ABSTRACT

An adapter assembly for quickly attaching and releasing an implement from a pair of spaced actuating arms, useful typically to mount a bucket to the loader arms and tilt cylinders of a front-end loader. The adapter assembly is permanently pinned to the loader arms and tilt cylinders of the front-end loader and releasably attached to the bucket. It is characterized by an elongate member extending substantially the distance between the loader arms and means spaced from the elongate member for releasably securing the adapter assembly to the bucket. The elongate member seats under an acute overhang at the upper rear wall of the bucket and the lower portion of the adapter is releasably secured to a protruding shelf at the lower rear wall of the bucket.

9 Claims, 12 Drawing Figures
1. QUICK ATTACHMENT DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of the corresponding application entitled Quick Attachment Device filed Nov. 1, 1968, Ser. No. 772,695, now abandoned.

BACKGROUND OF THE INVENTION

The invention pertains to the field of quick-attachment and quick-release devices for attaching an implement, typically an earth-moving bucket, to the loader arms and tilt cylinders of a front-end loader. A front-end loader with which the present invention may be used is disclosed in Melroe et al. U.S. Pat. No. 3,231,117. Such loaders are extremely versatile machines, particularly if a variety of attachments may be interchangeably mounted on the loader arms thereof. Typical attachments may include a dirt bucket, manure bucket, fertilizer bucket, potato bucket, snow plow, sweeper broom, log grapple, fork lift and many others for other uses. Considerable time and effort can be saved by an efficient means for allowing quick release of one implement and quick attachment of another.

The problem of providing such a quick attachment and release device is accentuated by the fact that the connection between the implement and the loader arms and tilt cylinders is one which must withstand high reciprocating stresses which occur in an abrasive and corrosive environment. Consequently, the device must be capable of withstanding considerable stresses and, at the same time, be capable of quick release. It must also be capable of prolonged use in a highly abrasive and corrosive environment, such as dirt and manure.

The prior art includes adapter assemblies for quickly and releasably attaching a pulled implement to the drawbar or rear of a prime mover. These adapters are typically three-point mountings and are exemplified by the U.S. Pat. to Knaap 3,312,478, Horney Pat. 3,231,294 and Todd No. 3,195,651. They are designed for connecting a pulled implement to a tractor and are generally unsuitable for use under conditions which require pushing. Moreover, the three-point mounting results in three concentrations of loading stress which is undesirable in the abrasive and corrosive environment of high reciprocating stresses, referred to above, and which characterizes the connection between the loader arms and tilt cylinders of a front-end loader, and the bucket. The concentrations of stress are undesirable because the probability of wear and distortion is increased, and when it occurs, the bucket tends to work loose from the loader arms and tilt cylinders.

The prior art also discloses an adapter for mounting various implements to the loader arms of a front-end loader. The U.S. Pat. to Wolf et al. No. 2,935,802 discloses such an adapter device but the disadvantage of the adapter disclosed is that it utilizes a four-point pin-mounting which results in four concentrations of stress and requires considerable effort to attach and release, as compared to the present invention. Removal of pins for bucket release is considerably more time consuming than release of the bucket through use of the present invention, as will be explained in detail below. Moreover, the pins must be exposed and reasonably loose-fitting to allow convenient removal and insertion. They are, consequently, extremely vulnerable to abrasive forces of dirt and other substrates in which the bucket and pins are submerged during operation. Because the pins must be removable, permanent measures cannot be taken to seal them against the contaminating environment and no measures can be taken to provide a close-fitting joint through the use of bearings or bushings.

The present invention solves these problems of the prior art, as will be explained in greater detail below.

SUMMARY

The present invention represents a quickly attachable and releasable means for attaching an implement to the loader arms and tilt cylinders of a front-end loader. It provides a joint which distributes the operational stresses throughout substantially the entire distance between the loader arms, and minimizes point concentration of stresses. It includes a wedging action which insures that the connection between the adapter device and the implement will remain tight in spite of minimal wear and distortion which may occur during operation. The quick attachment device described below makes possible the use of semi-permanently placed pins at the pivotal connection between the loader arms and the tilt cylinders, and the adapter assembly. Such a semi-permanent pivotal connection is exemplified by the copending U.S. application of James J. Bauer entitled Pivotal Joint with Ball Bushing and Countersunk Pin, filed May 17, 1968, and assigned Ser. No. 730,044.

