring operations of the machine 10. The input devices (not shown) may include, but are not limited to, a push-button, a control lever, and a steering wheel.

[0015] The power source 18 includes an internal combustion engine. The internal combustion engine may include, but is not limited to, a diesel engine, a gasoline engine, a gaseous fuel-powered engine, a turbine engine or any other type of combustion engine known in the art. In one example, the power source 18 may be an electric combustion source of power, such as a fuel cell or a battery. The power source 18 is provided for generating a power output to propel the machine 10 and to operate the implement systems 22 of the machine 10.
The pair of track assemblies 20 is in contact with a ground surface (not shown) for moving the machine 10 on the ground surface. The pair of track assemblies 20 includes a first track assembly 24 and a second track assembly 26. The first track assembly 24 is disposed on a first side 28 of the machine 10. The second track assembly 26 is disposed on a second side 30 of the machine 10. Each of the first track assembly 24 and the second track assembly 26 includes a drive sprocket 32, a track 34, a pair of idlers 36, and a number of track rollers 38 (only shown on the first side 28).

The drive sprocket 32 receives the power output from the power source 18 via a drive train assembly 40 which will be described in detail with reference to FIG. 2. The drive sprocket 32 includes a number of teeth 42 engageable with the track 34. The track 34 forms a continuous structure operatively coupled to the drive sprocket 32, the idlers 36 and the track rollers 38. The track 34 includes a number of inter-connected track links 44. The track links 44 are rotatably coupled together, via a track pin assembly 46. The track pin assembly 46 is engaged with the teeth 42 of the drive sprocket 32 to drive the track 34 around the drive sprocket 32, the idlers 36, and the track rollers 38, thereby propelling the machine 10 on the ground surface.

The first track assembly 24 and the second track assembly 26 also include a first roller frame 48 and a second roller frame (not shown), respectively. The first roller frame 48 and the second roller frames are provided to keep the track 34 of the first track assembly 24 and the second track assembly 26 inline with the ground surface. Each of the first roller frame 48 and the second roller frame carries the idlers 36. The first roller frame 48 and the second roller frame are connected to the frame assembly 12 of the machine 10 by a first pivot shaft 52 (shown in FIG. 2) and a second pivot shaft 54 (shown in FIG. 2), respectively. The first roller frame 48 and the second roller frames may oscillate about the first pivot shaft 52 and the second pivot shaft 54, respectively, during movement of the machine 10 on the ground surface.

The implement systems 22 include a first implement system 56 and a second implement system (not shown) disposed at a front end 60 and a rear end 62 of the machine 10, respectively. The first implement system 56 includes a blade assembly. The blade assembly may include, but is not limited to, a blade, such as a semi-universal blade, foldable blade, a straight blade, or an angle blade. The second implement system includes a ripper, such as a multi-shank ripper. In one example, the second implement system may include, but is not limited to, a winch assembly, a drawbar assembly or any other rear attachments known in the art.

FIG. 2 is a perspective view of the frame assembly 12 of the machine 10. Referring to FIG. 1 and FIG. 2, the power source 18 is coupled to the drive train assembly 40 of the machine 10. In one example, the power source 18 may be coupled to the drive train assembly 40, via direct mechanical coupling (not shown). In another example, the power source 18 may be coupled to the drive train assembly 40 by a circuit (not shown), such as, an electric circuit or a hydraulic circuit.

The drive train assembly 40 is supported on the frame assembly 12 of the machine 10. The drive train assembly 40 includes a first drive shaft 64 and a second drive shaft 66. The first drive shaft 64 and the second drive shaft 66 extend from the drive train assembly 40 along a transverse axis Y-Y' of the frame assembly 12. The drive train assembly 40 also includes a first final drive 68 and a second final drive 70. The first final drive 68 is disposed on the first side 28 of the machine 10. The first final drive 68 is mounted on the frame assembly 12 via a first drive hub 69. The first final drive 68 is engaged with the first drive shaft 64 of the drive train assembly 40, via a planetary gear arrangement (not shown). The first final drive 68 is also engaged with the track 34 of the first track assembly 24, via the drive sprocket 32 of the first track assembly 24. The second final drive 70 is disposed on the second side 30 of the machine 10. The second final drive 70 is mounted on the frame assembly 12 via a second drive hub 71. The second final drive 70 is engaged with the second drive shaft 66 of the drive train assembly 40, via a planetary gear arrangement (not shown). The second final drive 70 is also engaged with the track 34 of the second track assembly 26, via the drive sprocket 32 of the second track assembly 26.

