United States Patent

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[54] **BUCKET LOADER ATTACHMENT**
4 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **214/145,** 37/117.5
[51] **Int. Cl.** **B66f 9/00**
[50] **Field of Search** ..... 214/145, 146, 140, 620, 86 (A); 37/117.5; 172/438

[56] **References Cited**
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ABSTRACT: An attachment for bucket loaders which provides means for quickly and easily mounting it on a bucket loader so that this type of machine can be used for lifting heavy objects to higher places and lowering them into deeper ditches below ground than such machines are presently capable of doing. The attachment consists of a three-legged boom with slotted portions on the ends of two of the legs into which fit the cutting edge of the bucket of the machine. The third leg is rigidly fastened to the back edge of the bucket by any suitable fastening means such as a bolt.

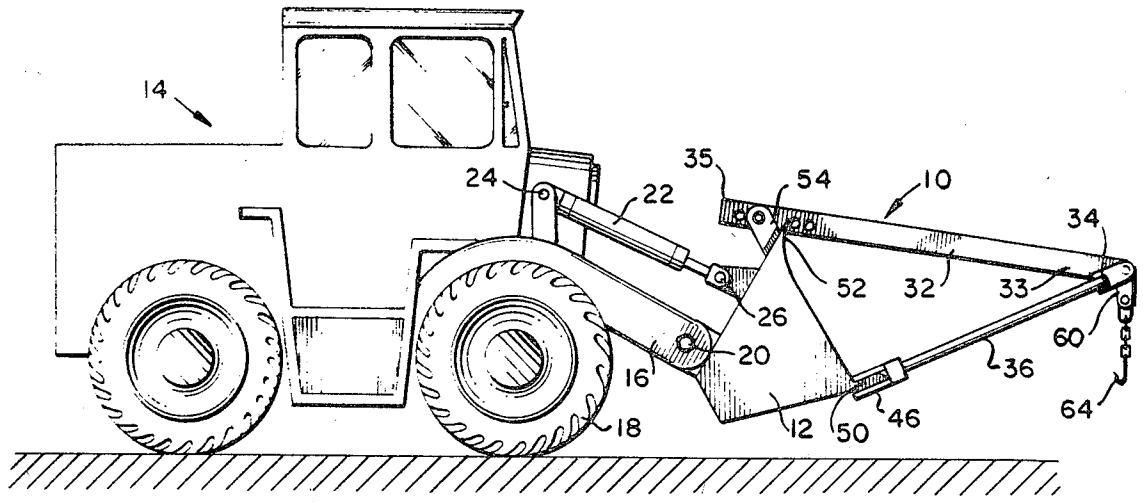


FIG. 1

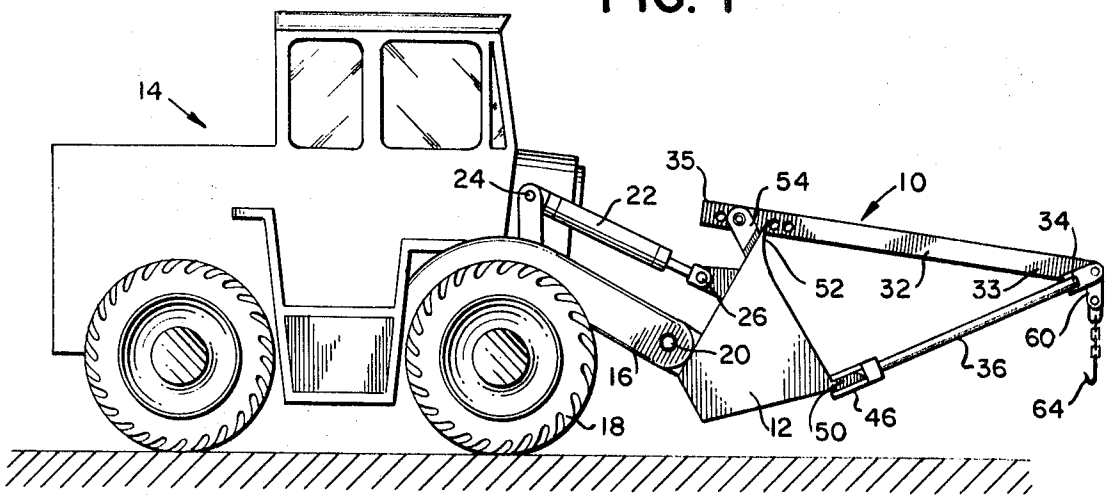
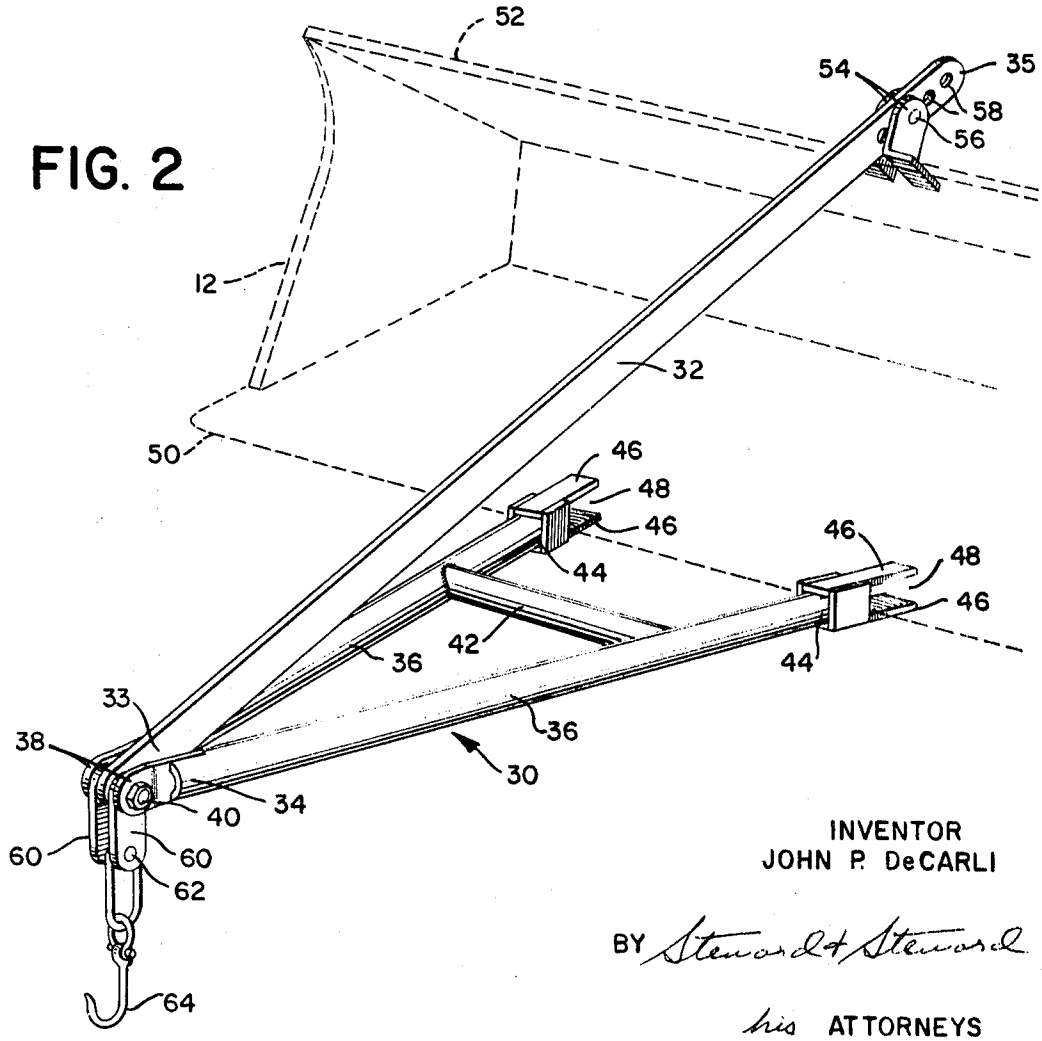