The primary object of the present invention is to provide means for quickly attaching and releasing an implement to the loader arms and tilt cylinders of a front-end loader. It is another object to provide means for quickly attaching an implement to the loader arms and tilt cylinders of a front-end loader which does not utilize pins for the connection and which distributes the stress between the implement and the loader arms over substantially the entire width of the implement.

It is also an object to provide means for quickly attaching and releasing an implement to the loader arms and tilt cylinders of a front-end loader which includes a wedging action at the joint to thereby insure a tight fit in spite of wear and distortion which may occur during operation.

The invention includes an elongate member adapted to seat against and substantially uniformly engage the implement; a pair of actuating-arm mounting brackets secured to the elongate member, extending transversely therefrom, and spaced substantially the distance between the actuating arms; and releasable means spaced from the elongate member for securing the actuating-arm-mounting brackets to the implement. The elongate member extends substantially the distance between the spaced actuating arms and is adapted to seat beneath an overhanging member on the rear wall of the implement. The actuating-arm mounting brackets wedge against a protruding shelf member which extends along the lower portion of the rear wall of the implement and, as the actuating-arm mounting brackets engage the protruding shelf member, the elongate member is forced into seated engagement with the overhanging member and rear wall of the implement. The releasable means for securing the mounting brackets to the implement consists of pivotally mounted hooks in two of the embodiments shown and axially slidable projecting wedge members in the other two embodiments shown.

DESCRIPTION OF DRAWINGS

FIG. 1 is a side view of a typical front-end loader with which the present invention may be used. The view of FIG. 1 shows one of the two spaced loader arms, one of the two tilt cylinders, a side view of the adapter assembly which comprises the present invention, and a side view of the bracket.

FIG. 2 is a perspective view of the adapter assembly which comprises the first embodiment of the present invention. The relationship between the adapter assembly and the bucket is shown in phantom.

FIG. 3 is a rear view of the adapter assembly shown in FIG. 2 and bucket.

FIG. 4 is a vertical sectional view taken on the line 4--4 of FIG. 3 and shows the wedging action between the adapter assembly and the bucket. FIG. 4 also shows the releasable means for securing the actuating-arm mounting brackets to the protruding shelf member of the bucket. FIG. 5 is a perspective view of the adapter assembly which comprises the second embodiment of the present invention and shows the addition of a cam roller linkage for locking the adapter hooks into engagement with the bucket.

FIG. 6 is a side view of the cam roller linkage shown in FIG. 5 and shows the released position of the linkage as well as the engaged and locked position of the linkage, the latter in phantom.
FIG. 7 is a sectional view taken on the line 7—7 of FIG. 6 and shows the adjustable eccentric bushing pivotal mounting for the adapter hooks.

FIG. 8 is a perspective view of the adapter assembly which comprises the third embodiment of the present invention.

FIG. 9 is a rear view of the adapter assembly shown in FIG. 8 with the hand operated locking and release mechanism removed.

FIG. 10 is a sectional view taken on the line 10—10 of FIG. 9.

FIG. 11 is a rear view of the adapter assembly which comprises the fourth embodiment of the present invention.

FIG. 12 is a sectional view taken on the line 12—12 of FIG. 11 with a partial sectional view of the bucket added.

DESCRIPTION OF PREFERRED EMBODIMENTS

Four embodiments of the invention are shown and described. The first embodiment is shown in FIGS. 2-4, the second in FIGS. 5-7, the third in FIGS. 8-10, and the fourth in FIGS. 11 and 12. The two embodiments of FIGS. 2-4 and 5-7 are characterized by pivotally mounted hooks spaced from the elonage member for releasably securing the adapter assembly to the rear wall of a bucket only with respect to the linkage for hand-operating the hooks. The two embodiments of FIGS. 8-10 and 11 and 12 are characterized by axially slidable projecting wedge members for releasably securing the adapter assembly to the bucket and differ only with respect to the linkage for hand-operating the wedge members.

The general nature of the present invention may be understood with reference to FIGS. 1 and 2. The adapter assembly 10 which comprises the present invention, is shown in FIG. 1 in association with front-end loader 11. Adapter assembly 10 is semi-permanently pinned at pins 12 and 13 to the loader arms 14 and tilt cylinders 15, respectively, of front-end loader 11. Adapter assembly 10 is releasably secured to bucket 16. For that purpose the rear wall 17 of bucket 16 is provided with an upper overhanging member 18 and a lower protruding shelf member 19 which together provide a seat for adapter assembly 10 and means for releasably securing adapter assembly 10 to bucket 16.

