Nov. 25, 1952 N. S. SMITH 2,619,244

BUCKET TILTING ATTACHMENT FOR LOADERS

Filed July 19, 1950 2 SHEETS--SHEET 1

Fig. 1.

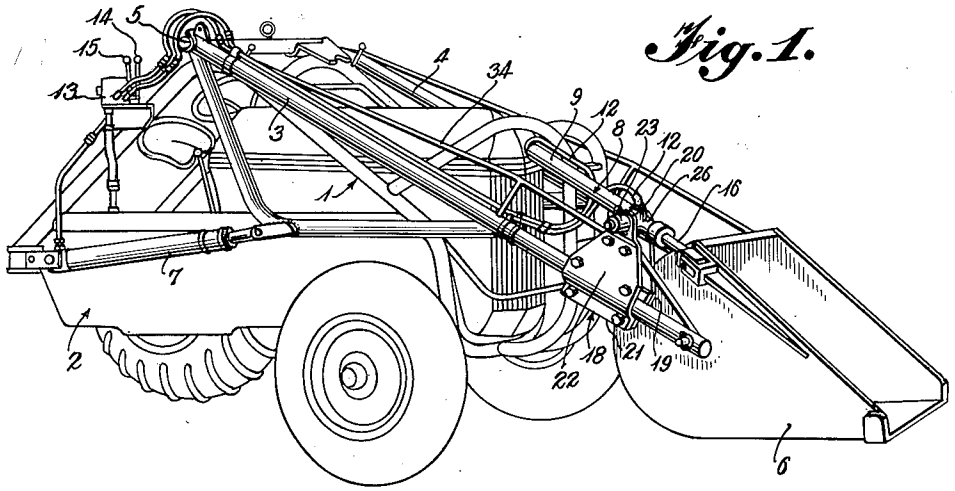


Fig. 2.

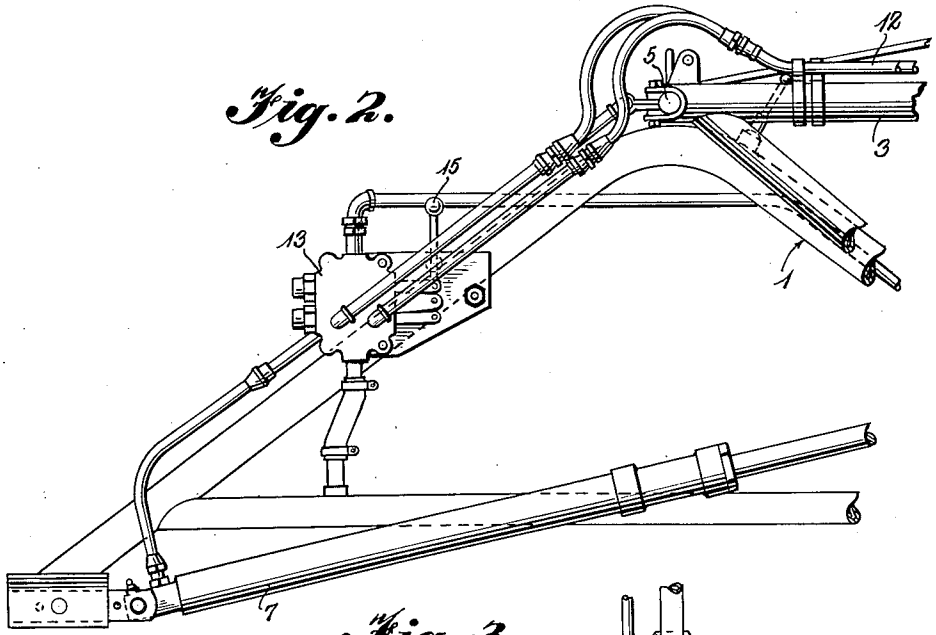
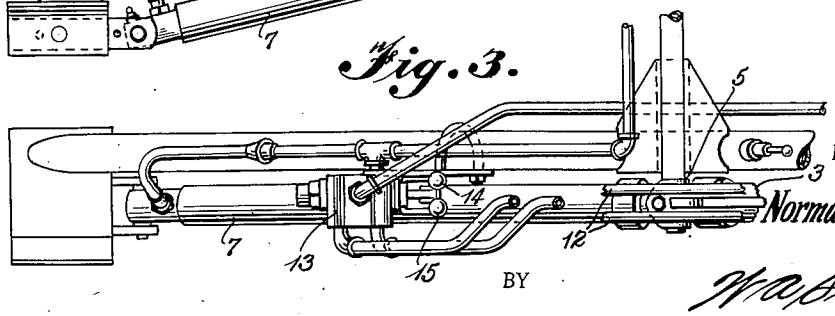


