Dec. 25, 1962 J. N. JOHNSON ET AL 3,070,246

POWER LOADER

Filed Jan. 27, 1960 2 Sheets-Sheet 1

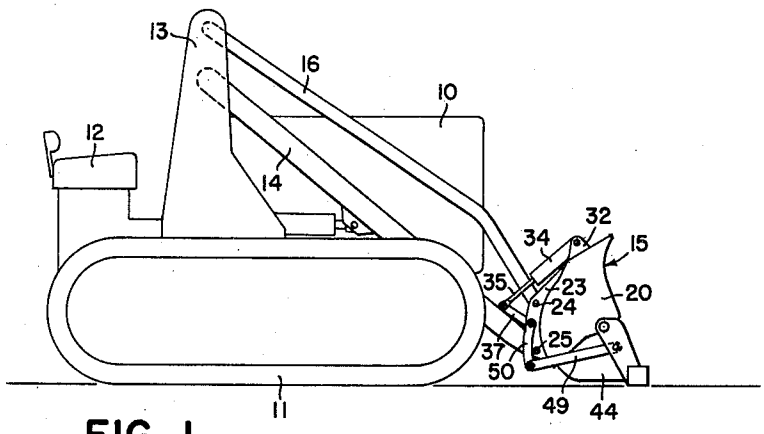


FIG. 1

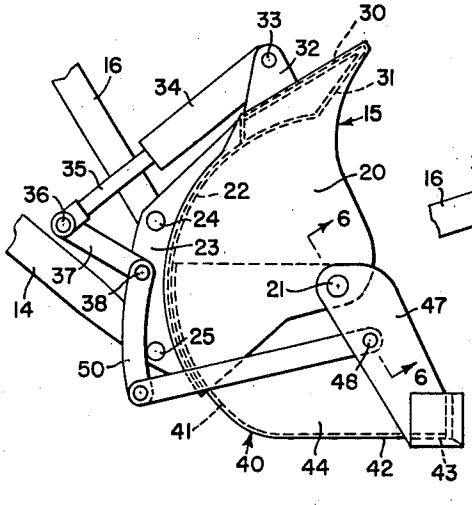


FIG. 3

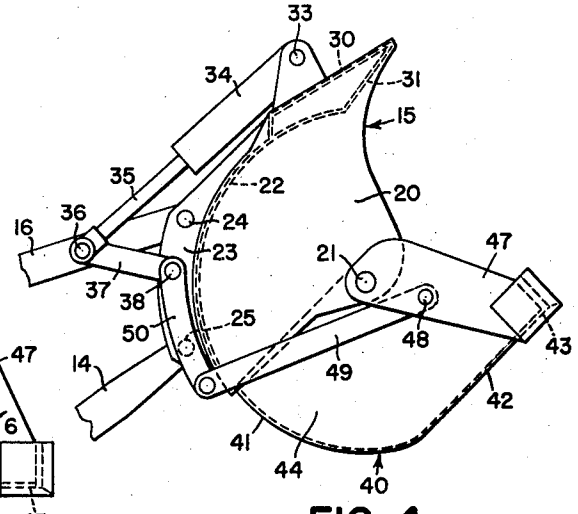


FIG. 4

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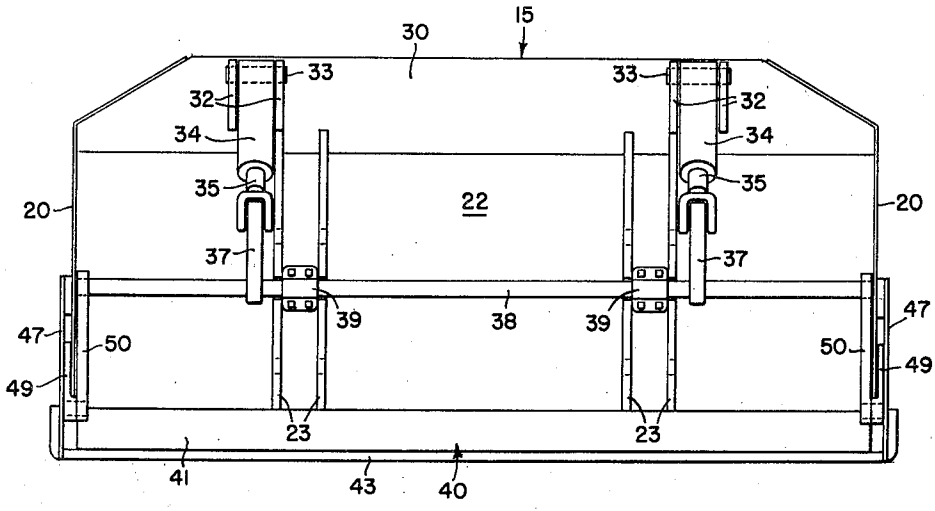
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FIG. 2



