

[54] **TRACTOR MOUNTED HYDRAULIC
POSTHOLE DIGGER**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 60,577, Aug. 3,
1970, abandoned.

[52] **U.S. Cl.** **173/22**

[51] **Int. Cl.** **E21c 11/02**

[58] **Field of Search** 173/22, 23, 25, 26, 27, 28,
173/29

[56] **References Cited**

UNITED STATES PATENTS

3,165,157	1/1965	Carbert.....	173/28
2,410,508	11/1946	Lamme.....	173/26 X
2,526,984	10/1950	Weishaar.....	173/26
2,812,162	11/1957	Lay.....	173/27 X
2,844,006	7/1958	Lutz et al.....	173/27 X
2,856,156	10/1958	Young.....	173/26

3,044,562 7/1962 Crampton..... 173/27 X

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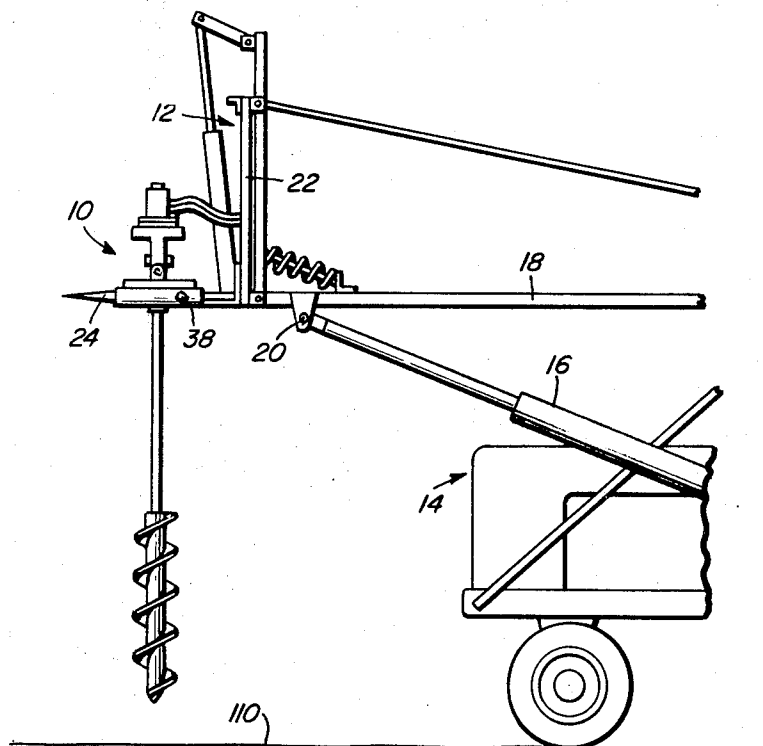
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[57]

ABSTRACT

An attachment selectively mountable on different loader heads of farm and construction equipment and including a readily detachable hydraulic motor for actuation by the central hydraulic system of the loader whereby the same hydraulic motor may be utilized to power other attachments. The attachment includes a cradle for supporting a motorized auger in pendulum-like fashion so that true vertical disposition of the auger may be obtained. When the motor is energized and the supporting portion of the loader is lowered relative to the ground with which the auger is engaged, a substantially true vertical hole is bored in the ground. Further, the hydraulic motor is reversible whereby after a hole has been bored removal of the auger is facilitated.

