

[54] **BACKHOE BUCKET APPARATUS**

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[22] Filed: **Aug. 7, 1973**

[21] Appl. No.: **386,392**

[52] U.S. Cl. **214/44 A; 214/138 R; 214/768**

[51] Int. Cl. **B65g 67/26**

[58] Field of Search **214/138 R, 138 C, 145,
214/140, 768, 778, 44 R, 44 A**

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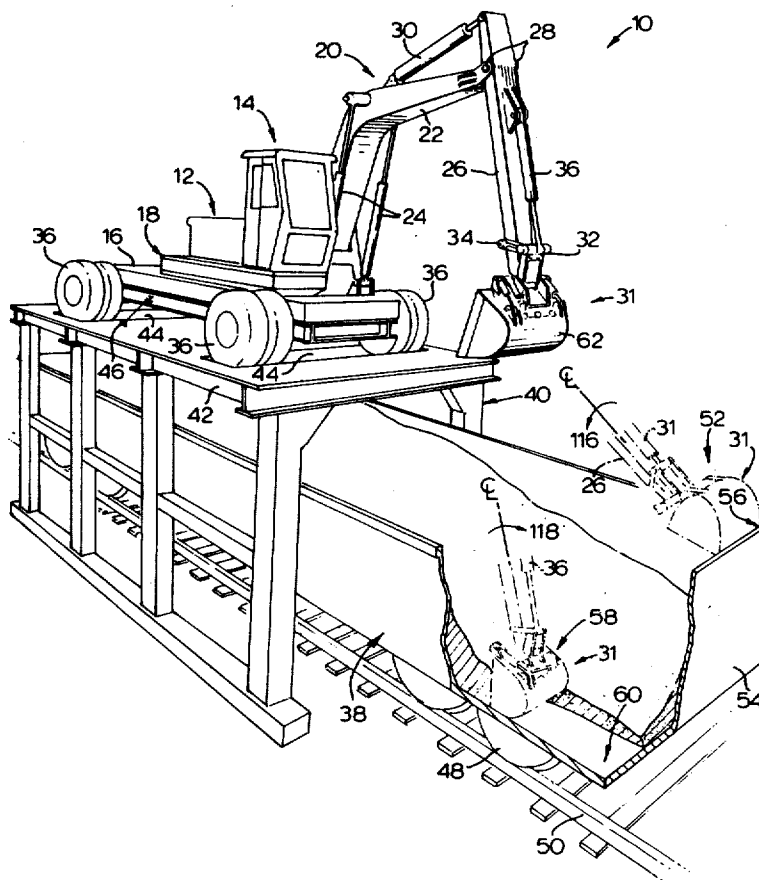
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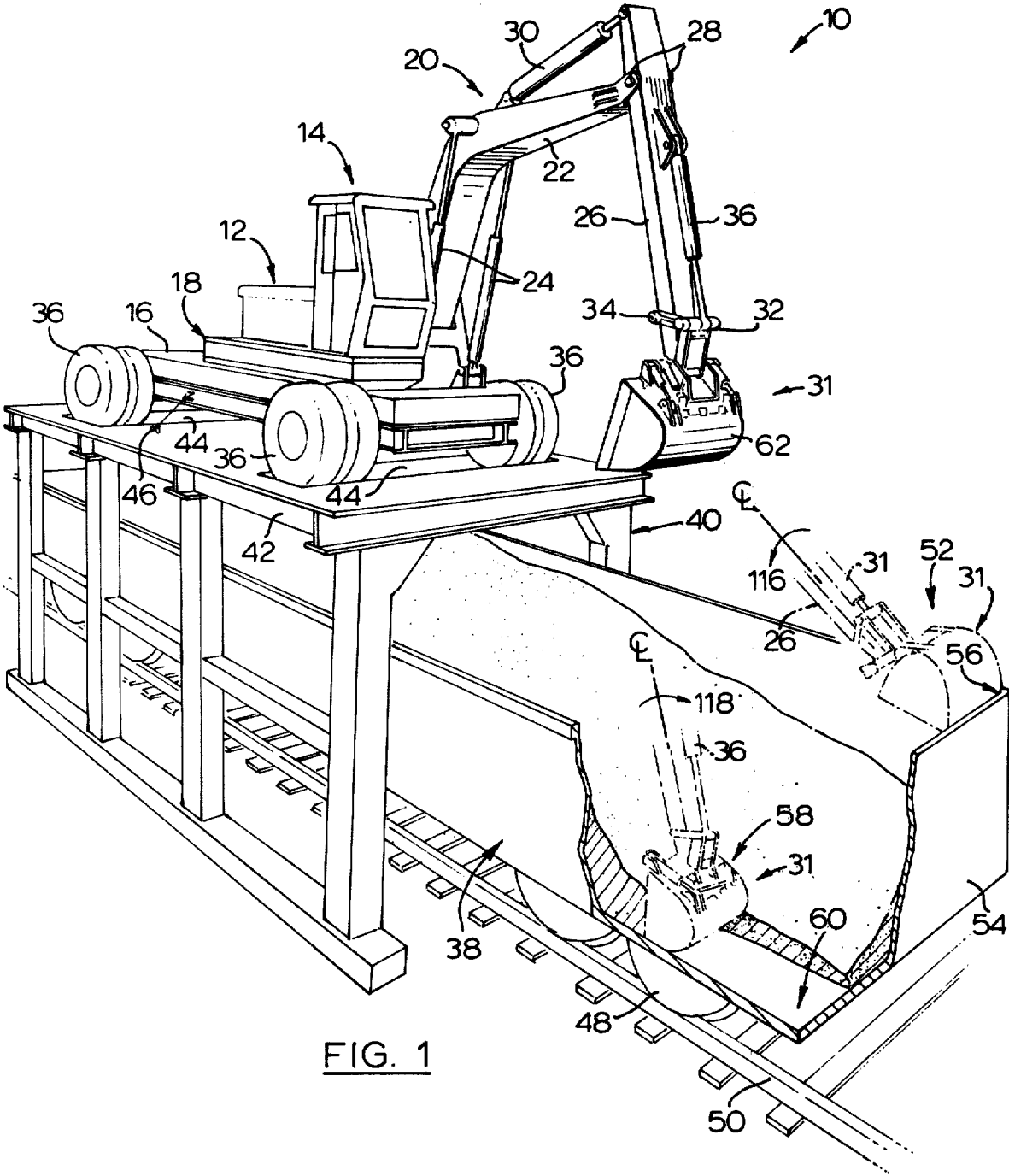
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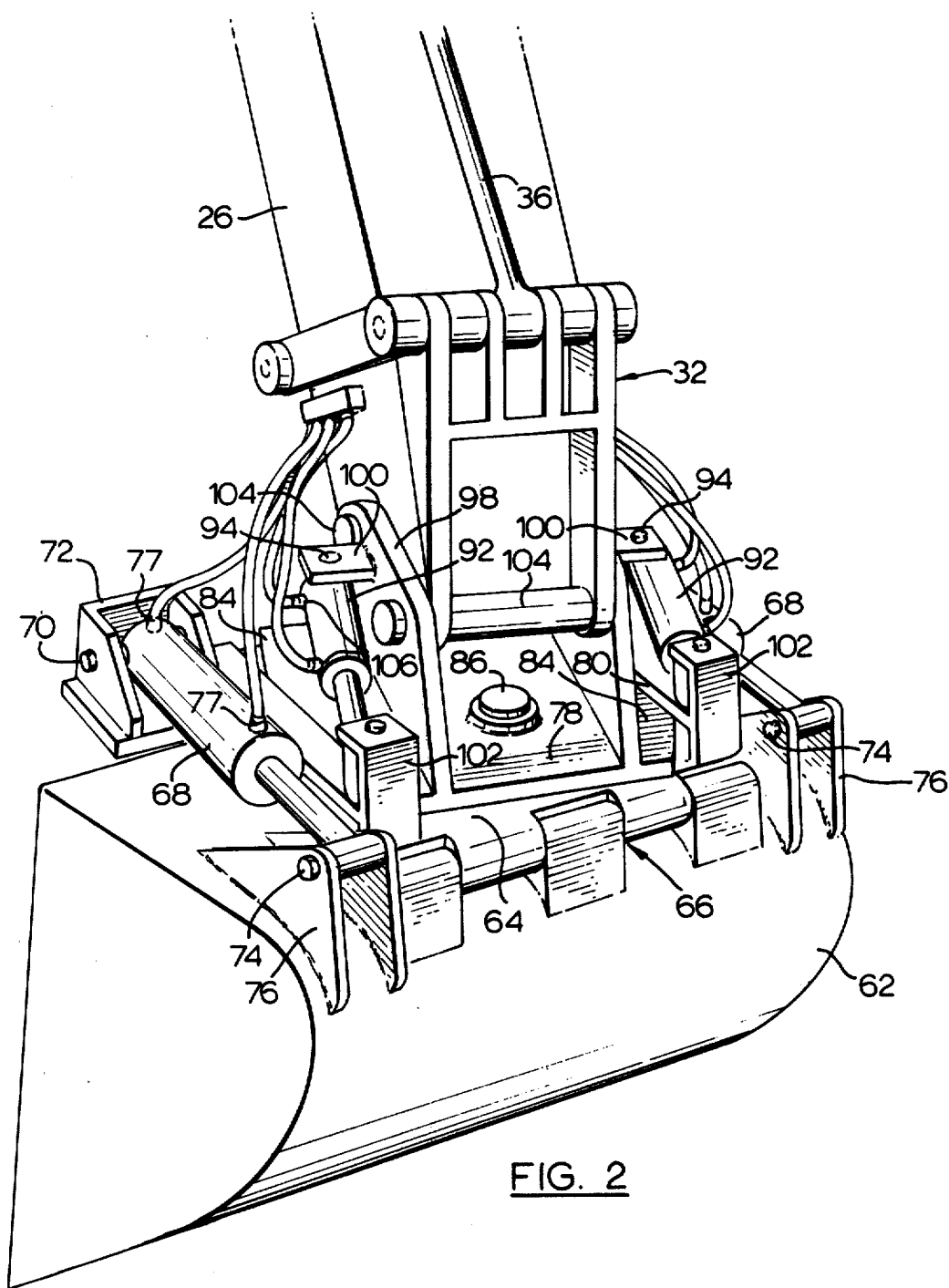
[57] **ABSTRACT**

