Nov. 22, 1966 G. H. LONG 3,286,377

TRENCHING HOE HAVING SPREAD FOOTING CUTTING MEANS

Filed Nov. 20, 1963 2 Sheets-Sheet 1

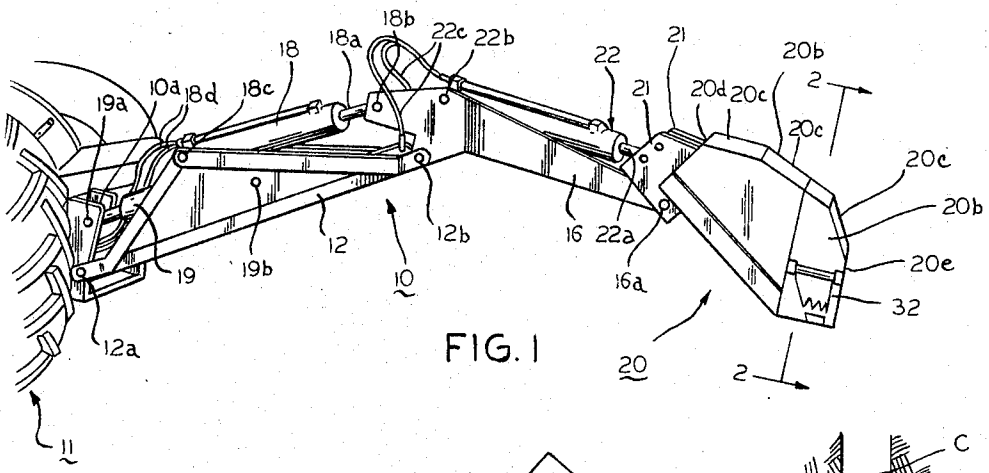


FIG. 1

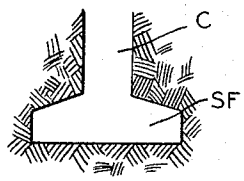


FIG. 5

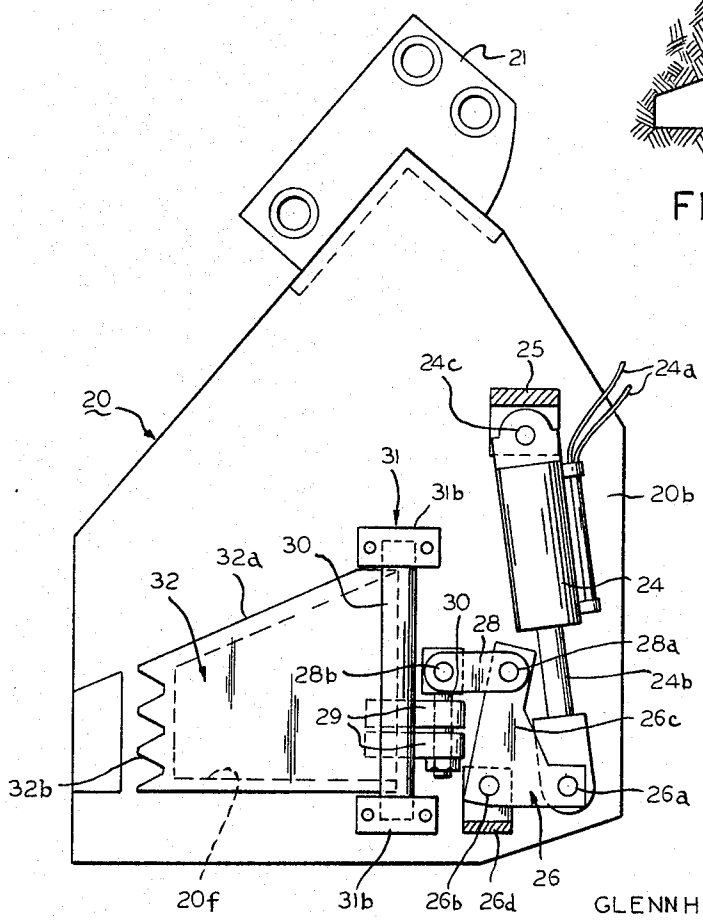


FIG. 4

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TRENCHING HOE HAVING SPREAD FOOTING CUTTING MEANS

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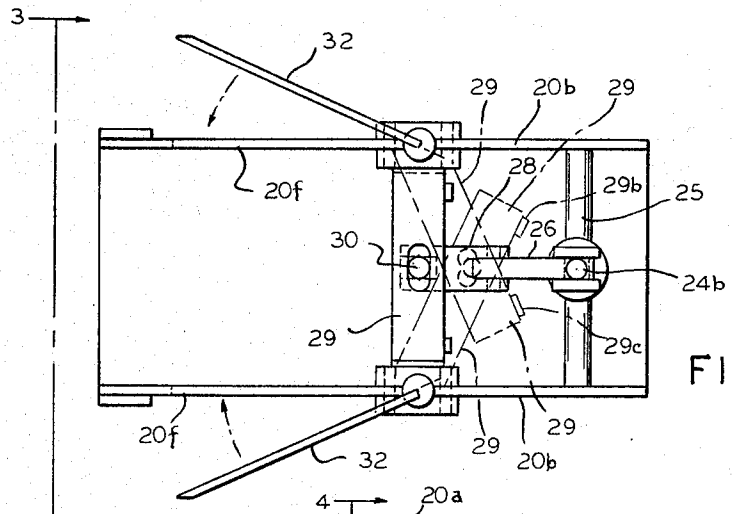