4 Claims, 9 Drawing Figures



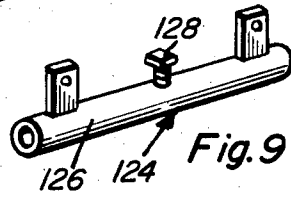
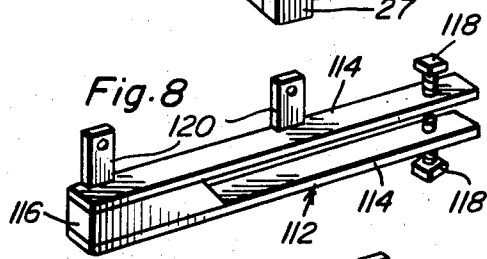
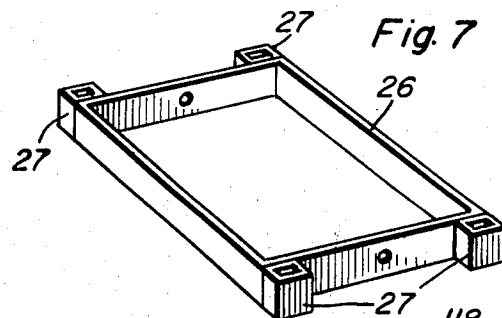
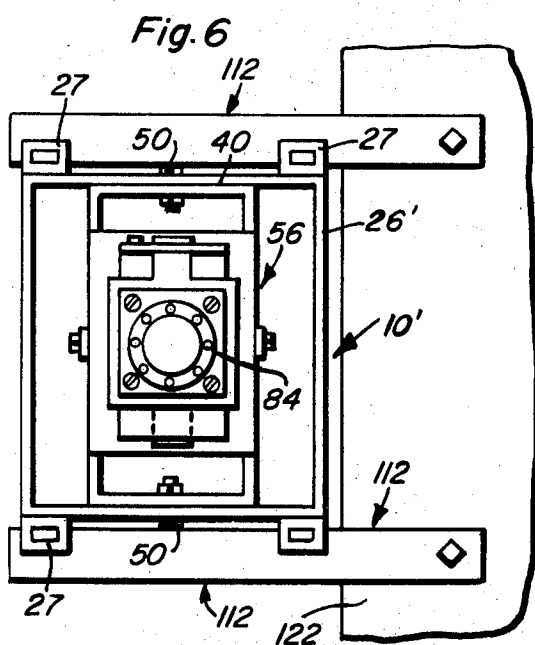
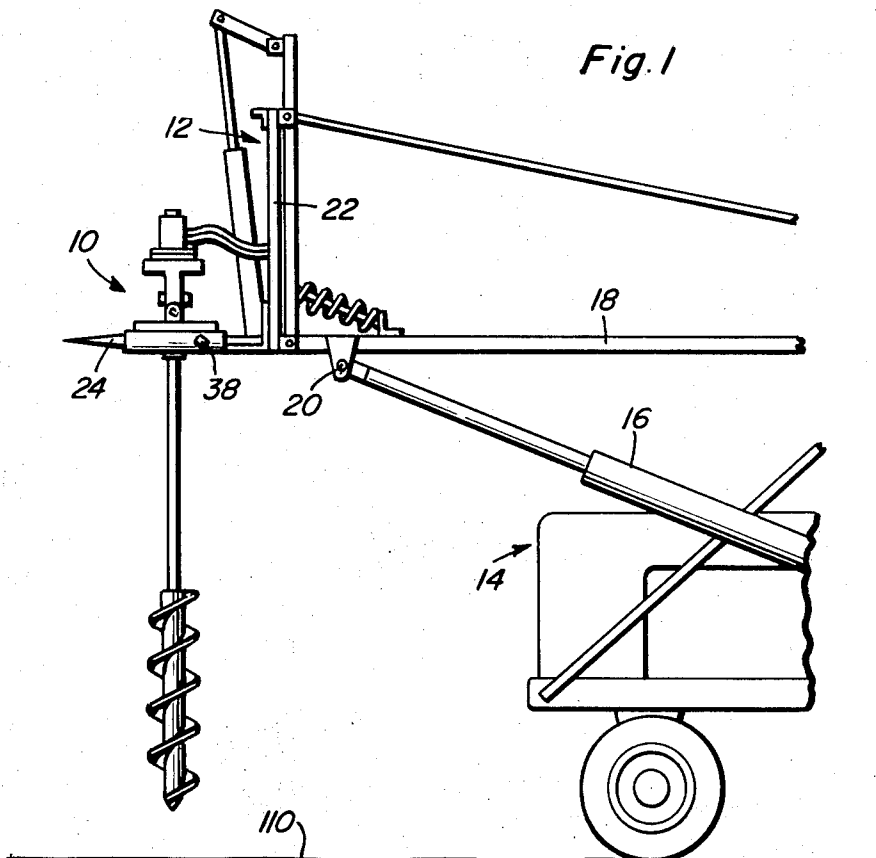