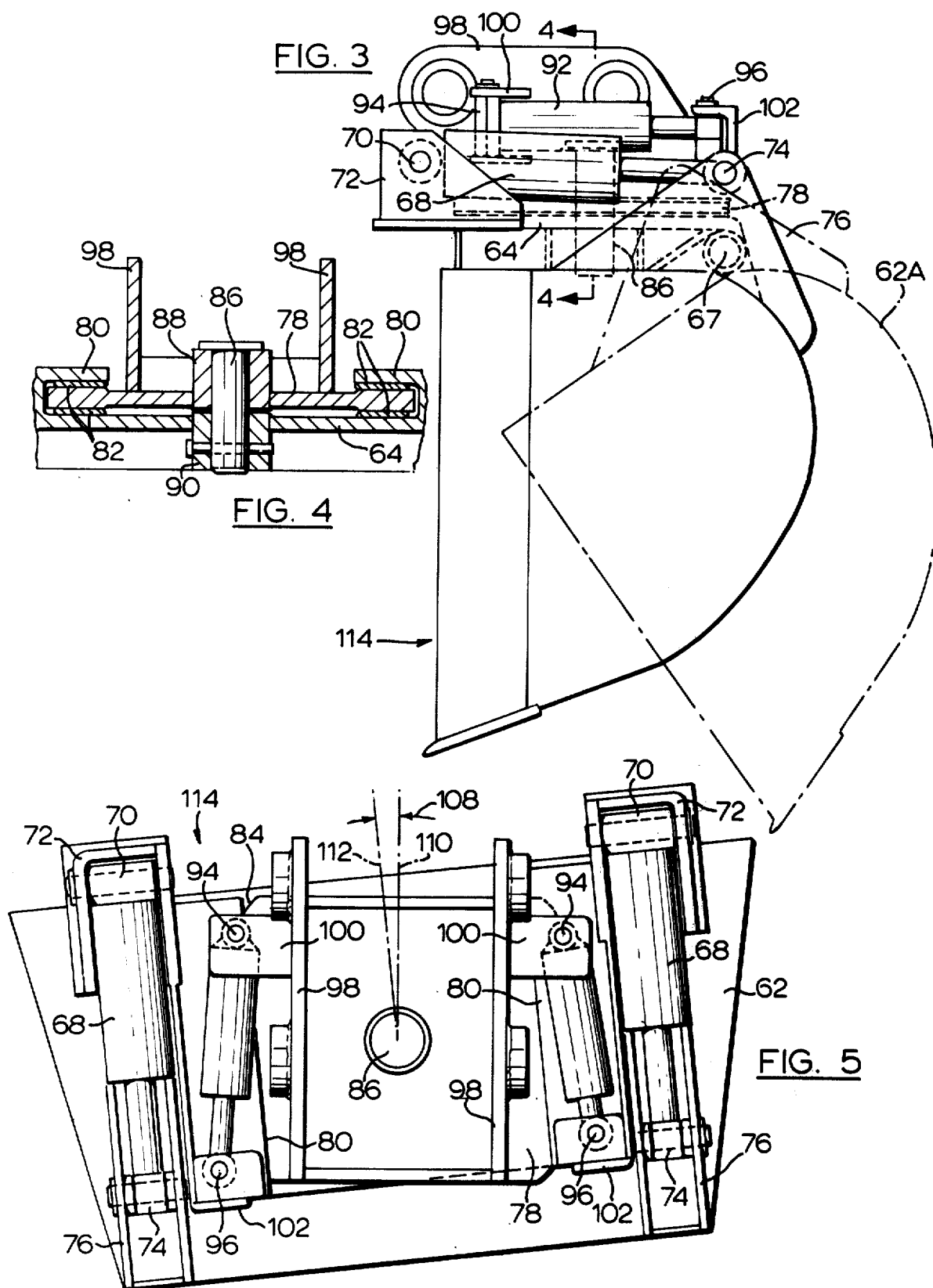
A bucket apparatus for a backhoe and similar apparatus is adapted to swing further than usual at the end of the boom, and to offset the mouth of the bucket relative to the longitudinal axis of the boom. A swivel plate is attached to the bucket pick-up on the boom, and is hinged to the bucket; and two pairs of cylinders operate to extend the swing of the bucket about the hinge or to swivel the bucket at the pick-up, respectively. An apparatus for unloading gondola cars and the like includes a backhoe with the bucket attachment of this invention, where the backhoe is mounted on a supporting frame beneath which the gondola car is moved under the control of the backhoe operator.

10 Claims, 5 Drawing Figures









BACKHOE BUCKET APPARATUS**FIELD OF THE INVENTION**

This invention relates to a bucket attachment and apparatus for a backhoe; and in a preferred embodiment, the invention teaches a backhoe apparatus having a bucket attachment therefor where the bucket can be swung about the end of the boom to a further extent than is permitted in a standard bucket attachment, and where the bucket can be swivelled with respect to the end of the boom.

