

March 10, 1964

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3,124,263

APPARATUS FOR HANDLING LOGS AND THE LIKE

Filed Dec. 1, 1960

3 Sheets-Sheet 1

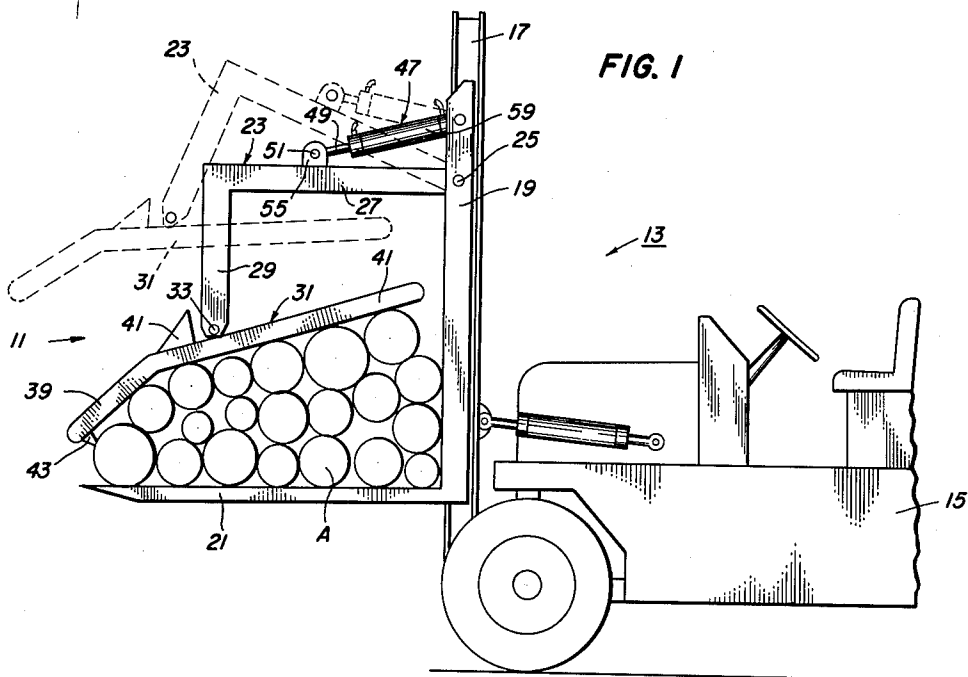


FIG. 1

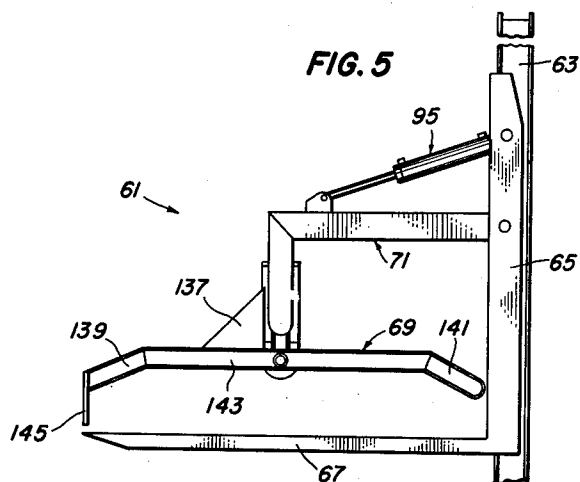


FIG. 5

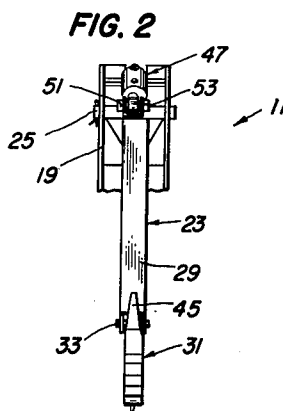


FIG. 2

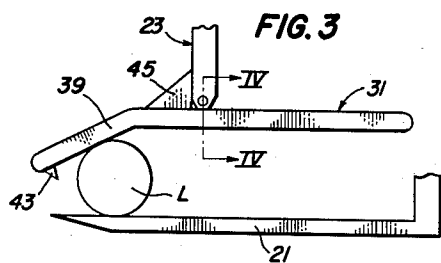
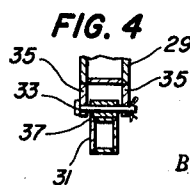