Fig. 3.



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Fig. 4.

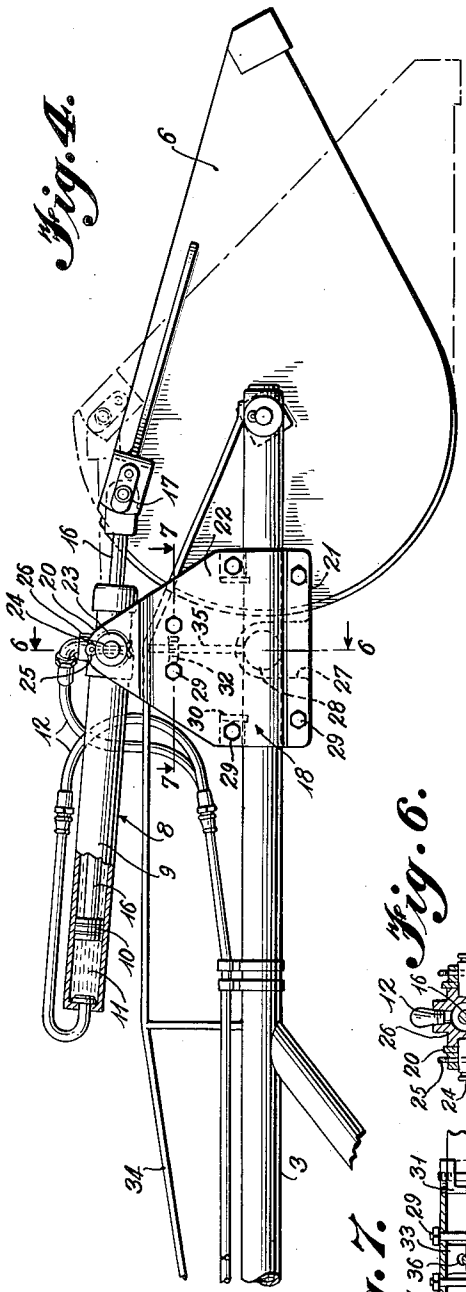


Fig. 5.

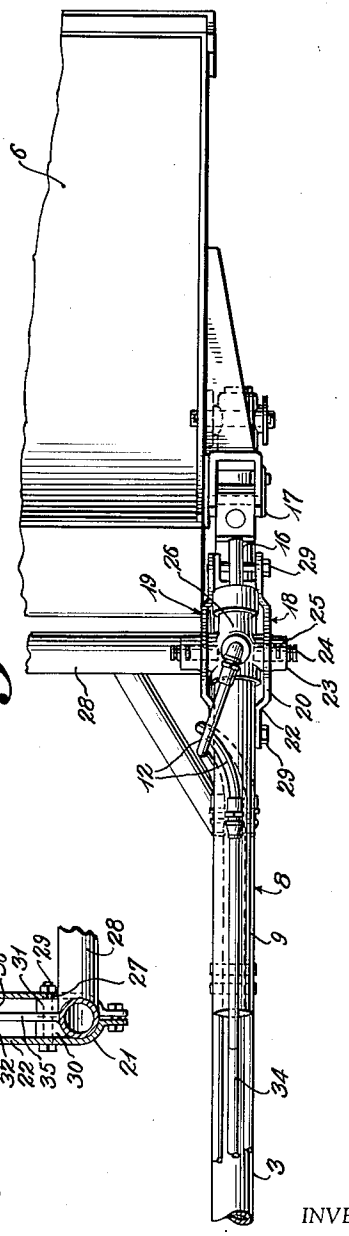


Fig. 6.