In general, adapter assembly 10, best seen in FIG. 2, includes an elite member 20, a pair of actuating-arm mounting brackets 21 and releasable means for securing actuating arm brackets 21 to protruding shelf member 19, said means being shown as 23 in FIG. 2.

The general operation of the present invention may be understood with reference to FIG. 2 which shows the adapter assembly 10 secured to bucket 16. To release bucket 16 from adapter assembly 10, the operator merely releases means 23 from engagement with protruding shelf member 19. Adapter assembly 10 may then be tilted slightly forward. With bucket 16 resting on a supporting surface, as loader 11 is moved rearwardly, engage member 20 of adapter assembly 10 may be withdrawn from beneath overhang 18 as actuating-arm mounting brackets 20 move rearwardly out of engagement with protruding shelf 19. To attach bucket 16 to loader arms 14 and tilt cylinders 15 of front-end loader 11, the process is simply reversed.

The detailed design of the present invention may be understood with reference to FIGS. 2-4. With reference first to FIG. 2, engage member 20 consists of an angle which extends substantially the entire distance between the loader arms 14 of front-end loader 11. Actuating-arm mounting brackets 21 extend transversely to engage member 20 and are spaced substantially equal to the distance between loader arms 14 and tilt cylinders 15. Loader arms 14 are pinned to actuating-arm mounting brackets 21 by means of pins 12 (not shown in FIG. 2) at openings 24. Tilt cylinders 15 are pinned to actuating-arm mounting brackets 21 by means of pin 13 (not shown in FIG. 2) at openings 25 which are spaced from openings 24. A channel cross-brace 26, best seen in FIGS. 3 and 4, extends through actuating-arm mounting brackets 21 to provide rigidity.

4. The rear wall 17 of bucket 16 is provided with an overhanging member 18 which defines an acute angle with the rear wall 17 of bucket 16, as best seen in FIG. 4. Rear wall 17 of bucket 16 is also provided with a protruding shelf member 19 which defines a substantially perpendicular angle with rear wall 17, also best seen in FIG. 4. Actuating-arm mounting brackets 21 are adapted to engage protruding shelf member 19 and simultaneously wedge elongate member 20 into seated relationship with between wall 17 and overhanging member 18, as shown in FIG. 4.

A pair of pivotally mounted hooks 30 along with a connecting lever arm 40 serve as releasable means for securing actuating-arm mounting brackets 21 to protruding shelf member 19. For that purpose, protruding shelf member 19 is provided with a pair of openings 31, shown in FIGS. 2, 4, and 5, and hooks 30 are designed to force actuating-arm mounting brackets 21 toward rear wall 17 of bucket 16, as they pivot counterclockwise about mounting pins 32, as viewed in FIG. 4.

Springs 33 are secured to cross-brace 26 at one end and to connecting lever arm 40 at their other end to serve as means for resiliently holding hooks 30 in engagement with openings 31 of shelf member 19.

The wedge ordinarily designed into the present invention is two-fold. Hooks 30 are designed to force or wedge actuating-arm mounting brackets 21 toward rear wall 17 of bucket 16 as hooks 30 are caused to pivot counterclockwise, as viewed in FIG. 4, by the force of springs 33 acting upon connecting lever arm 40. In addition, actuating-arm mounting brackets 21 are adapted to engage protruding shelf member 19 and simultaneously wedge elongate member 20 into seated relationship between overhanging member 18 and rear wall 17 of bucket 16, as mounting brackets 21 approach engagement with rear wall 17. Thus as wear and distortion may occur between adapter assembly 10 and bucket 11, adapter assembly 10 automatically compensates by wedging against bucket 16 as springs 33 tend to pivot hooks 30 counterclockwise about pins 32, as viewed in FIG. 4.

Lever arm 40 represents a mechanical advantage as compared to the lever arm represented by the distance from the axis of pin 32 to the point of engagement of hooks 30 with openings 31 of shelf member 19. Consequently, a small force exerted on the upper portion of lever arm 40, such as that asserted by springs 33, results in a substantially greater force at the point of engagement between hooks 30 and openings 31. Moreover, hooks 30 are designed with a leading edge 35 which has only a gradually decreasing cross-sectional area from the axis of pin 32. More particularly, as hooks 30 are caused to pivot counterclockwise about the axis of pins 32, as viewed in FIG. 4, the leading edge 35 of each hook 30 draws actuating arm mounting brackets 21 only slightly toward rear wall 17 of bucket 16. This represents an additional advantage in the design disclosed and contributes to a tightly wedged connection between adapter 10 and bucket 16.

