United States Patent [19]

Campbell

[11] **3,872,986**

[45] **Mar. 25, 1975**

[54] **SELF-CLEANING BUCKET ARRANGEMENT FOR AN EXCAVATOR**

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[73] Assignee: **Caterpillar Tractor Company,** Peoria, Ill.

[22] Filed: **Aug. 23, 1973**

[21] Appl. No.: **390,910**

[52] **U.S. Cl.** ..... **214/146 E,** 37/117.5

[51] **Int. Cl.** **E02f 3/36**

[58] **Field of Search** ..... 214/146 E, 767, 510, 82; 37/117.5, 118

[56] **References Cited**

UNITED STATES PATENTS

2,858,035	10/1958	Mett et al.	214/510
3,380,604	4/1968	Leese	214/767
3,426,928	2/1969	Campbell	214/146 E

Primary Examiner—Albert J. Makay
Assistant Examiner—Ross Weaver
Attorney, Agent, or Firm—Phillips, Moore, Weissenberger, Lempio & Strabala

[57] **ABSTRACT**

An excavator boom has a bucket pivotally mounted on an end thereof and a hydraulic cylinder is pivotally connected to the boom and bucket through a pair of links to selectively pivot the bucket between its rack-back and digging positions of operation. A third link is pivotally interconnected between the boom and a first end of a bellcrank, pivotally mounted on the bucket. The bellcrank is U-shaped to have a cleaning blade secured to its second, lower end which sweeps through the bucket upon selective extension and retraction of the hydraulic cylinder.