FIG. 2



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FIG. 3

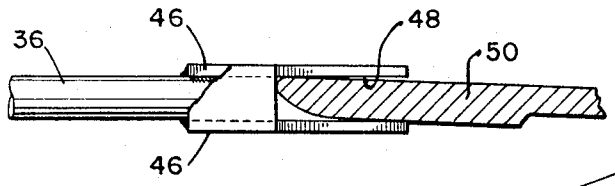
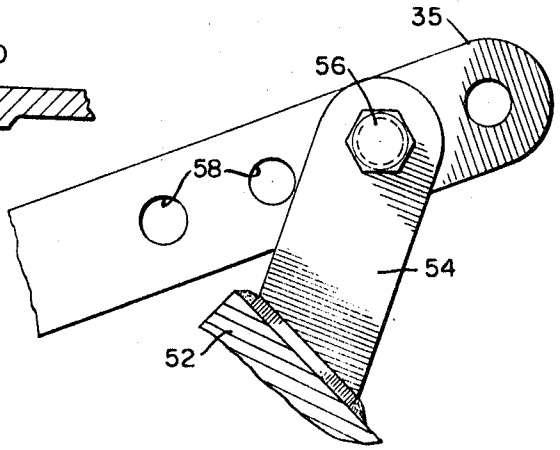


FIG. 4



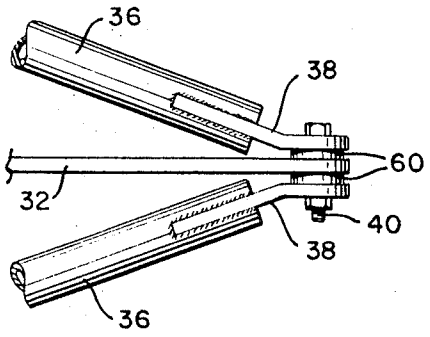
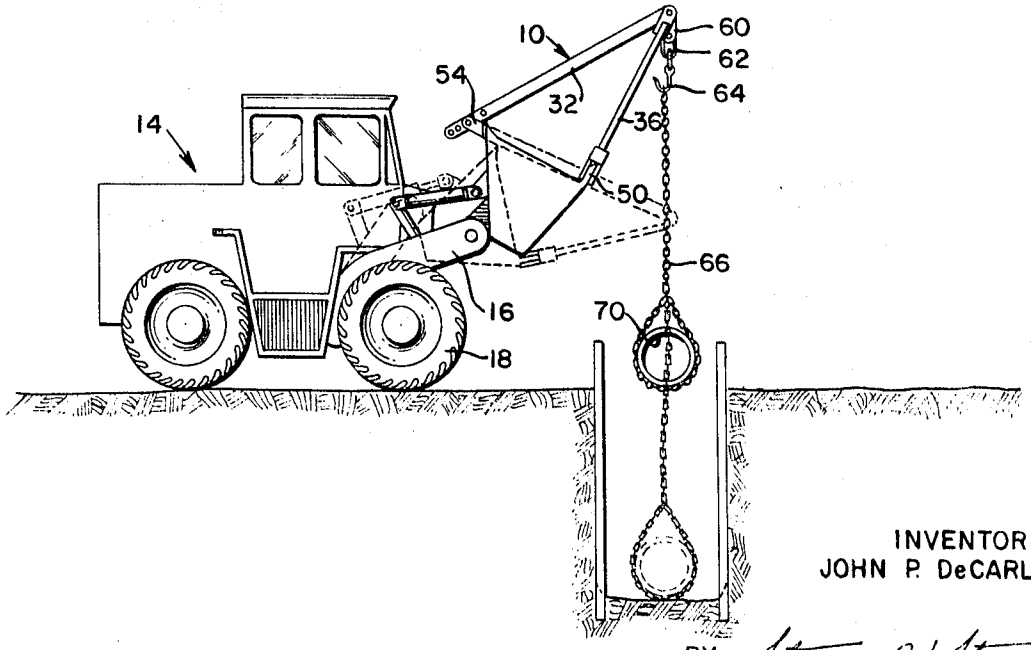


