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REACHING LOADER WITH GUIDED LIFT CYLINDERS

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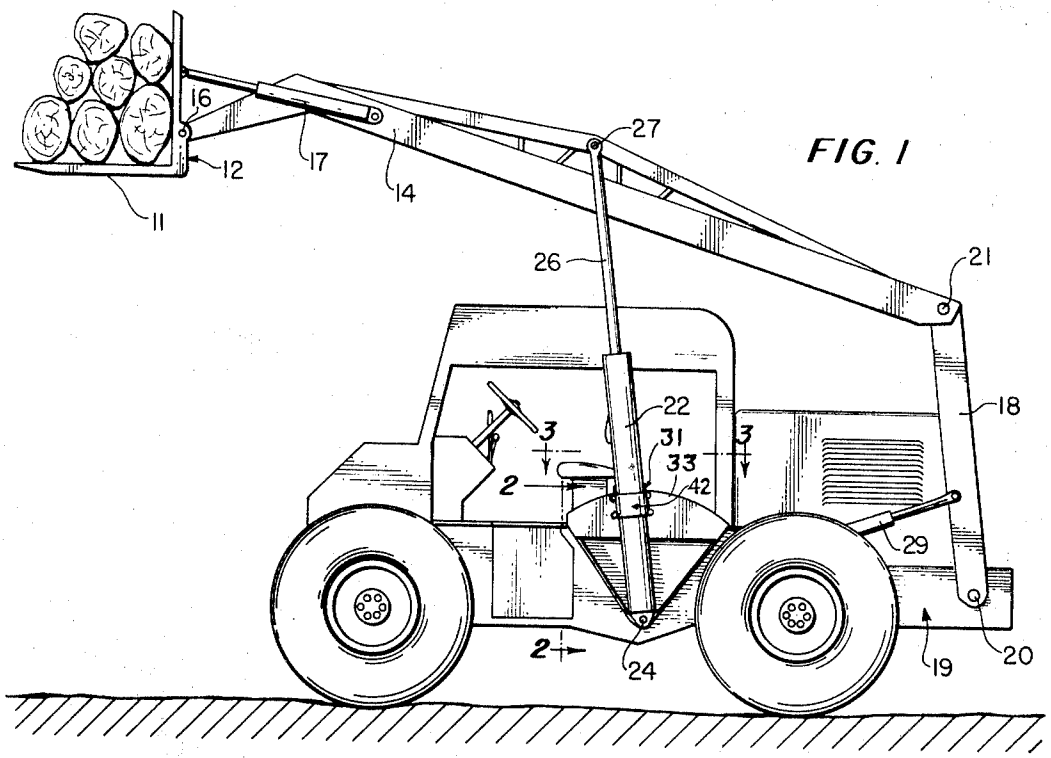


FIG. 1

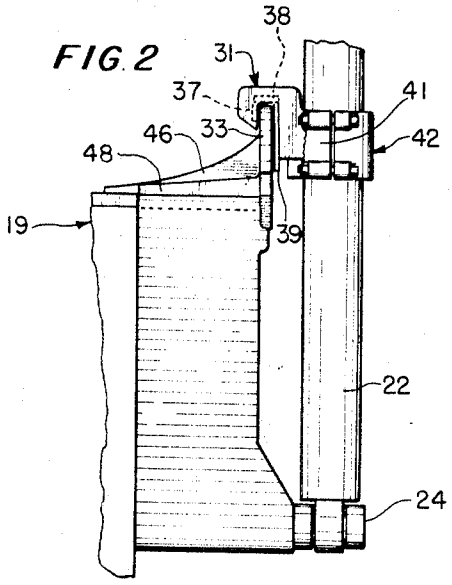


FIG. 2

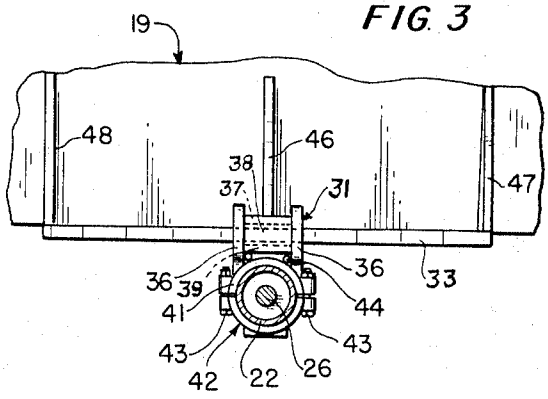


FIG. 3

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REACHING LOADER WITH GUIDED LIFT CYLINDERS

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Int. Cl. B66f 9/16

ABSTRACT OF THE DISCLOSURE

In a reaching loader in which the boom is pivoted at the upper end of an upstanding reaching link, lateral stability is achieved through guidance of the lift cylinder assemblies which extend from the boom to the chassis. A U-shaped yoke, rigidly secured to each cylinder, slides along an arcuately shaped guide plate.

