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Garnett

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[54] **MEANS FOR PROTECTING THE ROD OF A HYDRAULIC LIFT JACK FROM DAMAGE BY THE LIFT CHAIN**

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[52] **U.S. Cl.** ..... **254/4 C,** 187/9 E, 254/93 R

[51] **Int. Cl.**..... **B60p 1/14,** B60p 1/22, B66f 3/24

[58] **Field of Search** ..... 254/2 R, 2 B, 2 C, 4 R, 254/4 B, 4 C, 93 R, 93 L; 187/9 R, 9 E

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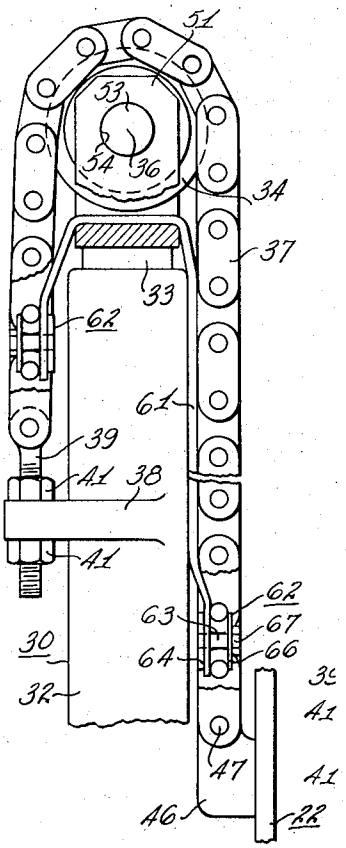
Primary Examiner—Othell M. Simpson

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[57] **ABSTRACT**

A protective band of flexible material is connected at its opposite ends to the lift chain of a lift truck and passes over the upper end of the rod of the lift jack beneath the chain roller. The protective band is in a protecting relation to the rod of the jack at both sides thereof and absorbs slapping impact of the chain during operation of the truck.

