United States Patent [19]

Gorby

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[54] **QUICK DETACHABLE BUCKET**

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[52] **U.S. Cl.** **214/145;** 172/272

[51] **Int. Cl.** **E02f 3/60**

[58] **Field of Search** ..... 214/145, 131 A

[56] **References Cited**

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Assistant Examiner—Ross Weaver
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[57] **ABSTRACT**

The invention comprises a loading frame having its lower ends pivotally mounted to the forward outer ends of the lifting arms of a front end loader. The loading frame has its central upper end pivotally mounted to a hydraulically actuated rod member mounted on the lifting arms to pivot the loading frame about the axis of the outer ends of the lifting arms. The loading frame has a central upper spike means and spaced latching means at its lower outer ends. The invention also has a bucket with a central upper eyelet along its rearward wall portion to receive the spike means, and a pair of spaced hook means to receiving the latching means of the loading frame to provide a three point connection.

2 Claims, 11 Drawing Figures

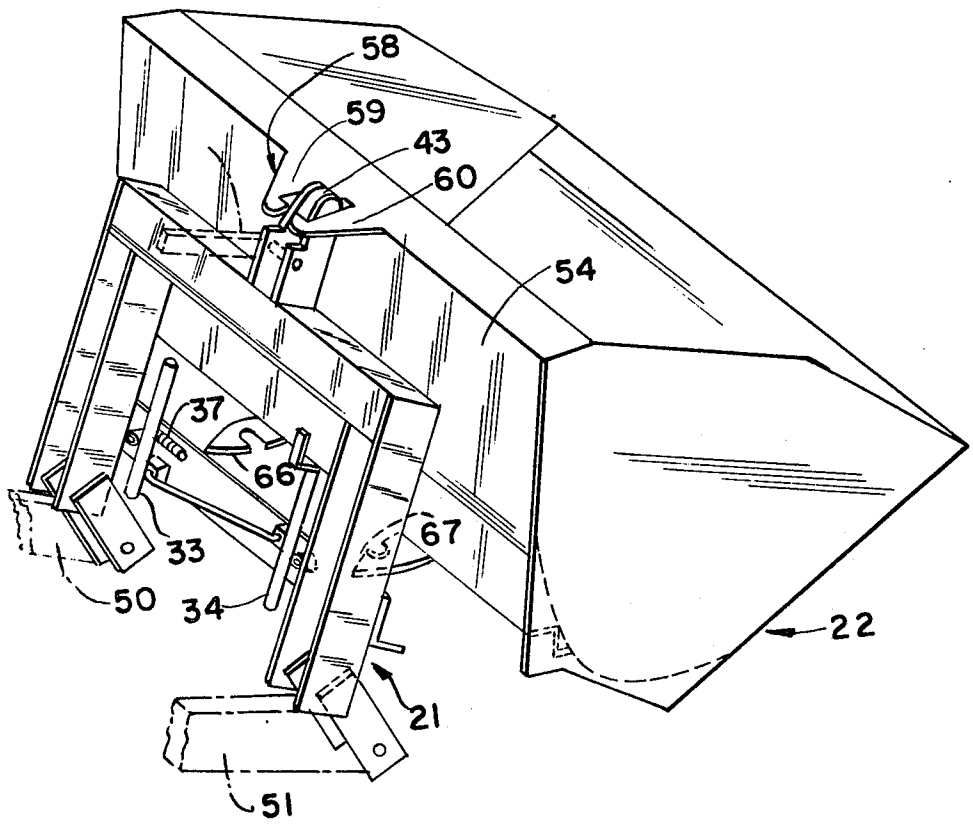
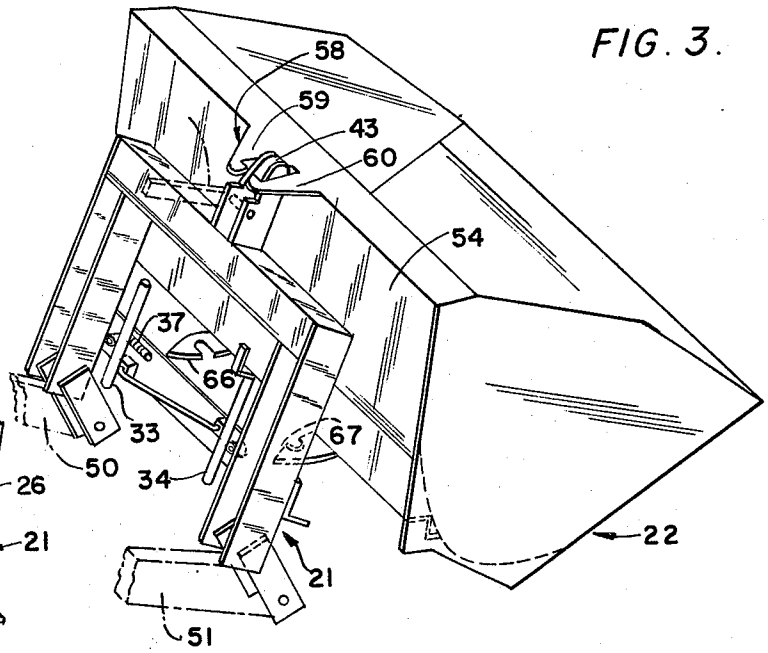