BACKGROUND OF THE INVENTION

In a normal backhoe apparatus, a wheeled or tracked frame is provided having a power source — usually a diesel engine — and an operator's cab mounted thereon. Also mounted on the frame is an articulated boom at the end of which a bucket is attached. In a backhoe, the mouth of the bucket faces towards the frame of the backhoe apparatus, and thus the operator has a view of the mouth of the bucket as it moves towards him in operation. Usually the frame of the backhoe apparatus is articulated with a swing-table, so that the boom and the bucket attached thereto may be swung in an arc — as well as the operator's cab — so that the area of operation of the bucket of the backhoe may be as large as possible.

However, because of the rugged construction of the usual backhoe apparatus, which is heavy and rugged, and because of the simple geometry of the articulated boom, the area of operation of the bucket when the frame is stationary and the swing-table and articulated frame are operable to their greatest extent, can be considered to be a portion of a sphere. That is to say, in the normal backhoe apparatus as the bucket moves downward into earth or other material which it might be digging, it must also move closer to the frame — at least to some extent. Also, at the greatest extension of the articulated boom, the bucket describes an arc at any elevation. Also, because of the geometry of the boom construction, there is a limit as to how close to the horizontal the mouth of the backhoe bucket can be brought particularly at a level below the operator. That is to say, in the usual apparatus, when the bucket is digging in ground or the other material at an elevation below the frame of the backhoe apparatus, at its greatest extension away from the frame the mouth of the bucket is usually downward turned at its outer edge or lip.

Sometimes, particularly in such circumstances as a preferred embodiment of this invention to be discussed hereafter, it is desirable that the mouth of the bucket be brought as close to the horizontal as possible at an elevation well below the elevation of the frame of the backhoe. In other words, it is desirable in such circumstances to "open" the bucket to a greater extent than can usually be provided in the typical backhoe apparatus. Also, as is discussed in greater detail hereafter, it is sometimes desirable that the mouth of the bucket be offset from being perpendicular to the axis of the boom to which it is attached. That is, it is sometimes desirable to rotate or swivel the bucket about the end of the boom.

The above desiderata may be applicable to backhoe apparatus in nearly any circumstance that such apparatus would be used. One circumstance, however, where it is very desirable to be able to extend or open the mouth of the bucket of a backhoe as well as to swivel

the bucket at the end of the boom is when the backhoe is used for unloading material from containers such as hoppers or gondola-type railway cars, and the like. It is particularly helpful when such an open-topped container as a gondola railway car can be emptied of material which may be noxious or otherwise injurious to workers — such as crushed lime, powdered sulphur and the like — or which may be hot but with a crust — such as semi-refined copper ore concentrate. In such circumstances, it may not be possible to tip a gondola car or to empty it from hopper openings, nor may it be desirable to place workers in the car with shovels. In order to overcome those difficulties therefore it is desirable to provide an apparatus for unloading such an open-topped container as a gondola-type railway car which can be extended into the corners of the car. At the same time, it is necessary to provide an apparatus which is supported above the car so that the bucket may be operated downwards into the car, and which has sufficient shock absorber means to absorb energy transmitted to the backhoe frame when the bucket encounters resistance to its movement.

BRIEF SUMMARY OF THE INVENTION

It is an object of this invention to provide a bucket apparatus for a backhoe or the like, where the bucket can be attached to a standard bucket attachment means on the boom or dipper stick of the backhoe, and where the bucket can be extended in its opening with respect to the end of the boom and swivelled with respect thereto.

Another object of this invention is to provide a bucket apparatus for a backhoe or the like, which can be easily and relatively inexpensively fabricated.

A still further object of this invention is to provide an apparatus for unloading open-topped containers such as gondola-type railway cars, where the bucket of a backhoe which is included in that apparatus can be extended into the corners of the open-topped container; and including suitable shock absorber, tiedown and control means.

Yet a further object of this invention is to provide an apparatus for unloading gondola-type railway cars, which can be adapted to facilitate the use of a standard, wheeled backhoe apparatus, but which has a bucket apparatus which includes extension of the opening of the mouth of the bucket and where the bucket can be swivelled.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and objects of the invention are discussed in greater detail hereafter, in association with the accompanying drawings, in which:

FIG. 1 is a perspective, partially fragmented view of a typical apparatus in accordance with a preferred embodiment of this invention, where the apparatus is adapted to unload gondola-type railway cars;

FIG. 2 is a perspective view of a bucket apparatus mounted at the end of a boom or dipper stick of a backhoe or like apparatus, in accordance with this invention;

FIG. 3 is a side view of the bucket of FIG. 2 including its attachment apparatus;

FIG. 4 is a partial cross-section taken in the direction of arrows 4—4 of FIG. 3; and

FIG. 5 is a plan view look downwardly at the apparatus of FIGS. 2 or 3, and particularly showing the bucket and its attachment apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 is particularly related to a preferred embodiment which is adapted for unloading gondola-type railway cars. This invention, which is particularly related to the bucket apparatus used in the apparatus of FIG. 1, is nevertheless applicable to backhoe apparatus per se. However, in the one aspect of the invention, the bucket apparatus hereof is discussed in association with the apparatus of FIG. 1 because that apparatus is particularly operable only with the bucket apparatus hereof, and because the invention is more easily discussed with respect thereto particularly in view of the requirements for extension of the opening of the mouth of the bucket and for swivelling the bucket with respect to the boom or dipper stick.