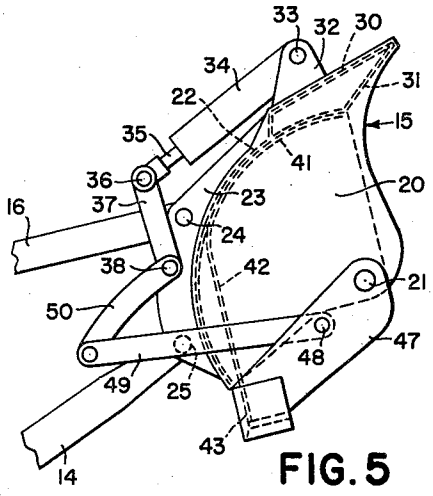


FIG. 5

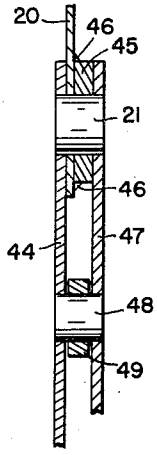


FIG. 6

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United States Patent Office 3,070,246 Patented Dec. 25, 1962

3,070,246
POWER LOADER

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Filed Jan. 27, 1960, Ser. No. 4,948
10 Claims. (Cl. 214—146)

This invention relates to a power loader. More particularly this invention relates to the bucket used on the loader.

In conventional type loaders there is provided a boom which is mounted on a loader frame which may be a part of the main vehicle frame or may be mounted on the vehicle frame as an attachment. On the free end of the boom is provided a bucket or scoop which serves to both dig and to carry the material. The bucket is normally pivoted about the end of the boom and conventionally there are provided power means, usually hydraulically operated, serving to swing the bucket between a digging position in which the bucket bottom is generally horizontal, a dumping position in which the bucket bottom is inclined forwardly and downwardly, and a carrying position in which the bucket is tilted to a position in which the bucket bottom is inclined upwardly. The hydraulic unit or cylinder which tilts the bucket normally extends from the bucket to the boom or the main frame of the implement and tilts the bucket by extension or retraction of the ram of the cylinder. Since the hydraulic cylinder is connected to the boom, movement of the boom upwardly or downwardly creates an automatic tilting of the bucket relative to the ground unless servo means, either mechanical or hydraulic, is provided to adjust the cylinder for purposes of maintaining the bucket at a fixed angle. This, however, creates or introduces into the loader additional expense both in manufacture and maintenance.

It is the primary object of the present invention to provide a loader bucket of a new and novel design which has its own power source for moving portions of the bucket relative to other portions of the bucket in order to permit material to be carried or to be dumped out of the bucket.

It is the purpose of the invention to provide a loader bucket composed of a back wall and a bottom plate, both of which have a curvature formed about a common transverse horizontal axis. The radius of the bottom plate is slightly smaller than that of the back wall and consequently the bottom plate may telescope or slide between a position in which the bottom plate is nested forwardly of the back wall and the bucket is generally open at its bottom and a position in which the bottom plate is swung forwardly until the bottom plate closes the bottom of the bucket. The bottom plate may operate so as to have a forward portion generally horizontal and directed forwardly so that the bucket may be in a digging position or the bottom plate may be positioned so that its forward portion is directed upwardly and the bucket be in a carrying position.

Incorporated in the above described type of bucket is power means of the hydraulic type mounted on the back wall or elsewhere and connected to the bottom plate so as to move the latter to the desired position relative to the back wall.