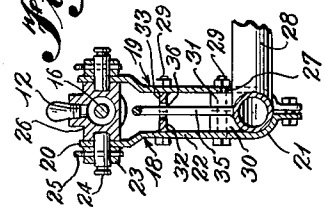
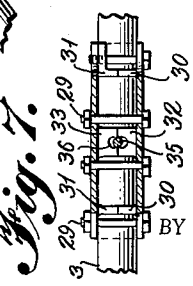


Fig. 7.



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BUCKET TILTING ATTACHMENT FOR LOADERS

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2 Claims. (Cl. 214—140)

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This invention relates to a bucket tilting attachment for a loader and more particularly to such an attachment for use with a loader wherein the loader bucket is pivotally supported by frame members which may be raised or lowered as desired.

The present invention is directed to the problem of providing an attachment for a self-propelled bucket type loader whereby the bucket of said loader may be caused to assume various positions with respect to the bucket supporting members. As will be evident to those skilled in the art, loader buckets of the type referred to are conventionally supported so that they can be lowered to engage a load and then raised to support the load when the bucket supporting vehicle is moved to a new location. Such support is usually achieved by means of a loader frame structure which is attached to the self-propelled vehicle and which has bucket supporting arms pivotally connected to the frame structure.

While the present invention is adapted to be used with self-propelled vehicles generally, wherein the loader bucket is carried by bucket supporting arms which are pivotally connected to a frame structure mounted on the vehicle, it has particular utility for use with a bucket supporting structure mounted on a tractor type vehicle and wherein the bucket supporting structure includes arms which may be raised or lowered with respect to the tractor by hydraulic means. The present invention provides a means of tilting the bucket with respect to the usual bucket supporting arms which are connected to the loader frame and thereby enables the operator to discharge the contents of the bucket more readily or, alternatively, to engage a load more effectively in order to pick up the load.

It is therefore an object of the present invention to provide an attachment for a loader having a bucket tiltable with respect to a bucket supporting means whereby said bucket may be tilted as desired.

It is another object of the present invention to provide such an attachment which may be readily connected to said bucket supporting means and, after it is so connected, may be readily disconnected therefrom whereby the attachment may be used optionally as desired.

It is a further object of the present invention to provide such an attachment wherein the component parts making up the attachment may be supplied in knock-down condition and readily assembled with respect to the bucket supporting means to complete the attachment.

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Briefly stated, a preferred embodiment of the present invention comprises a mechanism adapted to produce force and means for supporting said mechanism with respect to the bucket supporting structure so that said mechanism can exert force on the bucket to tilt it with respect to the bucket supporting structure. As previously indicated, it is conventional to support a loader bucket by means of a pair of elongated supporting arms, said bucket being located between and pivotally connected to the outer ends of said arms and being tiltable with respect thereto. In a preferred embodiment of the present invention the force producing mechanism is an elongated piston and cylinder assembly which is supported with respect to one of the bucket supporting arms so that the piston shaft may be connected to the bucket and whereby movement of the piston shaft with respect to the cylinder will cause tilting of said bucket with respect to the bucket supporting arm. This support is achieved by means of a support bracket structure having a portion connectable to the bucket supporting arm and having another portion to which the cylinder member of the piston and cylinder assembly may be connected. The various component parts making up the attachment are supplied in knocked-down relation (i. e. as disassembled parts) and may be readily assembled by means of ordinary tools. Conversely, the attachment may just as easily be detached from the loader when it is not desired to use it.