Hooks 30 are designed with a trailing edge 36, best seen in FIG. 4, which is adapted to engage lip portion 37 of protruding shelf member 19, during the process of seating adapter assembly 10 in the position shown in FIG. 4. Thus, during the seating operation, lip portion 37 engages edge 36 and forces each of the hooks 30 to pivot clockwise about the axis of pin 32 to thereby allow seating of adapter assembly 10.

An additional cam roller linkage may be provided to lock adapter hooks 30 into engagement with the openings 31 in protruding shelf member 19. The linkage is best seen in FIGS. 5 and 6. It includes a link 50 which is pivotally mounted to each of the adapter hooks 30. A connecting bar 51 extends between and is welded to the links and is provided with a handle 52 extending transversely to connecting bar 51 midway between links 50. Roller 53 is pivotally mounted to link 50 as best seen in FIG. 6. Cam follower bar 54 is mounted to the inside face of the two inside actuating-arm mounting brackets 21, as best seen in FIGS. 5 and 6, to provide a cam follower surface for engagement by rollers 53, respectively.
As adapter hooks 30 and the associated cam roller linkage moves from the released position, to the engaged and locked position, (see FIG. 6) roller 53 passes "over center" to the locked position. In the locked position handle 52 is in engagement with cross-brace 26 and adapter hooks 30 are in engagement with openings 31 of protruding shelf member 19. The cam roller linkage is locked since rollers 53 and links 50 have passed "over center" and cannot be moved by force applied to hooks 30. In the embodiment shown in FIGS. 5-7, adapter hooks 30 are mounted to actuating-arm mounting brackets 21 by means of eccentric bushing pivotal mounting shown in FIG. 7. Eccentric bushing 55 is mounted to bracket 21 by means of bolt 56 and nut 57. Since eccentric bushing 55 is provided with a hexagonal head 58, after nut 57 has been loosen, bushing 55 can be pivoted about the axis of bolt 56 to thereby vary the position of adapter hooks 30 to adjust the locking and wedging action.

With reference to FIG. 6, an elongate plate 60 may be provided to extend the depth of bucket 16 to the rim of protruding shelf member 19. Elongate plate 60 serves to lend rigidity to bucket 16 and also to protect hooks 30 during use of the bucket.

The detailed operation of the invention may be understood with reference to FIGS. 2 and 4. Bucket 16 is released from attachment to adapter assembly 10 by extending tilt cylinders 15 without bucket 16 resting on a supporting surface, thus causing bucket 16 to be tilted forwardly and downwardly against the supporting surface. The operator then simply pulls connecting arm 40 away from rear wall 17 of bucket 16 to thereby pivot hooks 30 in a clockwise direction about the axis of pins 32 as viewed in FIG. 4. Hooks 30, consequently, disengage from openings 31 of protruding shelf member 19 and actuating-arm mounting brackets 21 are allowed to pivot roughly about the axis of elongate member 20 in a counterclockwise direction as viewed in FIG. 4. Loader 11 may then be backed up to withdraw elongate member 20 from seated relationship with overhanging member 18 to thereby completely free the bucket from its attachment with adapter assembly 10.

To attach bucket 16 to adapter assembly 10, the process is reversed. Loader 11 is driven toward the rear wall 17 of bucket 16 with tilt cylinders 15 extended. Elongate member 20 may then be guided into approximate seated relationship with overhanging member 18 as loader 11 is driven forward and tilt cylinders 15 are simultaneously retracted. Raising the loader arm then causes bucket 16 to hang on elongate member 20 which is loosely seated under overhanging member 18 with its pivot point 36 in alignment with slot 37 of elongate member 20. Lip portion 37 of protruding shelf member 19 contacts edges 36 of hooks 30. Lip portion 37 causes hooks 30 to pivot counterclockwise, as viewed in FIG. 4, against the tension of springs 33. If the weight of the bucket is not sufficient to wedge adapter assembly 10 into its seated relationship, the operator need merely step downwardly on the leading edge of bucket 16 to forcibly complete the wedging action and cause hooks 30 to seat in openings 31 of protruding shelf member 19. The attachment is then complete.