FIG. 3



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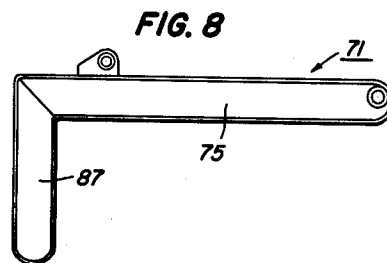
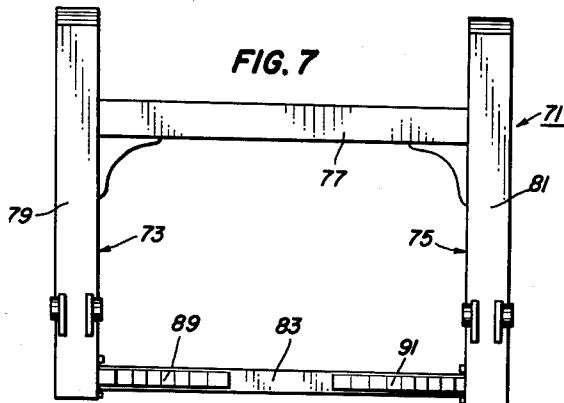
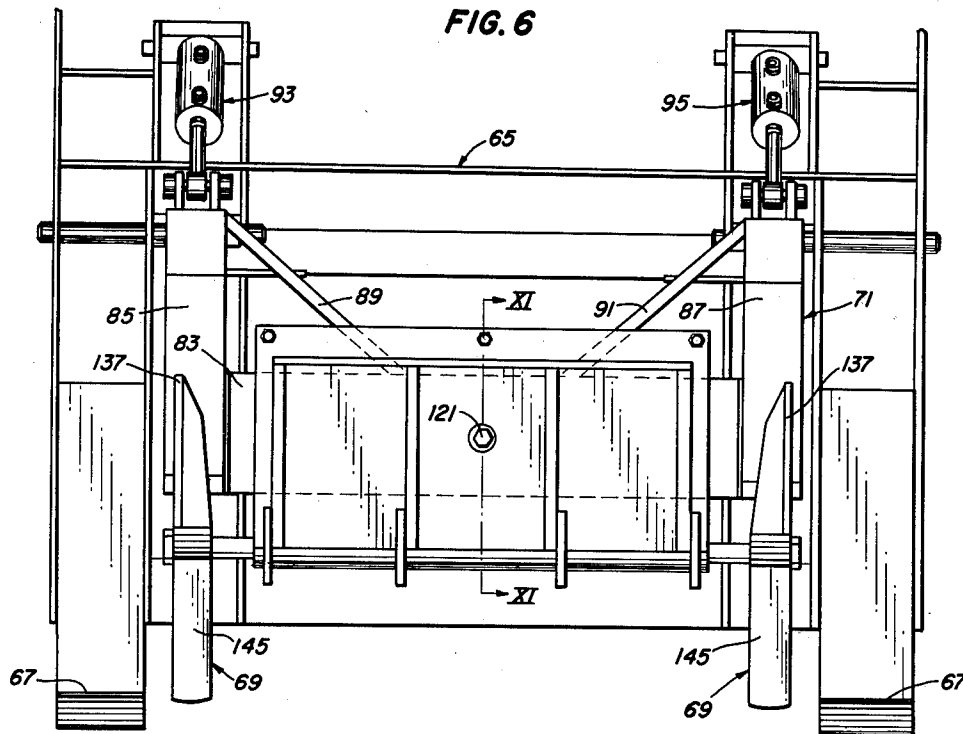
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3 Sheets-Sheet 2