13 Claims, 3 Drawing Figures

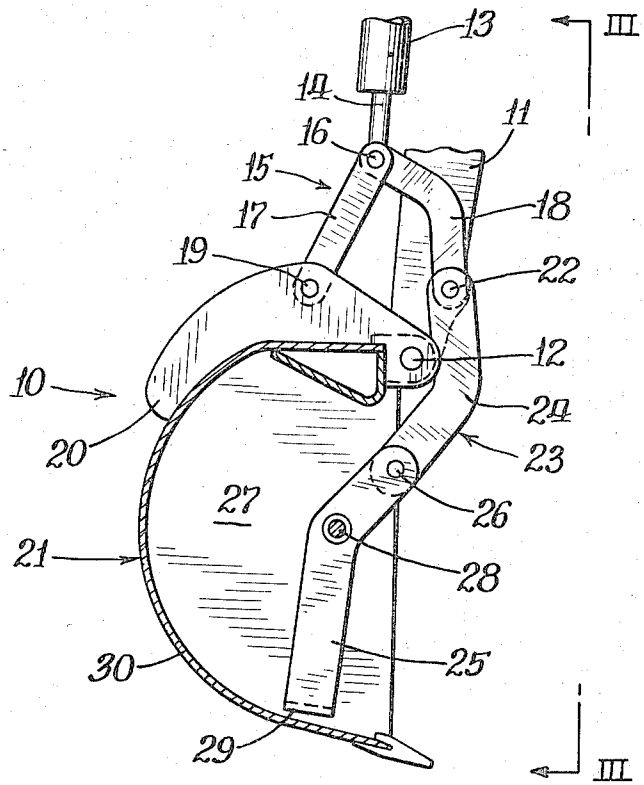

Fig. 1

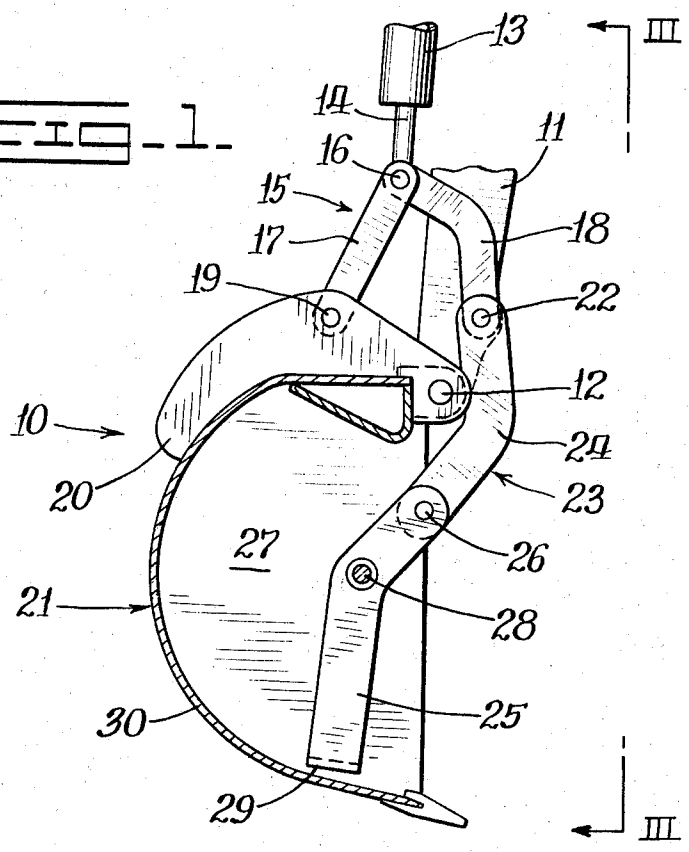
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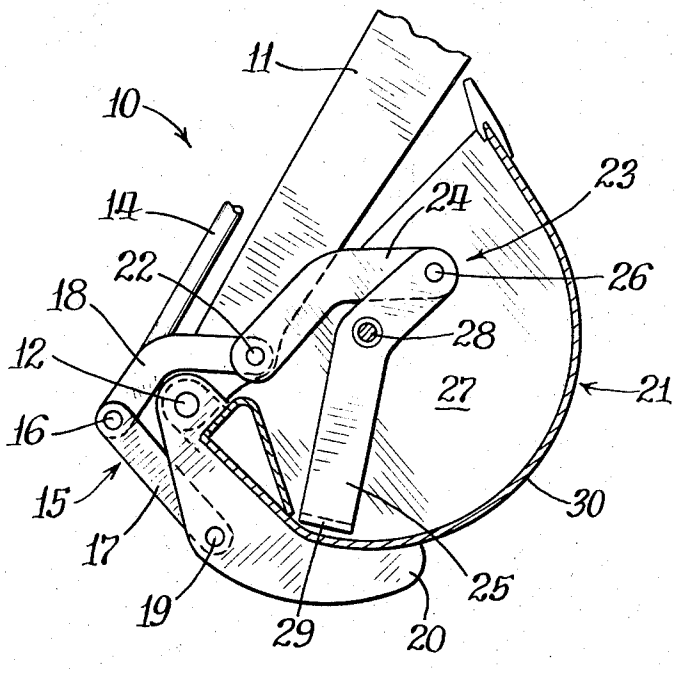
Fig. 2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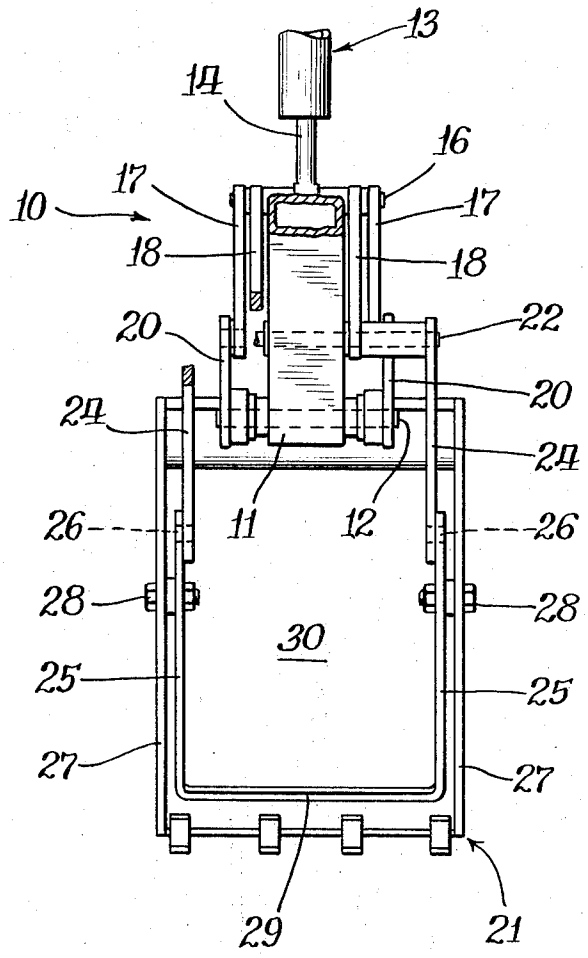
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SELF-CLEANING BUCKET ARRANGEMENT FOR AN EXCAVATOR