FIG. 3.



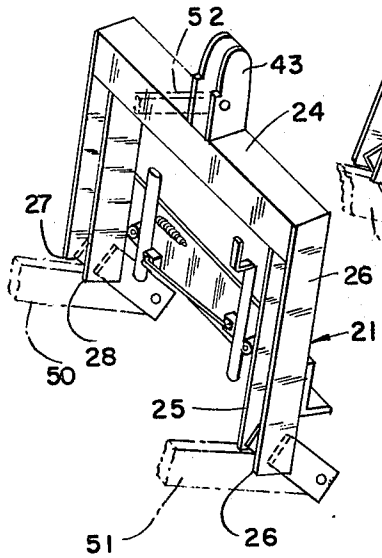


FIG. 2.

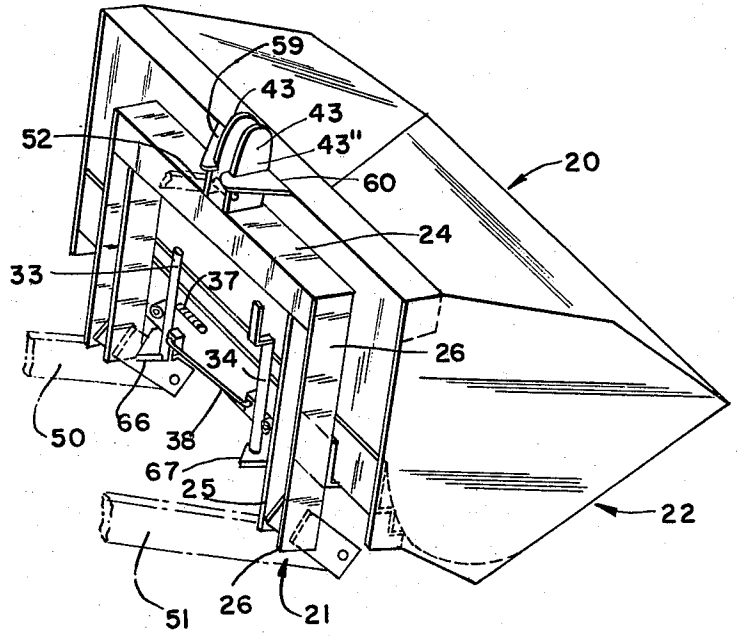
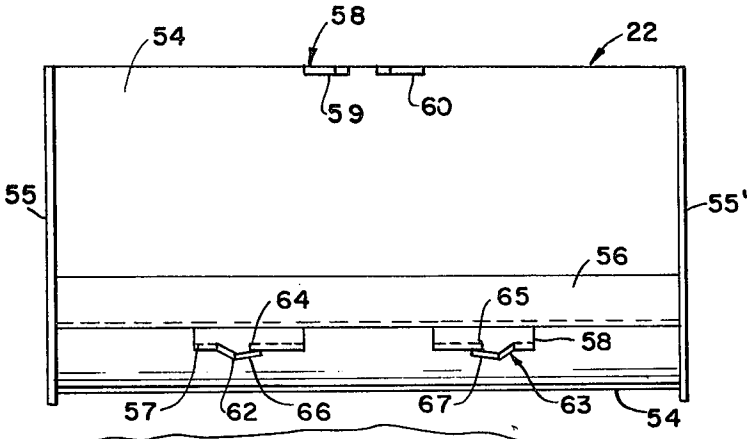


FIG. 1.