5 Claims, 5 Drawing Figures



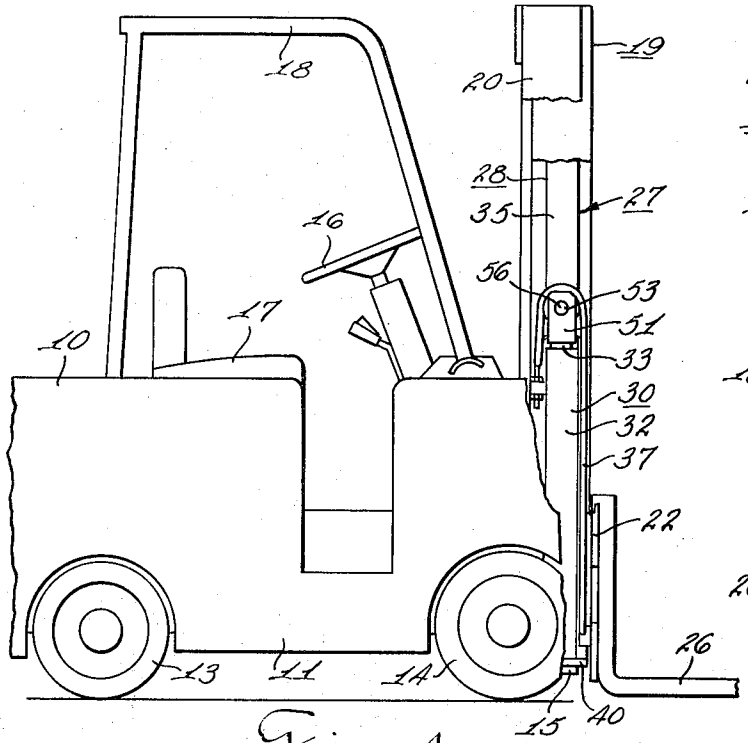


Fig. 1

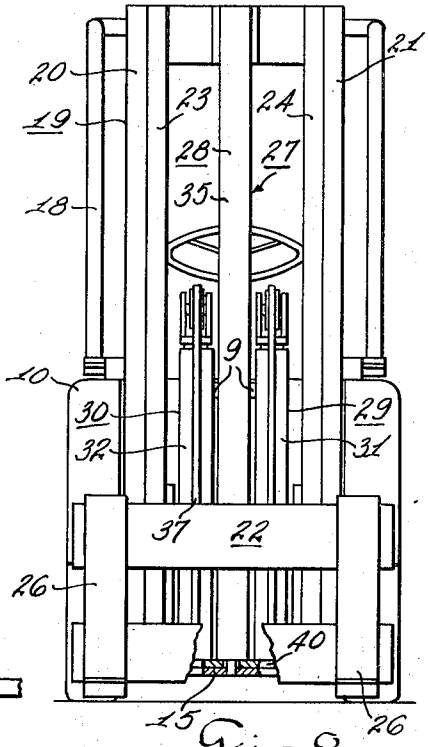


Fig. 2

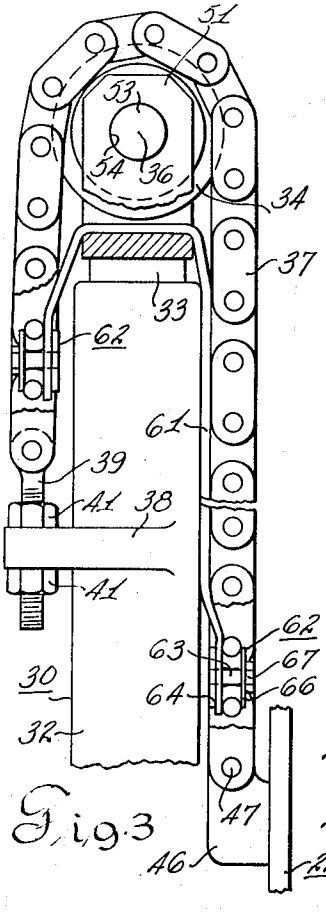


Fig. 3

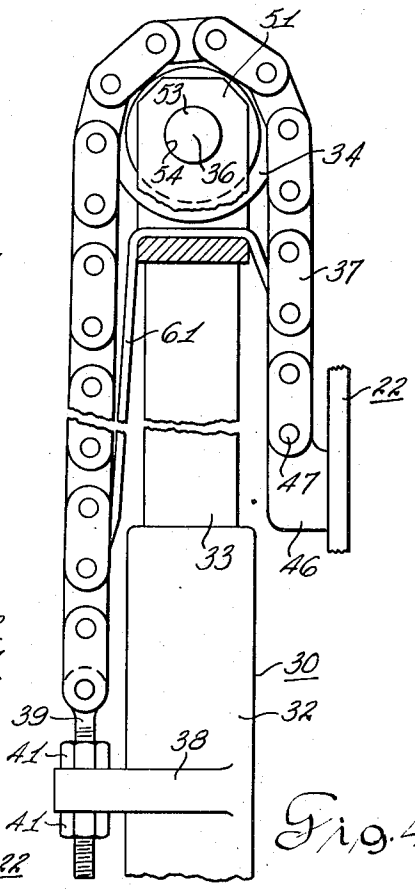


Fig. 4

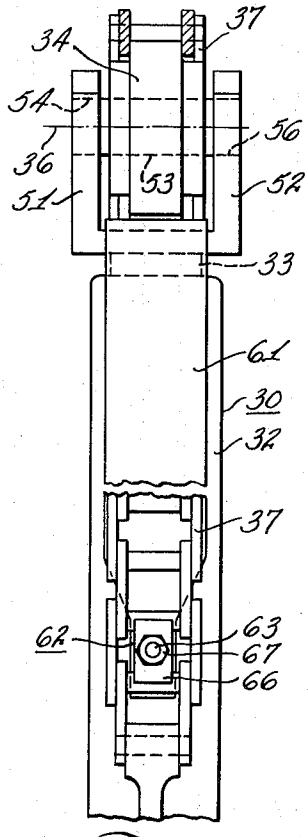


Fig. 5

MEANS FOR PROTECTING THE ROD OF A HYDRAULIC LIFT JACK FROM DAMAGE BY THE LIFT CHAIN

BACKGROUND OF THE INVENTION

The rods of the lift jacks of lift trucks are subject to damage by the lift chain slapping thereagainst. Heretofore, a rigid member has been secured to the upper end of the rod so as to extend downwardly along the back of the rod to protect it from any slapping action of the chain. This method has not proven entirely satisfactory in reliability and the front side of the rod was not protected.

BRIEF DESCRIPTION OF THE INVENTION

A flexible band of suitable material such as nylon or the like is connected at its opposite ends to the lift chain so as to be disposed between the chain and the rod of the lift jack at all times during extension and contraction of the rod. The flexible band passes beneath the roller on the upper end of the rod, thus avoiding the crushing and wearing action that would otherwise occur if the band were run with the chain over the roller.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated in the attached drawings in which:

FIG. **1** is a side view of the lift truck incorporating the present invention;

FIG. **2** is a front view of the truck shown in FIG. **1**;

FIG. **3** is an enlarged side view of part of the truck shown in FIG. **1** and showing the present invention with the lift carriage in a lowered position;

FIG. **4** is a view similar to FIG. **3** but showing the lift rod extended from the cylinder structure of the jack so as to raise the carriage; and

