

May 30, 1967

P. D. GERNHARDT

3,322,206

EARTH BORER

Filed Oct. 9, 1964

5 Sheets-Sheet 1

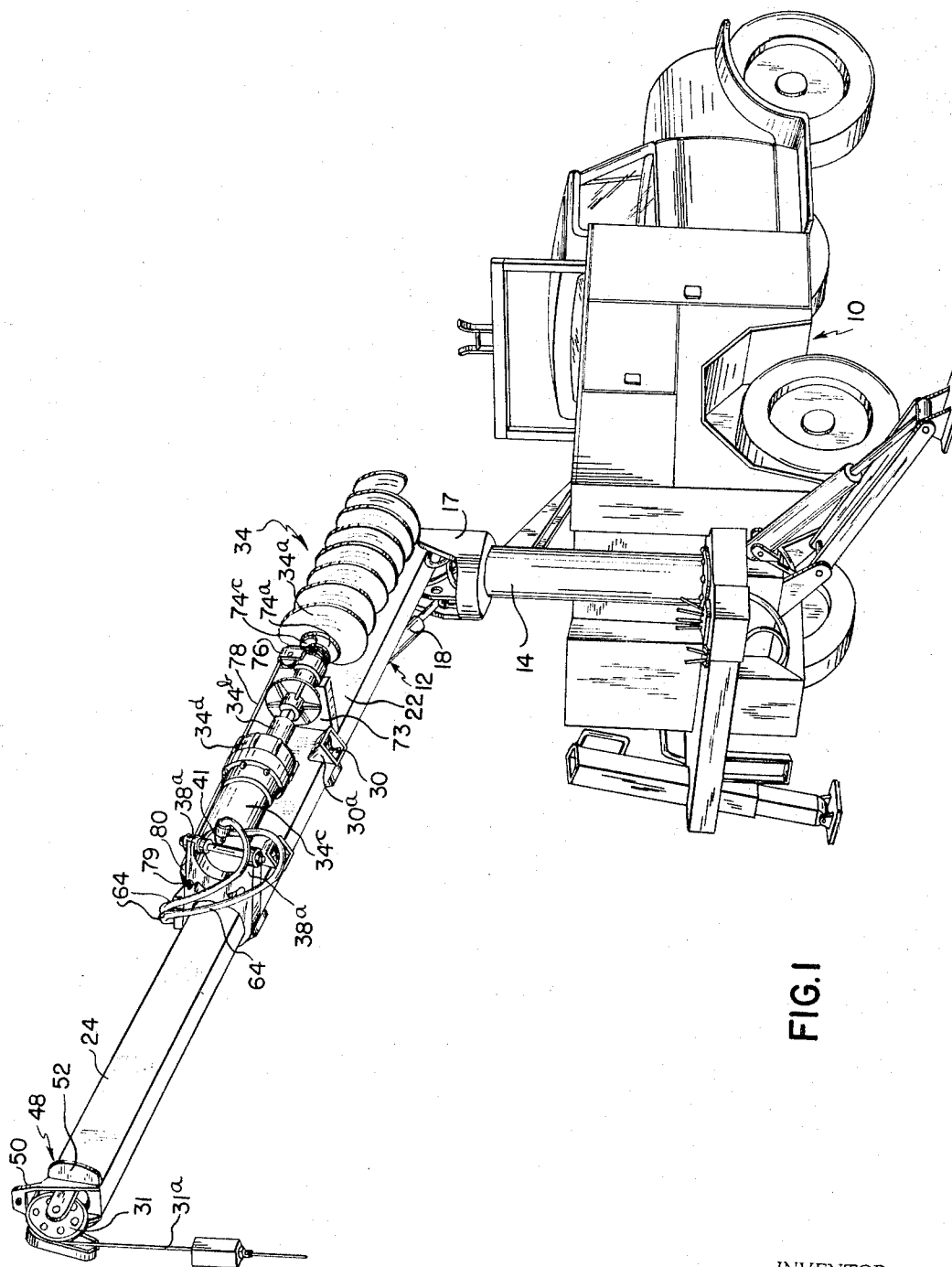


FIG. 1

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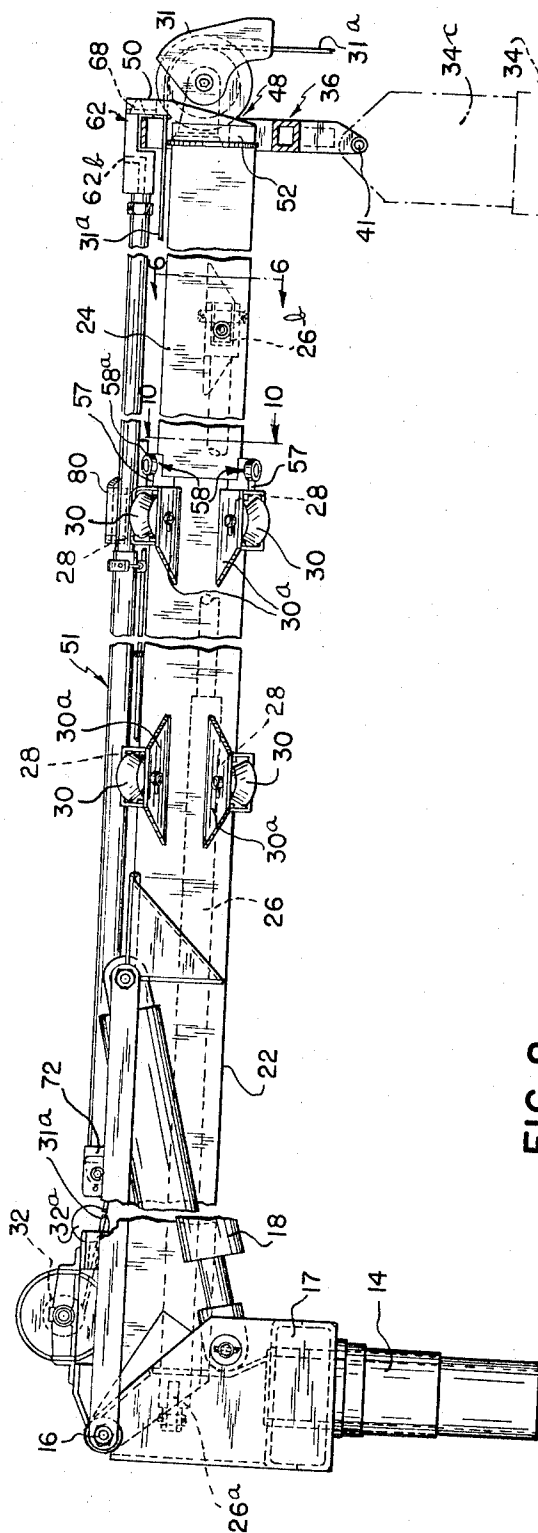


FIG. 2

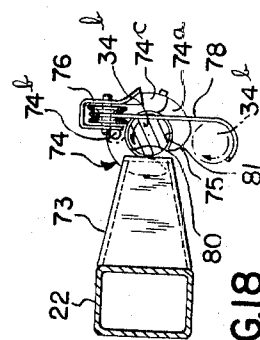


FIG. 18

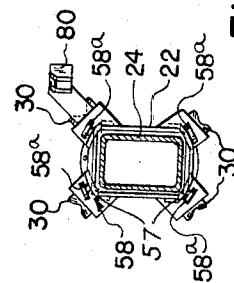


FIG. 10

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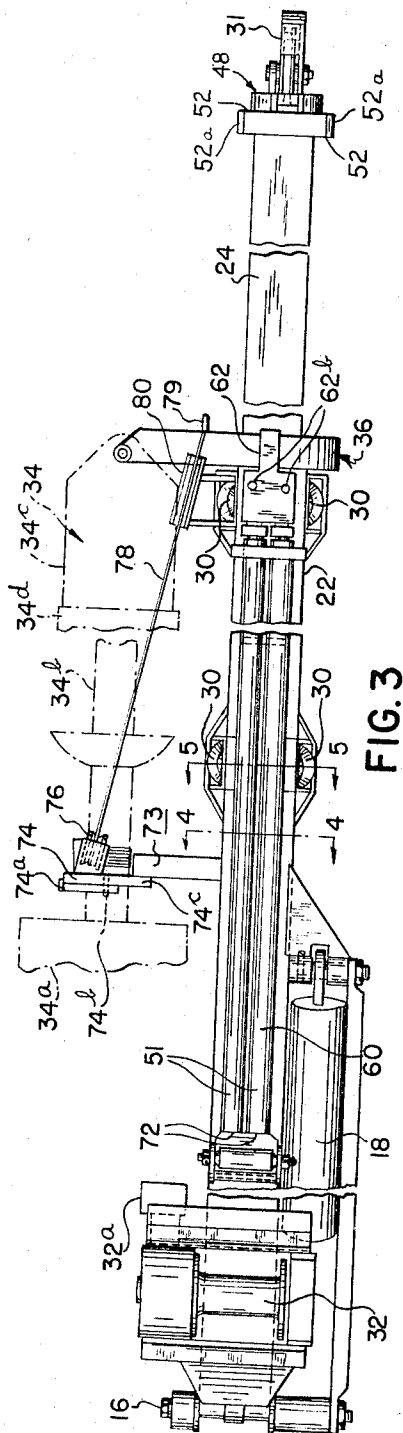


FIG. 3

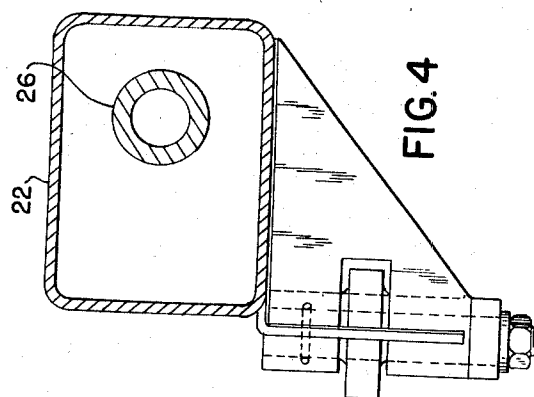


FIG. 4

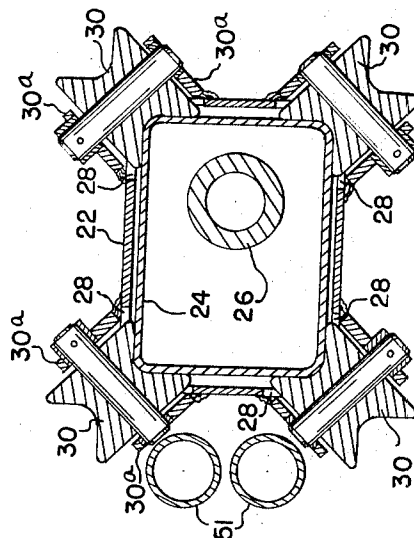


FIG. 5

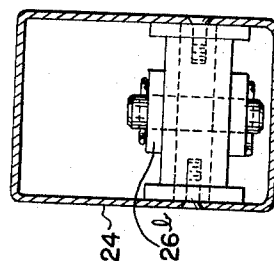


FIG. 6

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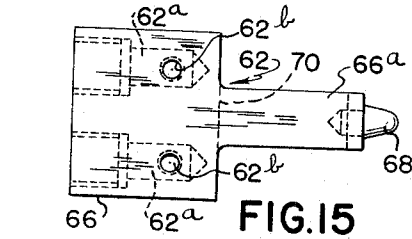


FIG. 15

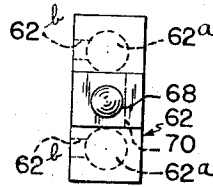


FIG. 17

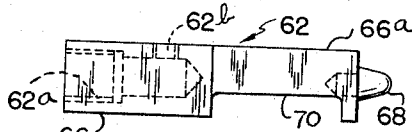


FIG. 16

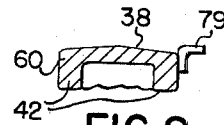


FIG. 9

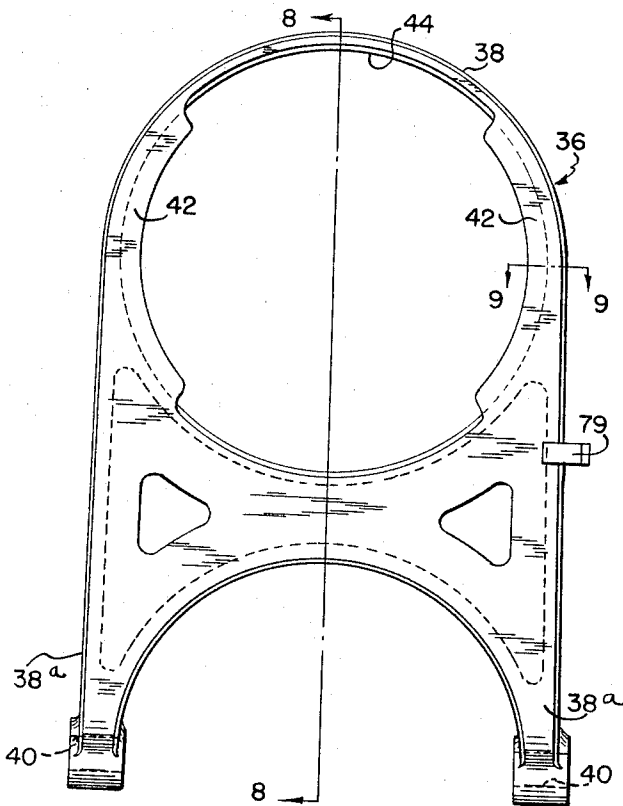


FIG. 7

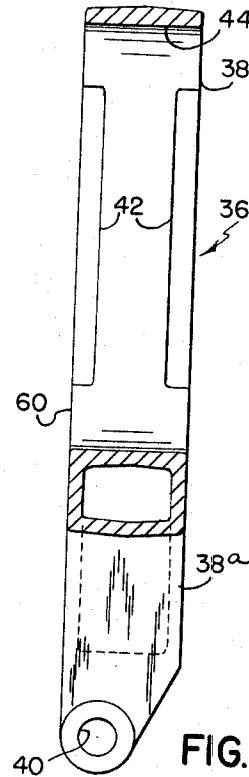


FIG. 8

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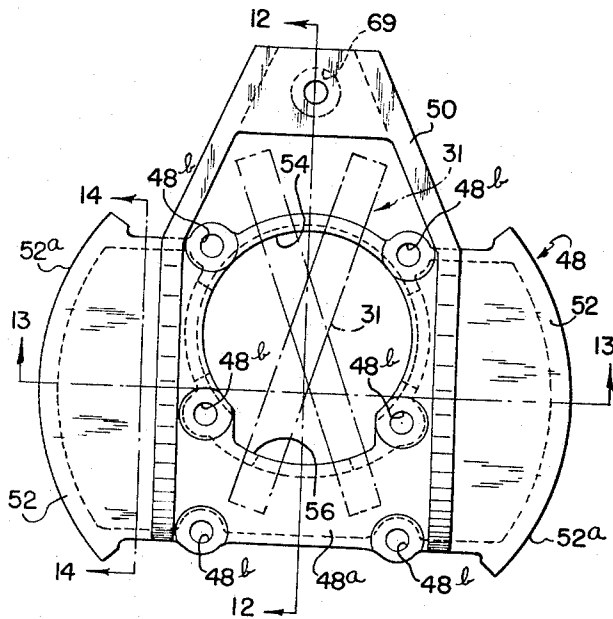


FIG. 11

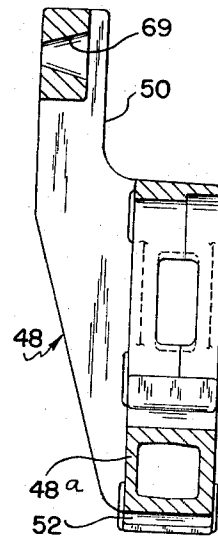


FIG. 12

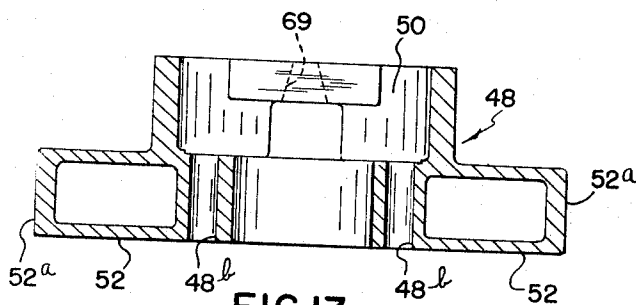


FIG. 13

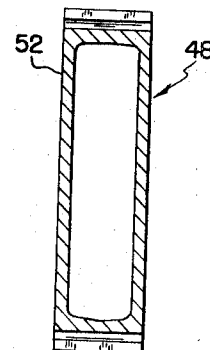


FIG. 14

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This invention relates in general to earth boring apparatus of the type supported on or suspended from a derrick or crane, for digging or boring operations, and more particularly to such type of apparatus wherein the earth boring mechanism or apparatus is adapted to be swung upwardly to a generally laterally disposed storage position with respect to the derrick boom when not in use.

Such type of apparatus is conventionally found in conjunction with a utility-type of vehicle and is adapted for handling and erecting various objects, such as telephone or telegraph poles, and may be effectively utilized in performing all of the necessary work operations associated with setting a utility line pole in proper place along a thoroughfare or the like.

In the United States Patent No. 3,073,455 of George H. Eckels et al., issued February 15, 1964, there is disclosed a portable type derrick mounted on a utility type vehicle of the above discussed type. Such derrick comprises a sectional, extensible boom and includes means on the boom for attaching an associated earth boring tool to the boom, with such attaching means comprising a support or collar member mounted on the extendible section of the boom and projecting laterally therefrom, and with the earth boring tool being suspended from such laterally projecting portion of the collar. The collar member is adapted for lengthwise movement with respect to the boom for adjusting the position of the earth boring auger lengthwise along the boom.

The present invention provides a novel arrangement of earth boring derrick wherein the auger supporting member is rotatable with respect to the section of the boom on which it is supported, and which may be moved or rotated in a direction generally transverse of such boom section, so that the earth boring auger may be disposed generally beneath the boom, rather than laterally to one side thereof, during earth boring operations, but wherein the supporting member and associated earth boring auger may be easily moved or rotated to a generally laterally disposed position with respect to the boom, or at least from a position beneath the boom, when it is desired to place the earth boring auger in storage position, thereby facilitating the use of the boom without interference from the auger.

Accordingly, an object of the invention is to provide a novel arrangement of earth boring derrick.

Another object of the invention is to provide a novel arrangement of derrick with a vertically swingable boom having a member thereon for supporting an associated work mechanism, such as for instance, a power driven earth boring tool, and which support member is movable or rotatable with respect to the derrick boom, so that the work mechanism can be positioned generally in alignment with and below the derrick boom for work operations, and can be positioned generally laterally of the derrick boom for storage.

A more specific object of the invention is to provide a portable type derrick including a vertically swingable, sectional, extensible boom, providing for telescopically varying the effective length of the boom, and wherein there is provided a support member on the extensible section of the boom, which support member mounts a work mechanism, such as an earth boring auger thereon, and which support member is rotatable with respect to

the boom, so that the auger may be moved downwardly to be disposed beneath the boom during drilling operations, and which support member may be rotated so as to position the earth boring mechanism generally laterally of the boom for convenient storage of the work mechanism with respect to the boom, and wherein there is provided novel means for selectively securing the work mechanism support member to either the extensible boom section or to the relatively stationary section of the boom, thereby providing for readily adjusting the position of the work mechanism lengthwise along the boom, and providing for selective use of the boom without interference from the earth boring mechanism.

Another object of the invention is to provide a novel arrangement of derrick with a vertically swingable, sectional extensible boom, providing for telescopically varying the effective length of the boom, and wherein there is provided a novel arrangement for facilitating the expeditious extension and retraction of the boom, together with means for supporting an associated work mechanism, such as a power driven earth boring auger thereon, and which support means is movable or rotatable transversely with respect to the derrick boom.

Another object of the invention is to provide a derrick of the aforementioned type which includes a novel arrangement of mechanism for powered swinging or movement of a work mechanism with respect to a supporting boom, and from an operative to a storage position and vice versa.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a generally diagrammatic, perspective view of the derrick of the invention as mounted on a utility type of vehicle, and illustrating an earth boring auger supported by the boom and disposed in a storage position thereon;

FIG. 2 is an enlarged, broken, side elevational view of the derrick boom, showing the work mechanism supporting member in section, and disposed in coupled relation with the outer extensible section of the boom, with the supporting member having been oriented so as to dispose the earth boring tool beneath the boom for boring operations;

FIG. 3 is a broken top plan view of the derrick of FIG. 2, but illustrating the work mechanism supporting member attached to the inner boom section and having been rotated so as to dispose the associated earth borer in a storage or laterally disposed position on the boom;

FIG. 4 is an enlarged transverse sectional view taken generally along the plane of line 4-4 of FIG. 3, looking in the direction of the arrows;

FIG. 5 is an enlarged transverse sectional view taken generally along the plane of line 5-5 of FIG. 3;

FIG. 6 is an enlarged, transverse sectional view taken generally along the plane of line 6-6 of FIG. 2;

FIG. 7 is an enlarged, front elevational view of the work mechanism supporting member, which is adapted to support the fluid driven earth borer on the extensible boom section;

FIG. 8 is a sectional view taken generally along the plane of line 8-8 of FIG. 7, looking in the direction of the arrows;

FIG. 9 is a sectional view taken generally along the plane of line 9-9 of FIG. 7, looking in the direction of the arrows;

FIG. 10 is a transverse sectional view taken generally along the plane of line 10-10 of FIG. 2 looking in the direction of the arrows, and illustrating the arrangement for coupling the work mechanism supporting member and associated earth borer to the inner boom section, for facilitating extension of the outer boom section with respect

to the inner boom section and attached work mechanism, and yet also providing for ready rotational movement of the work mechanism supporting member in a direction transverse of the boom, and with respect to such retainer means;

FIG. 11 is an enlarged, front end elevational view of the winged retaining member, which is adapted for attachment to the distal end of the outer boom section, for securing the work mechanism supporting member to such outer boom section for movement of the work mechanism with the outer boom section, and yet providing for rotational movement of the work mechanism supporting member with respect to said winged retainer member;

FIG. 12 is a sectional view taken generally along the plane of line 12—12 of FIG. 11 looking in the direction of the arrows;

FIG. 13 is a sectional view taken generally along the plane of line 13—13 of FIG. 11 looking in the direction of the arrows;

FIG. 14 is a sectional view taken generally along the plane of line 14—14 of FIG. 11 looking in the direction of the arrows;

FIG. 15 is an enlarged, top plan view of a coupling member which is adapted for coupling extensible or telescopic fluid transmission lines carried by the boom for transmitting pressurized actuating fluid, to the fluid powered motor unit which drives the earth boring mechanism; the coupling member is adapted for attachment to the work mechanism supporting member mounted on the extensible section of the boom, and yet provides for rotational movement of the work mechanism supporting member with respect to such coupling member;

FIG. 16 is a side elevational view of the coupling member of FIG. 15;

FIG. 17 is an end elevational view of the FIG. 15 member, taken from the right hand end thereof;

FIG. 18 is a front elevational view of the auger storing bracket and associated cable means for rolling or pulling the auger into storage position on the boom; the sheave or pulley illustrated has been rotated 10° from its true position in this view for purposes of illustration, and from the true position illustrated in FIG. 3; in dot-dash lines there is illustrated the auger shaft as it is rotated by its associated motor unit to automatically move the auger upwardly into storage position.

Referring now again to the drawings, there is shown a utility vehicle 10 having a truck body which carries a movable derrick 12 thereon. The derrick boom may be mounted on a pedestal 14, and adapted for rotational movement about a generally vertical axis, for swinging of the boom in a generally horizontal plane. Conventional power means including suitable control means may be provided for so selectively swinging the boom through any desired range, and preferably through a full 360° range of movement.

The boom may be pivoted adjacent the lower end thereof, and as at 16 (FIG. 2) to the superstructure 17, for swinging movement in a generally vertical plane with respect to the vehicle. This swinging movement of the boom in a generally vertical plane may be provided by any suitable means, and preferably including fluid powered reciprocal motor means 18, operatively coupled to the derrick boom.

The derrick boom illustrated embodies an inner or lower, generally hollow boom section 22, pivoted, as aforementioned, as at 16, and an outer generally hollow, extendible boom section 24, which may be received in telescoping relation in the inner section 22 of the boom. The boom sections are preferably of rectilinear configuration in vertical cross-section. A reciprocal fluid powered motor unit 26 may be disposed interiorly of the boom sections for extension and retraction of the extendible section 24 of the boom, and in this connection, the motor unit may be secured as at 26a to the inner boom section 22 and as at 26b to the outer boom section 24.

In order to provide for ready relative lengthwise movement of the outer boom section 24 with respect to the inner boom section 22, the inner boom section may be provided with lengthwise spaced sets of diametrically opposed slots 28 (FIGS. 2 and 5) therein, through which extend coacting rollers 30 which may be mounted on brackets 30a attached to the inner boom section 22. The rollers are of generally V-notched exterior configuration and engage the corresponding corners of the outer boom section 24 in anti-friction relationship, to guide the lengthwise movement of the outer boom section telescopically within the inner boom section 22. The spaced sets of rollers, best illustrated in FIGS. 2 and 3 of the drawings, provide expeditious support in guiding the outer boom section in its lengthwise movement with respect to the inner boom section, to insure a non-binding relationship between such boom sections.

Mounted on the outer end of the outer section 24 of the boom, there may be provided a head sheave assembly 31, which is adapted to coact in anti-friction relationship with a flexible lift cable 31a for supporting a load. The other end of the cable 31a may be reeved about a winch mechanism 32, mounted for instance on the inner section 22 of the boom adjacent the pivotal axis 16 thereof, which mechanism 32 may be driven by means of a conventional rotary, reversible, fluid powered motor unit 32a.

The earth boring mechanism 34 may be of generally conventional type, including an auger 34a, a drive shaft 34b, and a preferably reversible, rotary fluid powered motor unit 34c (FIG. 1) operatively coupled to a geared transmission mechanism 34d for driving or rotating the earth boring auger at a selected speed.

The earth boring mechanism 34 in the embodiment illustrated is selectively couplable to either the extendible outer section 24 of the boom, or to the relatively stationary inner section 22 of the boom. The arrangement for so accomplishing the latter may comprise a tool supporting member 36 (FIGS. 2 and 7) mounted on or associated with the extendible section 24 of the boom, and which member 36 may comprise a collar-like portion 38 and laterally spaced arm portions 38a projecting outwardly from the collar portion. Arm portions 38a are apertured as at 40 for receiving a pin or shaft means 41 (FIG. 1) for pivotally supporting the motor housing 34c of the earth boring tool. The collar portion 38 may be provided with pairs of diametrically opposed lengthwise spaced flanges 42 (FIGS. 7, 8 and 9) for a purpose to be hereinafter set forth. As can be seen, the flanges 42 project into the circular opening 44 through the collar portion, and extended circumferentially about the edges of such opening a predetermined amount.

Secured to the outer end of the outer boom section 24 is a retainer member 48 (FIGS. 11, 12, 13 and 14). Retainer member 48 comprises a body portion 48a having openings 48b therethrough, which are adapted to receive, for instance, threaded fastener means, for attaching or bolting the retainer member 48 to the outer end of boom section 24. Projecting upwardly from the body portion 48 is a head portion 50 adapted for providing an abutment for the fluid transmission tube mechanism 51 (FIGS. 2 and 3) mounted on the boom, in a manner to be hereinafter described. Projecting laterally from body portion 48a are wing portions 52 which have arcuate exterior surfaces 52a of a configuration generally complementary to the curvature of the interior surface of opening 44 in collar portion 38 of work mechanism supporting member 36. Wings 52 are of a width which can be received between the lengthwise spaced flanges 42 on the work mechanism supporting member 36, and when disposed between such flanges will interlock the work mechanism supporting member 36 to the retainer member 48.

Retainer member 48 also has an opening 54 therethrough adapted to receive therethrough in partially rotatable relation the sheave head 31. It will be seen there-

fore that the sheave head may be rotated with respect to retainer member 48, and as shown in dot-dash lines in FIG. 11. The cut-out portion 56 of opening 54 provides clearance for the pulley of the sheave head 31.

Mounted adjacent the distal or outer end of inner boom section 22, and as by means of segmental arcuate brackets 57 secured to the bracket structure 30a of the outer set of guiding rollers 30, is another retainer means 58 (FIG. 2). Retainer means 58 comprises preferably rotatable idler roller members 58a (FIG. 10) disposed generally adjacent the corners of the boom and in generally overlying relation with respect to outer boom section 24. The roller members 58a are adapted to be received intermediate the aforementioned spaced flanges 42 on support member 36, when said support member is disposed in encompassing relation to rollers 58a and is rotated to a position so as to extend generally laterally of the boom, and as shown for instance in FIG. 3 of the drawings, thus positively coupling the support member to the inner section 22 of the boom. The rotatable roller members 58a facilitate the rotary movement of the support member 36 with respect to the boom, during its movement laterally to a side of the boom, and during its reverse rotary movement back downwardly, so as to dispose the earth borer below the boom.

When the support member 36 is rotated downwardly from a laterally disposed position so that the leg sections 38a are disposed beneath the boom, the retainer roller members 58a clear the flanges 42 on the collar portion 38 of the support member 36 so that the support member may move outwardly with the outer extendible section 24 of the boom. However, when the support member 36 is disposed in encompassing relation to rollers 58a by adequate retraction of motor unit 26, and then support member 36 is rotated so as to dispose the leg portions 38a generally laterally to a side of the boom, the flanges 42 on the support member will be disposed in interlocked coaction with the roller members 58a, and thus will couple the support member 36 to the inner section 22 of the boom.

Mounted on the top of the boom, in the embodiment illustrated, are aforementioned telescopically extensible fluid transmission lines 51 (FIGS. 2 and 3) which are adapted to transmit pressurized fluid from a source (not shown) on the vehicle outwardly along the boom to the motor unit 34c of the earth borer 34. In this connection, there is provided a coupling member 62 (FIGS. 2, 15, 16 and 17) which has fluid passageways 62a therethrough, which passageways are adapted to be coupled at one end to the respective extensible or telescoping fluid transmission lines 51, and at the other end thereof may be provided with ports 62b, which are adapted for coupling, as by means of flexible hose 64 (FIGS. 1 and 2) to the motor ports of the fluid powered motor unit 34c.

Coupling member 62 preferably comprises a body portion 66 which in the embodiment illustrated is of block-like configuration, and a head portion 66a projecting forwardly therefrom. At the forward end of the head portion there is provided a tapered bumper or boss 68, which is adapted to be received in an opening 69 (FIGS. 11 and 12) in the head portion 50 of outer retainer member 48 secured to the outer end of outer boom section 24. Opening 69 is preferably tapered to receive in guiding coacting relation the bumper 68. The underside of head portion 66a may be provided with a slot 70 for receiving in lengthwise interlocking but relatively rotatable relation, the collar portion 38 of work mechanism supporting member 36 (FIG. 2). The other ends 72 (FIG. 2) of the telescopic fluid transmission lines 51 may be connected by, for instance, flexible hose (not shown) passing down along the supporting structure for the boom, to be connected in the conventional manner into the fluid power system for the derrick, including suitable control valve means for controlling the flow of pressurized fluid through lines 51.

In order to provide for automatic movement of the earth borer mechanism to the storage position illustrated, for instance, in FIG. 3, a bracket 73 (FIGS. 3 and 18) may be provided extending laterally from the inner boom section 22, with the bracket mounting a generally C-shaped, in front elevation, storage clamp member 74 (FIG. 18) thereon. C-shaped storage bracket 74 may be of sectional configuration, with the pivotal section 74a thereof pivoted as at 74b to the remainder 74c of the bracket. Section 74a preferably has a curved or arcuate under surface 75 which is adapted to coact in frictional, relatively pivotal relation with the drive shaft 34b of the earth borer mechanism as will be hereinafter described.

Mounted on the stationary section 74c of the bracket may be an idler sheave or pulley 76, tilted approximately 10° from a plane running parallel to the boom, and in a direction toward the boom. This tilt of the pulley 76 can be best seen from FIG. 3. In FIG. 18 for purposes of illustration, the pulley has been shown with no tilt. A cable or flexible member 78 (FIG. 3) is adapted to be detachably secured to the work mechanism support member 36 and as by means of securing lug 79 on the support member 36, and then extend up to and through trough-like bracket 80 (FIG. 3) mounted on inner boom section 22, and then over to and downwardly from the pulley 76, to be detachably secured to the rotatable shaft 34b of the earth borer. When the outer boom section 24 is retracted into the inner boom section 22 a predetermined amount so that the work supporting member 36 is caused to move into coacting relationship with the retainer rollers 58 adjacent the outer end of the inner boom section 24, and the cable 78 is secured to the shaft 34b of the earth borer and to lug 79 on support 36, and then the earth borer is driven by its motor so as to rotate shaft 34b, the cable 78 will wind up about the rotating shaft and cause the support member 36 to be automatically moved from a position wherein the leg portions 38a are disposed beneath the boom to a position wherein the support member is rotated to orient the leg portions laterally of the boom, thus automatically placing the earth borer in storage position.

As the work mechanism supporting member 36 and associated earth borer is rotated about the axis of the boom, and the shaft 34b of the earth borer is winding the cable 78 thereabout, the shaft 34b of the earth borer engages the pivotal section 74a of storage bracket 74 and due to the frictional coaction between the rotating shaft and the surface 75 of the bracket, section 74a is automatically pivoted outwardly so that the shaft 34b moves into the recess 80 in the bracket. After the shaft 34b is received in the recess 80 of the storage bracket, section 74a pivots due to gravity, back down to the position illustrated in FIG. 18, thereby coupling the earth borer in laterally disposed relation to the boom. From FIG. 18 it can be seen that the center of gravity of the earth borer shaft is disposed in a plane passing generally through the pivotal axis 74b of the pivotal section 74a of the storage bracket, and therefore the bracket will hold the earth borer in storage position.

When it is desired to release the earth borer from its coupled relation with bracket 74, the reversible fluid motor of the earth borer can be rotated in the opposite direction, or in the direction of the full line arrow illustrated in FIG. 18, and the frictional coaction between the rotating shaft 34b of the earth borer and the curved interior surface 81 of the pivotal section 74a of the bracket, causes section 74a to pivot outwardly about its pivot 74b, thereby releasing the earth borer shaft from the opening 80 in the bracket. Continued rotation of the earth borer motor will unwind the shaft from the cable 78, causing downward movement of the earth borer and rotational movement of the work mechanism support member 36 about the axis of the boom, to disposed the earth borer and supporting member 36 below the boom.

The cable 78 may then be uncoupled from the shaft of the earth borer.

In such downwardly rotated position of the support member 36 and associated earth borer, the support member 36 is no longer interlocked with the rollers 58a of retainer means 58 but instead is coupled to the retainer member 48 by the coaction between wings 52 on retainer 48 and the flanges 42 on support member 36. It will be understood, however, that the inner boom has to be first retracted to dispose the wings 52 of the retainer member 48 in alignment with the space between the flanges 42 on the support member 36, so that when the support members 36 rotates from lateral position, to a position beneath the boom, the flanges 42 thereon are disposed in interlocking coaction with the wings 52. During such downward rotation of the support member 36, the rollers 58 may coast with the flanges 42 in rolling relation and guide support member 36 into coupled relation with member 48.

The support member 36 and attached earth borer are then coupled to the outer boom section 24, and upon extension of the motor unit 26, will move outwardly with the outer boom section 24. The coupling member 62 and associated telescoping fluid lines 51 will likewise move outwardly with the support member since the coupling member 62 is coupled to the support member by the aforementioned recessed arrangement 70, to provide for supplying of actuating fluid to the motor of the earth borer irrespective of its position with respect to the inner boom section 22.

After finishing of the boring operation, the outer boom section 24 and coupled earth boring tool can be retracted so as to dispose the support member 36 adjacent the outer end of the inner boom section and in encompassing relation to rollers 58a, and then the line 78 can be attached to the shaft of the earth borer auger and to the support member 36 at lug 79, and the motor unit 34c rotated, so as to readily rotate the support member 36 and coupled earth borer back into storage position, whereupon the retainer bracket 74 will automatically hold the earth borer in said storage position.

The terms and expressions which have been used are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of any of the features shown or described, or portions thereof, and it is recognized that various modifications are possible within the scope of the invention claimed.

I claim:

1. In a derrick comprising, a vertically pivotal boom, said boom being of the selectively extensible type including an inner boom section and an outer boom section telescoped within said inner boom section for movement lengthwise thereof, a work mechanism supporting member mounted on said boom, said supporting member comprising a collar-like portion generally encompassing said boom and arm means extending outwardly from said collar-like portion for attaching a work mechanism thereto, said collar-like portion being provided with a cylindrical opening therethrough providing for rotation of said supporting member about the lengthwise axis of the boom in a direction generally transverse of the boom, whereby said arm means and associated work mechanism may be disposed beneath the boom for work operations or laterally to a side of the boom for storage, retainer means on said outer boom section adapted to receive said collar-like portion thereon in generally encompassing relation, said retainer means having generally laterally extending wings thereon adapted for supporting said collar-like portion and for interlocking coaction with lengthwise spaced flange means on said collar-like portion, for coupling said collar-like portion to said outer boom section, and rotatable roller means on said inner boom section off-set vertically with respect to said wings and adapted to be received in the opening through the collar-like portion

in generally vertically oriented relationship with respect to said wings, for locking said supporting member to said inner boom section upon rotation of said collar-like portion to dispose said arm means laterally of the boom, said roller means being oriented obliquely with respect to the boom.

2. A derrick in accordance with claim 1, including extensible fluid transmission line means mounted on the boom for transmitting pressurized actuating fluid to and from the work mechanism, a coupling member on said boom, said line means being connected to said coupling member, said coupling member having slot means there-through receiving therein in relatively rotatable relation said collar-like portion for coupling said coupling member to said collar-like portion in a direction lengthwise of the boom, while permitting rotary movement of said collar-like portion with respect to said coupling member.

3. A derrick in accordance with claim 2, wherein said retainer means on said outer boom section includes means thereon adapted for aligning coaction with complementary means on said coupling member when said collar-like portion is coupled to said retainer means on said outer boom section.

4. A derrick in accordance with claim 1, wherein said flange means comprises a pair of flanges extending circumferentially about said collar-like portion for about 90° thereof and disposed in diametrically opposed relationship.

5. A derrick in accordance with claim 1, wherein said wings are disposed in substantially centralized alignment with said collar-like portion in directions lengthwise and crosswise of the boom, whereby the work mechanism will be automatically aligned with said collar-like portion and with said wings, for causing the full force of the boom to be applied to the work mechanism during work operations.

6. A derrick in accordance with claim 1, wherein said outer boom section is of a polygonal configuration in transverse cross-section, said inner boom section having openings therethrough registering with the corners of said outer boom section, roller means mounted on said inner boom section and extending into respective of said openings, and said roller means having generally V-shaped configurations in transverse cross-section and coacting with said corners in supporting and guiding relation with respect to said outer boom section.

7. A derrick in accordance with claim 6, including a double acting reciprocal fluid powered motor unit disposed interiorly of said boom sections and coacting between the latter for moving said outer boom section lengthwise of said inner boom section, said motor unit being off-set from the lengthwise axis of said boom.

8. A derrick in accordance with claim 1, including means for automatically moving said supporting member to and from the aforementioned positions upon predetermined actuation of said work mechanism, said work mechanism including a rotatable drive shaft, and the last mentioned means comprising a flexible member adapted for connection at one end to the shaft of said work mechanism and at the other end thereof to said boom.

9. A derrick in accordance with claim 8, including latch means mounted on said boom in generally laterally extending relation thereto for automatically holding said work mechanism in said storage position upon movement of said work mechanism to said storage position.

10. A derrick in accordance with claim 9, wherein said latch means comprises a generally arcuate shaped bracket pivotally mounted on said boom and partially defining an opening into which is adapted to be received the rotatable drive shaft of the work mechanism, and cam means on said bracket adapted for camming coaction with said rotatable shaft during rotation of the latter, to pivot said bracket outwardly and thus permit entry of said shaft into said opening.

11. A derrick in accordance with claim 10, including an arcuate cam surface on the interior of said bracket adapted for camming coaction with said rotatable shaft to cause outward pivoting of said bracket with respect to said shaft and permit release of said shaft from said opening upon reverse rotation of said shaft.

12. A derrick in accordance with claim 1, including a means for automatically moving said supporting member to and from said aforementioned positions, said means comprising a flexible cable connected to said supporting member, means on said boom disposed in elevated relation to said supporting member and about which extends said cable, means on said boom disposed in lengthwise spaced relationship to said elevated means and over which said cable passes to be attached to said work mechanism, said elevated means comprising a trough-like bracket extending laterally from said boom adjacent the supporting member and above the location of attachment of the cable to the supporting member, and said lengthwise spaced means comprising a pulley spaced from the supporting member.

13. In a derrick comprising, a vertically pivotal boom, said boom being of the selectively extensible type including an inner boom section and an outer boom section movable lengthwise with respect to the inner boom section, means on said boom for attaching an associated rotatable, power unit operated work mechanism thereto, said means comprising a work mechanism supporting member, said supporting member comprising a collar-like portion generally encompassing said boom, means extending outwardly from said collar-like portion for attaching the work mechanism thereto, said collar-like portion having means thereon providing for rotation of said supporting member about the lengthwise axis of the boom in a direction generally transverse of the boom, whereby said extending means and associated work mechanism may be disposed beneath the boom for work operations or laterally to a side thereof for storage, means for automatically moving said supporting to and from said positions upon

actuation of the power unit of said work mechanism, the last mentioned means comprising, a laterally off-set trough mounted on said inner boom section adjacent the distal end thereof, a pulley mounted on said inner boom section in rearwardly spaced relation to said trough, and flexible cable means extending from said rotatable work mechanism upwardly about said pulley then forwardly over said trough and downwardly to be anchored to said supporting member, rotation of said work mechanism winding said flexible cable means thereabout to cause said support member to be rotated about said boom for orienting said outwardly extending means laterally of the boom and for moving the work mechanism laterally of the boom, and latch means mounted on said boom and extending laterally thereof for automatically locking said work mechanism in said storage position upon movement of said work mechanism to said storage position.

14. A derrick in accordance with claim 13, wherein said latch means comprises a segmental bracket having an arcuate shaped pivotal section defining an opening there-through, and cam surfaces on said pivotal section adapted for camming coaction with said rotatable work mechanism to cause said pivotal section to pivot outwardly for receipt of the work mechanism in said opening whereupon gravity causes said pivotal section of said bracket to pivot back into locking coaction with said work mechanism.

References Cited

UNITED STATES PATENTS

2,684,159	7/1954	Oldenkomp	212—55
2,984,373	5/1961	Przybylski	212—55
3,109,545	11/1963	Hedin	212—55
3,165,157	1/1965	Carbert	173—28
3,236,316	2/1966	Dorkins et al.	173—28
3,244,239	4/1966	Balogh et al.	173—28

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