Fig. 2

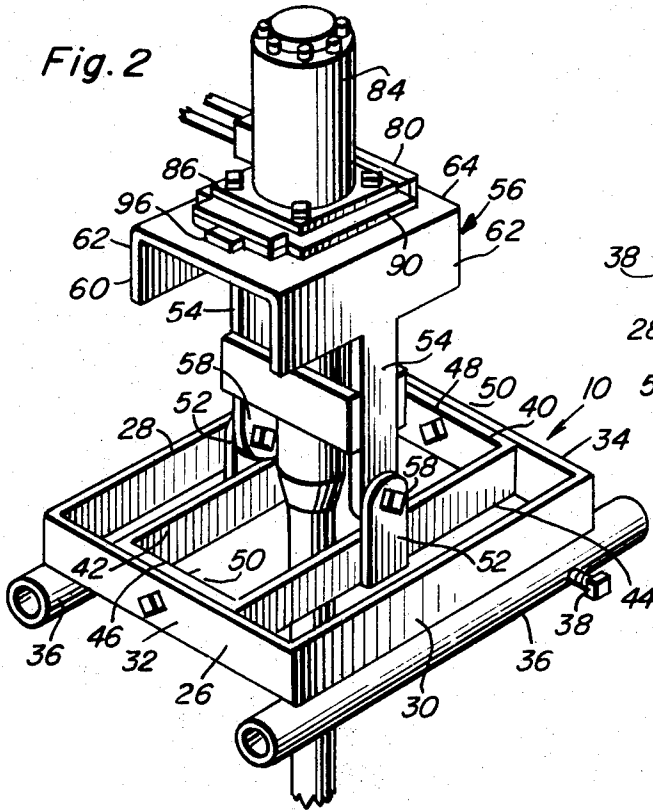


Fig. 3

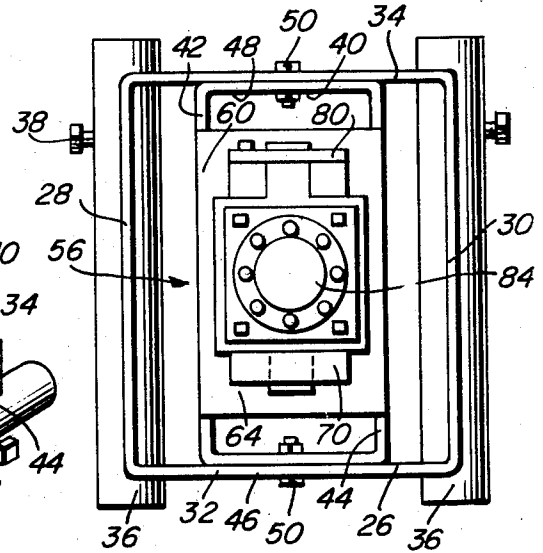


Fig. 4

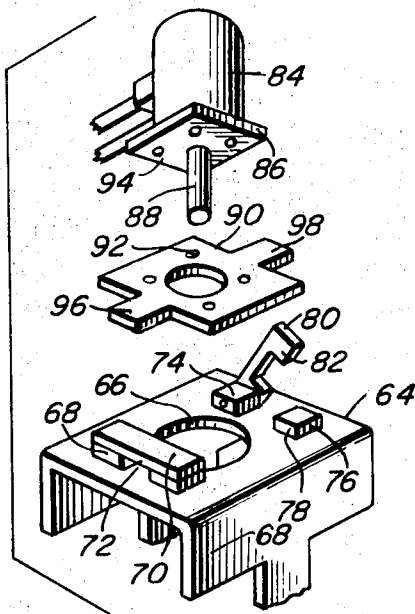
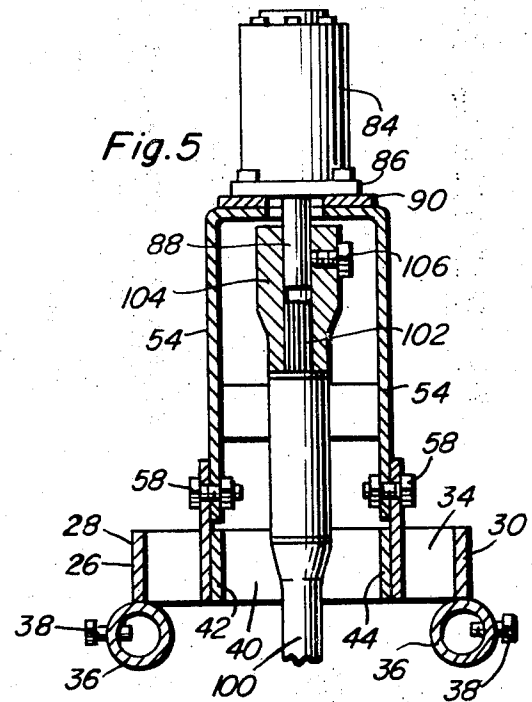