Introduction

The invention of which this disclosure is offered for public dissemination in the event adequate patent protection is available, relates to material handling devices with reaching booms, commonly called "reaching loaders."

A most successful type of reaching loader is that manufactured under La Tendresse Patent No. 2,788,139. In this patent, a boom which projects forwardly and carries a fork, bucket or other load-engaging device, is pivoted at its rear end to a reaching link. The reaching link in turn is pivoted to the vehicle chassis. A hydraulic cylinder assembly pivots the reaching link in order to move the boom forwardly in a reaching action. The boom can be raised and lowered by a hydraulic cylinder assembly which extends between the boom and the chassis in general parallelism with the reaching link. The hydraulic cylinders are in pairs, one on each side.

In spite of the fact that the reaching link would be a rigid member as wide as the vehicle and the boom would likewise be a rigid member as wide as the vehicle, there is a tendency in such a machine for sidesway of the boom. Various measures have been taken to limit the sidesway or to provide lateral stability. For example, the cab has sometimes been used as a guiding or limiting structure, the cab extending upwardly between two longitudinal side pieces of the boom. There has, however, been some danger attendant upon the shearing action which this type of guiding produced. Also it necessitated carrying the cab relatively high for guidance purposes, and this both increased the cost and necessitated high clearance. More recently, there has been very little effort to provide lateral stability beyond that which careful engineering of the reach link and the boom and the connection between them could provide. It has been recognized, however, that close clearance between the inside of the lift cylinders and a portion of the chassis along which the cylinders would swing gave some help in the direction of lateral stability. If for example, the boom should start to sway to the left, the right-hand lift cylinder would come into engagement with the chassis at a point far enough above the pivot point of the lift cylinder to add some tendency toward limiting the sidesway. There has long been recognition, however, that under adverse conditions this was inadequate. If, for example, the mobile loader should run on uneven ground so as to be tilted to one side, a heavy load will exert a very strong lateral force on the boom.

According to the present invention, a tremendous improvement in lateral stability is achieved by giving guidance to both lift cylinders in both lateral directions instead of in one, and at the same time raising the height of the guidance point. To this end a downwardly open U shaped yoke is rigidly secured to each cylinder and straddles an arcuately shaped rigid plate which firmly guides the cylinder as it swings during the reaching movement of the boom.

Additional objects and advantages of the invention will be apparent from the following description and from the drawings.

Designation of figures

FIGURE 1 is a view generally from the side of a reaching loader embodying the present invention;

FIGURE 2 is a fragmentary view looking in the forward-rearward direction so that the cooperation of the yoke and the guide plate and the mounting of the yoke to the cylinder can be seen;

FIGURE 3 is a generally horizontal sectional view taken transversely to the axis of the cylinder and looking down on the yoke and guide plate.

Intent clause

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

Background description

The reaching loader with which the invention is illustrated includes a pair of forks **11** comprising a load-engaging member **12** which is pivoted to boom **14** by pivot **16**. The angularity of the load-engaging device **12** with respect to the boom **14** may be controlled by hydraulic cylinders **17**. The boom **14** is pivoted to a reach link **18** by a pivot **21**, the reach link **18** being pivoted to the chassis **19** at pivot **20**. The boom can be raised and lowered by lift cylinders **22** pivoted to the chassis at **24**, the cylinder assemblies including piston rods **26** which are pivoted to the boom structure at **27**. The reach link **18** is a rigid member having uprights at opposite sides of the machine rigidly secured together as one pivoted unit. Likewise, the boom **14** has longitudinal members widely separated but rigidly secured together as one rigid unit. This rigidity goes a long way towards providing lateral stability for the boom, but not far enough for adverse conditions.

Reach cylinders **29** swing reach link **18** to make the boom **14** reach and retract. Lift cylinders **22** are swung by the boom, staying generally paralleled with reach link **18**.