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FIG. 9

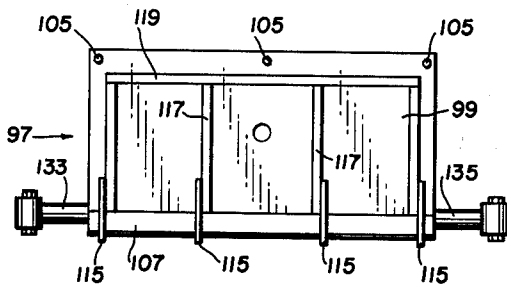


FIG. 10

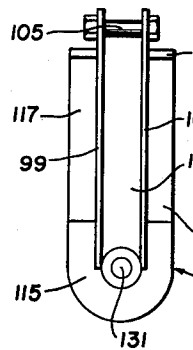


FIG. 11

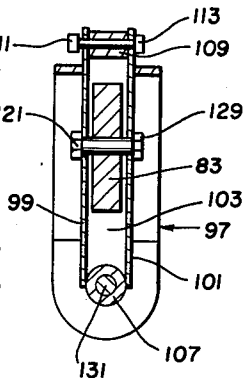
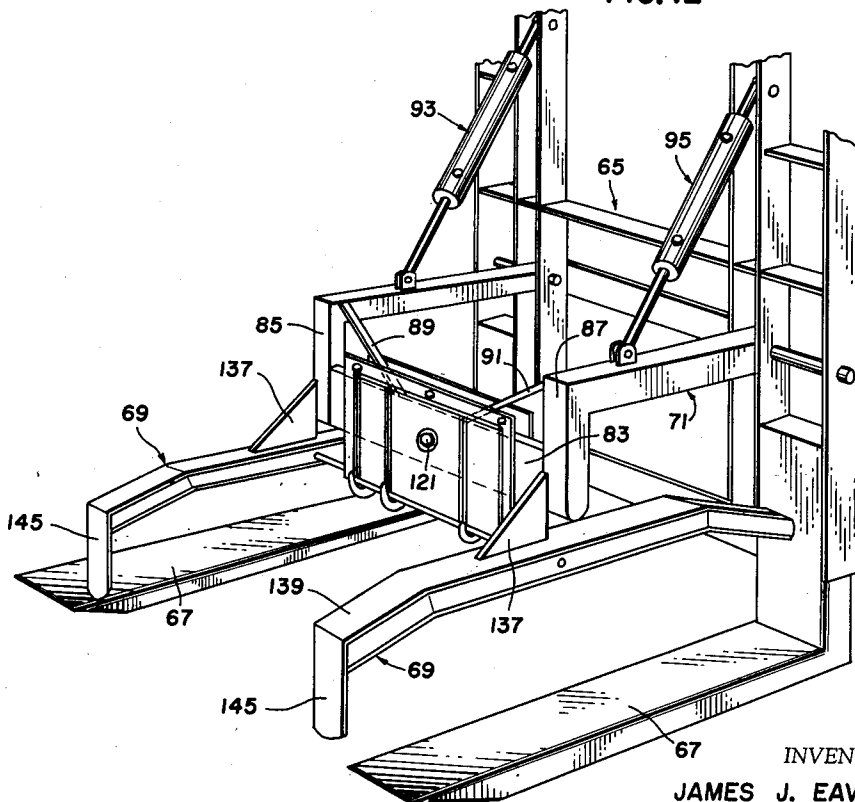


FIG. 12



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3,124,263 APPARATUS FOR HANDLING LOGS AND THE LIKE

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Filed Dec. 1, 1960, Ser. No. 73,100
5 Claims. (Cl. 214-654)

This invention relates to improvements in devices for handling logs, lumber and the like, and is particularly adapted for use with the so-called fork lift type of log and lumber handling machines.