Fig. 5



TRACTOR MOUNTED HYDRAULIC POSTHOLE DIGGER

This application comprises a continuation-in-part of my co-pending U. S. application Ser. No. 60,577, filed Aug. 3, 1970, now abandoned.

At present, farms and construction projects make wide use of conventional vehicles known as loaders. Essentially, a loader comprises a vehicle including a chassis having hydraulic cylinders extending outwardly therefrom for attachment to a lift member supported thereby and extension and retraction of the cylinders functions to raise and lower the lift member. Various attachments are available for removable securement to the lift member and such attachments include direct buckets, grapple forks, hay baskets, etc. However, at present no earth boring attachment has been specifically designed for use in conjunction with such loaders. Rather, auger attachments have been designed for tractors having independent power take-off facilities. These available auger attachments are relatively expensive due to the motion translation parts that must be interposed between the independent power take-off shaft of the tractor and the auger. These parts include gears and other elements that are prone to maintenance problems and they also decrease the efficiency that would be available with direct power transmission to the auger. Further, utilization of an auger attachment with the independent power take-off of a tractor requires a high degree of operator skill in controlling the auger position and speed.

The posthole digger of the instant invention includes selectively usable support portions for supporting the posthole digger from a plurality of different types of loader heads. The invention is particularly adapted for posthole digging and may be powered by the loader vehicle central hydraulic system or may be mounted on a loader powered by the hydraulic system of a tractor, the attachment being controlled through the valves of the loader.

The advantages of the present invention over that of the prior art are many. Initially, it is pointed out that the present attachment is coupled and uncoupled from a loader vehicle in the same manner as other attachments and, therefore, no special time-consuming instruction or expertise is required to connect the attachment to the associated loader. Further, the manner in which the motorized auger is supported from the existing head of the loader in pendulum-like fashion insures that even an unexperienced loader operator may utilize the posthole digger to dig vertical postholes.

Also, because the posthole digger is removably supported from existing heads of loaders, it performs superiorly in hard or frozen soils because forced penetration is possible either by the weight of the existing head of the loader as it bears down upon the soil, or by virtue of downward forces exerted by the hydraulic cylinders connected between the loader vehicle chassis and the lift member or head of the loader from which the present invention is supported.

It is possible to automatically position the auger of the present invention in a true vertical orientation because the auger and its powering hydraulic motor are mounted in pendulum-type fashion from the corresponding loader head. Also, the hydraulic motor of the posthole digger is removably mounted from the supporting portion therefor and may accordingly be uti-

lized to power other tools when operation of the posthole digger is not required. Also, because the posthole digger is to be supported from the head of a loader, the operation of the posthole digger may be constantly viewed by the operator of the associated loader vehicle, such constant observation of power take-off driven posthole digging attachments not being possible.

In addition, because of the manner in which the posthole digger is supported from the associated motor head in pendulum-type fashion, extremely deep holes may be bored by the utilization of extension shafts between the auger shaft and the powering hydraulic motor of the posthole digger.

The main object of this invention is to provide a posthole digger that may be readily supported from different types of heads provided on farm and construction loaders.

Another object of this invention is to provide a posthole digger supported from the corresponding loader head in a manner such that vertical positioning of the auger shaft to the posthole digger is assured.

Still another object of this invention is to provide a posthole digger attachment adapted to be driven from the central hydraulic system of the associated loader and including a readily removable hydraulic motor whereby the latter may be removed and utilized to power other tools when desired.