Other objects and advantages of the present invention will become more apparent from the following detailed description taken in conjunction with the attached drawing wherein Fig. 1 is a perspective view showing a tractor type vehicle (in part) having a loader mounted thereon, said loader having a preferred embodiment of the attachment constituting the present invention connected thereto; Fig. 2 is a view in side elevation of a rear portion of the loader frame structure shown in Fig. 1; Fig. 3 is a plan view of that portion of the loader frame structure shown in Fig. 2; Fig. 4 is a view in side elevation showing the loader bucket with a preferred embodiment of the bucket tilting attachment constituting the present invention connected thereto and to one of the bucket supporting arms, a tilted position of the loader bucket being shown in dot and dash outline; Fig. 5 is a plan view of the structure shown in Fig. 4, a portion of the loader bucket being broken away; Fig. 6 is a sectional view taken on line 6—6 of Fig. 4; and Fig. 7 is a sectional view taken on line 7—7 of Fig. 4.

As previously mentioned, the bucket tilting attachment constituting the present invention is preferably used in connection with a loader which is mounted on a tractor type vehicle and wherein the bucket supporting arms may be raised or lowered by hydraulic means. Such an arrangement is shown in Fig. 1 wherein the loader frame, indicated generally by the reference numeral 1, is mounted on a tractor type vehicle, indicated generally by the reference numeral 2. Loader bucket supporting arms 3 and 4 are pivotally connected to the loader frame 1, as for example at pivot location 5 (see Fig. 2). The loader bucket 6 is pivotally connected to, and supported between the outer ends of the bucket supporting arms 3 and 4 as is shown in Fig. 1.

By means of hydraulic piston and cylinder assemblies, for example the piston and cylinder assembly 7 shown in Fig. 1, the bucket supporting arms 3 and 4 may be simultaneously pivoted with respect to the loader frame 1 to thereby raise or lower the loader bucket 6 as desired. Inasmuch as the loader frame and bucket raising and lowering arrangement does not, per se, form a part of the present invention, further details concerning this portion of the structure shown in the drawings are considered to be unnecessary. For further details concerning this portion of the structure, reference is made to Letters Patent 2,489,629 issued November 29, 1949, to A. Ford, which describes a loader frame structure and bucket raising and lowering arrangement substantially the same as that shown and described herein.

By means of the arrangement described generally above, it is possible to raise the loader bucket 6 in order to transport a load from one location to another. However, it is often desirable to be able to tilt the loader bucket with respect to its supporting structure so that the bucket contents may be discharged more readily or, if the bucket is engaging a load, to tilt the bucket to provide a more favorable angle of attack. In order to enable this result to be accomplished an elongated piston and cylinder assembly (see Fig. 4), which is indicated generally by the reference numeral 8, is supported with respect to the bucket supporting arm 3 so that force exerted by the piston and cylinder assembly 8 may be applied to the bucket 6 to tilt it.

The elongated piston and cylinder assembly 8 comprises a hollow cylinder member 9 which houses a piston 10, the latter being movable lengthwise with respect to the cylinder 9 in response to force exerted by a suitable medium such as hydraulic fluid 11. Of course, a piston and cylinder assembly of this type is well known in the art and further details concerning its construction and operation are deemed unnecessary. Suffice it to say that, by means of hydraulic fluid supplied from a suitable source through flexible tubing 12, the piston 10 may be caused to move lengthwise with respect to the cylinder 9 in such direction as is desired by the operator.