In using the above mentioned type of machines, the logs are carried by the load supporting structure or forks with the forks contacting the logs intermediate the ends thereof and with the logs extending transversely of the machine and projecting laterally out in opposite directions from the forks. Heretofore, in the use of these machines the logs had to be evenly balanced on the lifting forks or they would fall off when traveling over uneven and rough terrain. In other words, it was necessary for the forks to contact the logs at the center of gravity thereof or they would tilt to one side and fall off. Thus, one of the objects of the present invention is to provide, in a log and lumber handling machine, an attachment or device for holding the logs on the lifting forks so that even though the logs are not evenly balanced on the forks they will not fall off.

A further object is to provide such an attachment which holds the logs by putting downward pressure on top of the logs.

A further object is to provide such an attachment which makes it possible to carry more logs on the lift forks.

A further object is to provide such an attachment which, due to the fact that the logs do not have to be balanced, eliminates much maneuvering to exactly position the logs, thereby saving much time and making it an easier job.

A further object is to provide such an attachment which is adapted to hold packaged lumber in place while traveling over rough terrain.

A further object is to provide means in such an attachment to force the logs rearwardly on the load supporting structure.

A further object is to provide in such an attachment at least one pivot arm, which upon contact with the load is adapted to pivot into a flat position against the top of the load to more effectively hold the load.

A further object is to provide another form of such an attachment which includes a pair of such pivotal arms mounted on a rocker which in turn is rockably mounted for rocking movement about an axis substantially perpendicular to the pivot axis of said arms, whereby said arms are adapted to align transversely as well as fore and aft relative to the load.

A further object is generally to improve the design and construction of devices for handling logs and the like.

The means by which the foregoing and other objects of the present invention are accomplished and the manner of their accomplishment will be readily understood from the following specification upon reference to the accompanying drawings, in which:

FIG. 1 is a side elevational view of a log handling machine embodying the preferred form of the present invention, with only a fragmentary portion of the vehicle of the machine being shown and with the machine being shown in use to carry logs.

FIG. 2 is a front elevational view of the preferred form of the attachment of the present invention.

FIG. 3 is a fragmentary portion of the device shown in FIG. 1 and illustrating the use of the device to force a log rearwardly on the supporting forks.

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FIG. 4 is an enlarged fragmentary sectional view taken as on the line IV—IV of FIG. 3.

FIG. 5 is a fragmentary side elevational view of a modified embodiment of the present invention.

FIG. 6 is an enlarged front elevational view of the device shown in FIG. 5.

FIG. 7 is a top plan view of the support framework of the modified embodiment, on a reduced scale relative to FIG. 6.

FIG. 8 is a side elevational view of same.

FIG. 9 is an enlarged front elevational view of the rocker assembly.

FIG. 10 is a further enlarged end elevational view thereof.

FIG. 11 is a sectional view on an enlarged scale and taken as on the line XI—XI of FIG. 6.

FIG. 12 is a perspective view on an enlarged scale of the device shown in FIG. 5.

Referring now to the drawings in which the various parts are indicated by numerals and referring first more particularly to the preferred embodiment shown in FIGS. 1-4, it is contemplated that the attachment or device 11 of the preferred embodiment of the present invention be used with any suitable machine adapted to handle logs, lumber and the like. For example, a typical machine with which the device 11 is adapted to be used is shown in FIG. 1, wherein it will be seen a log handling machine 13 includes a self-propelled wheeled vehicle 15 having a mast 17 adjacent the forward part thereof upon which is slidably mounted a carriage 19 adapted to be moved upwardly and downwardly along the mast 17 by suitable means to raise and lower the load A, which is illustrated in this figure as logs. Also, in the usual manner mast 17 is adapted to be power actuated to tilt the mast forwardly or rearwardly. In addition, machine 13 preferably includes the usual load supporting structure 21 attached to carriage 19 and extending forwardly therefrom, and which is preferably in the form of the usual pair of lift forks that are spaced laterally and rigidly attached adjacent the lower end of carriage 19 in the usual manner for upward and downward movement therewith.