BACKGROUND OF THE INVENTION

Earthworking buckets, such as those employed on the boom of an excavator, oftentimes fail to fully discharge material contained therein when the bucket is pivoted to its dump position. Tacky material, such as clay, is particularly difficult to dislodge from the bucket due to its adherence thereto. Thus, the operator must normally bang the bucket against a stationary object or pry out the material manually. Prior art attempts to provide self-cleaning means for the bucket are exemplified by the teachings of U.S. Pat. Nos. 1,653,905; 2,683,542; 2,858,035 and 3,438,526.

SUMMARY OF THIS INVENTION

An object of this invention is to provide an economical and non-complex self-cleaning means for automatically sweeping through an earthworking bucket upon pivotal movement of the bucket between its rack-back and dump positions on a boom. First linkage means are pivotally interconnected between an extensible actuating means and the boom and the bucket for selectively pivoting the bucket between such positions. Second linkage means are interconnected between the boom and the bucket and have the self-cleaning means secured thereon for sweeping movements between the fore and aft ends of the bucket in response to extension or retraction of the actuating means.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects of this invention will become apparent from the following description and accompanying drawings wherein:

FIG. 1 is a partially sectioned, side elevational view of a self-cleaning bucket arrangement of this invention, mounted on the boom of an excavator and shown in its digging position of operation;

FIG. 2 is a view similar to FIG. 1, but illustrating the bucket arrangement in a rack-back position of operation; and

FIG. 3 is a front elevational view of the bucket arrangement, taken in the direction of arrows III—III in FIG. 1.

DETAILED DESCRIPTION

FIG. 1 depicts a bucket arrangement **10** and an excavator boom **11** pivotally connected to an upper, back side thereof by a pivot pin **12.** Although the bucket arrangement is hereindescribed in association with an excavator, it should be understood that the bucket arrangement can be readily adapted for use on other types of buckets, such as loader buckets.

An extensible and retractable actuating means **13,** such as a double-acting hydraulic cylinder, has its rod **14** pivotally connected to a first linkage means **15** by a pin **16.** The first linkage means comprises a pair of first and second links **17** and **18,** respectively, having their first ends pivotally connected to the rod by common pin **16.** The second end of link **17** is pivotally connected by a pin **19** to a flange **20,** secured on the aft end of a bucket **21.**

The second end of link **18** is pivotally connected by a pin **22** to a second linkage means **23.** The second linkage means comprises a third link **24** pivotally mounted on boom **11** by common pin **22** and a bellcrank **25** pivotally connected to a second end of link **24** by a pin **26.** As more clearly shown in FIG. **3,** the bellcrank comprises a U-shaped member pivotally mounted between laterally spaced sidewalls **27** of the bucket by pins **28.**

The bellcrank has a self-cleaning means or elongated blade **29** formed on its lower end. The blade extends between sidewalls **27** and is transversely disposed in bucket shell **30,** having a generally U-shaped cross section, to automatically sweep therealong between the fore and aft ends thereof in response to actuation of cylinder **13.** In particular, FIG. **1** discloses cylinder **13** in its retracted condition whereby the bucket arrangement is maintained in its digging or dumping position of operation with boom **11,** lever **24** and bellcrank **25** disposed in general vertical alignment.

Upon extension of the cylinder, the first and second linkage means will function to automatically retract blade **29** towards an aft end of the bucket wherein the bucket is maintained in its rack-back or load-carrying condition of operation. Bellcrank **25** is thus disposed generally forwardly of the boom and link **24** with an open face of the bucket facing the boom. It should be noted that blade **29** sweeps the bottom of the bucket automatically during both the loading and dumping phases of bucket operation.

In view of the above, it can be seen that the self-cleaning bucket arrangement of this invention comprises an economical and non-complex design which can be adapted to conventional bucket arrangements expeditiously. In addition to its efficient cleaning capabilities, the integrated linkage system will not interfere with the line of sight of the operator of an excavator or like earthworking machine. In addition, such linkage is positioned inboard of the bucket's sidewalls to protect it against damage.