FIG.4.



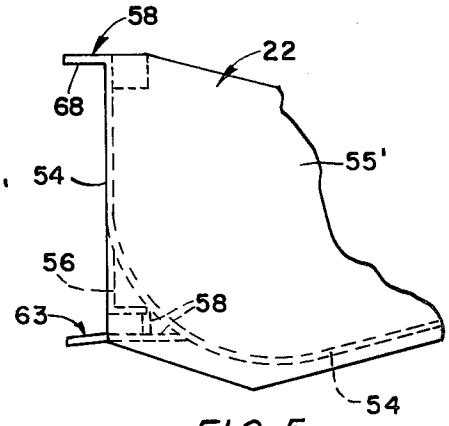


FIG.5.

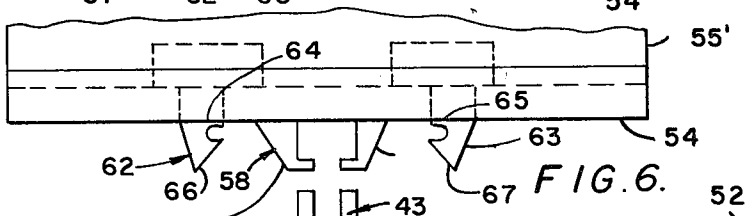


FIG.6.

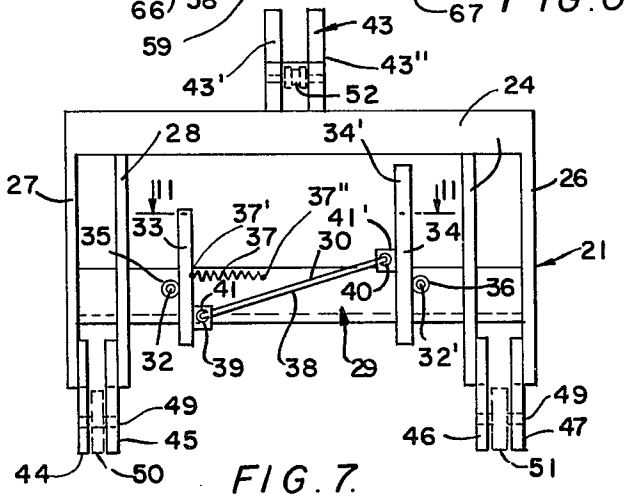


FIG.7.

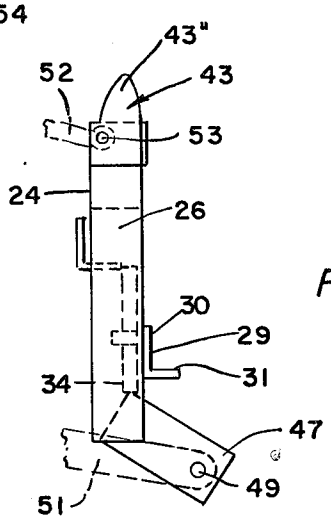


FIG.8.

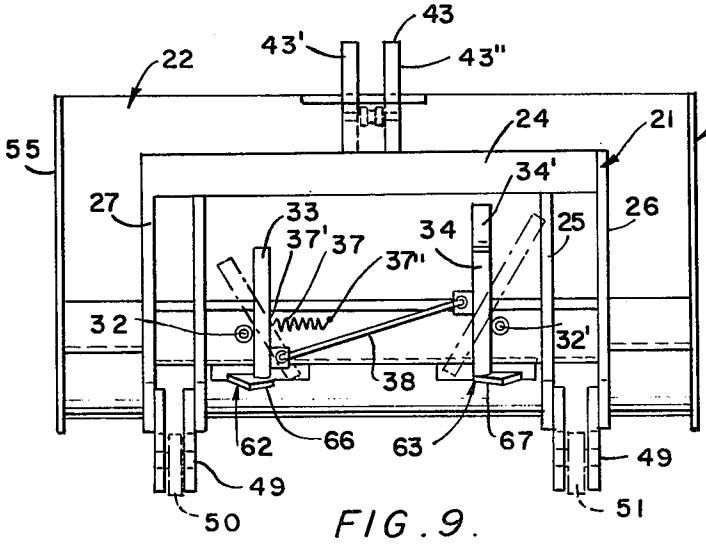


FIG.9.