As shown in FIG. 2, the frame assembly 12 includes an encasing member 72 having a first portion 74 (shown in FIG. 3) and a second portion 76. The second portion 76 is laterally spaced apart from the first portion 74 along the transverse axis X-Y' of the frame assembly 12. The encasing member 72 also includes a top portion 78, a front portion 80, and a bottom portion (not shown).

The frame assembly 12 further includes a rear wall 82 connected to the encasing member 72. The frame assembly 12 also includes a first side rail 84 and a second side rail 86. The first side rail 84 is coupled to the first portion 74 of the encasing member 72 and the rear wall 82. The first side rail 84 extends along a longitudinal axis X-X' of the frame assembly 12. The second side rail 86 includes a first opening 88 (shown in FIG. 3). The first opening 88 is formed on a portion of first side rail 90. The first drive shaft 64 of the drive train assembly 40 extends through the first opening 88 along the transverse axis Y-Y' of the frame assembly 12.

The second side rail 86 is coupled to the second portion 76 of the encasing member 72 and the rear wall 82. The second side rail 86 extends along the longitudinal axis X-X' of the frame assembly 12. The second side rail 86 includes a second opening 92 (shown in FIG. 3). The second opening 92 is formed on a portion of second side rail 94. The second drive shaft 66 of the drive train assembly 40 extends through the second opening 92 along the transverse axis Y-Y' of the frame assembly 12. The portion of first side rail 90, the portion of second side rail 94, the rear wall 82, and the encasing member 72 define a casing 96. The casing 96 accommodates the drive train assembly 40 of the machine 10.

Further, the frame assembly 12 includes a pair of mounting members 100. FIG. 3 is an exploded view of the frame assembly 12 with the mounting members 100. Referring to FIG. 2 and FIG. 3, the mounting members 100 are connected to the first side rail 84 and the second side rail 86. For the sake of convenience, the present disclosure will be described in connection with only one mounting member, such as the mounting member 100 connected to the first side rail 84, although it will be understood that the present disclosure is also applicable to another mounting member 100 connected to the second side rail 86 of the frame assembly 12. The mounting member 100 supports the first drive hub 69 of the first drive shaft 64 and the first pivot shaft 52. The mounting member 100 may be manufactured using variety of manufacturing process including, but not limited to, casting, molding, or any other manufacturing processes known in the art.

FIG. 4 is a top view of the mounting member 100. FIG. 5 is a sectional view of the mounting member 100 taken along a line A-A'. Referring to FIG. 4 and FIG. 5, the mounting member 100 has a peanut shaped contour (also referred to as "peanut shaped casting"). The mounting member 100 includes a top end 101, a bottom end 102, and amid section 103 joining the top end 101 and the bottom end 102. The top
end 101 of the mounting member 100 includes a first lobe portion 104. The bottom end 102 of the mounting member 100 includes a second lobe portion 105.  

The first lobe portion 104 includes an opening 106 defined by an inner annular surface 108 (shown in FIG. 3) of the first lobe portion 104. The first lobe portion 104 coincides with the first opening 88 of the first side rail 84. More specifically, the opening 106 of the first lobe portion 104 is aligned with the first opening 88 of the first side rail 84 along the transverse axis X-Y. The first lobe portion 104 includes a number of first mounting holes 110 formed on a first surface 112 of the first lobe portion 104. The first mounting holes 110 is provided to connect the first drive hub 69 with the first lobe portion 104, thereby mounting the first drive hub 69 on the frame assembly 12. The first lobe portion 104 also includes a first shoulder portion 113 (shown in FIG. 3) extending between the first surface 112 and a second surface 114 (shown in FIG. 3) of the first lobe portion 104.  

