Dec. 31, 1968 K. SALNA ETAL 3,419,170

ATTACHMENT FOR TRACTOR LOADER

Filed Dec. 10, 1965 Sheet 1 of 2

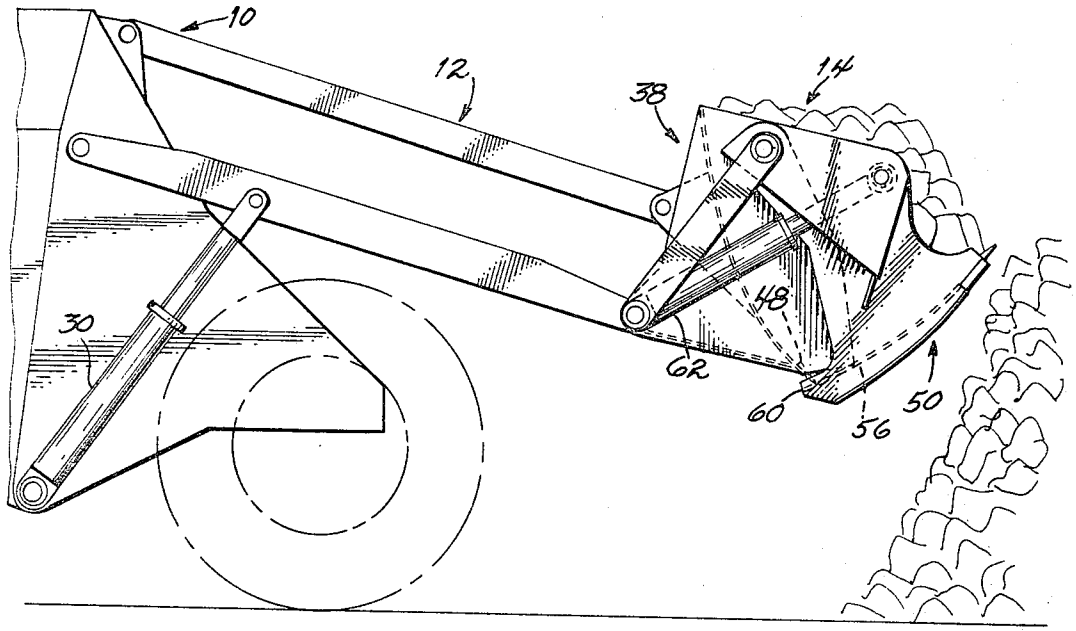


FIG. 3.