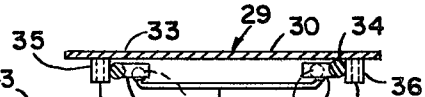


FIG.11.

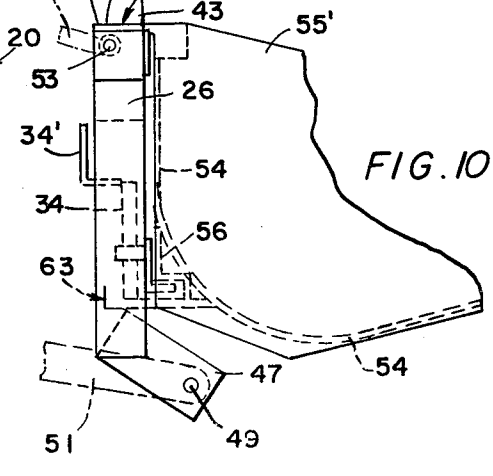


FIG.10.

QUICK DETACHABLE BUCKET

This invention relates to quick detachable implements for front end loaders.

It is an object of the invention to provide a novel quick detachable bucket for a front end loader which can be easily and quickly detached from the arms of a loader by a three point connection.

It is a further object of the invention to provide a novel quick detachable bucket which is connected to the loading arms of a front end loader by a single central spike with latching means space below and on opposite sides of the spike.

It is another object of the invention to provide a novel quickly attachable implement from the loading arms of a front end loader.

Further objects and advantages of the invention will become apparent as the description proceeds and when taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view of the loading frame for pivot mounting to the loading arms of a front end loader with the loading arm attachment frame shown attached to the rear frame of the bucket.

FIG. 2 is a perspective view of the loading frame or attachment framework.

FIG. 3 is a perspective view of the loading frame shown in the process of being attached to the bucket.

FIG. 4 is a rear elevational view of the rear of the bucket.

FIG. 5 is a fragmentary top plan view of the rear of the bucket.

FIG. 6 is a fragmentary side elevational view of the rear of the bucket.

FIG. 7 is a rear elevational view of the loading frame.

FIG. 8 is a side elevational view of the loading frame.

FIG. 9 is a rear elevational view illustrating the loading frame attached to the bucket.

FIG. 10 is a fragmentary side elevational view of the loading frame shown attached to the bucket.

FIG. 11 is a cross-sectional view taken along line 11—11 of FIG. 7.

Briefly stated, the invention comprises a loading frame for mounting to the front end of a front end loader and a detachable bucket detachably mounted to the loading frame. The loading frame has a central upper spike member and a pair of latching lines spaced below and on opposite sides of the spike member, said bucket having a central upper eyelet to receive the central spike member and a pair of rearwardly projecting hook member to receive and latch the levers of the loading frame to the bucket to form a three point detachable connection between the loading frame and bucket.

Referring more particularly to the drawings, in FIG. 1, the quick detachable bucket invention 20 is illustrated with the loading frame 21 and bucket 22 attached together.

The loading frame 21 has a rectangular framework 23. The framework 23 has a horizontally elongated square tubing member 24. A pair of vertically elongated plates 25 and 26 are fixed to one end of the tubing member 24 and project vertically downwardly in parallel spaced relation. A similar opposing pair of elongated plates 27 and 28 are fixed to the other end of the tubing member 24 and project vertically downward in parallel spaced relation. An L-shaped angle iron 29 has one of its flanges 30 welded upright flush across the front edges 31 of the plates 25, 26, 27, and 28. The angle iron 29 has a horizontally extending forward flange 31 which extends perpendicularly to the first flange 30 and is formed integrally therewith.