A final object of this invention to be specifically enumerated herein is to provide a posthole digger which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a fragmentary side elevational view of the forward portion of a conventional form of loader with the posthole digger of the instant invention removably supported from the head of the loader;

FIG. 2 is a perspective view of the posthole digger with the lower end portion of the auger shaft being broken away;

FIG. 3 is a top plan view of the posthole digger;

FIG. 4 is a fragmentary exploded perspective view of the hydraulic motor and hydraulic motor mounting structure of the posthole digger;

FIG. 5 is a fragmentary vertical transverse sectional view taken substantially upon a plane passing through the center of the posthole digger assembly illustrated in FIG. 2;

FIG. 6 is a top plan view of a modified form of posthole digger supported from an earth bucket head of a loader;

FIG. 7 is a perspective view of the main support frame of the modified form of posthole digger illustrated in FIG. 6;

FIG. 8 is a perspective view of one of the supporting arms by which the main support frame illustrated in FIG. 7 is supported from the earth bucket fragmentarily illustrated in FIG. 6; and

FIG. 9 is a perspective view of yet another form of support member by which the posthole digger may be

removably mounted upon a specified type of loader head.

Referring now more specifically to the drawings, the numeral 10 generally designates the posthole digging attachment of the instant invention which is supported from a multi-tine head 12 of a conventional form of loader vehicle referred to in general by the reference numeral 14. The loader vehicle 14 includes hydraulic cylinders 16 connected at their lower ends to the vehicle chassis and at their upper ends to respective longitudinal horizontal booms 18 by means of pivot fasteners 20.

The head 12 includes an upstanding frame 22 and horizontally forwardly projecting transversely spaced tines 24.

With attention now invited more specifically to FIGS. 2 through 5 of the drawings, it may be seen that the posthole digger 10 includes a main rectangular frame 26 consisting of a pair of opposite side longitudinal members 28 and 30 innerconnected at their forward and rear ends by a forward transverse member 32 and a rear transverse member 34. A pair of cylindrical mounting tubes 36 extend along beneath and are secured to the lower marginal portions of the longitudinally members 28 and 30 and the mounting tubes 36 are removably telescoped over a selected pair of the tines 24 and secured in position thereon by means of setscrews 38 carried by the rear ends of the mounting tubes 36.

An inner rectangular frame 40 is disposed within the main outer frame 26 and includes a pair of opposite side longitudinal members 42 and 44 innerconnected at their front and rear ends by means of transverse front and rear members 46 and 48. The spacing between the remote sides of the transverse members 46 and 48 is slightly less than the spacing between the adjacent sides of the transverse members 32 and 34 and each pair of corresponding transverse members of the frames 26 and 40 are provided with registered bores through which pivot fasteners 50 are secured whereby the inner frame 40 is oscillatably supported within the main outer frame 26.

The opposite side longitudinal members 42 and 44 of the inner frame 40 include upstanding mounting ears 52 and the lower ends of a pair of opposite side depending support arms 54 of a mounting frame referred to in general by the reference numeral 56 are pivotally secured to the mounting ears 52 by means of pivot fasteners 58.

The mounting frame 56 comprises an inverted U-shaped channel member 60 including a pair of opposite side depending flanges 62 innerconnected by means of an integral bight portion 64 extending between the upper marginal edge portions of the flanges 62. The bight portion 64 has a central opening 66 formed therein a pair of spacing blocks 68 are secured to the upper surface face of one end of the bight portion 64 and are bridged by a bridging member 70 to define a horizontally opening pocket 72 beneath the bridging member 70 and between the spacing blocks 68. In addition, the other end of the bight portion 64 has a mounting block 74 secured thereto on one side and an anchor block 76 provided with a bore 78 secured on the other side. A notched latching arm 80 is pivotally secured to the mounting block 74 and has an aperture 82 formed therethrough which is registrable with the bore 78 when the latching arm 80 is in the horizontal position

thereof, illustrated in FIG. 2 of the drawings, a latching pin (not shown) being provided for insertion through the aperture 82 and the bore 78 to releasably retain the latching arm 80 in the latched horizontal position.