FIG. 2

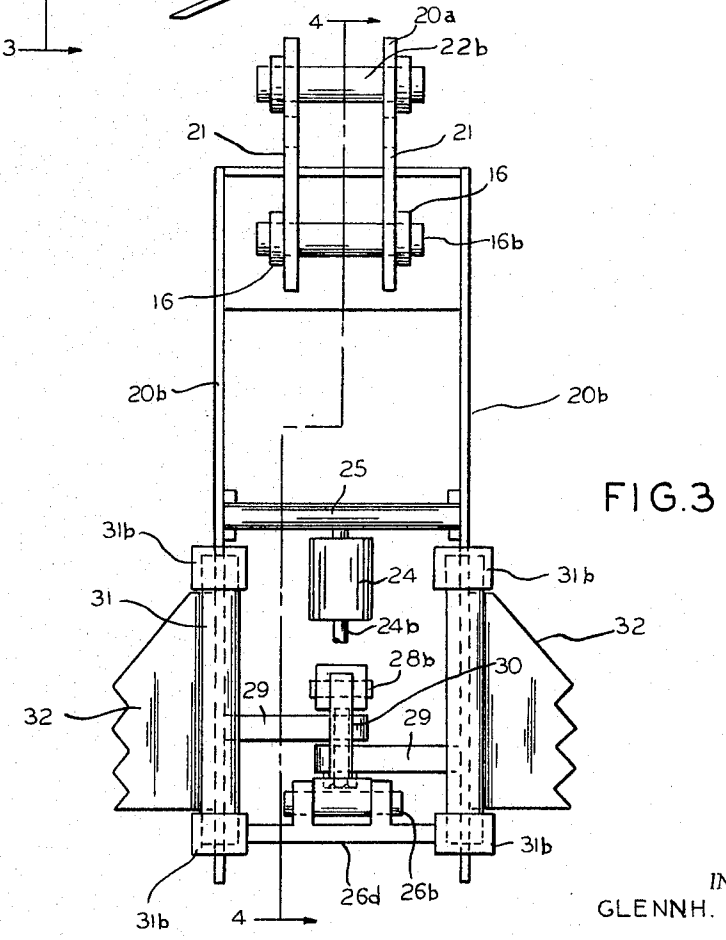


FIG. 3

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TRENCHING HOE HAVING SPREAD FOOTING CUTTING MEANS

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2 Claims. (Cl. 37—118)

This invention relates generally to digging implements, and more particularly to a trenching hoe including structure for cutting into the side walls of the bottom of a trench to provide a spread footing.