Turning to FIG. 1, there is shown a typical backhoe apparatus indicated at 10. The backhoe apparatus includes an engine or other power device indicated generally at 12, an operator's cab indicated generally at 14, a frame 16 upon which a swing table indicated generally at 18 is mounted, and a boom apparatus indicated generally at 20. It should be noted that the boom apparatus 20, the operator's cab 14 and the power source 12 are mounted on the swing table 18. The boom apparatus 20 includes a boom 22 which is pivotable at its lower end and is operable by hydraulic cylinders 24. A dipper stick 26 is attached to the boom 22 and is pivotable at 28. The dipper stick 26 is powered for "knee action" about the pivot 28 by hydraulic cylinders 30. A bucket indicated generally at 31 is attached at the end of the boom apparatus 20 — specifically by a bucket attachment apparatus which includes a standard backhoe pick-up 32 which is pivoted at 34 and operable by hydraulic cylinder 36. The hydraulic cylinders 24, 30 and 36 are attached by suitable hose means to hydraulic power means which are associated with the engine 12.

So far, the above description has been such that it could relate almost to any standard backhoe apparatus. The backhoe 10, in this example, is wheel mounted; i.e. wheels having pneumatic tires and which are indicated generally at 36 are secured to the frame 16. In the apparatus of FIG. 1, which is intended for unloading gondola cars of the sort shown generally at 38, the backhoe 10 is mounted on a structure indicated generally at 40. The structure includes a deck 42 having troughs 44 formed therein. A tiedown such as a cable or chain is indicated at 46, and the tiedown 46 is secured between the backhoe frame 16 and the support structure 40. It will be noted that the troughs 44 are each adapted to receive the tires 36 of the backhoe 10. The gondola car 38 is mounted on the usual railway trucks 48 which run on tracks 50. Control means are provided for moving the gondola car 38 beneath the backhoe 10 mounted on structure 40, as discussed hereafter.

When the gondola car 38 is to be unloaded, and when it contains such material as copper ore concentrate, it is necessary that the backhoe 10 be mounted upon suitable shock absorbers so that when the bucket 31 is forced or "crowded" into the material in the gondola car 38, the energy of the crowding which may be transmitted back by the boom apparatus 20 to the backhoe

10 can be absorbed. The pneumatic tires 36 make provision for such energy absorption; and thus a standard backhoe 10 can be mounted on the structure 40. However, as discussed above, a standard backhoe has limitations as to the operation of its bucket. In such circumstances as the unloading of gondola car 38 — as well as in any circumstances requiring excavation of a rectangular or other hole — it may be necessary to extend the opening of the mouth of the bucket 31, or to swivel the bucket 31 beyond the usual limits of a standard backhoe. For example, when the bucket 31 is in the position indicated in ghost lines at 52, it may be necessary to open the bucket mouth beyond the usual limit. That limit is, of course, reached by the geometry of the boom structure 20; and particularly by the geometry of the bucket attachment 32 and the hydraulic cylinder 36. Means are provided by this invention for extending the opening of the mouth [the open side] of the bucket 31 so that the mouth is substantially horizontal, or in any event so that the lower lip of the mouth is such that it can contact the inner side of the end wall 54 of gondola car 38. At the same time, although the swing table 18 of backhoe 10 may be swung slightly so that the bucket 31 reaches nearly into the corner 56 of the gondola car 38, it will be understood that it does not completely extend into the corner because the bucket has finite width and would interfere at one corner thereof with the inside of end 54 of the gondola car 38. Thus, it is desirable to swivel the bucket so that the lower lip of the mouth thereof is no longer perpendicular to the longitudinal axis of the dipper stick 26 of the boom apparatus 20.

Referring to the position of the bucket as indicated generally at 58, it will be noted that for the outer corner of the lower lip of the mouth of the bucket to maintain contact with the bottom corner 60, it is again necessary to swivel the bucket so that its mouth is no longer perpendicular to the longitudinal axis of the dipper stick 26.

In the apparatus as illustrated in FIG. 1, suitable controls are provided in the operator's cab 14 to control the shunting motion back and forth of the gondola car 38 beneath the structure 40 on which the backhoe 10 is supported. Thus, an operator seated in the operator's cab 14 can control the operation of the backhoe 10, and particularly of the bucket 31 thereof; and as well he can control the shunting operation of the gondola car 38 beneath him so that he can operate the bucket 31 to completely unload the gondola car 38, including all of its corners. Thus, the movement of the bucket 31 with respect to the end of the boom apparatus 20 must be somewhat beyond the normal extent of movement of the bucket 31, particularly if it is to get into the vertical corners of the gondola car 38 and to move along them so as to remove material within the gondola car therefrom at those corners. Otherwise, where a standard backhoe having a standard bucket attachment is used, it may be necessary to send workers into the gondola car with shovels to clean out the corners which cannot be reached by the standard bucket attachment.