FIG. **5** is a front view of the structure shown in FIG. **4** with some parts broken away.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIGS. **1** and **2**, the invention is incorporated in a riding type lift truck **10** having a main frame **11** supported at its rear end by a pair of steerable wheels **13** and at its front end by a pair of drive wheels **14.** A suitable steering wheel **16** is provided at the operator's station **17** which is within the confines of an overhead guard **18.** A mast or mast structure **19** includes a pair of outer uprights **20, 21** which are interconnected at their bottom by a cross member **15** and are connected to the truck main frame **11** in a conventional manner. A lift carriage **22** is mounted by rollers (not shown) on an inner pair of channel section uprights **23, 24** of the lift truck mast **19.** The carriage **22** supports a pair of lift forks **26** which are adapted to receive and carry palletized loads and the like. The carriage **22** is raised and lowered on the mast by a hydraulic lift jack assembly **27** which includes a central jack **28** and a pair of chain carrying lift jacks **29, 30** disposed on opposite lateral sides of the central jack **28.** The cylinder structures **31, 32** of the lift jacks **29, 30** are rigidly secured to the cylinder component **35** of the central jack **28** as by welding same to spacer blocks **9** positioned therebetween. The cylinder structures **31, 32, 35** are secured at their lower ends to a cross member **40** interconnecting the inner uprights **23, 24.** The rod of the central jack **28** extends through an opening in the cross member **40** and is secured to the cross member **15.**

As shown in FIGS. **3, 4** and **5,** the lift jack **30** includes a piston rod **33** which rotatably supports a roller **34** at the upper end thereof on a horizontal pivot axis **36.** A lift chain **37** is reeved or trained over the roller **34** and has its opposite ends secured, respectively, to the cylinder structure **32** and to the carriage **22.** One end of the chain **37** is connected to an eye bolt **39** which is fixedly secured to the bracket **38** by a pair of nuts **41.** The other end of the chain **37** is secured to a bracket **46** at the rear of the carriage **22** by a suitable pin **47.** The upper end of the rod **33** is U-shaped and includes a pair of upstanding brackets **51, 52** with aligned drilled holes **54, 56** supporting a shaft **53** for the roller **34.**

In order to protect the rod **33** from damage by the slapping action of the chain **37** when the rod is extended from the cylinder structure **32,** a flexible protective band **61** is secured at its opposite ends to the lift chain **37** by releasable fastening means **62.** The protective band **61** is disposed between the chain **37** and the rod **33** at diametrically opposite sides of the latter and passes between the upstanding brackets **51, 52** and beneath the roller **34.** Thus the protective band **61** does not pass over the top of the roller **34** with the chain **37,** where it would be crushed between the chain **37** and the roller **34.** The upstanding brackets **51, 52** serve as guide means to maintain the band **61** in juxtaposed relation to said chain at diametrically opposite sides of the rod **33.**

The protective band **61,** which may be made of nylon material, is at least as wide as the chain **37** and is at least as long as the stroke of the piston rod **33.** The use of the protective band **61** is fully effective to protect the rod **33,** at both its front and back side, against nicking damage, which would otherwise be caused by slapping of the chain against the rod **33.** As is well known in the art, when a rod becomes nicked and dented, it is more difficult to seal and leakage of hydraulic fluid may occur. The opposite ends of the flexible band **61** are secured to the chain by releasable fastening means **62** whereby the flexible band **61** can be replaced, should it become excessively worn, without removing the lift chain **37.** Each of the fastening means **62** includes a bolt **63** having an enlarged head **64,** a washer **66** and a nut **67.**

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a lift truck having a mast structure, a carriage reciprocably mounted on said mast structure for vertical movement, means for raising and lowering said carriage on said mast structure including a lift jack with a cylinder structure supported on said truck and a rod having an upper end extending from the top of said cylinder structure, a roller carried on said upper end of said rod for rotation about a horizontal axis and a chain trained over said roller and having one end secured to one of said structures and its other end secured to said carriage, the improvement comprising:

a flexible protective band passing beneath said roller and between the latter and said upper end of said rod and having its opposite ends secured to said chain, said band being disposed between said chain and said lift jack at diametrically opposite sides of the latter and operable to prevent said chain from

slapping said rod when the latter is extended from said cylinder structure.

2. The structure of claim **1** wherein said protective band is at least as wide as said chain.

3. The structure of claim **1** wherein said band is at least as long as the operating stroke of said jack.

4. The structure of claim **1** wherein said upper end of said rod includes a pair of spaced upstanding flanges, said roller is rotatably mounted on and between said flanges, and said protective band passes between said flanges and beneath said roller.

5. The structure of claim **1** wherein said band is secured to said chain by releasable fastening means permitting replacement of said band without removal of said chain.

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