FIG. 5

FIG. 6



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BUCKET LOADER ATTACHMENT

BACKGROUND OF INVENTION

This invention relates to construction or excavating equipment and particularly to means for equipping heavy machines known as bucket loaders so that they can be used in lifting heavy objects to greater heights or to lower them into deep trenches, such as in laying deep sewer pipe for example.

Bucket loaders, as distinguished from bulldozers, are usually provided with four large rubber-tired wheels which support the operator's cab and a large open bucket mounted in front of the cab on a pair of lifting arms capable of raising the bucket from a position below ground level to an elevated position higher than the cab. In addition, the bucket is mounted so that it can be tilted forward in order to dig its front or cutting edge into a pile of gravel and soil or the like as the machine is driven forward on its wheels, then back to scoop the soil into the bucket so that it can be raised to the height of a dump truck, for example, and carried into position over the truck where the bucket is tilted forward again to deposit its load in the truck.

Bucket loaders are also used for many other jobs, such as light bulldozing or backfilling around building foundations or into trenches where pipe has been laid. They have also been used in a limited manner to lift heavy objects from one place to another. For example, in laying sewer pipe, a bucket loader can transport the heavy lengths of pipe into position alongside the trench and, if the trench is not too deep, it can lower the pipe into place in the trench. This is usually done by wrapping a chain around the pipe and hooking the chain to the bucket, which is then raised, lifting the pipe off the ground so that the loader can carry it into position over the trench and lower it into the trench. However, where the trench is deep, the loader may not be capable of lowering the pipe to the bottom because the total distance which the bucket can be raised and lowered is necessarily limited. Furthermore, the deeper the trench into which the pipe is to be lowered, the closer the front wheels of the loader must come to the edge of the trench in order to lower the bucket into the trench so that the pipe can be laid on the bottom. The weight of the loader plus the weight of the load being lifted at the edge of the trench can cause dangerous and costly cave-ins.

Consequently, a bucket loader can not always be used to lay pipe or precast sections of catch basins, manholes and the like. Especially in laying sewers, therefore, the loader may have to be idle for long periods of time while the trench is being dug and pipe laid before it can be used to fill the trench. Such inefficient use of a high-priced machine and operator is costly to a contractor.

It is therefore an object of the present invention to provide a relatively inexpensive attachment which can be quickly mounted on a bucket loader so that it can be used to lower heavy objects into deep holes or trenches in the ground, and thereby kept in more constant use. Another object of the invention is to provide relatively inexpensive means for adapting a bucket loader for use in lifting heavy equipment to greater heights than it is normally capable of.

The invention resides in providing a three-legged boom that extends forwardly from the bucket and is constructed of a pair of struts connected together at their outer ends with an elongated tie bar rigidly fastened at one end to the two struts near the outer end of the boom thus formed. The opposite end of each of the struts is provided with a slot which receives the front or blade edge of the bucket so that the ends of the struts are forced securely into engagement with the blade of the bucket by their own weight and by the load carried in the bucket. The tie bar is detachably fastened at its free end to the rear edge of the bucket of the loader, thereby rigidly mounting the boom on the bucket. As will be more readily apparent hereinafter, this construction not only provides a strong boom capable of lifting heavy objects fastened to its outer end, but also makes it extremely easy to assemble and disassemble on a bucket loader.