Use of the cam roller linkage shown in FIGS. 5 and 6, in the attachment to and release of adapter assembly 10 from bucket 16 insures that hooks 30 are locked into engagement with protruding shelf member 19. With the adapter assembly 10 in the position shown in FIG. 6, the operator grasps handle 52 and pulls it upwardly and toward bucket 16. Since connecting bar 51 is welded to links 50, links 50 are caused to pivot about their pivotal connection with hooks 30 and roller 53 is moved by link 50 into engagement with cam follower bar 54. Continued movement of handle 52 causes roller 53 to ride along cam follower bar 54 and force hooks 30 to pivot completely, as viewed in FIG. 6, to engagement with openings 31 of protruding shelf member 19. As each hook 30 approaches full engagement with opening 31, link 50 and roller 53 passes "over center" with respect to cam follower bar 54. When link 50 reaches the position shown in phantom in FIG. 6, hook 30 is securely locked into place. The length of handle 52 as compared with the length of link 50 provides a significant mechanical advantage in forcing hooks 30 into such locked engagement. To release or unlock hooks 30, handle 52 is pivoted away from bucket 16 and downwardly to cause link 50 and roller 53 to pass "over center" and pivot hooks 30 counterclockwise as viewed in FIG. 6.

The relationship between hooks 30 and openings 31 of protruding shelf member 19 may be adjusted through the use of the eccentric bushing best seen in FIG. 7. Thus if the leading edge 36 and the trailing edge 35 of hooks 30 do not register as desired with openings 30, hexagonal head 58 of eccentric bushing 55 may be turned to thereby adjust the pivotal axis of hooks 30 with respect to openings 31. This may be done by loosening bolt 57 followed by turning of hexagonal head 58 to change the position of eccentric bushing 55.

The embodiment of FIGS. 8-10 is similar in many respects to the embodiments of FIG. 2-7 described above. Like the embodiments described above, it includes an elongated member 20 actuating arm mounting brackets 21, loader arm mounting openings 24, and tilt cylinder mounting openings 25.

Unlike the other embodiments, the embodiments of FIGS. 8-10 includes a stiffener 70 extending the entire length of elongated member 20 welded thereto. Actuating arm mounting brackets are welded to plates 71 and bottom spacers 72. A tubular stiffener 73 extends between the actuating arms 21 on one side to those of the other. Bearings 74 serve loader arm openings 24 and bearings 75 serve tilt cylinder openings 25.

The means 80 for releasably securing the adapter assembly 10 of FIGS. 8-10 to the bucket or other attachment may be best understood with reference to FIG. 8. It includes a pair of axially slidable wedge members 81 (only one of which is shown) which are slidably mounted in an opened chamber 21, defined by the inner mounting bracket 21, stiffener 73, plate 82 and plate 71. Wedge members 81 are formed with a sufficient tolerance to freely slide in the chamber. Bolt 83 is threaded into the upper end of wedge member 81. Coil spring 84 is mounted on bolt 83 and washers 85 are mounted between the head of bolt 83 and spring 84.

Hand operated lever 90 with its associated linkage described below serves as a means for sliding wedges 81 upwardly to release the adapter assembly to from its attachment and downwardly to lock the adapter assembly 10 from its attachment and downwardly to lock the adapter assembly to the attachment. With continued reference to FIG. 8, lever 90 includes a hand grip 91 and is welded to tube 92 which is pivotally mounted to adapter assembly 10. Two pairs of projecting fingers 94 are welded to rod 92 and extend past and bracket the neck of bolt 83 between members 85. While only one pair of fingers 94 is shown, it should be understood that a second pair extends from tube 92 in association with the wedge member (now shown) on the right side of adapter assembly 10 as viewed in FIG. 8.

Set screw 95 secures pin 96 in place to thereby mount tube 92 to brackets 21. Keeper 97 locks the upper end of lever 90 in contact with elongated member 20 and allows the release thereof merely by deflecting lever 90 laterally.

In operation the embodiment shown in FIGS. 8-10 is released from its attachment by pivoting hand operated lever 90 rearwardly to thereby cause fingers 94 to lift wedge members 81 upwardly and contact stop 98. Wedge members 81 withdraw from openings 31 of shelf member 19 of bucket 16 (see FIG. 2) to thereby release the lower portion of adapter assembly from shelf member 19. Adapter assembly 10 may then be pivoted rearwardly about elongated member 20 to release the latter from its mating relationship with overhanging member 18 of bucket 16. After completely release the adapter assembly from bucket 16 (or other attachment).