A pair of cylindrical pins 32 and 32' are fixed to the rear face of the flange 30 of angle iron 29 and project axially rearwardly. A pair of elongated rods 33 and 34 which serve as lever rods have each an eyelet 35 and 36, respectively, welded thereto. The eyelets 35 and 36 are rotatably mounted about the pins 32 and 32' so that the lever rods 33 and 34 can pivot about the axis of the pins 32 and 32' between their position shown in solid lines in FIG. 9 and their position shown in phantom lines in FIG. 9.

A coil spring 37 has one end 37' fixed to the rod 33 and the other end 37'' fixed to the flange 30 of angle iron 29. The coil spring 37 acts and urges the lever 33 back to its position shown in solid lines in FIG. 9.

A connecting rod 38 has a pair of spherical balls 39 and 40 projecting horizontally and laterally away from the opposing ends of the rod 38 and are fixed to the ends of the rod 38. The spherical balls 39 and 40 are rotatably swivel mounted in spherical sockets 41 and 41' in block members 42 and 42', shown in FIGS. 9 and 11. Block members 42 and 42' are fixed to the lever rods 33 and 34, respectively, so that the lever rods 33 and 34 will pivot in unison in opposite directions between their position shown in dashed lines in FIG. 9 and their position shown in solid lines in FIG. 11, through the connecting linkage of connecting rod 38.

The spring 37 in urging the lever 33 back to its position shown in solid lines in FIG. 9, will also urge the lever 34 in an opposite direction back to its position shown in solid lines in FIG. 9, through the connecting linkage of the connecting rod 38.

The loading frame also has a spike-like member 43 formed of a pair of vertical plates 43' and 43'' which project and point upward in close parallel relation from the tubing 24, with the lower ends of the plate 43' and 43'' fixed to the tubing member 24, centrally of the length of the tubing member 24.

At the lower ends of the vertical plates 25 and 26, 27, and 28 are two pair of plates 44, 45, 46, and 47 which are fixed to the plates 25, 26, 27, and 28, respectively, and project diagonally forward with axial aligned bores 49 in the plates 44, 45, 46, and 47.

The conventional forward ends of the loading arms 50 and 51, shown in phantom lines, of a conventional front end loader are pivotally mounted by bolts in the bores 49, between plates 44 and 45, and 46 and 47, respectively.

The forward end of a conventional bucket pivoting linkage member 52, shown in phantom lines of a conventional front end loader, is pivotally mounted between plates 43' and 43'' of the spike-like member of the loading frame, in the bores 53 in the plates 43' and 43''. This linkage member 52 is normally movably mounted between the loading arms of a front end loader and actuated by a hydraulic cylinder also mounted on the loading arms and movable upon actuation of the cylinder, generally from left to right as viewed from FIGS. 1, 2, and 3.

In some front end loaders the member 52 is the piston end of a hydraulic cylinder, which cylinder has its cylinder end pivotally mounted to the loading arms, in which case the piston of the cylinder directly moves the

loading frame by being attached to the plates 43' and 43'' to pivot in the bores 53.

The loading arms 50 and 51 of the loader can be raised and lowered to raise and lower the loading frame 21, and the elongated plate member 52 is movable forwardly and rearwardly, by its hydraulic cylinder, to pivot the loading frame 21 either clockwise or counterclockwise about the axis of the bores 49 in the ends of loading arms, when viewed from FIGS. 1, 2, 3, and 10.

The detachable bucket member 22 has a conventional sheet metal back wall and bottom plate 54, with side walls 55 and 55' fixed to the edges of the back wall and bottom plate 54.

An L-shaped angle iron 56 is welded across the back of the back wall 54. A pair of relatively short angle irons 57 and 58 are welded across the back wall 54 in spaced relation and stepped beneath the angle iron 56.

An eyelet member 58 is formed by a pair of hook-like plates 59 and 60. The hook-like plates 59 and 60 have their rearward edges welded to the back wall 54 of the bucket 22 and project rearwardly with inwardly turned hooked ends 50' and 60' turned inwardly to one another to form a rectantular opening 61, with a slotlike opening 62 between the hooked ends 59' and 60', which opening 62 communicates with opening 61.