TECHNICAL DISCLOSURE OF INVENTION

One particularly desirable embodiment of the invention is shown in the accompanying drawings, in which;

FIG. 1 is a side elevational view of a typical bucket loader with an extension boom mounted thereon in accordance with the present invention;

FIG. 2 is a perspective view on a larger scale of the boom itself; with the bucket of the loader shown in phantom;

FIG. 3 is a detail view on a still larger scale, showing how the cutting blade at the front of the bucket (shown in cross section) fits within a slot formed by a pair of plates welded to opposite sides of the back end of one of the lower struts of the boom;

FIG. 4 is a detail view in side elevation of the end of the central tie bar where it is fastened to the rear edge of the bucket;

FIG. 5 is a detail plan view of the outer end of the extension boom; and

FIG. 6 is a view similar to FIG. 1, but on a smaller scale and showing how the extension boom makes it feasible to use a bucket loader for lowering heavy objects into a deep trench.

The extension boom **10** of the present invention is shown in FIG. 1 mounted on the bucket **12** of the typical four-wheel bucket loader **14**. Loader **14** has a pair of heavy lifting arms **16** which swing vertically on a trunnion (not shown) of the loader and extend forward of the rubber-tired front wheels **18**. Bucket **12** is pivotally mounted on a pivot shaft **20** at the outer ends of arms **16**, so that it can tilt forward and back transversely about pivot shaft **20**. On each lifting arm **16** is mounted an hydraulic cylinder **22**, which is pivotally connected at one end **24** to its arm **16** and at the other end **26** to the rear of bucket **12** above the pivotal connection **20** of arm **16** with the bucket. When cylinders **22** are extended, bucket **12** is tilted forward, and when they are retracted, the bucket is tilted back. Hydraulic cylinders (not shown) raise and lower lifting arms **16** for elevating and lowering bucket **12**.

Extension boom **10** is constructed essentially of an A-frame **30** (FIG. 2) and a tie bar **32** connected at one end **33** to the apex **34** of the A-frame and at the other end **35** to the upper or rear side of bucket **12**. A-frame **30** is made in this instance of a pair of tubular struts **36,36** connected together at the apex **34** by a pair of connecting plates **38,38** each welded within a slot cut in the end of one of the struts **36,36** and fastened together by a heavy bolt **40**. A tubular crossbar **42** is welded between the struts **36,36** about two-thirds of the distance from the apex **34** to the rear ends **44,44** of the struts **36,36**. Instead of being made of tubular material, members **36,36** and **42** may be formed from heavy angle iron, channels or other suitable structural members capable of supporting heavy compressive forces.

At the rear ends of struts **36,36** are welded a pair of vertically spaced fastening plates **46,46**, which form a slot **48** that opens rearward from the end **44** of each strut **36**. As best shown in FIG. 3 fastening plates **46,46** are spaced far enough apart to receive the cutting blade **50** at the upper front edge of bucket **12** of the loader **14**. Consequently, the boom **10** is readily mounted on bucket **12** simply by sliding the blade **50** of the loader into slots **48** of the boom **10** while the latter is resting with its A-frame **30** flat on the ground in the position shown in FIG. 2, and then by fastening the then free end **35** of tie bar **32** to the upper rear edge **52** of bucket **12**.

As shown in FIGS. 1, 2 and 4, the end **35** of tie bar **32** fits between a pair of brackets **54,54** welded on the outside of the rear wall of bucket **12** adjacent its upper edge. A pin or bolt **56** passes through aligned holes in brackets **54,54** and through one of a series of holes **58** in tie bar **32**, depending on the size of the bucket **12** to which the boom is to be attached. The opposite end **33** of tie bar **32** fits between a pair of flat links **60,60**, each of which has holes at both ends, one through which the bolt **40** is threaded and one for a shackle pin **62**, to which a hook **64** may be fastened by means of a heavy chain link and shackle. The flat links **60,60** are interposed between the central tie bar **32** and connecting plates **38,38** on the outer ends of struts **36,36**.