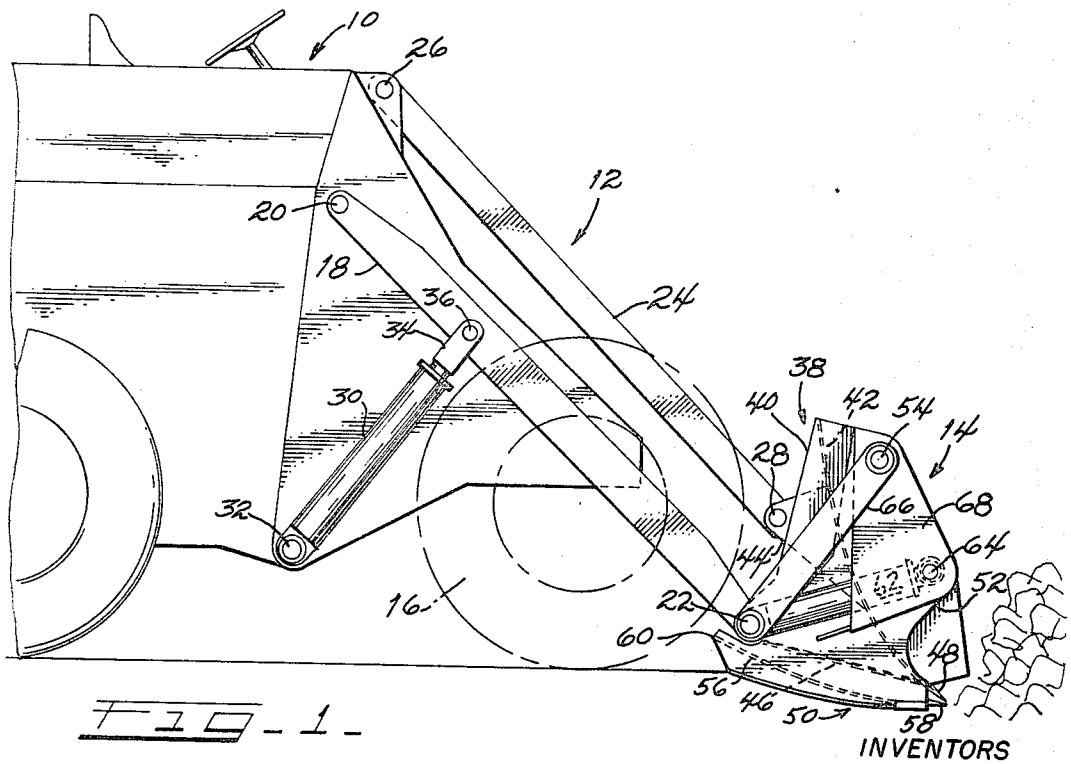


FIG. 1.

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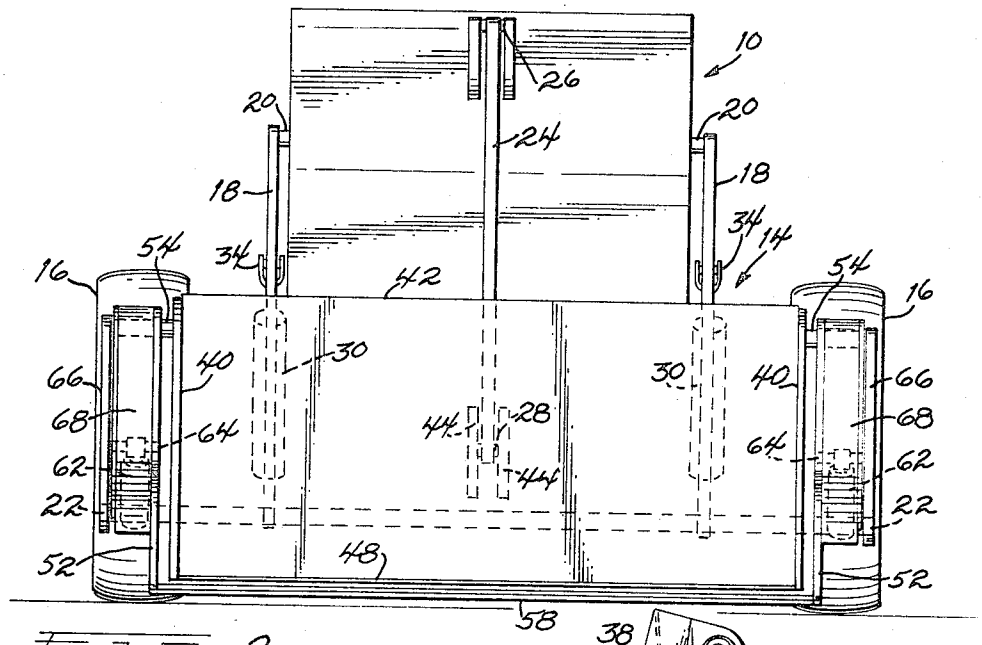