Other objects and advantages of the present invention will become apparent to those skilled in the art as the nature of the invention is better understood from the following description and as shown in the accompanying drawings.

FIG. 1 is a side view of a tractor and a power loader incorporating the features of the present invention.

FIG. 2 is an enlarged rear view of the bucket.

FIG. 3 is an end view of the bucket shown in FIG. 2 with parts thereof in one position.

FIG. 4 is an end view of the bucket shown in FIG. 2 with portions thereof in a different location.

FIG. 5 is an end view of the bucket shown in FIG. 2 with portions thereof in still a different location.

FIG. 6 is an enlarged sectional view taken along the line 6—6 of FIG. 3.

Referring now to FIG. 1, there is therein provided a tractor of the track-laying type having an elongated tractor body **10** carried on a pair of side tracks, one of which is shown at **11**, and controlled from an operator's station as indicated by the seat **12**. Positioned on the tractor frame is a main loader framework composed of a pair of upright frames **13** on opposite sides of the tractor body **10**. Forwardly extending booms **14** are pivotally mounted on the upright frame structures **13** and extend forwardly on opposite sides of the tractor body **10** to free ends connected to a forwardly opening bucket indicated in its entirety by the reference numeral **15**. Upper links **16**, generally parallel to the booms **14** and positioned on opposite sides of the tractor body **10**, are also pivotally connected to the main frame **13** and to the rear of the bucket **15**.

The bucket **15** is composed of a back structure including a pair of transversely spaced and oppositely disposed end walls **20** carrying at their forward ends transverse pivot means in the form of pivot pins **21**. The end walls **20** are rigidly interconnected by a back wall **22** having a curvature formed about the transverse horizontal axis of the pivot pin **21**. Rearwardly extending and vertically disposed bracket plates **23** are fixed to the rear surface of the back wall **22** and are provided with suitable transversely alined openings which receive pivot pins **24**, **25** for pivotally connecting the upper links **16** and booms **14** to the bracket plates **23**. As may be seen from viewing FIG. 1, the boom **14**, upper links **16**, bracket plates **23**, and the upper portion of the frame **14** form a parallelogram type linkage for the purpose of maintaining the back plate **22** of the bucket at substantially the same angular disposition relative to the ground regardless of the position of the booms **14**.

Transverse channel structure **30** is provided to reinforce the upper edge of the back wall **22** and has a forwardly projecting portion **31***a* which operates or serves as the spill sheet for the bucket. Extending upwardly from the upper surface of the channel structure **30** are a series of identical brackets **32** having transverse openings for receiving transverse pivot pins **33** that connect hydraulic cylinders **34** to the back wall **32**. Downwardly extending ram ends **35** are pivotally connected by pivot pins **36** to transversely spaced rock arms **37** fixed to a transverse rock shaft **38**. The shaft **38** is carried on the rear face of the rear wall **22** by means of journal supports **39**.

The bottom structure of the bucket is composed of a bottom plate **40** having a rear portion **41** with a curavture formed about the axis of the pivot pins **21** and having a radius slightly smaller than the radius of curvature of the rear wall **20** so that the rear portion **41** may slide inwardly of the rear wall **22** and in close proximity to the wall **22** so as to operate as a scraper when the portion **41** is moved upwardly relative to the rear wall. The bottom plate **40** also has a forwardly disposed flat portion **42**, the forward edge of which serves as the cutting portion of the bucket. As is conventional, the forward edge of the bucket **42** is provided with a reinforcing and forwardly directed cutting edge plate **43**.

Oppositely disposed and upwardly extending rigid wall structure **44** extends from the upper surface and from opposite ends of the bottom plates **40**. The end wall struc-

tures 44 are positioned inwardly of the forwardly extending end walls connected to the rear wall 22 and are pivotally mounted on the transverse pivot pins 21. Referring now to FIG. 6, the pivot pins 21 are carried on the side or end walls 20 by means of a spacer plate 45 fixed to the pivot pin and is welded at 46 to the outer surface of the outer walls 20. The pins 21 are inserted in the walls 44 prior to the welding operation. Reinforcing plates 47 are provided outwardly of the spacers 45 and also extend over the pivot pins 21. The reinforcing plates 47 and end walls 44 also carry pivot pins 48 pivotally receiving forwardly extending links 49 having their rear ends connected to upwardly extending arms 50 which in turn are rigid with the rock shaft 38.