When the boom **10** is not in use, it is positioned with its A-frame **30** resting flat on the ground as shown in FIG. **2** and preferably with the tie bar **32** propped up by any suitable means that may be available, so that its free end **35** is raised above the height of the bucket **12**. The loader **14** can then be driven into position with its bucket lowered, so that its front side is flat on the ground and so that its blade **50** fits into the slots **48,48** between the mounting plates **46,46** of the struts **36,36**. The tie bar **32** is then readily slipped between the brackets **54,54** which are mounted on the rear edge **52** of the bucket. It should be noted that for the sake of clarity of illustration bucket **12** is shown in FIG. **2** in phantom lines, whereas the brackets **54,54** which are welded or otherwise rigidly fastened to bucket **12** are shown in solid lines. The bolt **56** is then fitted through brackets **54,54** and the nearest one of the holes **38** in tie bar **32** and held in place by means of a nut or large cotter pin (not shown). The extension boom **10** is then ready for use.

As illustrated in FIG. **6**, the boom **10** makes it feasible to drop a heavy concrete pipe **70** into a deep trench in the ground. To this end a long chain **66** is passed around the pipe and connected to the hook **64**. The boom **10** is lifted high in the air by tilting the bucket **12** rearward and raising it on the lifting arms **16** until the chain lifts the section of pipe **70** off the ground enough to clear the shoring in the trench. The loader **14** is then moved far enough forward to position the pipe over the trench so that it can be lowered into it by lowering and tilting the bucket **12** forward. It will be noted that without the use of the extension boom **10**, it would be impossible to lower the pipe **70** into such a deep trench by means of this bucket loader. Note also that the heavy loading machine **14** is located substantially farther from the edge of the trench than would be possible without the use of extension boom **10**.

The extension boom of the present invention may be employed for many other purposes in order to adapt a bucket loader for uses to which it otherwise could not be put. For example, it can lift a sand spreading attachment onto a highway truck for sanding roads, thereby saving the expense of purchasing a crane or costly overhead hoisting equipment where a bucket loader is required and available for purposes for which it is primarily intended. Moreover, the east by which the extension boom can be mounted and removed from the bucket of the loader makes it feasible to assemble and disassemble in a matter of minutes in order to use the loader for different jobs. Consequently, the bucket loader can be kept in use almost continuously with little or no loss of time in waiting for work that it can do while on the job, or in connecting and disconnecting the extension boom when the loader is needed for different types of work.

I claim:

1. A detachable boom for use with an excavating and construction machine known as a bucket loader which has an open bucket mounted at the outer end of a support capable of elevating said bucket and pivoting it about a transverse axis, said bucket having a front edge along one side of its opening capable of being disposed on the ground when said bucket is tilted forwardly such that the rear edge of the opening is disposed above said front edge, said boom comprising a pair of struts, disposed at an angle to each other and rigidly connected together at one end, each of said struts having a slotted portion adjacent its opposite end adapted and arranged to receive the front edge of said bucket, an elongated tie bar pivotally connected to said struts adjacent their connection with each other and projecting in a direction to form a three-legged extension forwardly of said bucket when attached thereto, means for fastening said tie bar to the rear edge of said bucket, and means for attaching an object to said three-legged extension adjacent its outer end for lifting such object upon rearward tilting and/or raising of said bucket.

2. A detachable boom for bucket-loading machines as defined in claim **1**, wherein each of said struts is provided with a pair of vertically spaced fastening plates projecting rearward from the end of such strut and rigidly fastened thereto, said spaced fastening plates comprising said slotted portion of said strut.

3. A detachable boom for bucket-loading machines as defined in claim **2**, which further includes a crossbar extending between said struts and rigidly connected thereto intermediate their ends for bracing the same.

4. A detachable boom for bucket-loading machines as defined in claim **1**, wherein said means for fastening said tie bar to the rear edge of said bucket comprises a pair of brackets rigidly mounted on said bucket adjacent the upper rear edge thereof, said brackets being spaced from each other along said edge to receive said tie bar between them, said tie bar having a plurality of holes spaced longitudinally along it adjacent its rear end and a detachable pin passing through said brackets and a selected one of said holes in said tie bar depending on the width of the opening of said bucket.