Device 11 includes support means which is preferably in the form of a support piece 23 that is pivotally joined adjacent its inner end to carriage 19 by suitable means, as a pivot pin 25, for pivot about a substantially horizontal axis. Support piece 23 extends outwardly and forwardly from carriage 19 for a portion as at 27 and then depends downwardly as at 29 from adjacent the forward end of portion 27. Depending portion 29 and portion 27 are rigid relative to one another and preferably extend at a right angle relative to one another.

An elongated rigid arm 31 extends in a fore and aft direction above load supporting structure 21 and is pivotally mounted on support piece 23 adjacent the lower end of depending portion 29 by suitable means, as for example, by a pivot pin 33 extending through aligned apertures in the bifurcated end 35 of depending portion 29 and through a bushing 37 fixedly attached to arm 31 as by welding or the like. The forward end 39 of arm 31 angles downwardly from the main body 41 of the arm and preferably forms an obtuse angle therewith, as best seen in FIGS. 1 and 3. The axis of pivot of arm 31 on support piece 23 is so located that the arm when uncontacted is supported by the support piece in a balanced position in which the arm is substantially horizontal, as best seen by the dotted line position in FIG. 1. A spike 43 is preferably provided adjacent the distal end of forward end 39 and projects downwardly therefrom substantially at a right angle relative thereto. A stop 41, which is preferably in the form of a triangular piece that is fixedly attached to arm 31 forward of pivot pin 33, limits clockwise pivot of the arm, as viewed in FIGS.

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1 and 3, to stop the arm with forward end 39 angled forwardly and downwardly relative to the horizontal, as best seen in FIG. 3. It will be understood that with arm 31 in the stopped position, as shown in FIG. 3, the forward end 39 wedges any logs, which are adjacent the forward end of load supporting structure 21, rearwardly when downward pressure is exerted on the arm. For example, the log L shown in FIG. 3 is urged to the right on load supporting structure 21 when downward pressure is exerted on arm 31 through support piece 23 in a manner hereinafter described. It will be understood that this wedging action is due to the angle of forward end 39.

A double-acting jack 47 is provided for pivoting support piece 23. Jack 47 is preferably, though not necessarily, of a hydraulic type and is of the usual construction including a piston rod 49 which is pivotally attached to support piece 23 by suitable means as a pin 51 extending through aligned apertures in the end portion 53 of the piston rod and rotatably through lugs 55 fixedly attached to portion 27. The cylinder 59 of jack 47 is pivotally attached to carriage 19 for pivot about a substantially horizontal axis by suitable well-known means, not shown. It will be understood that when jack 47 is retracted, support piece 23 and arm 31 will be moved thereby into a raised position, as for example, like the one shown in broken lines in FIG. 1 wherein it will be seen the arm is spaced from supporting structure 21 so that the load A can be placed thereon or removed therefrom. Also, it will be understood that when jack 47 is extended, support piece 23 will be pivoted counterclockwise, as viewed in FIG. 1, to carry the arm 31 downwardly to a lowered position, as for example, the position shown in solid lines in FIG. 1. When arm 31 is moved into contact with load A, it will be understood that the arm will be pivoted into a flat position against the top of the load. Thus, for example, with the load stacked in the manner shown in FIG. 1, that is, with the logs being stacked higher adjacent the rearward end of supporting structure 21, since the arm is balanced in a horizontal position, the first portion of the arm that will contact the logs will be that portion adjacent the rearward end thereof (that is, the end to the right as viewed in FIG. 1) whereupon the arm will be pivoted counterclockwise until the remaining portion of the arm is flat against the top of the load. When the term "flat against the top of the load" or similar description is used relative to the arm 31, it will be understood to mean that the arm bears against a majority of the upper surfaces presented by the load. For example, if the load comprises round objects such as logs, then the arm 31 contacts the majority of the uppermost logs in a tangential manner as shown in FIG. 1. Also, it will be understood that the logs adjacent the outer or forward end of load supporting structure 21 will be moved rearwardly by the wedging action of portion 39 so that the logs will be compressed together tightly and will not fall off of supporting structure 21 even though the logs are not evenly balanced thereon.