[In apparatus of the sort illustrated in FIG. 1, a gondola car which is 80 feet long and which is loaded with copper ore concentrate can be unloaded in less than one-half of an hour.]

Turning now to FIGS. 2 to 5, the following description is particularly related to the bucket apparatus indicated generally at 31 in FIG. 1. That bucket apparatus

includes a bucket 62, the standard bucket attachment 32 which would be found on any backhoe apparatus, and suitable hydraulic power means (not shown). The bucket apparatus of FIGS. 2 to 5 is such that it provides means for extending the swinging of the bucket 62 about the end of the boom apparatus 20 — and particularly the dipper stick 26 — where the extended swinging of the bucket 62 is about an axis of rotation which is substantially perpendicular to the longitudinal axis of the dipper stick 26, as discussed in greater detail hereafter. Further, the bucket apparatus of FIGS. 2 to 5 provides means whereby the mouth of the bucket can be offset from being perpendicular to the longitudinal axis of the boom or dipper stick, as discussed hereafter.

The bucket apparatus of this invention includes a first, base plate 64 which is hingedly secured to the bucket 62 at hinges 66. The plate 64 is secured to the bucket attachment 32 as discussed hereafter. Also included is a pair of hydraulic cylinders 68 which are hingedly secured by such as a pin 70 in a support frame 72, which in turn is secured to the plate 64. The other end of cylinder 68 is hingedly secured to the bucket 62 by such means as pin 74 in a support structure 76 therefor.

In the usual circumstances, cylinders 68 are double-acting hydraulic cylinders which are connected at suitable hydraulic connection points 77 to a suitable source of hydraulic pressure. Each of the double-acting hydraulic cylinders 68 includes a piston rod 79, and each is adapted to exert pressure axially along the piston rod 79, and each is adapted to exert pressure axially along the piston rod 79. [In the broadest terms, one of the cylinders could act in one direction with a free dump in the opposite direction, and vice versa; or alternatively, one double-acting hydraulic cylinder might be provided in certain circumstances, depending upon the size of the bucket and other considerations.]

Referring now to FIG. 3, it will be noted that the base plate 64 is secured to the support structure 72 for hinge pin 70 at the left hand end of hydraulic cylinder 68 as seen in FIG. 3, and that the right hand end of hydraulic cylinder 68 is secured to pin 74. 67 is the axis of the hinges 66, and is the axis of rotation about which the bucket 62 is made to rotate upon operation of the hydraulic cylinders 68. Thus, as the hydraulic cylinders 68 are retracted, the bucket 62 assumes the position 62A as shown in ghost lines in FIG. 3, pin 74 moves downwards and to the left slightly as seen in the figure, and the bucket is made to rotate about the axis of rotation 67. Upon extension of the hydraulic cylinders 68, the bucket assumes the position as shown in solid lines in FIG. 3 and as indicated in FIG. 2. The position 62A of the bucket 62 indicated in FIG. 3 is the open or extended position of the bucket such as is indicated at 52 in FIG. 1. It will be seen, therefore, that the bucket 62 can be made to swing about an axis of rotation 67 which is a part of the bucket attachment means disposed at the end of dipper stick 26 of boom structure 20 beyond the normal extent; because of the operation of hydraulic cylinders 68 and their relationship to the bucket 62, plate 64 and axis of rotation 67 of the hinges 66.

In order to accommodate the rotation or swivelling action of the bucket at the end of the boom apparatus 20, a second, swivel plate 78 is interposed between the base plate 64 and the bucket attachment apparatus 32. As particularly noted in FIG. 4, the swivel plate 78 is

secured in channel sections 80 at either side of the base plate 64, between bearing bars 82 which are secured therein. Each of the edges of the swivel plate 78 forms an arc of a circle as indicated at 84 in FIGS. 2 and 5, so as to accommodate rotation of the swivel plate 78 between bearing bars 82, as noted hereafter. A shaft 86 is disposed in bearings or bushings 88 and 90 so as to be bearingly disposed with respect to the base plate 64 and the swivel plate 78. Thus, rotation of the swivel plate 78 about the axis of shaft 86 between the bearing bars 82 is accommodated.

Rotation of the swivel plate 78 with respect to the base plate 64 is effected by operation of hydraulic cylinders 92. The upper side of the swivel plate 78 has a pair of brackets 98 secured thereto; and a pair of wing-like support plates 100 extend outwardly, one from each of the brackets 98. Each of the hydraulic cylinders 92 is hingedly secured to the support plates 100 by pins 94, and thus each of the hydraulic cylinders 92 is hingedly secured at one end of each to the swivel plate 78. The other end of each of the hydraulic cylinders 92 is hingedly secured at pin 96 in a support structure 102 which is secured to the base plate 64. It should also be noted that the bucket attachment apparatus 32 is secured to the brackets 98 by pins 104, so that the swivel plate 78 is therefore secured to the bucket attachment apparatus 32 and is interposed between the standard backhoe bucket attachment apparatus 32 and the base plate 64 of the bucket apparatus according to this invention.