FIG. 2

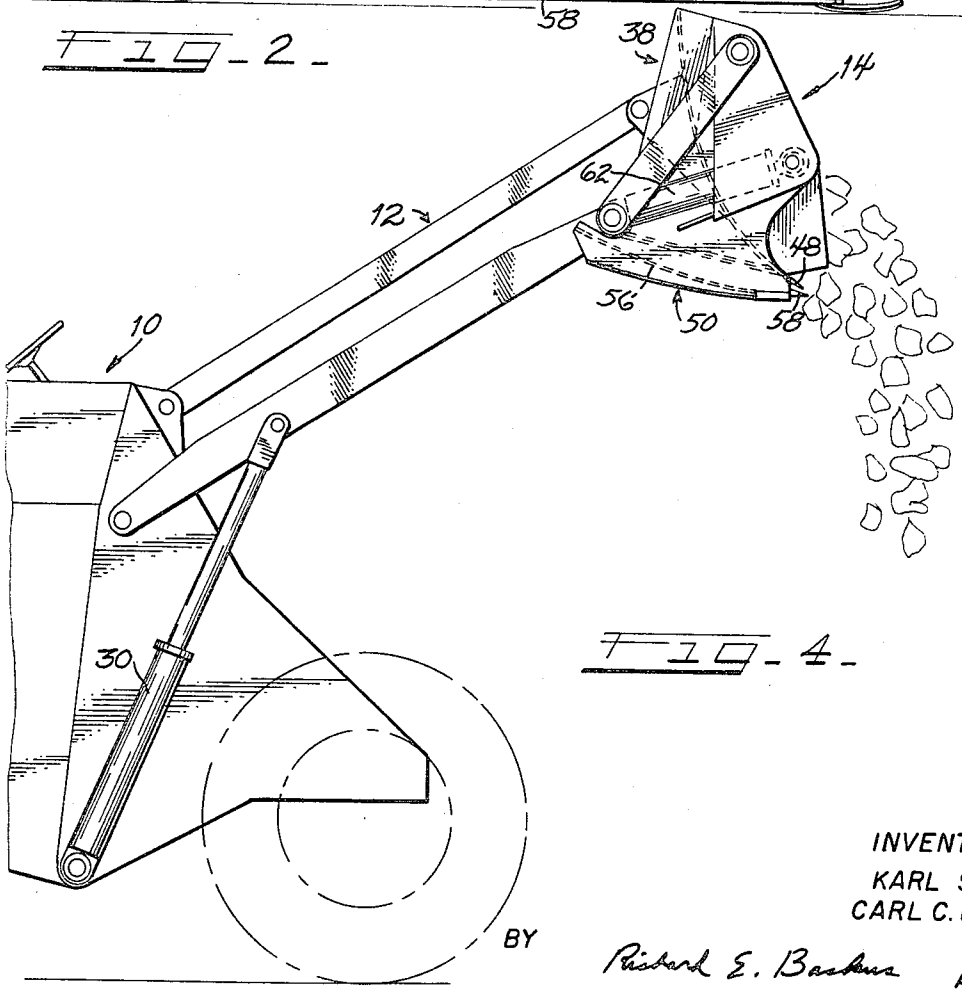


FIG. 4

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ATTACHMENT FOR TRACTOR LOADER

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ABSTRACT OF THE DISCLOSURE

A tractor loader material handling attachment having a digging bucket with a front section pivotally supported on a back section. A hydraulic ram connected between the back section and the front section at a point between the cutting edge and the pivotal support, and a bracket interconnecting the pivotal support and the connection of the ram to the back section.

This invention relates to material handling attachments for tractor loader vehicles and more particularly relates to material handling attachments incorporating a variable volume, two-section bucket affording improved digging and loading characteristics.

It is an object of this invention to provide a novel two-section bucket attachment for a loader vehicle which affords increased dumping height and forward reach, improved cutting action, and a more efficient operating sequence whereby following the dumping cycle the bucket sections are automatically positioned in a digging position for the subsequent loading cycle.

It is another object of this invention to provide an improved bucket attachment for a loader vehicle in which a front bucket section pivots forward relative to a rear bucket section for digging material to be loaded, in which the bucket raises the material to any desired elevation, and in which the front section then pivots rearwardly for dumping the material as the sections are automatically returned to the digging position.

It is another important object of this invention to provide a material handling attachment for a tractor loader in which a floating linkage boom mechanism supports the rear section of a two-section bucket, in which a front section having a bottom wall pivots relative to the rear section for varying the volume of the bucket, and in which pivotal movement of the front section under the rear section for dumping automatically positions the sections in the digging position.

It is still another object of this invention to provide an improved method of handling material by means of a two-section bucket in which the material is loaded while moving the front bucket section forwardly relative to the rear bucket section, in which the bucket is then elevated to any desired position, and in which the material is then dumped by moving the front section rearwardly into the digging position so that the operator is free to manipulate other controls on the vehicle while the boom is being lowered.