Referring now more specifically to the modified device 61 of the present invention shown in FIGS. 5-11, the device, like the preferred embodiment, is adapted to be used with any suitable machine for handling logs, lumber and the like. For example, device 61 may be used with a self-propelled wheeled vehicle similar to that shown in FIG. 1 and having a mast 63 which corresponds to mast 17 of the preferred embodiment. Also, as in the preferred embodiment, a carriage 65 is slidably mounted on mast 63 and is adapted to be moved upwardly and downwardly along mast 63 to raise and lower the load. In addition, the usual load supporting structure 67 attached to carriage 65 is provided, and which is preferably, like the preferred embodiment, in the form of the usual pair of lift forks. The principal difference between the modified embodiment and the preferred embodiment is that in the modified device 61 a pair of arms

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69 are provided instead of a single arm, and the support means for device 61, which corresponds to support piece 23 of the preferred embodiment, is modified so that in addition to being pivotable the pair of arms 69 are arranged to rock together about an axis substantially perpendicular relative to the pivot axis of the arms. This structure is described hereinbelow:

A rigid support framework 71 is pivotally mounted on carriage 65 and corresponds to support piece 23 of the preferred embodiment. In fact, the support framework 71 as viewed from the side thereof (see FIG. 8) resembles the support piece 23 as viewed from the side thereof (see FIG. 1). However, support framework 71 comprises a pair of support pieces 73, 75 rather than the one in the preferred embodiment, and support pieces 73, 75 are rigidly interconnected by a cross-brace 77 extending between the portions 79, 81 and by the transverse plate 83 that extends between the depending portions 85, 87 of the respective support pieces 73, 75. Transverse plate 83 is disposed substantially perpendicular to portions 79, 81, that is, when portions 79, 81 are horizontal the transverse plate 83 is vertically disposed. To add rigidity to support framework 71 a pair of diagonal braces 89, 91 extend between the upper edge of transverse plate 83 and the respective support pieces 73, 75.

A pair of double-acting jacks 93, 95 are provided for pivoting support framework 71 in the same manner that jack 47 pivots support piece 23, and the jacks 93, 95 are preferably attached to the respective support pieces and to the carriage 65 in the same manner that the connections are made in the preferred embodiment.

A rocker assembly 97 is pivotally mounted on support framework 71 and comprises a pair of parallel transverse plates 99, 101 which are spaced apart as at 103 and held in spaced relationship by means of spacers 105 adjacent the upper edges thereof and by a transversely extending pipe 107 fixedly attached adjacent the lower edges thereof. Each of spacers 105 preferably includes a cylinder 109 disposed between plates 99, 101 and a bolt 111 extending through aligned apertures in the plates and through cylinder 109, wherein it is anchored by a nut 113. U-shaped stiffener plates 115 are preferably provided around the lower ends of plates 99, 101 and around pipe 107, with the U-shaped plates being respectively fixedly attached thereto as by welding or the like. In addition, elongated stiffener plates 117 are preferably fixedly attached to remote sides of transverse plates 99, 101. Also, transverse stiffener plates 119 are preferably provided across the top of stiffener plates 117 and attached thereto as by welding or the like.

In the assembled relationship of rocker assembly 97 with support frame 71, transverse plate 83 extends through space 103 with transverse plates 99, 101 on opposite sides thereof, as best seen in FIG. 11, and a pivot bolt 121 extends through aligned apertures in plates 99, 101 and transverse plate 83, respectively, with the pivot bolt being anchored therein as by means of a nut 129 or the like. A shaft 131 extends through pipe 107 and out the opposite ends thereof as at portions 133, 135 and upon each portion an arm 69 is pivotally mounted as by means of the shaft portions extending through apertures in the arms. Arms 69 are supported in a normally balanced substantially horizontal position as the arm 31 of the preferred embodiment and the arms function in the same manner as the arm of the preferred embodiment. Thus, each arm 69 is provided with a stop 137 adapted to contact support framework 71 to limit clockwise rotation of the arm, as viewed in FIG. 5. Also, the angular portion 139 is provided adjacent the forward end of arm 69 and functions in the same manner as the preferred embodiment. However, if desired, the rearward end of arm 69 is also provided with an angular portion 141 angled downwardly and rearwardly from the main body 143 of the arm. Also, if desired, a depending end portion 145 is provided