The operation is reversed when it is desired to attach adapter assembly 10 to bucket 16. With wedge member 81 in registration with openings 31 (see FIG. 2) forward movement of lever 90 causes fingers 94 to pivot downwardly to act
against washer 85 and through spring 84 upon wedge member 81 forcing it downwardly through openings 31. Spring 84 prevents the forcing of wedge members 81 in the event that there is a lack of registration between wedge member 81 and openings 31.

The embodiment shown in FIGS. 11 and 12 is similar to the embodiment of FIGS. 8–10 but it includes individually operated over-center linkages for sliding the wedge members up and down out of and into engagement with the attachment. With reference to FIGS. 11 and 12, adapter assembly 10 includes elongated member 20 and actuating arm mounting brackets 100. Unlike the actuating arm brackets of the embodiments of FIGS. 1–10, brackets 100 are formed with an upper member 101, a lower member 102, plate 103, plate 104 parallel to lower member 102, and spacer plate 105. Upper members 101 are welded to elongated member 20 and stif
cen 106 extends from one lower member 102 to the other to provide the basic framework of the adapter assembly 10. Stif
cen 107 is welded in elongate member 20.

Upper members 101 are formed with tilt cylinder mounting openings 108 and lower members 102 are formed with loader arm mounting openings 109 which extend through plates 104 also.

Like the embodiment of FIGS. 8–10, the embodiment of FIGS. 11 and 12 is characterized by a pair of axially slidable wedge members 110. Wedge members 110 are slidable mounted in chambers defined by stif
cen 106, plate 111, welded thereto, an extension of plate 103, and lower member 102. Thus wedge members 110 may be raised and lowered to release and lock adapter assembly 10 to bracket 16.

The means 112 for raising and lowering wedge members 110 consists of a separate over-center linkage for each member. Means 112 includes hand grip 115 and is welded to link 116 and extends diagonally therefrom as shown in FIG. 11. Link 116 is pivotedally mounted by means of pin 117 to mounting plate 113 which is welded to upper bracket member 101. Stop plate 119 is welded to the lower end of link 116 to engage upper bracket 101 to thereby define the locked over-center portion of means 112.

L-shaped link 120 is pivotally mounted to link 116 by means of nut and bolt 121. Bolt 122 extends from link 120 through plate 123 which is welded to the top of wedge member 110. Spring 124 is mounted on bolt 122 between link 120 and plate 123 and nut 125 completes the connection between link 120 and plate 123.

In operation the adapter assembly 10 of FIGS. 11 and 12 may be conveniently secured to and released from bracket 16 through hand operation of levers 114. Pivotal movement of levers 114 upwardly as viewed in FIGS. 11 and 12 about the axis of pin 117 causes nut and bolt 121 to move accurately. The axis of nut and bolt 121 initially moves downwardly to compress link 120 against spring 124, passes over center, and then moves in an upward accurate path to slide wedge member 110 upwardly out of engagement with opening 31 of shelf 19 of bucket 16 (See FIG. 12).

The over-center action of means 112 for sliding wedge members 110 up and down insures that locking occurs when adapter assembly 10 is mounted to bucket 116. More particularly, linkage 112 cannot be moved by an upward force applied to wedge member 110 because such force merely urges link 116 to pivot about pin 117 in a direction which forces plate 119 into contact with upper members 101.

A feature of each of the embodiments shown as described is exemplified by FIG. 12. The distance from elongate member 20 to the lower extremity of member 102 is chosen to be greater than the inside distance from overlapping member 18 to shelf member 19. Thus adapter assembly 10, when mounted to bucket 16, does not contact the rear wall of bucket 16 from top to bottom. Space 130, shown in FIG. 112 results and insures a tight mounting between adapter assembly 10 and bucket 16 even if wear occurs. Any wear which may occur is compensated for by forcing wedge members 110 deeper into openings 31 to thereby move the lower members 102 closer to the rear wall of bucket 16 and, due to the angle of shelf member 19, force elongate member 20 upwardly into tight engagement with overlapping member 18. This is a significant feature of the invention shown and described in its various embodiments.