The foregoing and other objects of the present invention will become obvious to those skilled in the art when the following specification is read in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a side elevational view of a tractor loader vehicle incorporating a material handling bucket attachment embodying features of the present invention and in which the attachment is shown in the digging position;

FIGURE 2 is a front elevational view of the loader vehicle and bucket attachment of FIGURE 1;

FIGURE 3 is a side elevational view similar to FIGURE 1 showing a loaded bucket as it is lifted toward an elevated position; and

FIGURE 4 is a side elevational view showing the bucket attachment of the present invention dumping the material from the elevated position.

Referring now to the drawings, and particularly FIGURES 1 and 2, a tractor loader vehicle is indicated generally by the reference numeral **10**. A boom assembly **12** is mounted at the front end of vehicle **10** and supports the material handling bucket attachment **14** for vertical swinging movement. The boom and bucket attachment are shown in a lowered, digging position with the boom cradled between the pair of front wheels **16** of the vehicle **10**.

The boom assembly **12** comprises a pair of boom arms **18** pivotally mounted to either side of the vehicle **10** by means of pins **20**. The free ends of each of the boom arms **18** are pivotally attached to the bucket attachment **14** by means of pins **22**. The boom assembly **12** further comprises a guide bar **24** pivotally attached at one end to the tractor by means of pin **26** and at its other end to the bucket attachment **14** by means of pin **28**. The boom arms **18** and guide bar **24** are connected between the tractor and bucket attachment in a parallelogram configuration to produce a "floating linkage" mechanism which maintains a substantially constant attitude of the attachment **14** with respect to ground level as the boom assembly **12** is raised and lowered. Although the floating linkage mechanism illustrated in FIGURES 1 through 4 is considered to be preferred it is understood that the guide bar **24** may be replaced by an extensible hydraulic ram and/or rocker arm assembly (not shown) for tilting the bucket attachment **14** about the pin **22**.

The boom assembly **12** is raised and lowered through operation of a pair of extensible hydraulic rams **30** provided on either side of the vehicle **10**. Each of the rams **30** is pivotally attached at its head end to the vehicle by means of pin **32** and at its rod end to a respective boom arm **18** by means of clevis **34** and pin **36**. Selective extension and retraction of the rams **30** is produced through operation of a hydraulic control circuit (not shown).

The bucket attachment **14** comprises two bucket sections operable to produce a variable volume capacity between the digging and carrying positions. The back section **38** includes a pair of laterally spaced-apart sidewalls **40** pivotally mounted to the pins **22**. A rear wall **42** is rigidly secured between sidewalls **40** and has a concave forward curvature. A pair of brackets **44** extend rearwardly from the rear wall **42** and are pivotally mounted on the pin **28** of guide bar **24**. A bottom support member **46** extends between the lower margins of the sidewalls **40** and the lower edge of rear wall **42**. A forwardly directed cutting blade **48** is mounted at the lower edge of rear wall **42** and extends between the sidewalls **40**.

The front section **50** is essentially U-shaped as viewed in FIGURE 2 and pivots relative to back section **38** to define a variable volume bucket therewith. The front section **50** comprises a pair of laterally spaced-apart outer walls **52** which enclose sidewalls **40** and are pivotally attached thereto by means of pins **54**. An arcuate bottom wall **56** is secured between the lower margins of the outer walls **52**. The upper surface of bottom wall **56** is in sliding contact with the cutting blade **48** as the front section **50** pivots about pins **54**. A forwardly directed cutting blade **58** is mounted on the leading edge of bottom wall **56** and extends between the outer walls **52**. The rear edge **60** of the bottom wall **56** may also be provided with a cutting blade (not shown) for use in leveling or clam-shell operations.