Each of the hydraulic cylinders 92 is conveniently a double-acting hydraulic cylinder, and each is adapted to be attached to suitable hydraulic means at hydraulic attachment points 106. As noted above with respect to hydraulic cylinders 68, each of the hydraulic cylinder 92 might be a single-acting cylinder with a dump in the opposite direction. However, in the most usual circumstance, cylinders 92 are double-acting and are arranged to operate in opposite directions when appropriately pressurized. That is, when one of the hydraulic cylinders 92 is opening, the other is closing, and vice versa. Thus, rotation of the swivel plate 78 about the axis of shaft 86 is accommodated, the rotation being with respect to the base plate 64 and thus the bucket 62; because one end of each of the hydraulic cylinders 92 is hingedly secured to the swivel plate 78 at 94 and the other end of each of the hydraulic cylinders 92 is hingedly secured to the base plate 64 at 96, and thus to the bucket 62.

FIG. 5 shows the shovel 62 in a swivelled position with respect to the swivel plate 78, the amount of swivel being indicated by angle 108. The angle 108 is shown between two centre lines 110 and 112; and centre line 110 is the centre line of the bucket attachment apparatus 32 and the dipper stick 26 of boom apparatus 20, while centre line 112 is the centre line of the bucket 62 taken perpendicular to the mouth 114 thereof.

Returning now to FIG. 1, it will be seen that if the bucket 31 is in position 52, then hydraulic cylinders 68 are retracted so as to extend or further open the mouth of the bucket with respect to the dipper stick 26; and the bucket is swivelled in the direction of arrow 116 with respect to the centre line of the dipper stick 26. Likewise, when the bucket 31 is in the position 58, the bucket is swivelled in the direction of arrow 118 with respect to the centre line of the dipper stick 26. It should also be noted that the swivelling action is not

about the centre line of the dipper stick 26, but rather it is about the axis of shaft 86, as discussed above. However, the swivelling of the bucket has the effect of permitting an offset of the mouth 114 thereof from being perpendicular to the longitudinal axis of the boom, as indicated in FIG. 5 with respect to the angle 108 and centre lines 110 and 112.

It will be recognized that the bucket apparatus according to this invention is useful for any backhoe apparatus where it is desired to open the mouth of the bucket further than can be accommodated by the bucket attachment to the boom apparatus thereof; and where it may be desired to swivel the bucket so as to turn the mouth thereof away from being perpendicular to the axis of the dipper stick. Also, it will be recognized that the apparatus including cylinders 68 to swing the bucket 62 about the axis 67 of hinges 66 is quite independent of the apparatus to swivel the bucket 62 about the axis of shaft 86.

The operation of the apparatus including cylinder 68 and the base plate 64 to swing the bucket 62 about the axis of hinges 66 may be likened to a "wrist" action; in that it is not unlike the action of moving one's hand upwards or backwards at the wrist so as to face the palm of the hand outwards and substantially perpendicularly to the forearm. Likewise the action of the standard boom apparatus 20 of a backhoe at its base, and at points 28 and 34 may be likened to a straightforward swinging action of the leg at the hip, knee and ankle respectively.

The apparatus of FIG. 1 may be used with many types of open-topped containers, particularly gondola-type railway cars and the like; although tractor-towed trailers operating on a roadway or other path may be substituted for the gondola cars. The operation of the backhoe 10 and of the bucket apparatus 31 in accordance with this invention is, however, quite independent of the specific example employing a backhoe as illustrated in FIG. 1, and it will be appreciated that the use of the novel bucket apparatus according to this invention for such purposes as trench or basement excavation, etc., may significantly reduce the time required or the requirements for additional labour for such purposes as "squaring up" the sides of the excavation, and thus significantly reducing the cost of such excavation of other work.

There has been described a bucket apparatus for a backhoe or the like, where the bucket may be swivelled so as to offset the mouth of the bucket from being perpendicular to the longitudinal axis of the boom apparatus to which it is attached, and where the bucket may independently be opened or extended with respect to its wrist action at the end of the boom apparatus. Also, there has been described an apparatus for unloading opened topped containers such as gondola cars and the like; where the apparatus is adapted for use with a standard, wheeled backhoe having a bucket apparatus as described herein. It has been noted that the bucket apparatus according to this invention may be used in any backhoe operation, and it has been noted that significant economies of operation may be realized thereby. Modifications and changes may be made to the apparatus beyond those which have been considered or contemplated in the above discussion and the drawings, without going beyond the scope of the appended claims.