Double two-way guidance of present invention

According to the present invention, a great deal of lateral reinforcing, or auxiliary lateral stability, is provided in the manner seen best in FIG. 2. Essentially, this comprises a U-shaped yoke **31** secured to each lift cylinder **22**, the yoke straddling a guide plate **33** and moving along it. As seen in FIG. 1, the guide plate **33** is shaped arcuately along its top, the arc being described about the pivotal axis **24** of the lift cylinders. Preferably, the yoke **31** has a slight clearance with the guide plate **33**, such as a sixteenth of an inch on both sides so that when there is no sidesway there will be no friction.

Yoke **31** preferably includes two U-shaped plates **36** welded to intermediate plates **37**, **38** and **39**, this whole assembly being welded to a member **41** which forms half of a split clamp **42**. The split clamp may be tightened by screws **43** around cylinder **22**. Rigidity of the attachment

of the yoke assembly **31** to the clamp half **41** is aided by a pair of spacer rods **44** welded both to plate **39** and to clamp half **41**.

Guide plate **33** is a very sturdy steel plate firmly secured to structural members of the chassis **19** by welding and braced by gusset plates **46**, **47** and **48**. Any gusset plates such as gusset plates **46** between the two ends is spaced low enough on the guide plate **33** to clear the yoke **31**.

Achievement

The additional lateral stability provided by the present invention is very important. Without it, damage to the equipment due to sideward forces beyond the ability of the equipment to withstand was of sufficiently frequent occurrence to be a severe problem. Doubling the strength in resisting side play does much more than reduce the occasions of damage to half the frequency. It provides a degree of sturdiness, a reserve of strength, such that damage from sideward forces is extremely rare.

I claim:

1. A reaching loader including a base frame, an upstanding link pivoted to the frame, a forwardly extending boom pivoted to the upper end of the upstanding link for a reaching movement as the link swings, and a lift cylinder means extending between the boom and the frame, swinging about an axis on the frame as the boom reaches; characterized by

guide means for the lift cylinder means, as it swings, including an upstanding guide plate rigid with the frame and having a free upwardly exposed edge arcuate about said axis, and a yoke straddling the edge and having bearing surfaces adapted to bear on opposite faces of the guide plate said yoke being rigidly secured to the lift cylinder means at a fixed distance from said axis.

2. A reaching loader including a mobile rough-terrain chassis, an upstanding link pivoted to the chassis and extending substantially the full width thereof, a forwardly extending boom pivoted to the upper end of the upstanding link, and extending substantially its full width, for a reaching movement as the link swings, and a pair of lift cylinder assemblies extending between the boom and the chassis, one on each side of the chassis, pivoted to the chassis to swing about an axis on the chassis as the boom reaches, each assembly including a cylinder and a piston, characterized by

guide means for each cylinder assembly, as it swings with the reaching boom, each said guide means restraining a portion of its lift cylinder at a point substantially spaced from the axis against lateral movement in either direction and through the lift cylinder exerting a force on the boom, when laterally displaced, for resisting sidesway of the boom.

3. A reaching loader including a mobile vehicle adapted for rough terrain and having a chassis frame, an upstanding link pivoted to the frame, a forwardly extending boom pivoted to the upper end of the upstanding link for a reaching movement as the link swings, and a lift cylinder means extending between the boom and the frame, swinging about an axis on the frame as the boom reaches; characterized by

guide means for the lift cylinder means, as it swings, including an upstanding guide plate rigid with the frame and having a free upwardly exposed edge arcuate about said axis, and a yoke straddling the edge and having bearing surfaces adapted to bear on opposite faces of the guide plate said yoke being rigidly secured to the lift cylinder means at a fixed distance from said axis.

4. A reaching loader including a mobile rough-terrain chassis, an upstanding link pivoted to the chassis and extending substantially the full width thereof, a forwardly extending boom pivoted to the upper end of the upstanding link, and extending substantially its full width, for a reaching movement as the link swings, and a pair of lift cylinder assemblies extending between the boom and the chassis, one on each side of the chassis, pivoted to the chassis to swing about an axis on the chassis as the boom reaches, each assembly including a cylinder and a piston, characterized by

guide means for each cylinder assembly, as it swings with the reaching boom, each said guide means restraining a portion of its lift cylinder at a point substantially spaced from the axis against lateral movement in either direction;

each guide means including an upstanding guide plate rigid with the chassis and having a free upwardly exposed edge arcuate about the designated axis and a yoke straddling the edge and having bearing surfaces adapted to bear on opposite faces of the guide plate, said yoke being rigidly secured to its associated cylinder.

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U.S. Cl. X.R.

214—770, 775