on the forward end of angular portion 139 in the place of spike 43. It will be noted that pivot bolt 121 and shaft 131 are disposed perpendicular to each other so that the pivot axis of arms 69 are substantially perpendicular to the rocking axis of rocker assembly 97. Also, it should be noted that pivot bolt 121 is substantially halfway between arms 69 and is above the center of gravity of the combined rocker assembly and arm assembly so that the rocker assembly and arms will be balanced in a substantially horizontal position, as best seen in FIG. 6, but may be rocked in either direction about the pivot bolt 121. Thus, it will be seen that with the modified device 61, if the load is irregular along a transverse direction, then the combined structure including rocker assembly 97 and arms 69 can pivot until the pair of arms 69 are in a flat disposition transversely relative to the load. Also, the arms 69 are individually pivotable into a flat disposition fore and aft relative to the load as heretofore described for the preferred embodiment.

From the foregoing description of both the preferred and the modified embodiment of the present invention, it will be understood that a very efficient and unique means is provided for holding a load, as logs or the like, on a supporting structure so that the logs or the like do not have to be evenly balanced thereon but are retained against tilting when going over rough terrain and the like. It will further be understood that a great deal of time and effort may be saved by the use of the present invention since the operator of the log handling machine does not have to do a lot of maneuvering to get the logs exactly balanced.

Although the invention has been described in some detail by way of illustration and example for purposes of clarity or understanding, it is to be understood that it is not to be so limited since changes and modifications may be made therein which are within the full intended scope of this invention as hereinafter claimed.

I claim:

1. In a machine for handling a load as logs and the like of the type including a carriage and a load supporting structure connected to said carriage and projecting forwardly therefrom, the improvement in said machine comprising support means having an inner end pivotally joined to said carriage above said supporting structure and pivotable about a substantially horizontal axis between a lowered position and a raised position, at least one load engaging arm, said load engaging arm being elongated in a fore and aft direction, means pivotally coupling said load engaging arm intermediate the ends thereof to said support means for pivot about a substantially horizontal axis, said load engaging arm being supported through said coupling means by said support means in a normal substantially horizontal balanced position about said axis above said load supporting structure, jack means attached adjacent one end to said carriage and attached adjacent the opposite end to said support means for moving said support means between said lowered position and said raised position to carry said load engaging arm therewith into a raised position and a lowered position, when in said raised position said load engaging arm being spaced from said load supporting structure to permit the load to be moved from and to said supporting structure, movement of said support means towards said lowered position being effective to move said load engaging arm into contact with a load carried by said load supporting structure, when a load is contacted by said load engaging arm said arm being normally pivotal into a flat position against the top of the load, said load engaging arm including a main body portion and a forward end portion angled downwardly from said main body portion, and stop means for cooperating between said support means and said load engaging arm to stop said load engaging arm in a fixed load engaging position relative to said support means and in which position said forward end portion is angled forwardly and downwardly relative to the hori-

zontal, whereby said forward end portion is adapted to act as a wedge to wedge the load rearwardly on said load supporting structure.