What I claim is:

1. In a bucket apparatus for a backhoe and similar apparatus, including a bucket, bucket attachment means and hydraulic power means, the improvement comprising:

first plate means secured to said bucket attachment means;

first hydraulic cylinder means having piston rod means adapted to exert pressure axially in a first direction thereof, and second hydraulic cylinder means adapted to exert pressure in a second direction opposite to said first direction; said first and second hydraulic cylinder means being hydraulically attached to said hydraulic power means;

a first end of said first hydraulic cylinder means being hingedly secured to said first plate means;

a second end of said first hydraulic cylinder means being hingedly secured to said bucket;

hinge means secured to said bucket and hingedly securing said first plate means to said bucket and disposed so that said bucket is rotatable about said hinge means in a first direction of rotation upon operation of said first hydraulic cylinder means, and in a second direction of rotation upon operation of said second hydraulic cylinder means; and

second plate means interposed between said first plate means and said bucket attachment means and substantially parallel to said first plate means; bearing means secured to said first plate means and adapted to accommodate said second plate means at its outer edges; shaft means disposed with respect to said first and second plate means and adapted with said bearing means secured to said first plate means to permit rotation of said first plate means relative to said second plate means about the axis of said shaft; third and fourth hydraulic cylinder means hingedly secured at a first end of each to said first plate means and at a second end of each to said bucket attachment means and disposed so that said first plate means is rotatable about the axis of said shaft in a first direction of rotation upon operation of said third hydraulic cylinder means, and in a second direction of rotation upon operation of said fourth hydraulic cylinder means.

2. In the bucket apparatus of claim 1, said first and second hydraulic cylinder means together being at least one double-acting hydraulic cylinder.

3. In the bucket apparatus of claim 1, said first and second hydraulic cylinder means being a pair of double-acting hydraulic cylinders placed one on each side of said bucket attachment means.

4. In the bucket apparatus of claim 3, the axis of said hinge means hingedly securing said bucket to said first plate means and the axes of said hinge means hingedly securing said first and second ends of each of said pair of double-acting hydraulic cylinder means being all substantially parallel.

5. In the bucket apparatus of claim 3, the axis of said shaft and the axes of said hinge means hingedly securing said first and second ends of each of said pair of double-acting hydraulic cylinder means being all substantially parallel.

6. In the bucket apparatus of claim 1, said third and fourth hydraulic cylinder means together being at least one double-acting hydraulic cylinder.

7. In a backhoe apparatus including a bucket having a mouth, bucket attachment means, hydraulic power

means and a frame, said bucket attachment means being secured to the end of boom means, said boom means being supported by the frame of said backhoe, the improvement comprising:

- means supporting said backhoe; 5
- means for extending the swinging of said bucket at the end of said boom means about an axis of rotation not parallel to the longitudinal axis of said boom means, and means for permitting an offset of the mouth of said bucket from being perpendicular to the longitudinal axis of said boom means, including; 10
- first plate means secured to said bucket attachment means;
- first hydraulic cylinder means having piston rod means adapted to exert pressure axially in a first direction thereof, and second hydraulic cylinder means adapted to exert pressure in a second direction opposite to said first direction; said first and second hydraulic cylinder means being hydraulically attached to said hydraulic power means; 15 20
- a first end of said first hydraulic cylinder means being hingedly secured to said first plate means;
- a second end of said first hydraulic cylinder means being hingedly secured to said bucket; 25
- hinge means secured to said bucket and hingedly securing said first plate means to said bucket and disposed so that said bucket is rotatable about said hinge means in a first direction of rotation upon operation of said first hydraulic cylinder means, and in a second direction of rotation upon operation of said second hydraulic cylinder means, the axis of rotation of said bucket being the axis of said hinge means; 30
- second plate means interposed between said first plate means and said bucket attachment and substantially parallel to said first plate means;
- bearing means secured to said first plate means and adapted to accommodate said second plate means at its outer edges; 35 40
- shaft means disposed with respect to said first and second plate means and adapted with said bearing

- means secured to said first plate means to permit rotation of said first plate means relative to said second plate means about the axis of said shaft;
- third and fourth hydraulic cylinder means hingedly secured at a first end of each to said first plate means and at a second end of each to said bucket attachment means and disposed so that said first plate means is rotatable about the axis of said shaft in a first direction of rotation upon operation of said third hydraulic cylinder means, and in a second direction of rotation upon operation of said fourth hydraulic cylinder means;
- rotation of said first plate means in either direction of rotation about the axis of said shaft being such as to offset the axis of the hinge means hingedly securing said first plate means to said bucket, and the mouth of said bucket, from being perpendicular to said longitudinal axis of said boom means; and
- shock absorber means secured to said frame of said backhoe to absorb shocks between said frame and said means supporting said backhoe, and tiedown means secured between said backhoe frame and said means supporting said backhoe.
- 8. In the backhoe apparatus of claim 7, said means for supporting said backhoe arranged to support said backhoe over path means along which open-topped container means are movable.
- 9. In the backhoe apparatus of claim 8, said shock absorber means comprising pneumatic means secured to said backhoe frame; and where said path means comprises track means, and said open-topper container means comprise gondola-type railway cars and the like.
- 10. In the backhoe apparatus of claim 9, said pneumatic means comprising pneumatic tires secured to the frame of a conventional wheeled backhoe, said tires being at least partially retained in trough means therefor; and where said tiedown means comprises cable or chain means, or the like, arranged to preclude movement of said pneumatic tires away from said trough means.

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