Pivotal movement of front section **50** is effected through operation of a pair of extensible hydraulic rams **62** mounted on either side of the attachment **14**. Each of the rams **62** is pivotally mounted at its head end to

pins **22** and at its rod end to pins **64** secured to the leading edge of outer walls **52**. A bracket **66** is mounted on either side of the attachment **14** between pins **54** and **22** and serves as additional support for the head end of ram **62**. Applicants have also provided a pair of covers **68** mounted on the outer surface of outer walls **52** and enclosing the rod ends of rams **62**. The purpose of covers **68** is to prevent dirt or other objectionable material from interfering with the operation of rams **62**.

Selective extension and retraction of rams **62** is effected through operation of a hydraulic circuit (not shown) with its hydraulic controls located in the operator's compartment. With the rams **62** fully retracted the front section **50** of the bucket attachment is in the digging position, as illustrated in FIGURE 1, whereby the blade **58** is in registry with blade **48** of back section **38**. In this position the attachment **14** may also be operated as a dozer blade to grade or level material.

In operation, with the bucket attachment **14** in position for digging, the vehicle **10** may be driven into the material pile with the blades **48** and **58** cutting into the material. Simultaneous with this the operator will manipulate the hydraulic controls to extend rams **62** thereby pivoting front section **50** forwardly about pins **54**. The blade **58** will now cut into the material in the path of an arc about pins **54**.

As the front section **50** is moved forward to fill the bucket with material, the rams **30** may also be extended and the boom **12** raised so that the bucket attachment **14** defines a longer arc of travel into the material, thereby loading a greater amount of material.

FIGURE 3 illustrates the invention with the boom assembly **12** partially raised and with the rams **62** fully extended so that the front section **50** is pivoted forward into the carry position. In this position the rear edge **60** of bottom wall **56** is moved into juxtaposition with blade **48** on the back section **38**. The bucket attachment **14** now defines its maximum volume capacity and is ready to elevate and carry the material.

FIGURE 4 illustrates the operation of the present invention during a dumping cycle. The boom assembly **12** is raised to elevate the bucket attachment **14** to the desired height. The operator now manipulates the hydraulic controls to retract rams **62** and thereby pivot the front section **50** rearwardly with respect to the back section **38** until the blade **58** of the bottom wall **56** is in juxtaposition to the blade **48**. The material will now fall by force of gravity from the bucket **14**.

As the front section **50** pivots rearwardly the blade **48** of the back section **38** is in sliding contact with the arcuate upper surface of the bottom wall **56**. This serves as a cleaning function whereby the blade **48** scrapes adhering material from the surface of bottom wall **56**.

After termination of the dumping cycle the front section **50** is automatically positioned with respect to rear section **38** in the digging position as illustrated in FIGURE 1. The need is eliminated for the operator to manipulate the controls for bringing the bucket back to the digging position after the dumping cycle as with conventional loader buckets. Thus, with the present invention

the operator is free to manipulate the controls for lowering the boom **12** while maneuvering the vehicle **10** into another location for a loading cycle. The time thus saved by the automatic positioning feature adds up to an appreciable time savings over a large number of operations.

In view of the foregoing description, it is clear that there has been provided herein a new and improved material handling attachment providing improved digging characteristics with automatic positioning of the bucket for the loading cycle after completion of the dumping cycle.

While the embodiment herein is at present considered to be preferred, it will be understood that numerous variations and modifications may be made therein by those skilled in the art, and it is intended to cover in the appended claims all such variations and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A material handling bucket for use with a vehicle having a vertically swingable boom, the bucket comprising:

a back section pivotally carried on the boom;

said back section having a side wall spaced exteriorly of the back section;

a front section having a cutting edge and an outer wall spaced exteriorly of said front section;

cover means secured to the side wall and extending laterally from and parallel to the side wall;

first means pivotally mounting the front section on the back section, first pin means extending through said side wall and said cover means;

a hydraulic ram;

second pin means pivotally securing one end of said ram to the back section;

third pin means extending between said outer wall and the cover means for pivotally securing the other end of said ram to the front section at a point between the first pin means and the cutting edge, and positioning said other end between the cover means and the outer wall; and

bracket means extending between said first and second pin means.

2. A material handling bucket according to claim **1** wherein said second pin means pivotally secures the back section on the boom.

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U.S. Cl. X.R.

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