2. In a machine for handling a load as logs and the like of the type including a carriage and a load supporting structure connected to said carriage and projecting forwardly therefrom, the improvement in said machine comprising support means having an inner end pivotally joined to said carriage above said supporting structure and pivotable about a substantially horizontal axis between a lowered position and a raised position, said support means including a transverse plate, a rocker assembly including a pair of parallel transverse plates spaced apart to establish a space therebetween, pivot means pivotally joining said rocker assembly and said support means with said transverse plate of said support means extending through said space, a pair of laterally spaced load engaging arms, said load engaging arms being respectively elongated in a fore and aft direction, means pivotally mounting said load engaging arms intermediate the ends thereof on said rocker assembly for pivot of said arms respectively about axes substantially perpendicular to the pivot axis of said rocker assembly and said support means, said load engaging arms being supported in normal balanced positions in which said load engaging arms are substantially horizontal above said load supporting structure, jack means attached adjacent one end to said carriage and attached adjacent the opposite end to said support means for moving said support means between said lowered position and said raised position to carry said load engaging arms therewith into a raised position and a lowered position, when in said raised position said load engaging arms being spaced from said load supporting structure to permit the load to be moved from and to said supporting structure, movement of said support means towards said lowered position being effective to move said load engaging arms into contact with a load carried by said load supporting structure, when a load is contacted by said load engaging arms each of said arms being normally pivotal into a flat disposition fore and aft against the top of the load and said pair of arms being normally rockable together into a flat disposition transversely relative to the load.

3. In a machine for handling a load as logs and the like of the type including a carriage and a load supporting structure connected to said carriage and projecting forwardly therefrom, the improvement in said machine comprising support means movable between a lowered position and a raised position, a rocker assembly, pivot means pivotally joining said rocker assembly and said support means, a pair of laterally spaced load engaging arms, means pivotally mounting said load engaging arms intermediate the ends thereof on said rocker assembly for pivot of said arms respectively about axes substantially perpendicular to the pivot axis of said rocker assembly and said support means, means for moving said support means between said lowered position and said raised position to carry said load engaging arms therewith into a raised position and a lowered position, when in said raised position said load engaging arms being spaced from said load supporting structure to permit the load to be moved from and to said supporting structure, movement of said support means towards said lowered position being effective to move said load engaging arms into contact with a load carried by said load supporting structure, when a load is contacted by said load engaging arms each of said arms being normally pivotal into a flat disposition against the top of the load and said pair of arms being normally rockable together into a flat disposition transversely relative to the load.

4. The structure according to claim 2 in which each of said load engaging arms includes a main body portion and a forward end portion angled downwardly from said main body portion, and stop means cooperating between

said support means and each of said load engaging arms for limiting pivot of said load engaging arms to stop said load engaging arms in a position in which said forward end portion of each of said arms is angled forwardly and downwardly relative to the horizontal, whereby said forward end portion of each of said arms is adapted to act as a wedge to wedge the load rearwardly on said load supporting structure.

5. In a machine for handling a load as logs and the like of the type including a carriage and a load supporting structure connected to said carriage and projecting forwardly therefrom, the improvement in said machine comprising support means movable between a lowered position and a raised position, at least one load engaging arm, means pivotally coupling said load engaging arm intermediate the ends thereof to said support means for pivot about a substantially horizontal axis, said load engaging arm being supported through said coupling means by said support means in a normal substantially horizontal balanced position about said axis above said load supporting structure, means for moving said support means between said lowered position and said raised position to carry said load engaging arm therewith into a raised position and a lowered position, when in said raised position said load engaging arm being spaced from said load supporting structure to permit the load to be moved from and to said supporting structure, movement of said support means towards said lowered position being effective to move said load engaging arm into holding contact with a load carried by said load supporting structure, when a load is contacted

by said load engaging arm said arm being normally pivotal into a flat position against the top of the load, said load engaging arm including a main body portion and a forward end portion angled downwardly from said main body portion, and stop means cooperating between said support means and said load engaging arm for limiting pivot of said load engaging arm to stop said load engaging arm in a fixed load engaging position relative to said support means and in which position said forward end portion is angled forwardly and downwardly relative to the horizontal, whereby said forward end portion is adapted to act as a wedge to wedge the load rearwardly on said load supporting structure.

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