As a matter of fact, in the preferred embodiment of the present invention illustrated in the drawings, the fluid supply for operating the piston and cylinder assembly 8 may be derived from the fluid supply used to operate the bucket raising and lowering piston and cylinder assemblies such as the assembly 7 shown in Fig. 1. For convenience of operation, the fluid path through the flexible conduits 12 goes through a suitable control valve assembly 13 (see Figs. 2 and 3) to which the flexible conduits 12 are connected. By means of an operating knob 14 (see Fig. 3), which is located adjacent the seat of the tractor, the operator may readily energize the piston and cylinder assembly 8 to cause tilting of the bucket. The control valve 13 also has another operating knob 15 incorporated therein by means of which the operator can energize the piston and cylinder assemblies, such as the assembly 7 shown in Fig. 1, which raise and lower the bucket supporting arms 3 and 4 and hence the bucket 6. Thus, the operator has at hand, so to speak, a control valve asesmbly by means of which he can conveniently raise or lower the bucket and also tilt the bucket as desired.

The piston 10 (see Fig. 4) has an elongated rigid shaft 16 connected thereto, said shaft extending longitudinally from the cylinder 9. The piston shaft 16 is pivotally connected to the loader bucket 6 by means of a suitable pivot type connection denoted generally by the reference numeral 17. Details concerning the specific construction of the pivot connection 17 are omitted since any suitable pivot type connection may be employed, the object being to provide a connection between the piston shaft 16 and the loader bucket 6 so that the bucket can pivot with respect to said shaft when said shaft exerts force on the bucket.

The piston and cylinder assembly 8 is supported with respect to one of the bucket supporting arms, for example bucket supporting arm 3, by a pair of similarly shaped supporting brackets indicated generally by the reference numerals 18 and 19. Each supporting bracket is preferably a metal plate member having a portion adapted to be connected to the bucket supporting arm and another portion, spaced from the first named portion, to which the cylinder of the piston and cylinder assembly may be connected. Since the brackes 18 and 19 are similarly shaped, only the bracket 18 is described in detail.

This bracket 18 has spaced apart end portions 20 and 21 (see Fig. 6) which extend from a substantially flat body portion 22. As viewed in elevation (see Fig. 4) bracket 18 is generally triangular in outline with end portion 20 being at the apex of the triangle and end portion 21 extending along the base of the triangle. To facilitate connection to the bucket supporting arm 3 (which is shown as being a tubular arm, circular in cross section) end portion 21 has a curved part (see Fig. 6) which is adapted to contact the bucket supporting arm along a portion of the length of this arm as is shown in Fig. 4.

The end portion 20 of bracket 18 has a bushing 23 extending outwardly therefrom and this bushing 23 is apertured to receive a pintle pin 24 which is held in place with respect to the bushing by suitable means, such as cotter pin 25. When so held in place, the pintle pin 24 projects through the end portion 20 (see Fig. 6) and provides a pivot pin means by means of which the cylinder 9 may be pivotally connected to the supporting bracket 18. Thus, cylinder 9 has an end section 26 which has a recess therein (as shown in Fig. 6) adapted to receive the inwardly projecting end of pintle pin 24 thereby enabling the cylinder 9 to be pivotally supported by bracket 18.

Inasmuch as support brackets 18 and 19 are similarly shaped, the foregoing details of description given with respect to bracket 18 may be considered to apply also to bracket 19. In fact the only material difference between brackets 18 and 19 is that bracket 19 has a cut-out 27 adapted to receive a cross bar 28 (see Fig. 5) which ex-

tends between the bucket supporting arms 3 and 4. Otherwise the brackets are the same.

When it is desired to mount the piston and cylinder assembly 8 with respect to the bucket supporting arm 3, the support brackets 18 and 19 are positioned opposite each other with end portions, such as the end portion 21 of bracket 18, engaging the bucket supporting arm 3 along a part of the length of this arm. The end section 26 of cylinder 9 is positioned between the spaced upper ends of the support brackets, such as the end portion 20 of bracket 18, and in position such that it will receive the pintle pins such as pintle pin 24, which project inwardly from these upper ends. With the parts thus positioned, the support brackets 18 and 19 are clamped together, in properly spaced relation, by suitable means such as nut and bolt assemblies 29, the brackets being suitably apertured to receive the nut and bolt assemblies.