It is to be understood also that the bucket arrangement of this invention will provide the capability of scooping or dipping water and/or aqueous solutions from a trench, hole, etc. The fluid will not drain from the bucket when the bucket is raised since the addition of the self-cleaning configuration does not disrupt the bucket enclosure.

What is claimed is:

1. A self-cleaning bucket arrangement comprising

a boom,

a bucket pivotally mounted directly on said boom,

extensible and retractable actuating means,

first linkage means pivotally interconnected between said actuating means, said boom and said bucket for selectively pivoting said bucket between its rack-back and digging positions on said boom upon actuation of said actuating means, and

second linkage means interconnected between said boom and said bucket and having self-cleaning means secured thereon for automatically sweeping through said bucket between fore and aft ends thereof in response to actuation of said actuating means,

said second linkage means comprising a link having its first end pivotally connected to said boom and a bellcrank pivotally mounted on said bucket and having its first end pivotally connected to a second end of said link, said self-cleaning means secured on a lower end of said bellcrank.

2. The bucket arrangement of claim **1** wherein said bucket comprises a shell having a generally U-shaped

cross section secured between laterally spaced sidewalls thereof and said self-cleaning means comprises a member pivotally mounted between said sidewalls.

3. The bucket arrangement of claim **2** wherein said member is generally U-shaped and comprises an elongated blade formed on a lower end thereof, closely adjacent to inner surface portions of said shell, to extend between said sidewalls.

4. The bucket arrangement of claim **1** wherein said first linkage means comprises a first link pivotally interconnected between said actuating means and said bucket and a second link pivotally interconnected between said actuating means and said boom.

5. The bucket arrangement of claim **4** wherein said second link and said second linkage means are pivotally mounted on said boom at a common pivot means.

6. The bucket arrangement of claim **1** wherein said boom is pivotally mounted to an upper, back side of said bucket.

7. The bucket arrangement of claim **1** wherein said boom, lever and bellcrank are in general vertical alignment when said bucket assumes its digging position on said boom.

8. The bucket arrangemtn of claim **7** wherein said bellcrank is disposed generally forwardly of said boom and said link when said bucket assumes its rack-back position on said boom with an open face of said bucket facing said boom.

9. In a self-cleaning bucket arrangement having a lower end of a boom pivotally mounted on an upper, back side of a bucket, the invention comprising a link having its first end pivotally connected directly to said boom and a bellcrank pivotally mounted directly on said bucket, said bellcrank having its first end pivotally connected directly to a second end of said link and self-cleaning means secured on a lower end of said bellcrank and disposed within said bucket.

10. The bucket arrangement of claim **9** wherein said bellcrank is generally U-shaped and comprises an elongated blade formed on a lower end thereof, closely adjacent to inner surface portions of said bucket.

11. The bucket arrangement of claim **9** wherein said boom, lever and bellcrank are in general vertical alignment when said bucket is pivoted to one extreme to a digging position on said boom.

12. The bucket arrangement of claim **11** wherein said bellcrank is disposed generally forwardly of said boom and said link when said bucket is pivoted to an opposite extreme to a rack-back position on said boom with an open face of said bucket facing said boom.

13. A self-cleaning bucket arrangement comprising

a boom

a bucket pivotally mounted on said boom,

extensible and retractable actuating means,

first linkage means pivotally interconnected between said actuating means, said boom and said bucket for selectively pivoting said bucket between its rack-back and digging positions on said boom upon actuation of said actuating means, said first linkage means comprising a first link pivotally interconnected between said actuating means and said bucket and a second link pivotally interconnected between said actuating means and said boom, and

second linkage means interconnected between said boom and said bucket and having self-cleaning means secured thereon for automatically sweeping through said bucket between fore and aft ends thereof in response to actuation of said actuating means, said second link and said second linkage means being pivotally mounted on said boom at a common pivot means.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,872,986

DATED : March 25, 1975

INVENTOR(S) : Trevor G. Campbell

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the Title Page, Item [73], change the spelling of the assignee's corporate name from "Caterpillar Tractor Company" to --- Caterpillar Tractor Co. ---.

Signed and Sealed this

twenty-second Day of *July 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks