

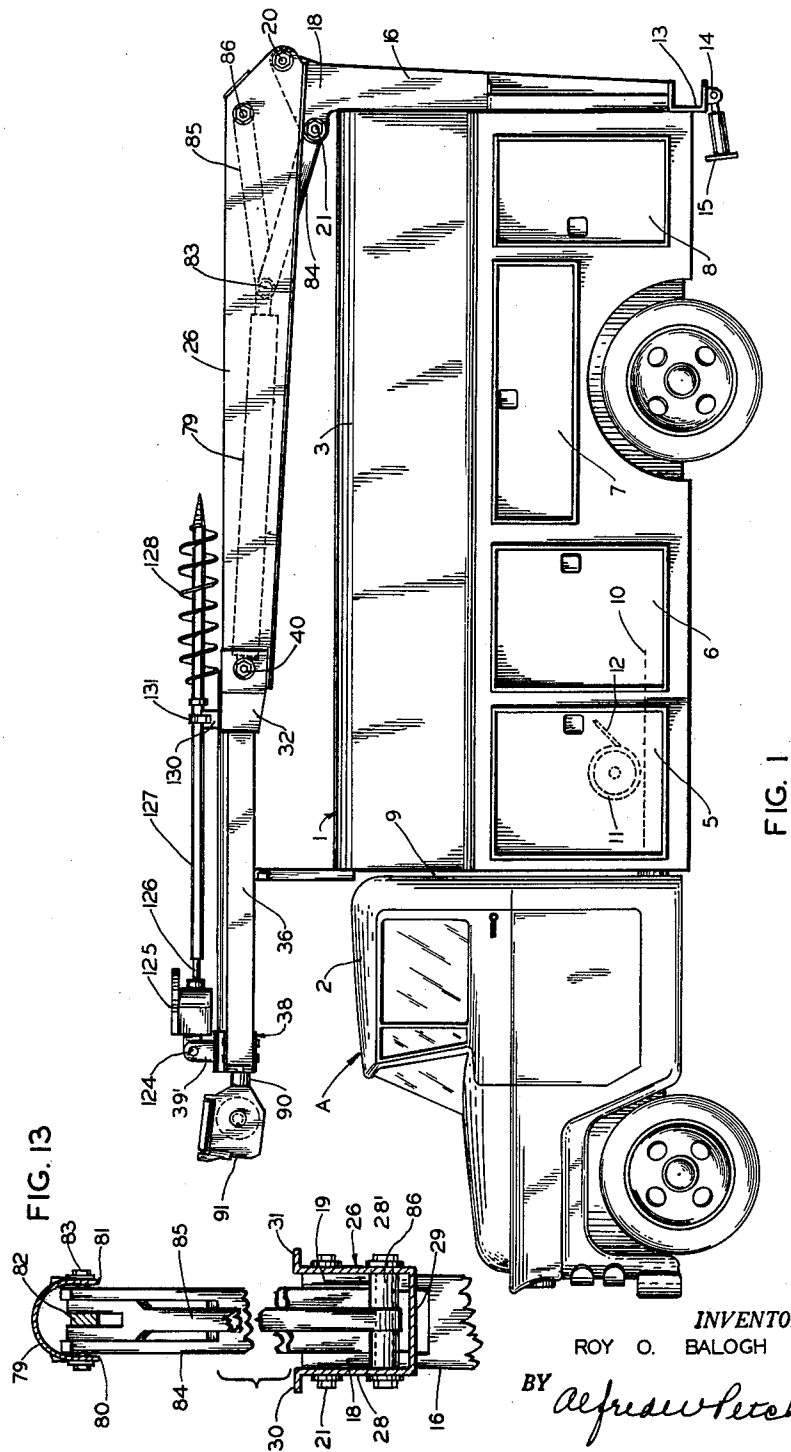
Jan. 15, 1963

R. O. BALOGH
PORTABLE DIGGER

3,073,397

Filed May 11, 1959

4 Sheets-Sheet 1



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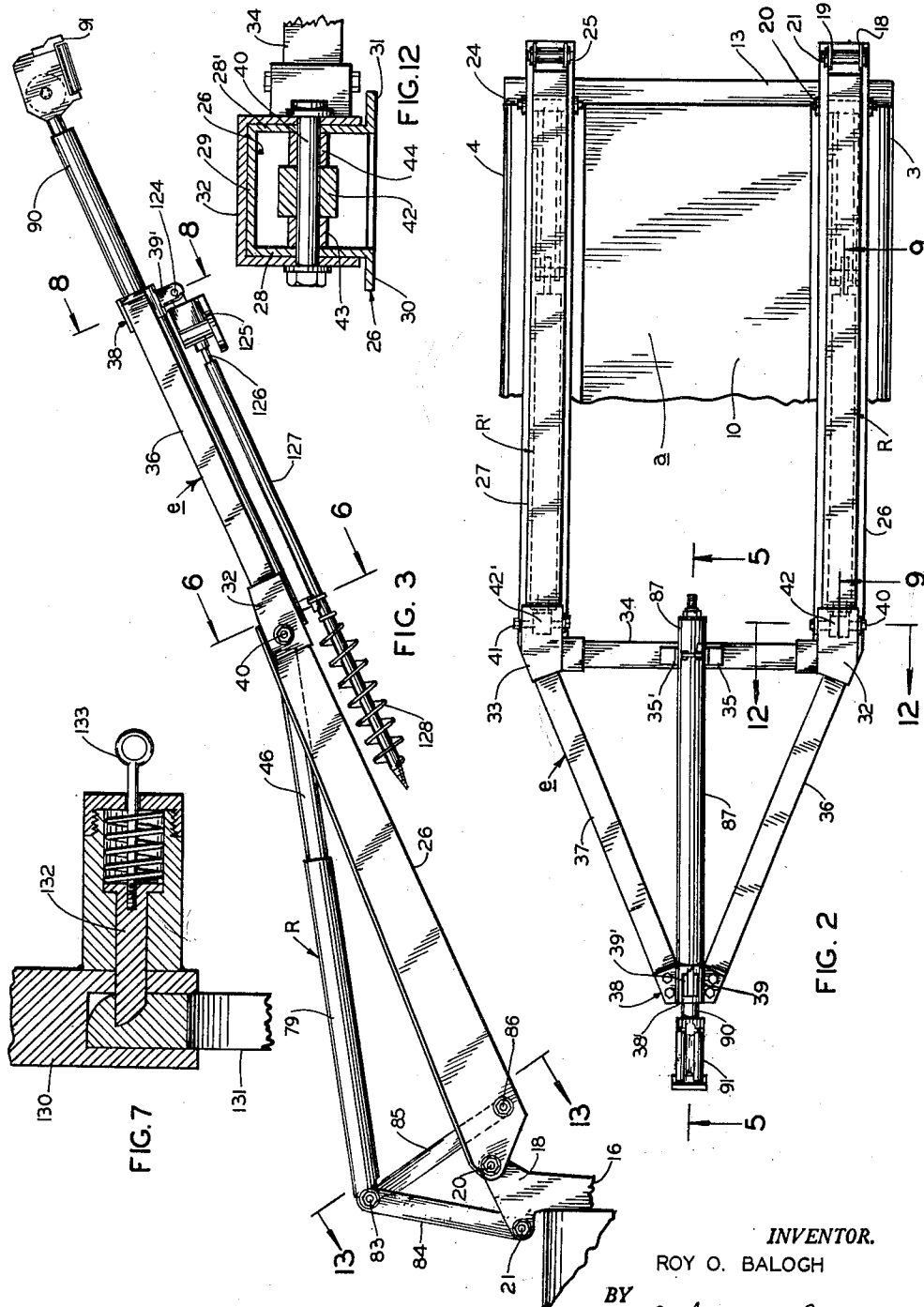
R. O. BALOGH

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PORTABLE DIGGER

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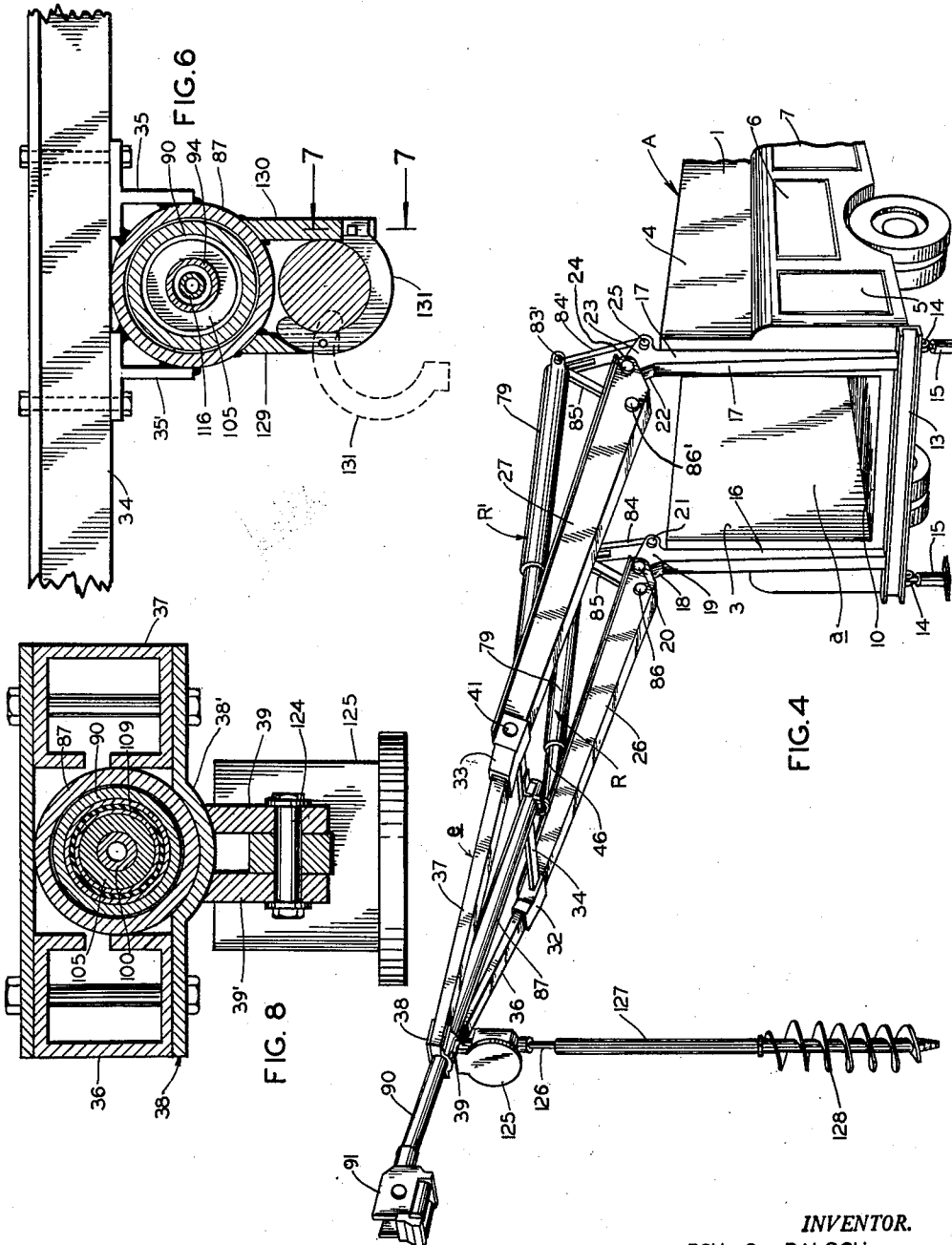
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R. O. BALOGH
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R. O. BALOGH
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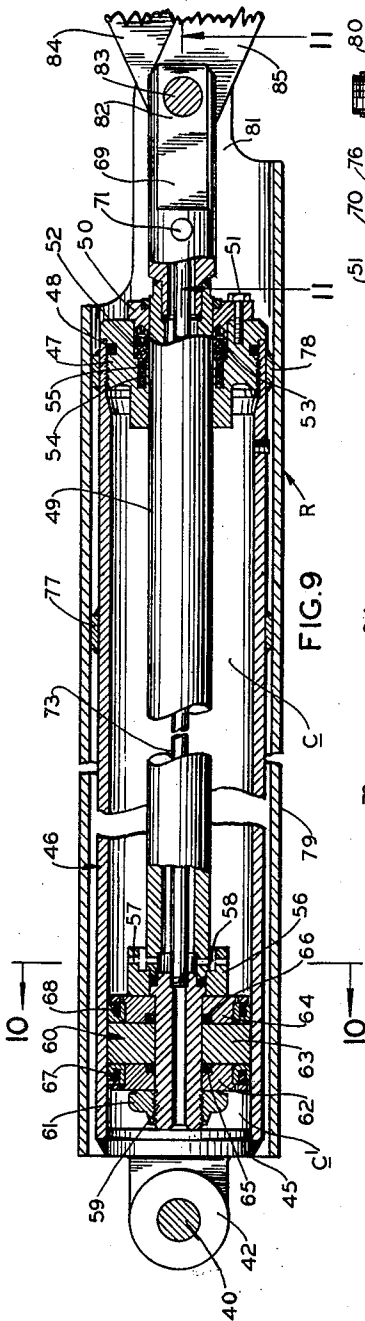


FIG. 9

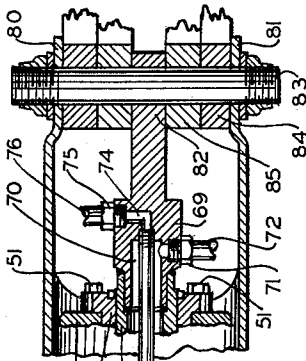


FIG. 10

FIG. 11

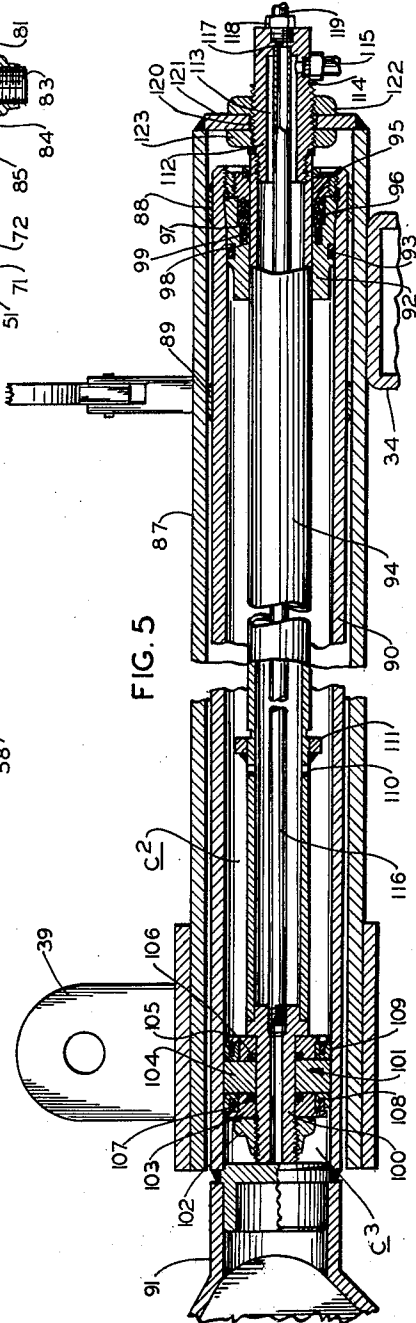


FIG. 5

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3,073,397

PORTABLE DIGGER

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3 Claims. (Cl. 175—201)

This invention relates in general to certain new and useful improvements in portable diggers and, more particularly, to a device which is capable of functioning both as a hole-digger and a derrick. Public utilities and similar industrial companies ordinarily use service and maintenance trucks which are suitably equipped for setting poles, removing worn out or defective poles and replacing them, lifting equipment, such as transformers, and performing other similar types of service and maintenance operations in the field. Such trucks are usually equipped with some type of machine for digging holes and some type of derrick for handling poles and lifting equipment. The derrick is usually pivoted near the rear end of the truck body and extends upwardly in a substantially horizontal position over the top of the body, in a so-called "transport position," when the truck is traveling from one location to another. At the location or site where work is being performed the derrick is usually elevated into some upwardly and rearwardly inclined position, or so-called "work position," and ordinarily may be swung into any selected work position through an arc from the transport position to the lowermost work position. This arcuate swinging movement, however, makes it virtually impossible to obtain true vertical or true horizontal shifting movement. As the derrick moves from one position to another along a conventional circular arc the derrick-head or sheave block must, of necessity, change its position in both the vertical direction and the horizontal direction. Thus, if a pole is being lowered into a hole, a great deal of skillful manipulation of the derrick is required to bring the pole into vertical position. Similar problems are encountered in lifting a transformer or similar piece of equipment to an overhead position. Once the transformer is lifted to the desired height it may be a few inches horizontally from the cross-arm or mounting bracket to which it must be attached.

Conventionally, the hole-digger is carried in the truck body as an accessory unit and is frequently handled separately from the derrick. Sometimes the derrick is used for swinging the hole-digging unit out of its storage position within the truck body and spotting it in the position at which the hole is to be dug. When so used, however, the derrick is merely a handling or supporting boom. The weight and action of the hole-digger is relied upon to provide downward thrust for the digging operation. It is also conventional to motivate the portable derrick of the type stated by means of double-acting hydraulic rams which usually consist of a cylinder and a piston which reciprocates therein and is provided with a relatively long piston rod. For ordinary purposes, it is necessary that such double-acting hydraulic rams have a long stroke and, consequently, the cylinder and piston rod are relatively long with respect to diameter. Moreover, the piston rod must be much smaller in diameter than the piston so that the differential area will be sufficient so that the double-acting hydraulic rams will develop adequate power on the return stroke as well as on the outward stroke. As a result, such rams tend to deflect laterally under heavy loads when approaching fully extended position and the piston rod may bend or buckle. If applied to a portable derrick, this buckling tendency can produce difficulty when excessive loads are applied to the winch line when the derrick is in such a position that the downward components of force will place the

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piston rod under compression. A somewhat similar problem may be encountered when excessive downward thrust is applied to the derrick-head or sheave block so that the piston rod is placed in compression. This latter type of load-force results when the derrick is inclined forwardly over the truck body and is used to lift a very heavy load vertically upwardly from the truck-floor, as would be the case in lifting a heavy transformer out the truck and setting it down upon the ground. A similar situation will result when the derrick is extended rearwardly from the back end of the truck and is pushed downwardly to apply downward thrust to a hole-digger, for example.

It is, therefore, the primary object of the present invention to provide a power-operated vehicle-mounted or portable derrick which can be quickly and efficiently swung from inoperative transport position to various work positions and also to an outwardly and rearwardly extended position from the rear end of the vehicle to handle, locate, support and apply positive downward thrust to hole-digging equipment.

It is also an object of the present invention to provide a vehicle-mounted derrick of the type stated which, when in operative position, can be swung along a circular arc forwardly and rearwardly by power-driven means and can also be shifted by auxiliary power-driven means in such a manner that the derrick-head or sheave block will move along various noncircular paths such as, for example, a truly horizontal path or a truly vertical path.

It is a further object of the present invention to provide a portable derrick of the type stated which is provided with hole-digging means and is adapted for carrying such hole-digging means in an inoperative transport position as well as shifting the hole-digging means into operative position and applying downward thrust thereto.

It is an additional object of the present invention to provide a combined derrick and hole-digging device of the type stated in which the derrick functions and the hole-digging functions are complementary and do not interfere with each other.

It is likewise an object of the present invention to provide a portable derrick of the type stated which is equipped with unique hydraulic actuating means capable of supplying relatively heavy thrust forces with a minimum of lateral deflection.

It is also an object of the present invention to provide unique hydraulic cylinder means for use in portable derricks and the like, whereby rather large amounts of longitudinal extension can be achieved under heavy load with a minimum of lateral deflection or permanent distortion.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings—

FIG. 1 is a side elevational view of a utility maintenance truck equipped with a combined derrick and hole-digging device constructed in accordance with and embodying the present invention;

FIG. 2 is a fragmentary top plan view of the utility maintenance truck equipped with the combined derrick and hole-digging device constructed in accordance with and embodying the present invention;

FIG. 3 is a fragmentary side elevational view of the combined derrick and hole-digging device in a readily inclined derrick work position;

FIG. 4 is a fragmentary perspective view of the utility maintenance truck showing the combined derrick and hole-digging device in rearwardly inclined position for hole-digging operations;

FIG. 5 is a fragmentary longitudinal sectional view taken along line 5—5 of FIG. 2;

FIG. 6 is a fragmentary sectional view taken along line 6—6 of FIG. 3 showing the open position of the catch-forming mechanism in dotted lines;

FIG. 7 is a fragmentary sectional view taken along line 7—7 of FIG. 6;

FIG. 8 is a fragmentary sectional view taken along line 8—8 of FIG. 3;

FIG. 9 is a fragmentary sectional view taken along line 9—9 of FIG. 2;

FIGS. 10 and 11 are fragmentary sectional views taken along lines 10—10 and 11—11, respectively, of FIG. 9;

FIG. 12 is a fragmentary sectional view taken along line 12—12 of FIG. 2; and

FIG. 13 is a fragmentary sectional view taken along line 13—13 of FIG. 3.

Referring now in more detail and by reference characters to the drawings, which illustrate practical embodiments of the present invention, A designates a utility maintenance truck equipped with a so-called utility body 1 provided at its forward end with the driver's cab 2 and having rearwardly extending side walls 3, 4, disposed in spaced parallel relation and including a series of built-in cabinets 5, 6, 7, 8, for the storage of tools, small parts, and similar items of equipment ordinarily used by repair crews. The side walls 3, 4, are spaced outwardly from each other and, together with the rear wall 9 of the cab compartment, define a cargo area *a* which is open at the top and rear. Mounted on the floor 10 adjacent to the crew compartment 2 is a conventional cable winch assembly 11 having a cable 12 for purposes presently more fully appearing. The floor 10 is extended rearwardly beyond the rear vertical faces of the side walls 3, 4, in the provision of an extension 13 provided on its under face with depending clevis-brackets 14 from which ground jacks 15 are suspended.

Welded or otherwise rigidly attached to the rear bracket faces of the side walls 3, 4, and projecting upwardly therefrom are two identical columns 16, 17. The column 16 is integrally provided at its upper end with two somewhat angularly disposed spaced parallel top plates 18, 19, for supporting honed pivot pins 20, 21. Similarly, the column 17 is integrally provided at its upper end with two somewhat angularly disposed spaced parallel top plates 22, 23, for supporting honed pivot pins 24, 25. Swingably mounted upon the pivot pins 20, 24, are two parallel derrick legs 26, 27, each formed of a relatively heavy U-shaped channel including side plates 28, 28', a transverse web 29, and marginal stiffening flanges 30, 31. At their outer ends the derrick legs 26, 27, are rigidly provided with channel-shaped elbow-fittings 32, 33, which are rigidly cross-connected by a cross-beam 34 rigidly provided with suitably spaced mounting brackets 35, 35'. Also rigidly mounted in the elbow-fittings 32, 33, are converging boom-members 36, 37, which extend outwardly therefrom in substantially the same plane as the derrick legs 26, 27, and meet in an end fitting 38 which integrally includes a central arcuate bend 38' which is provided on its outer face with projecting parallel ears 39, 39', as will be seen by reference to FIG. 2. The longitudinal axis of the arcuate bend 38' is on the center line of the derrick, that is to say, the line which is parallel to and midway between the legs 26, 27. Furthermore, the brackets 35, 35' and the ears 39, 39' are located equidistantly on opposite sides of such center line. Mounted in and extending horizontally across the anterior of the elbow-fittings 32, 33, and between the pairs of side plates 28, 28', of the legs 26, 27, respectively, are pivot pins 40, 41, for hingedly supporting the bearing-eyes 42, 42' of main hydraulic rams or motors R, R'. Since the derrick legs 26, 27, and the hydraulic rams R, R', mounted therein are substantially identical, only the structure of the leg 26 and the hydraulic ram R will be described in detail herein.

As will be seen by reference to FIG. 12 the bearing-eye 42 is held against lateral shifting movement along the pin

40 by means of spaced collars 43, 44, and is integrally formed as a part of the head plate 45 forming a part of and being integrally mounted across one end of a hydraulic cylinder 46, the anterior surface of which is machined and honed in the usual manner of hydraulic cylinders. At its other end the cylinder 46 is counter-bored and threaded for receiving an end collar 47 which is provided with an O-ring 48 for establishing an oil-seal between the collar 47 and the cylinder 46. The collar 47 is concentrically drilled for slidably receiving a tubular piston rod 49 and a packing gland which consists of an external packing ring 50 removably secured upon the collar 47 by a plurality of bolts 51 and interiorly pressing against an annular packing gland 52 which, in turn, fits endwise against an annular seating ring 53. Interiorly the collar 47 is provided with a plurality of axial drill-holes 54 for retaining small compression springs 55 which bear against the inner face of the seating ring 53 and exert mechanical pressure against the packing gland 52 thereby establishing a sliding seal against the outer surface of the piston rod 49. At its anterior end the piston rod 49 is rigidly mounted in a collar 56 which extends concentrically therearound and is provided with a plurality of radial passages 57 and axial passages 58 for communication with the anterior of the tubular piston rod 49. The collar 56 projects axially beyond the end of the tubular piston rod 49 and is rigidly attached to a coaxial quill 59 which projects concentrically through a piston 60 and terminates at its opposite end in an externally threaded portion which receives a collar-nut 61 by which the piston 60 is firmly and securely held in place. Preferably the piston 60 consists of three circular plates 62, 63, 64, which are sealed upon the quill by O-rings 65, 66, and are provided with annular piston rings 67, 68, which are in tightly sealed sliding contact with the internal surface of the cylinder 46.

At its opposite or external end the piston rod 49 projects beyond the packing ring 50 and is rigidly provided with an end-fitting 69 having an inwardly opening tubular chamber 70 communicating with the interior of the tubular piston rod 49 and being provided with a laterally projecting nipple 71 which is, in turn, connected by means of a flexible hose or conduit 72 to a suitable source of hydraulic fluid under pressure. The hydraulic fluid is supplied from a pump and valving system which may be of any conventional type or design and is not specifically shown or described herein. It is sufficient, for present purposes, to point out that hydraulic fluid, when desired, may flow through the nipple 71 and the tubular chamber 70 into the interior of the tubular piston rod 49 and thence through the passages 57, 58, in the collar 56 to the chamber *c* which is on the posterior side of the piston 60. Tightly threaded at one end in the interior of the end-fitting 69 and extending axially through the chamber 70 and piston rod 49 is a central pipe or conduit 73 which is likewise threaded at its other end in the quill 59. The pipe 73 communicates through a passage 74 in the end-fitting 69 with a nipple 75 which is, in turn, connected by a flexible hose or conduit 76 to the hydraulic system so that hydraulic fluid under pressure may, when desired, flow through the interior of the pipe 73 and the quill 59 to the chamber *c* on the anterior side of the piston 60.

Welded or otherwise rigidly secured upon the external surface of the cylinder 46 adjacent the posterior end thereof are two axially spaced concentric bearing rings 77, 78, which are suitably machined both to have external or peripheral surfaces which are accurately concentric with the honed anterior surface of the cylinder 46 and the central line of the tubular piston rod 49. Slidably mounted upon the machined external surfaces of the rings 77, 78, is a tubular sleeve 79 which is concentric with and somewhat longer than the cylinder 46. At its posterior end the tubular sleeve 79 is provided with a pair of spaced parallel ears 80, 81, which register with

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the rearwardly projecting end 82 of the end-fitting 69, the ears 80, 81, and the rearwardly projecting end 82 of the end-fitting 69 being suitably drilled for receiving a pivot pin 83 which connects the tubular sleeve 79 and the piston rod 49 in common to a clevis-ended link 84 and a clevis-ended link 85. The link 84 is, in turn, pivotally connected at its other end to the pivot pin 21 and the link 85 is similarly connected at its opposite end to a pivot pin 86 which is mounted at its end in and pressed between the side plates 28, 28', of the derrick leg 26 is outwardly spaced relation to the pivot pin 20.

As will be seen by reference to FIG. 9, when the hydraulic ram R is in fully retracted position the cylinder 46 will be telescoped entirely within the tubular sleeve 79. On the other hand, when the cylinder 46 is in extended position, somewhat as shown in FIG. 3, the cylinder 46 will still be sheathed within the tubular sleeve 79 and the latter will still be slidably bearing upon the rings 77, 78, so as to stabilize the cylinder 46 against any serious degree of lateral deflection or buckling. In fact, the interior diametral size of the sleeve 79 is such that even if the cylinder 46 were to buckle until it bowed outwardly against, and came in contact with, the interior surface of the sleeve 79 such deflection would still be within the elastic limits of the cylinder 46 and the distortion would not be permanent or detrimental.

As has been above pointed out, the leg 27 and the hydraulic ram R' are identical with the leg 26 and the hydraulic ram R having a pivot pin 83', links 84', 85', and a pivot pin 86'. Moreover the hydraulic rams R, R', act simultaneously as paired power-units. Rigidly mounted at one end in and projecting posteriorly from the sleeve 38' of the end-fitting 38 is an elongated tubular sleeve 87 which is rigidly welded at its posterior end to and mounted between the brackets 35, 35'. The internal surface of the sleeve 87 is suitably machined for sliding engagement with bearing rings 88, 89, which are substantially similar to the previously described bearing rings 77, 78, and are rigidly mounted upon the external surface of an auxiliary end-boom *e* consisting of a hydraulic cylinder 90 which is disposed slidably and coaxially within the tubular sleeve 87 and projects outwardly therefrom beyond the end-fitting 38 for rigid securement within a conventional sheave block 91 around which the cable 12 from the winch 11 may be trained. Thus, if it is desired to lift some heavy device like a conventional electrical transformer (not shown) from the ground to the floor 10, the derrick legs 26, 27, can be swung to an angular position over the rear end of the truck A and the cable 12 manually threaded through the sheave block and fastened to a conventional load gripping means such as a hook. Since the cable 11, winch 12, and related means, are conventional, and do not constitute part of the present invention, they are not shown or described herein in detail. The other or posterior end of the cylinder 90 is counterbored and threaded for receiving an end collar 92 which is provided with an O-ring 93 for establishing an oil-seal between the collar 92 and the cylinder 90. The collar 92 is concentrically drilled for slidably receiving a tubular piston rod 94 and a packing ring 95 which is suitably threaded into the outer end of the collar 92 and presses interiorly against an annular packing gland 96 which, in turn, fits endwise against an annular seating ring 97. Interiorly the collar 92 is provided with a plurality of axial drill-holes 98 for retaining small compression springs 99 which bear against the inner face of the seating ring 97 and exert mechanical pressure against the packing gland 96 thereby establishing a sliding seal against the outer surface of the piston rod 94. At its anterior end the piston rod 94 is rigidly mounted upon a coaxial quill 100 which projects concentrically through a piston 101 and terminates at its opposite end in an externally threaded portion which receives a collar-nut 102 by which the piston 101 is firmly and securely held in place. Preferably, the piston 101 consists of three

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circular plates 103, 104, 105, which are sealed upon the quill by O-rings 106, 107, and are provided with annular piston rings 108, 109, which are in tightly sealed sliding contact with the internal surface of the cylinder 90. The piston rod 94 is also provided with a plurality of radial apertures 110 which provide communication between the anterior of the piston rod 94 and the posterior chamber *c*². In the region of the apertures 110 the piston rod 94 is provided with an external stop ring 111 which abuts against the interior end face of the collar 92 when the cylinder 90 is extended and thus acts as a limit preventing further outward travel of the cylinder 90.

At its opposite or external end the piston rod 94 projects beyond the packing ring 95 and is rigidly provided with an end-fitting 112 having an inwardly opening tubular chamber 113 communicating with the interior of the tubular piston rod 94 and being provided with a laterally projecting nipple 114 which is, in turn, connected by means of a flexible hose or conduit 115 to a suitable source of hydraulic fluid under pressure. Tightly threaded at one end in the interior of the end-fitting 112 and extending axially through the chamber 113 and piston rod 94 is a central pipe or conduit 116 which is likewise threaded at its other end in the quill 100. The pipe 116 communicates through a passage 117 in the end-fitting 112 with a nipple 118 which is, in turn, connected by a flexible hose or conduit 119 to the hydraulic system so that hydraulic fluid under pressure may, when desired, flow through the interior of the pipe 116 and the quill 100 to the chamber *c*³ on the anterior side of the piston 101.

The end-fitting 112 is externally threaded and inserted through an aperture 120 formed in an end plate 121 which is rigidly welded or otherwise attached to the posterior end of the tube 87. Threaded externally upon the end-fitting 112 for holding it to the end plate 121 are collar-nuts 122, 123.

When the piston 101 is in fully retracted position, as shown in FIG. 5, the cylinder 90 will be fully telescoped within the sleeve 87. When, however, oil under pressure flows through the pipe 116 into the anterior chamber *c*³ of the cylinder 90, the latter may be propelled outwardly until the end collar 92 abuts the stop ring 111. In such outwardly shifted position the cylinder 90 will be stabilized and strengthened against lateral deflection by the sleeve 87 just as the previously described cylinder 46 is stabilized by the sleeve 79.

Swingably mounted between the ears 39, 39' by means of a pivot pin 124 is an oil motor 125 which may be of any suitable or conventional design and includes an outwardly projecting shaft 126 which is rigidly fastened to an auger-rod 127 which is provided at its outer end with a spiral auger plate 128. The auger-rod 127 is of such length that it may be swung upwardly and nested in a transport position between depending ears 129, 130, which are welded to and project outwardly from the sleeve 87 in symmetrical alignment with the ears 39, 39'.

Pivotally mounted at the lower end of the ear 129 is an arcuate catch member 131 which is adapted to swing from the position shown in full lines, over to the position shown in dotted lines, in FIG. 6 for retention by a spring pressed snap-lock 132 having a manually operable pull handle 133 as shown in FIG. 7. In the last position the catch member 131 will lock the auger-rod in a transport position as shown in FIGS. 1 and 3. As has been above pointed out, the auger-rod 127 is sufficiently long so that the auger plate 128 will be disposed downwardly from the ears 129, 130 (reference being made to FIG. 3) so as to be carried, more or less, between the legs 26 and 27. In this transport position the auger-rod 127 and auger plate 128 will in no way interfere with the operation and use of the structure as a derrick.

By suitable manipulation of the valves (not shown) oil may be admitted into the anterior chamber *c*¹ of the hydraulic rams or motors R, R', thereby swinging the derrick from the transport position shown in FIG. 1 to

the work position shown in FIG. 3. When the derrick is in the transport position, that is, the position shown in FIG. 1, the links 84, 85, will lie on the underside of the derrick legs 26, 27, as shown in dotted lines. When oil is applied to the hydraulic rams R, R', the force on the links 84, 85, will tend the separate and enlarge the distance between the axes of the pivot pins 21 and 86, pivoting the derrick about the pivot pin 20. As the derrick is rising through the first 90° in the clockwise position, the greatest component of compressional force will be on the link 84 and pin 21. There can never be a "dead center" position for the hydraulic rams R, R', because the axes of the pivot pins 20, 21, and 86, can never all lie in the same straight line and, consequently, there will always be a component of force tending to change the angular relation of the links 84, 85, whenever the rams R, R', are actuated. It will, of course, be obvious that by shutting off the hydraulic fluid at any desired time the derrick can be stopped in any intermediate work position and by continuing the admission of oil the derrick can be swung downwardly beyond the position shown in FIG. 3 until the sheave block 91 has practically reached the ground beyond the maintenance truck A. It is important, in this connection, to point out that by reason of the strength of the hydraulic rams or motors R, R', and the linkage of clevis-ended links 84, 85, it is possible to apply a downward thrust of several tons, if necessary, to the outer end of the derrick. Moreover, the portion of the arc traveled by the sheave block 91 in moving downwardly from the work position shown in FIG. 3 toward the ground is relatively flat and for all practical purposes when it is in the drilling position shown in FIG. 4 a substantial vertical downward thrust can be applied to the auger-rod 127 when the latter is in hole-drilling position. After the hole-drilling operation has been completed the derrick can be swung upwardly thereby lifting the auger-rod out of the hole and above the ground, from which position it can be manually swung upwardly and latched in transport position.