A pair of pointed plates 62 and 63 project rearwardly from the spaced angle irons 57 and 58 and are fixed thereto. The pointed plates have circular slots or cutouts 64 and 65 along their inner tapered edges 66 and 67, which slots are of a size to receive therein the lever rods 33 and 34 of the loading frame. The pointed plates are each pointed rearwardly from the rearward wall 54 of the bucket.

Operation

The detachable bucket invention 20 operates as follows:

The loading frame will be attached to the loading or lifting arms 51 and 52 of the front end loader, as illustrated in FIGS. 1-3. The front ends of the loading arms are pivotably mounted between the plates 44, 45, and 46, and 47 as described so that the loading frame may pivot on the loading arms about the axis of the bores 49.

The hydraulically activated linkage member 52 will be pivotally mounted to the central upper portion of the frame 21 to pivot about the axis of the bores 53, so that actuating the cylinder for the member 52 of the loader will move the plates 52 generally to the right when viewed from FIGS. 1, 2, and 3 and pivot the loading frame counterclockwise, and actuating the cylinder in the opposite direction will move the plate member 52 in the opposite direction causing the frame to pivot clockwise.

To attach the bucket to the loading frame the front end loader will be moved into closer proximity with the bucket 22. The loading arms 51 and 52 of the loader will be lowered to the ground. The operator will then actuate the hydraulic cylinder which moves the plate member 52 to the right, which pivots the frame 21 clockwise about the axis of the bores 49 of the loading arms, until the frame has moved to a forward inclined angle and the spikelike member 43 of the loading frame has moved below the level of the hook-like plates 59 and 60. The operator will then move the loader closer to the bucket to slide or move the spike member 43 under the plate 59 and 60 forming the eyelet 58 and directly beneath the rectangular opening 61.

The operator will hereafter actuate the cylinder for plate member 52 in the opposite direction, which pivots the loading frame 21 counterclockwise upward toward a vertical position and projects the spike member up into the opening 61, as illustrated in FIG. 2. The operator will then raise the loading arms 51 and 52 which raises the spike 43 and the spike member 43, projecting through the opening 61, engages the lower edges of the plates 59 and 60, at its edges 68 and 68'. Consequently the spike 42 of the loading frame will raise the bucket off the ground as the loading arms raise the loading frame off the ground once the bucket is clear of the ground. The operator will continue to actuate the cylinder to plate member 52 to move plate member fairly rapidly to the left when viewed from FIG. 2 until frame member 21 has moved counterclockwise about the loader arm well past a vertical position.

As the loading frame 21 moves left to right counterclockwise past its vertical position, the bucket will pivot clockwise downward about the axis of the spike member 43, thereby swinging the bucket 22 downward flush against the loading frame, as illustrated in FIGS. 1, 9, and 10.

As the bucket member swings downward flush against the loading frame, while suspended only by the spike member 43, the pointed plates 62 and 63 will move or swing under the angle iron 29 of the loading frame, and the inner edges 66 and 67 of the pointed plates will engage or impart against the outside edges of the lower ends of the lever rods 33 and 34 and cam the rods inward, causing them to pivot at their lower ends toward one another about the axis of pins 32 and 32' toward their position shown in phantom lines in FIG. 9. The inner edges 66 and 67 will cam the rods 33 and 34 inward, as the pointed plates swing rearwardly under the angle iron until the rods 33 and 34 reach the circular cutouts 64 and 65. When the rods 33 and 34 reach the cutouts 64 and 65, the spring 37 urging the lower ends of the rods outwardly will pivot the lower ends of the rods outwardly from one another and into the cutouts 64 and 65 of the pointed plates, as illustrated in solid lines in FIGS. 1, 9, and 10, thus moving the rods back to their original positon and locking or latching the rods 33 and 34 of the loading frame to the pointed plates 62 and 63 of the bucket by the rods engaging into the cutout areas of the pointed plates.

The bucket 22 will now be locked to the loading frame by a three point connection, the spike 43 engagement with the eyelet 58, forming one connection and the lever rods 33 and 34 being latched in the pointed plates 62 and 63 in the cutouts forming the second and third connection.

The three point engagement or connection between the loading frame and bucket provides a strong positive three point locking connection between the loading frame and bucket.