The invention herein has for one of its principal objects the provision of a structure adapted to be employed with a trenching hoe, and including a bucket having diverging wings pivotally mounted at each side thereof which are selectively caused to project outward by an hydraulically actuated toggle linkage. The ability of the device to cut additional cross section at the sides and bottom of a trench to provide a spread footing for a concrete structure thus enhances its usefulness. The diverging wings, being in alignment with the sides of the excavation bucket when not in use, enable the excavation bucket to be used for routine digging work without any additional time wasting operations.

It is another object to provide a trenching hoe bucket with structure enabling the same to fulfill the dual purpose of doing ordinary digging or trenching, with the additional function of the cutting of additional cross section for a spread footing.

Other and further objects of this invention will become more readily apparent from reading the specification taken together with the accompanying drawings which shown a preferred embodiment of the invention wherein:

FIG. 1 is a perspective view of a trenching hoe having the improvements according to the present invention incorporated therein;

FIG. 2 is a sectional view of hoe bucket seen in FIG. 1 taken on a plane passing through the lines 2—2 of FIG. 1, and looking in the direction of the arrows;

FIG. 3 is an end view looking in the direction of the arrows 3—3 of FIG. 2;

FIG. 4 is an elevational view taken substantially along the line 4—4 of FIG. 3, looking in the direction of the arrows; and

FIG. 5 is a transverse sectional view through a trench that has been widened at the bottom with the improved structure according to the invention.

Referring now to the drawings, the preferred embodiment of the invention is illustrated in FIG. 1, and is embodied in a trenching hoe referred to by the reference numeral **10**, and pivotally mounted at an abutment **10***a* at the rear of a tractor **11**, partially shown. Hoe **10** includes a boom **12** pivotally connected at **12***a* to the abutment **10***a*. A dipper stick **16** is pivoted at **16***a* to the boom **12** and a hoe bucket **20** is pivotally connected at **16***a* to dipper stick **16**.

Hoe bucket **20** is formed of a pair of laterally spaced side plates **20***b* which are joined by welding to back plates **20***c*, a top plate **20***d* and a bottom plate **20***e*. Plate **20***d* has a pair of ears **21** extending therefrom which flank the dipper stick **16**, and the ears **21** are pivotally connected at **16***a* to the dipper stick **16** by a pin **16***b* passing through the sides of dipper stick **16** and the ears **21**.

An actuating cylinder **22** for bucket **20** lies along the upper side of dipper stick **16**, and has a piston rod **22***a* connected to a pin **22***b* supported by the ears **21**. Actuating cylinder **22** is pivotally connected at **22***b* to dipper stick **16**, and is supplied with actuating fluid by lines **22***c* from the retractor **11** where control structure, not shown, is located.

Dipper stick **16** is adjusted in its position with respect

to boom **12** by an actuating cyclinder **18** having a piston rod **18***a* pivotally connected at **18***b* to dipper stick **16**. The other end of cylinder **18** is pivotally connected at **18***c* to boom **12**, and actuating fluid for cylinder **18** is supplied by lines **18***d*.

Boom **12** is adjusted in position with respect to tractor **11** by a cylinder **19** acting between point **19***a* on abutment **10***a* and point **19***b* on boom **12**.

Hoe bucket **20** is of a shape which is common to such type buckets, and is provided with an opening **20***f* in each opposing side wall **20***b* thereof. The holes **20***f* are closed by a scraper wing **32**, each having a pintle **31** received at their upper and lower ends in pintle holding members **31***b* secured by welding to the sides **20***b* of bucket **20**. Each wing **31** is substantially trapezoidal in shape with an upper inclined surface **32***a* and saw tooth ends **32***b*, and wings **31** are supported near the bottom of bucket **20** in order to widen a trench at the bottom thereof. As seen in FIG. 4 openings **20***f* are substantially the same size and shape as the wings **32**, so that wings **32** overlap openings **20***f*.