Brackets 18 and 19 are maintained in properly spaced relation by means of spacer lugs which extend from each bracket and are similarly positioned on each bracket so that, when the brackets are positioned opposite each other, the respective lugs abut against each other to maintain the brackets in properly spaced relation. Thus, bracket 18 has projecting therefrom (adjacent end portion 21) a pair of spacer lugs 30 and bracket 19 has projecting therefrom a pair of similarly positioned spacer lugs 31. When brackets 18 and 19 are positioned opposite each other (see Figs. 6 and 7) the respective spacer lugs 30 and 31 abut against each other to maintain the brackets in properly spaced relation. By virtue of the position and shape of the spacer lugs 30 and 31, they also assist in positioning the brackets 18 and 19 in clamped relation to the bucket supporting arm 3 (see Fig. 6). In addition to the spacer lugs 30 and 31, there are also spacer lugs located nearer the upper ends of the support brackets. Thus, bracket 18 has projecting therefrom a spacer lug 32 and bracket 19 has projecting therefrom a similarly positioned spacer lug 33. When brackets 18 and 19 are positioned opposite each other the respective spacer lugs 32 and 33 abut against each other (see Figs. 6 and 7). As viewed in Fig. 4, the various sets of spacer lugs are positioned in triangular relation.

By virtue of the fact that the bucket supporting arm 3 has connected thereto a reinforcing rod arrangement, indicated generally by the reference numeral 34 (see Fig. 4) the spacer lugs 32 and 33 not only have the function of helping to maintain the supporting brackets 18 and 19 in correctly spaced position but also encompass an upright rod or post 35 which forms a part of the reinforcing rod assembly 34. Thus, referring to Figs. 4, 6 and 7 it is seen that the spacer lugs 32 and 33 are recessed and the recesses are so located that when these lugs are positioned opposite each other the upright rod 35 may extend through the opening 36 defined by the recesses. This insures that should the bracket assembly tend to tilt about the longitudinal axis of bucket supporting arm 3, such tilting will be resisted by engagement of either one or the other of spacer lugs 32 and 33 with upright rod 35. Of course, in a loader structure where the bucket supporting arm does not have a reinforcing rod arrangement such as that designated at 34, there would be no need to provide for a means of encompassing an upright rod such as the means for encompassing rod 35. However, it is desirable to provide such an arrangement to give stability to the attachment.

It is thus seen that the support brackets 18 and 19 may be clamped to the bucket supporting arm 3 and are maintained in correctly spaced relation with respect to each other by means of the various spacer lugs 30—33. When they are so spaced the upper end portions, such as end portion 20 of bracket 18, will be in correctly spaced relation to receive the end section 26 of cylinder 9. When end section 26 is so located between the upper end portions of the support brackets 18 and 19, it is pivotally connected thereto by means of pintle pins 24. The piston and cylinder assembly 8 is thus pivotally supported with respect to the bucket supporting arm 3.

When the piston shaft 16 is pivotally connected, as at 17, to the loader bucket 6, movement of the piston 10 with respect to the cylinder 9 will cause tilting of the loader bucket 6 with respect to the bucket supporting arm 3. A tilted position of the bucket 6 is shown in dot and dash outline in Fig. 4. Of course, tilt movement of the bucket 6 causes the cylinder 9 to pivot with respect to the support brackets 18 and 19, i. e. to rock about pintle pins 24.

The loader bucket 6 tilts about a tilt axis which is substantially perpendicular to the longitudinal axis of bucket supporting arm 3. This is evident from an inspection of the various figures of the drawings and more particularly Figs. 1, 4 and 5. Also, the piston and cylinder assembly 8 is mounted with respect to the bucket supporting arm 3 so that the longitudinal axis of this piston and cylinder assembly 8 lies substantially in the same plane as does the longitudinal axis of the bucket supporting arm 3. This is evident from an inspection of Figs. 5 and 6. The plane which includes these longitudinal axes is substantially perpendicular to the axis about which loader bucket 6 tilts. This is also evident from an inspection of Figs. 4–6 inclusive.

While a piston and cylinder assembly is shown as a preferred embodiment of a mechanism for producing force to tilt the loader bucket 6, other suitable force producing means could be provided if desired. The central idea is to have an elongated housing and a movable rigid shaft extending longitudinally therefrom which is pivotally connectable to the loader bucket and wherein the elongated housing is pivotally connectable to the support bracket structure. The central idea with respect to the support bracket arrangement is to have a bracket structure which will position the force producing mechanism in substantial alignment with the bucket supporting arm and which will enable this force producing mechanism to pivot with respect to the support bracket structure.

An attachment of the type described and illustrated herein is found to have substantial utility in connection with a power loader, particularly a loader mounted on a tractor type vehicle and operated by hydraulic means. The various component parts of said attachment may be supplied as a kit and assembled at the location where the attachment is to be used. It is to be noticed that the means of assembly are relatively simple including primarily nut and bolt connections. When it is desired to disconnect the attachment this may be readily done as is evident and the attachment may be stored for subsequent use as desired.

While I have described and illustrated a preferred embodiment of my invention, I wish it to

be understood that I do not intend to be restricted solely thereto but that I do intend to cover all modifications thereof which would be readily apparent to one skilled in the art and which come within the spirit and scope of my invention.

Having thus described my invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A bucket tilting attachment for a loader having a bucket supported by an elongated arm and tiltable with respect thereto about an axis substantially perpendicular to said arm, said arm having truss type reinforcements including an upstanding post extending therefrom adjacent the bucket, said attachment comprising a mechanism capable of producing force, said mechanism having an elongated housing and a rigid shaft movable with respect to said housing and extending longitudinally therefrom, a bracket for supporting said mechanism with respect to the bucket supporting arm, said bracket having a substantially flat body portion and spaced apart end portions extending from said body portion, one of said end portions being adapted to contact the bucket supporting arm along a portion of the length of said arm, means to detachably connect said last named end portion to the bucket supporting arm adjacent the upstanding post extending from said arm, means to detachably connect the substantially flat bracket body portion to said upstanding post, means to connect the mechanism housing to the other bracket end portion, and means to connect the mechanism shaft to the bucket whereby, when said bracket is connected to the bucket supporting arm, the mechanism housing is connected to the bracket and the mechanism shaft is connected to the bucket, movement of said shaft with respect to said housing causes tilting of the bucket.

2. A bucket tilting attachment for a loader having a bucket supported by an elongated arm and tiltable with respect thereto about an axis substantially perpendicular to said arm, said arm having truss type reinforcements including an upstanding post extending therefrom adjacent the bucket, said attachment comprising an elongated hydraulic piston and cylinder assembly, said piston having a rigid shaft attached thereto and said shaft extending lengthwise from said cylinder, a pair of similarly shaped brackets for supporting said piston and cylinder assembly with respect to the bucket supporting arm, each of said brackets having spaced apart end portions, one of said end portions being adapted to contact the bucket supporting arm along a portion of the length of said arm, means to detachably clamp said brackets in oppositely disposed relation to the bucket supporting arm adjacent the upstanding post extending from said arm whereby said last named end portions contact the bucket supporting arm, a spacer lug extending from each bracket body portion, said spacer lug being similarly positioned on each bracket and abutting against each other to maintain the bracket body portions and the other bracket end portions in spaced apart relation when the brackets are clamped to the bucket supporting arm, the abutting faces of said spacer lug defining an opening therethrough through which said upstanding post may extend when said brackets are so clamped, means to pivotally support said cylinder between said other bracket end portions, means to connect the piston shaft to the bucket, and means to admit hydraulic fluid to said cylinder whereby, when said brackets are clamped to the bucket supporting arm, the cylinder is pivotally supported by and between the brackets, and the piston shaft is connected to the bucket, movement of said piston shaft with respect to said cylinder causes tilting of the bucket.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
2,490,724	Williams	Dec. 6, 1949