A conventional hydraulic orbit motor 84 is provided and includes an apertured mounting plate 86 through which the output shaft 88 of the motor 84 extends. A mounting plate 90 is provided and suitably apertured in its four corners as at 92 and suitable fasteners (not shown) are utilized to secure the mounting plate 90 to the plate 86 with the fasteners secured through the apertures 92 and also corresponding apertures 94 formed in the plate 86. The mounting plate 90 includes front and rear tongues 96 and 98 and the former is receivable in the opening or recess 72 while the latter is receivable beneath the notched portion of the latching arm 80. In this manner, the motor 84 may be secured to the mounting frame 56.

An auger shaft 100 is provided and disposed in upstanding position. The upper end of the auger shaft 100 is diametrically reduced and splined as at 102 and a coupling sleeve 104 internally splined on one end and provided with a setscrew 106 on its other end is utilized to supportingly and drivingly couple the output shaft 88 to the auger shaft 100.

It may, of course, be noted from FIGS. 1, 2 and 5 of the drawings that the auger shaft 100 is thus supported, together with the motor 84, from the main outer frame 26 in pendulum fashion whereby the auger shaft 100 will be vertically disposed when hanging free. In this manner, the motor 84 may be actuated in conjunction with lowering of the head 12 in order to bore a vertical hole in the ground 110 upon which the loader 14 rests.

With attention now invited more specifically to FIGS. 6 through 8 of the drawings, there may be seen a pair of clamp-type support arm assemblies referred to in general by the reference numeral 112. The support arm assemblies 112 each include a pair of elongated horizontal and generally parallel jaws 114 innerconnected by means of a spacing block 116 at their base ends and are provided with setscrews 118 at their free ends. The upper arm 114 of each support arm assembly 112 is further provided with a pair of longitudinally spaced upwardly projecting apertured mounting lugs 120.

The posthole digger or attachment illustrated in FIG. 6 is referred to in general by the reference numeral 10' and is substantially identical to the posthole digger 10, except that the main frame 26' thereof is provided with four vertically short corner sleeve member 27 which may be telescoped downwardly over the apertured mounting ears 120 carried by the support arm assemblies 112. Accordingly, after the support arm assemblies 112 have been secured to the frame 26, they may be clampingly engaged with an earth bucket 122, such as that illustrated in FIG. 6 of the drawings, in lieu of the tines 24 of the head 12. In addition, with attention now invited more specifically to FIG. 9, there may be seen a support assembly referred to in general by the reference numeral 124 and which may be utilized to support the frame 26' from the tines 24 of the head 12 and thus enable the posthole digger 10' to be supported from the head 12. Of course, the support assembly 124 includes a cylindrical tube 126 for telescoping over a selected tine 24 and a setscrew 128 is provided on each tube 126 and serves the purpose of the setscrews 38. Also, if the tines 24 are other than cylindrical, the cross-

sectional shape of the support assembly 124 may be varied accordingly.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. An earth boring attachment for a loader vehicle having a lift member, said attachment comprising a first outer frame including mounting means for removable support from said lift member, said frame being generally horizontal and including opposite side marginal portions, a second generally horizontal inner frame disposed within said outer frame and including opposite side portions pivotally supported between said opposite side marginal portions for angular displacement about first aligned axes extending between said side portions and side marginal portions, said second frame including a second pair of opposite side portions disposed in an upstanding plane normal to an upstanding plane containing said axes, and a mounting frame including de-

pending opposite side members whose lower end portions are pivotally supported from said second pair of opposite side portions of said second frame for angular displacement about second aligned axes extending therebetween, and a torque producer removably supported from an upper portion of said mounting frame above said first and second aligned axes and including a depending rotary output shaft drivingly coupled to the upper end of an upstanding auger shaft.

2. The combination of claim 1 wherein said mounting means including a pair of parallel tube members fixedly supported from said first frame and adapted to be telescoped over parallel tines carried by said lift member.

3. The combination of claim 1 wherein said mounting means including a pair of parallel tube members to which opposite sides of said first frame are removably attached and adapted to be telescoped over parallel tines carried by said lift member.

4. The combination of claim 1 wherein said mounting means including a pair of clamp assemblies to which opposite sides of said first frame are removably attached, said clamp assemblies including clamp portions adapted to be removably clampingly engaged with an earth bucket carried by said lift member head.

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