Cylinder **24** has a piston rod **24***b* pivotally connected at **26***a* to a bell crank **26**. Bell crank **26** is pivotally connected at **26***b* to an abutment **26***d* extending between the sides **20***b* of bucket **20**. Bell crank **26** has an arm **26***c* connected at **28***a* to a toggle rod **28**. The other end **28***b* of the toggle rod **28** is pivotally attached to a vertical spindle **30**. A pair of toggle arms **29** are pivotally connected at their inner ends to spindle **30**, and the other end of each toggle arms **30** is fixed to its corresponding pintle **31**. The toggle arms **29** extend from their corresponding pintles **31** at such an angle that when the bell crank is rocked in a counter-clockwise direction as seen in FIG. 4, the two toggle arms **29** occupy a "straight away" position as seen in FIG. 2, with the corresponding wings **32** in the extended or open position.

Structure is provided to lock the wings in their extended position until the toggle cylinder **24** is actuated in a return direction. Such locking structure insures that the toggle arms **29** maintain the "straightaway" position and includes a locking lug **29***b* extending downward from the side of the upper toggle arm **29** and a similar lug **29***c* extending upward from the other toggle arm **29**.

In operation, the bucket **20** is moved so that it digs a trench having conventional vertical side walls. The bucket **20** is adapted during or after the trenching operation to cut additional cross section to define space for a spread footing SF, as seen in FIG. 5, when a concrete mass is poured into the trench. When the hydraulic toggle cylinder **24** is actuated, the spindle **30** of the toggle linkage is caused to move into its "straightaway" position, as illustrated in FIGS. 2 and 4, thereby causing the wings **32** to be in an open position. The movement to open position is done when the bucket is moving, so that the wings **32** have forward motion while extending to give a shearing action at the trench bottom. The openings **20***f* in the side walls **20***b* of bucket enable the excavated material to move readily into bucket **20**.

It will be seen that there has been provided a digging device having the dual function of both conventional trenching and the digging of an extra cross section for a spread footing. The wings being in alignment with the sides of the bucket during normal digging operation enable the same to be utilized for conventional digging, and when the extra cross section is desired at the trench bottom for a spread footing, the wings can be brought into operation.

Although there has been illustrated a novel arrangement including an excavating bucket in the environment of a backhoe having a boom and dipper stick, it is not

intended to restrict the invention to the environment shown, and other expedients in the art are contemplated.

While the invention has been described in terms of a preferred embodiment, it is for purposes of illustration only, and the invention is therefore intended to be defined only by the claims here appended.

I claim:

1. An excavation bucket that can be utilized for both trenching and the cutting of additional cross-section at the bottom of a trench comprising: a pair of opposing sides, a pair of diverging wings, each of said diverging wings being pivotally mounted to one of said opposing sides, said diverging wings having open and closed positions, said diverging wings being in alignment with said sides of said excavation bucket in their closed position, said diverging wings projecting outward from said sides in their open positon, said pair of opposing sides have openings that are substantially of the same size and shape as said diverging wings, said diverging wings being positioned over said openings when in said closed position, and means for selectively actuating said diverging wings to said open and said closed positions.

2. An excavation bucket as defined in claim 1 wherein a toggle arm is associated with each of said diverging

wings, a spindle disposed between said diverging wings is pivotally associated with said arms to form a toggle linkage, said spindle being in one position when said diverging wings are in said open position, and being in a second position when said diverging wings are in their closed position, and said means for selectively acuating said diverging wings is associated with said toggle linkage to move said spindle to its first and second positions, whereby said diverging wings are caused to move to said open position with toggle linkage leverage and provide additional cross section in the bottom of a trench and wherein said spindle cooperates with locking means on said toggle arms to maintain said toggle arms in a straightaway position when said diverging wings are in extended position.

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