During operation, elongate member 20 serves to substantially uniformly distribute stress at the joint represented by the engagement between elongate member 20, rear wall 17 and overlapping member 18, throughout the entire length of elongate member 20. Thus point concentration of stress is avoided along the upper portion of rear wall 17. Point concentration is also avoided along the lower portion of rear wall 17 since compressive forces, which represent the most common force between adapter assembly 10 and bucket 16, are distributed along protruding shelf member 19 at each area of engagement with actuating-arm mounting brackets 21. The use of adapter assembly 10 to achieve a quick attachment and release from bucket 16 allows semi-permanent placement of pins 12 and 13 to pivotally connect loader arms 14 and tilt cylinders 15, respectively, to actuating-arm mounting brackets 21. The invention also eliminates the necessity of inserting and removing pins to accomplish the mounting and release of various attachments to the loader. And finally, the invention provides a sound maintenance-free joint which can withstand prolonged periods of use in the abrasive and corrosive environment in which it is most often used.

While the invention has been described in association with a bucket as the implement mounted to loader 11, it should be recognized that the adapter assembly 10 may be used in association with many other implements. Some of these have been referred to above and include, for example, a snow plow, snow blower, and a sweeper broom as well as larger and smaller buckets. To be adapted for use with the present invention these implements need only be provided with an overhanging member 18, a protruding shelf member 19 and a wall member which, together with overlapping member 18, defines a seat for elongate member 20.

Variations may be made in the design of the invention described without departing from its scope, which is to be limited only by the scope of the following claims.

Having thus described the invention, we claim:

1. A quick attachment and release device for attaching an implement to a pair of spaced actuating arms comprising:

an elongate member adapted to substantially uniformly engage said implement throughout its length and extending substantially the distance between said spaced actuating arms;

a pair of actuating-arm mounting brackets secured to said elongate member, extending transversely thereto, spaced substantially the distance between said actuating arms, and adapted to engage said implement, said elongate member and said actuating arm mounting brackets being adapted to wedge against said implement when urged into engagement therewith; and

releaseable means spaced from said elongate member for securing said actuating-arm mounting brackets to said implement comprising a pair of hooks pivotally mounted to said respective mounting brackets and adapted to wedgeingly engage said implement when urged into engagement therewith.

2. The device of claim 1 wherein said elongate member is adapted to seat under an overhanging member mounted to said implement and extending substantially the length of said elongate member and said actuating-arm mounting brackets are adapted to wedge against a protruding shelf extending from said implement to thereby urge said elongate member into engagement with said implement.

3. The device of claim 2 and spaced means on each of said brackets for respectively pivotally connecting said actuating-arm mounting brackets to said actuating arms and tilt cylinders.

4. Apparatus for quickly attaching and releasing an implement to a pair of spaced actuating arms comprising:
an overhanging member mounted to a wall of said implement, extending substantially the entire distance between said spaced actuating arms, and defining an acute angle with said wall;
a protruding shelf member spaced below said overhanging member and extending substantially the entire distance between said spaced actuating arms;
an elongate member adapted to seat between said overhanging member and said wall and extending substantially the distance between said spaced actuating arms;
a pair of actuating-arm mounting brackets secured to said elongate member, extending transversely thereto, spaced substantially the distance between said actuating arms and adapted to engage said protruding shelf member and simultaneously wedge said elongate member into seated engagement between said overhanging member and said wall; and
releasable means spaced from said elongate member for securing said actuating-arm mounting brackets to said protruding shelf.

5. The apparatus of claim 4 wherein said protruding shelf defines at least a perpendicular angle with said wall.

6. The apparatus of claim 5 wherein said releasable means spaced from said elongate member for securing said actuating-arm mounting brackets to said protruding shelf comprises a pair of hooks pivotally mounted to said respective mounting brackets and adapted to pivot into and out of engagement with openings in said shelf member.

7. The apparatus of claim 6 and resilient means for holding said hooks in engagement with said shelf member.

8. The apparatus of claim 7 wherein said resilient means operates upon a lever extending between said hooks.

9. A quick attachment and release device for attaching an implement to a pair of spaced actuating arms comprising:
an elongate member adapted to substantially uniformly engage said implement throughout its length (and extending substantially the distance between said spaced actuating arms) and adapted to wedge against said implement when urged into engagement therewith;
a pair of actuating-arm mounting brackets secured to said elongate member, extending transversely thereto, spaced substantially the distance between said actuating arms, and adapted to engage said implement; and
releasable means spaced from said elongate member for securing said actuating-arm mounting brackets to said implement including means for insuring wedging engagement between said elongate member and said implement despite wear and distortion which may occur between said elongate member and said implement during operation.