The hydraulic bucket operates in the following manner. Referring first to FIG. 3, the bucket is disposed in its digging or operating position and consequently the booms 14 and the links 16 are directed downwardly. The hydraulic rams 45 are partially extended so that the flat portion 42 of the bottom wall is substantially horizontal and directed forwardly. The linkages 49, 50 and 37 extending from the bottom plate to the hydraulic rams or cylinders will generally lock the bucket in this position. Upon filling the bucket with earth or other material, the booms 14 are raised to an inclined position for carrying purposes. Prior to reaching this position (FIG. 4) the rams 35 are further extended so that the bottom plate 41 is in its fully extended position in which the forward flat portion of the plate is directed upwardly and forwardly in order to prevent material from dropping over the forward edge of the bucket.

Referring now to FIG. 5, the bucket is retracted into a dumping position for discharging the material from the bucket. The hydraulic rams 35 are fully retracted and the linkage extending from the power units to the bottom plate 41 withdraws the bottom plate 40 to its fully retracted position in which the plate 40 lies forwardly of the rear wall 22 and generally in nested relation to that wall. In this position the bottom of the bucket is open and material may be discharged. Also, the rear or upper edge of the curved portion 41 of the bottom plate 40 operates to scrape or loosen the material from the back wall 22.

While only one form of the invention has been shown, it should be recognized other forms and variations may occur to those skilled in the art. Therefore, while the present disclosure has been shown and described in concise and detailed manner for the purpose of clearly and concisely illustrating the principles of the invention, it is not the intention to limit or narrow the invention beyond the broad concepts set forth in the appended claims. Also, it should be recognized that directional references such as forwardly and rearwardly are for purposes of convenience of description and are not meant as terms of limitation in either the specification or the claims.

What is claimed is:

1. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a pair of transversely spaced and oppositely disposed vertical end walls; transversely alined pivot means on the end walls; a back upright wall rigid with the end walls and facing forwardly having a curvature formed about the axis of the transverse pivot means; a bottom plate having a forward digging portion and a rear scraping portion, said rear scraping portion having a curvature formed about the axis of the transverse pivot means and being disposed forwardly of and proximate the rear wall; a pair of vertically disposed side walls rigid with opposite ends of the bottom wall and disposed inwardly of and adjacent the end walls, said side walls being mounted on the respective pivot means on the end walls; power means mounted on the back wall and connected to the bottom plate for adjustably swiveling the bottom plate about the transverse pivot means between a retracted dumping position in which the digging portion is substantially vertical and closely adjacent the back wall and the bottom of the bucket is generally open and an extended position in which the digging portion is directed forwardly and the bottom of the bucket is closed, the bottom plate in the latter position defining with the back wall and end walls a forwardly opening bucket open at its top.

2. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a pair of transversely spaced and oppositely disposed vertical end walls; transversely alined pivot means on the end walls; a back upright wall rigid with the end walls and facing forwardly having a curvature formed about the axis of the transverse pivot means; a bottom plate having a forward digging portion and a rear scraping portion, said rear scraping portion having a curvature formed about the axis of the transverse pivot means and being disposed forwardly of and proximate the rear wall; a pair of vertically disposed side walls rigid with opposite ends of the bottom wall, said side walls being mounted on the respective pivot means on the end walls; power means between the back wall and the bottom plate for adjustably swiveling the bottom plate about the transverse pivot means between an extreme retracted position in which the digging portion is substantially vertical and closely adjacent the back wall and the bottom of the bucket is generally open and an extended position in which the digging portion is directed forwardly and upwardly and the bottom of the bucket is closed, the bottom plate in the latter position defining with the back wall and end walls a forwardly opening bucket open at its top.

3. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall having a curvature formed about a transverse horizontal axis; rigid forwardly extending end structures at opposite ends of the back wall; transverse pivot means on the axis of curvature supported on said end structures; a bottom plate with a curvature formed about the aforesaid axis and normally disposed forwardly of and proximate the rear wall and having a forwardly positioned cutting portion; vertically disposed side structure rigid with opposite ends of the bottom wall mounted on the respective pivot means on the end structures; power means connected to the bottom plate for adjustably swiveling the bottom plate about the transverse pivot means between an extreme retracted position in which the bottom plate is positioned rearwardly and in vertical nested relation to the back wall with the cutting portion thereof depending beneath the rear wall, an extreme extended position in which the bottom plate defines with the rear wall an upwardly opening container closed at the bottom, front, rear and sides, and an intermediate digging position in which a portion of the bottom plate is generally horizontal and the cutting portion is generally horizontal and extending forwardly.

4. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall having a curvature formed about a transverse horizontal axis with a lower horizontal edge; a bottom plate having a forward digging portion and a rear scraping portion, said rear scraping portion having a curvature formed about the aforesaid transverse axis; end structures interconnecting the back wall and bottom plate for pivotal movement about the aforesaid transverse axis; power means connected to the bottom plate for adjustable swiveling of the bottom plate about the transverse axis between the dumping position in which the bottom plate is vertically disposed with the digging portion projecting beneath the lower edge of the back wall and the bottom of the bucket is generally open, a carrying position in which the cutting portion is directed forwardly and upwardly and the bottom of the bucket is closed, and a digging position in which the cutting portion is generally horizontal and directed forwardly.

5. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall having a curvature formed about a transverse horizontal axis with a lower horizontal edge; a bottom plate having a curvature portion formed about the aforesaid axis with a forward cutting edge portion; end structure interconnecting the back wall and bottom plate for pivotal movement about the aforesaid transverse axis; power means connected to the bottom plate for adjustable swiveling of the bottom plate about the transverse axis between a dumping position in which the bottom plate is vertically disposed and closely adjacent the back wall with the cutting edge portion projecting beneath the lower edge of the back wall and the bottom of the bucket is generally open, a carrying position in which the forward portion of the bottom plate is directed fowardly and upwardly and the bottom of the bucket is closed, and a digging position in which the forward cutting portion is generally horizontal and directed forwardly.

6. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall; a bottom plate; end structure interconnecting the back wall and bottom plate for pivotal movement about a transverse horizontal axis; power means connected to the bottom plate for adjustable swiveling of the bottom plate about the transverse axis between a dumping position in which the bottom plate is vertically disposed and closely adjacent the back wall and the bottom of the bucket is generally open, a carrying position in which the forward portion of the bottom plate is directed forwardly and upwardly and the bottom of the bucket is closed, and a digging position in which the forward portion is generally horizontal and directed forwardly.

7. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall; a bottom plate; end structure interconnecting the back wall and bottom plate for permitting relative movement of the bottom plate relative to the back wall; power means connected to the bottom plate for adjusting the bottom plate between a dumping position in which the bottom plate is vertically disposed and closely adjacent the back wall and the bottom of the bucket is generally open, a carrying position in which the forward portion of the bottom plate is directed forwardly and upwardly and the bottom of the bucket is closed, and a digging position in which the forward portion is generally horizontal and directed forwardly.

8. A forwardly opening bucket for a power loader of the type supported on one end of moving vehicle comprising: a back wall; a bottom plate; end structure interconnecting the back wall and bottom plate for permitting relative movement of the bottom plate relative to the back wall; power means connected to the bottom plate for adjusting the bottom plate between a dumping position in which the bottom plate is vertically disposed and closely adjacent the back wall and the bottom of the bucket is generally open, and a digging position in which the bottom plate is generally horizontal and directed forwardly, and the bottom of the bucket is closed.

9. The invention defined in claim 8 in which the back wall and bottom plate have curvatures formed about a common transverse axis defined by transverse pivot means interconnecting them, with one thereof having a radius slightly smaller than the other to permit nesting of the bottom plate in fore-and-aft disposition relative to the back wall.

10. The invention defined in claim 9 in which the power means for adjusting the bottom plate is in the form of linkage extending between the back wall and bottom plate and an hydraulic cylinder mounted on the back wall and connected to the linkage to effect movement of the bottom plate about the transverse pivot means.

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