By appropriate manipulation of the valves admitting oil into the hydraulic rams R, R', and into the auxiliary cylinder 90 it is conventionally and readily possible to cause the sheave block 91 to move in a truly vertical path or a truly horizontal path whenever such movements may be necessary in the handling of poles or heavy equipment. If the cylinder 90 is not actuated during movement of the derrick, the sheave block will follow an arcuate path. However, hydraulic pressure can be applied to the cylinder 90, as the derrick is swung up and down from the position shown in FIG. 4, whereby the extensible sheave can be caused to move inwardly or outwardly so that the effective length of the boom will be adjusted as necessary to cause the sheave block 91 to follow a substantially vertical or straight line path during a portion of the arcuate swing of the derrick legs 25, 26. Thus, by the combined actuation of the ram R, R', and the cylinder 90, it is possible to obtain several feet of straight-line movement of the sheave block 91 along any part of the path of arcuate swing of the derrick.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the portable diggers may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A portable derrick comprising a base having laterally spaced supports at the rear end thereof, a boom pivotally mounted on said support and being adapted to swing from a forward position in which it extends over the base in a forward direction with respect to its point of attachment to a rearward position in which it extends outwardly over the rear end of the base, each of said supports being provided at its rearwardmost end with a first pivot,

each of said supports being further provided at its rearward end with a second pivot, which is located in upwardly and forwardly spaced relation to the first pivot of said support, the first pivot on one support being in axial alignment with the first pivot on the other support and the second pivot on one support being in axial alignment with the second pivot on the other support, said boom including a pair of substantially parallel derrick legs respectively mounted for swinging movement upon said second pivots, said legs being transversely connected to each other at their outer ends by a triangular frame which includes a transversely extending cross-beam and two outwardly extending converging boom-members, a hydraulic ram pivotally connected at one end to each leg outwardly therealong with respect to the second pivot and extending along the leg toward said second pivot, each of said hydraulic rams being pivotally connected at its other end to two diverging links which are also pivotally connected respectively to the first pivot and to the leg, means for simultaneously admitting fluid under pressure to the two hydraulic rams, an auxiliary end-boom mounted on and being positioned centrally of the converging boom-members, said auxiliary end-boom including an extensible cylinder at its forward end, hydraulic means for shifting the extensible cylinder outwardly with respect to the converging boom-members, and means for reinforcing said hydraulic rams against lateral deflection between their ends as they extend in length.

2. A portable derrick comprising a base having laterally spaced supports at the rear end thereof, a boom pivotally mounted on said support and being adapted to swing from a forward position in which it extends over the base in a forward direction with respect to its point of attachment to a rearward position in which it extends outwardly over the rear end of the base, each of said supports being provided at its rearwardmost end with a first pivot, each of said supports being further provided at its rearward end with a second pivot, which is located in upwardly and forwardly spaced relation to the first pivot of said support, the first pivot on one support being in axial alignment with the first pivot on the other support and the second pivot on one support being in axial alignment with the second pivot on the other support, said boom including a pair of substantially parallel derrick legs respectively mounted for swinging movement upon said second pivots, said legs being transversely connected to each other at their outer ends by a triangular frame which includes a transversely extending cross-beam and two outwardly extending converging boom-members, a hydraulic ram pivotally connected at one end to each leg outwardly therealong with respect to the second pivot and extending along the leg toward said second pivot, each of said hydraulic rams being pivotally connected at its other end to two diverging links which are also pivotally connected respectively to the first pivot and to the leg, means for simultaneously admitting fluid under pressure to the two hydraulic rams, an auxiliary end-boom mounted on and being positioned centrally of the converging boom-members, said auxiliary end-boom including an extensible cylinder at its forward end, a sheave-block carried by the extensible cylinder, hydraulic means for shifting the extensible cylinder outwardly with respect to the converging boom-members, and means for reinforcing said hydraulic rams against lateral deflection between their ends as they extend in length.

3. A portable hole-digging device comprising a base, a boom pivotally mounted on the base, and having a pair of converging members, an end fitting mounted on the end of said converging members and having a first pair of downwardly extending ears adjacent the outer end of said boom, a transversely extending pin mounted between said first pair of ears, a post-hole digger swingably mounted at its upper end upon the said pin and being adapted for movement into an inoperative transport position in which it extends lengthwise along the boom, a sleeve member

secured to said end fitting at one end, a second pair of downwardly extending ears mounted on the other end of said sleeve member, and manually releasable catch means on said second pair of ears for holding the digger in said transport position.

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