The front end loader may now be operated in a conventional manner with the bucket fixed to the loading frame.

Thus, it will be seen that the bucket may be attached to the body frame by the operator on the loader simply manipulating the lifting arms and the bucket pivoting plate member and that this attachment may be accomplished without the operator having to leave his seat on the loader.

When it is desired to unlatch the bucket from the loading frame, the operator will lower the loading arms down to the ground, thereby lowering the bucket to the ground. The operator will then grasp the handle **34'** of the lever **34** and pivot the handle and rod **34** clockwise, which pivots the rods **34** clockwise and rod **33** counterclockwise through the rod linkage **38,** about the axis of pins **32** and **32'**, moving the rods toward their position shown in FIG. **9** in phantom lines until the rods **33** and **34** clear the inner edges of the pointed plates.

The handle **34** will then be temporarily locked in its position shown in phantom lines in FIG. **9,** with rods **33** and **34** free of the pointed plates. The loader will be backed rearward, as viewed from FIG. **2,** and at the same time, the cylinder to plate member **52** will be actuated to pivot the loading frame forward and downward moving the spike out of the eyelet **58** of the bucket and below the level of the plates **59** and **60.** The operator will move the loader further rearward thus completely freeing the bucket from the loading frame.

A cable may be provided to connect the handle **34'** in a manner that the handle may be moved by the operator of the loader while he is sitting in the seat of the loader.

It will be obvious that various changes and departures may be made to the invention without departing from the spirit thereof, and accordingly it is not intended that the invention be limited to that specifically described in the specification or as illustrated in the drawing but only as set forth in the appended claims wherein:

What is claimed is:

1. A quick detachable bucket for a front end loader having lifting arms and a movable plate member movably mounted on the lifting arms, a loading frame having its lower outer corners pivotally mounted to the outer ends of the lifting arms and its upper portions pivotally mounted to the plate member for movement of the loading frame by the loader, said bucket having an open mouth at its forward edge and a rear wall, central upper spike means and eyelet means with said spike means receivable in said eyelet means to interengage one another and with one of said means mounted to the central upper edge of said rear wall and the other of said means mounted to the central upper front edge of said frame, said bucket and frame having lower outer hook means and lower outer spring biased rod means comprising two rods pivoted about a horizontal axis, with one of said means mounted to the bucket and the other of said means mounted to the frame and coacting with one another to automatically latch the bucket to the frame upon impact of the lower portion of the bucket to the frame, whereby the spike may be inserted into the eyelet and the frame may lift the bucket upward and rearward to cause the bucket to swing down and impact against the frame to latch the bucket to the bucket to the frame at its lower outer corners by the latch and rod means, camming means acting to cam the rods relative to the frame in opposing directions along a path laterally between the lower outer corners of the bucket and frame to facilitate the latching of the lower outer corners of the bucket to the frame.

2. A quick detachable bucket for a front end loader having lifting arms and a movable plate member movably mounted on the lifting arms, a loading frame having its lower outer corners pivotally mounted to the outer ends of the lifting arms and its upper portions pivotally mounted to the plate member for movement of the loading frame by the loader, said bucket having an open mouth at its forward edge and a rear wall, central upper spike means and eyelet means with said spike means receivable in said eyelet means to interengage one another and with one of said means mounted to the central upper edge of said rear wall and the other of said means mounted to the central upper front edge of said frame, said bucket and frame having lower outer hook means and lower outer spring biased rod means comprising two rods pivoted about a horizontal axis, with one of said means mounted to the bucket and the other of said means mounted to the frame and coacting with one another to automatically latch the bucket to the frame upon impact of the lower portion of the bucket to the frame, whereby the spike may be inserted into the eyelet and the frame may lift the bucket upward and rearward to cause the bucket to swing down and impact against the frame to latch the bucket to the frame at its lower outer corners by the latch and rod means, camming means acting to cam the rods relative to the frame in opposing directions along a path laterally between the lower outer corners of the bucket and frame to facilitate the latching of the lower outer corners of the bucket to the frame, said lower outer latch rods having linkage means connecting said latch rods together so as to cause said latch rods to operate simultaneously, a cable connected to a portion of said latch rod to actuate said latch rod to unlatch simultaneously.

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