The second lobe portion 105 includes a third surface 115 (shown in FIG. 5) provided with a number of second mounting holes 116. The second mounting holes 116 allows the first pivot shaft 52 to be connected with the mounting member 100, thereby mounting the first pivot shaft 52 to the frame assembly 12. The second lobe portion 105 includes a cavity 117. The second lobe portion 105 also includes a second shoulder portion 118 (shown in FIG. 5) extending between the third surface 115 and a fourth surface 119 (shown in FIG. 5). The mounting member 100 also includes a neck portion 120 defined at the mid section 103 of the mounting member 100. The neck portion 120 connects the first lobe portion 104 and the second lobe portion 105. The neck portion 120 includes a pair of surfaces 121. Each of the pair of surfaces 121 includes a pair of slope portions 122 and a concave portion 124 (shown in FIG. 3). In alternative examples of the present disclosure, each of the pair of surfaces 121 may have a predefined inclination. Further, in other examples of the present disclosure each of the pair of surfaces 121 may have a curved profile.  

Further, the mounting member 100 includes a reinforcement portion 126 extending from the first lobe portion 104 to the second lobe portion 105 along the neck portion 120. The reinforcement portion 126 partially surrounds the second lobe portion 105 of the mounting member 100. The reinforcement portion 126, the first lobe portion 104, and the second lobe portion 105 are coupled to the frame assembly 12 of the machine 10. More specifically, the reinforcement portion 126, the first lobe portion 104, and the second lobe portion 105 are coupled to the first side rail 84, via welding.  

INDUSTRIAL APPLICABILITY  

The present disclosure relates to the mounting member mounted on the frame assembly 12 of the machine 10. The mounting member 100 includes the first lobe portion 104, the second lobe portion 105 and the neck portion 120. The first lobe portion 104 coincides with one of the first opening 88 and the second opening 92 for supporting one of the first drive shaft 64 and the second drive shaft 66. The second lobe portion 105 supports one of the first pivot shaft 52 and the second pivot shaft 54. The neck portion 120 connects the first lobe portion 104 with the second lobe portion 105. Each of the mounting members 100 also includes the reinforcement portion 126 extending from the first lobe portion 104 to the second lobe portion 105 along the neck portion 120. The reinforcement portion 126 is coupled to the first side rail 84, via welding.  

The mounting member 100 may be used for the frame assembly 12 of the machine 10 that may be employed in various industries, such as, mining, construction, farming, transportation, or any other industry known in the art. Therefore, the mounting member 100 has a wide range of application across industries.  

The reinforcement portion 126 welded to the first side rail 84 ensures secure mounting of the mounting member 100 to the frame assembly 12. More specifically, the reinforcement portion 126 prevents rupture of welding joints between the mounting member 100 and the first side rail 84. The reinforcement portion 126 aids in relocating high stresses from the welding joints to the mounting member 100. Due to higher fatigue strength of the mounting member 100 compared to the welding joints, the mounting member 100 withstands high stress thereby increasing life of the frame assembly 12.  

Similarly, the reinforcement portion 126 of another mounting member 100 that is welded to the second side rail 86 ensures secure mounting of the mounting member 100 to the frame assembly 12. More specifically, the reinforcement portion 126 prevents rupture of welding joints between the mounting member 100 and the frame assembly 12. The reinforcement portion 126 aids in relocating high stresses from the welding joints to the mounting member 100. Due to higher fatigue strength of the mounting member 100 compared to the welding joints, the mounting member 100 withstands high stress thereby increasing life of the frame assembly 12. The present disclosure offers the mounting members 100 that are simple, effective, easy to use, and economical.  

While aspects of the present disclosure have been particularly shown and described with reference to the embodiments above, it will be understood by those skilled in the art that various additional embodiments 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 embodiments should be understood to fall within the scope of the present disclosure as determined based upon the claims and any equivalents thereof.  

What is claimed is:  

1. A mounting member for a frame assembly of a machine, the mounting member comprising:  
   a first lobe portion having a opening, a shoulder portion extending from a first surface to a second surface and a plurality of first mounting holes adapted to mount a drive hub;  
   a second lobe portion having a cavity, a second shoulder portion extending from a third surface to a fourth surface and a plurality of second mounting holes adapted to mount a pivot shaft;  
   a neck portion connecting the first lobe portion and the second lobe portion; and  
   a reinforcement portion extending from the first lobe portion to the second lobe portion along the neck portion, the reinforcement portion at least partially surrounding the second lobe portion, wherein the reinforcement portion, the first lobe portion and the second lobe portion are coupled to the frame assembly of the machine.  

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