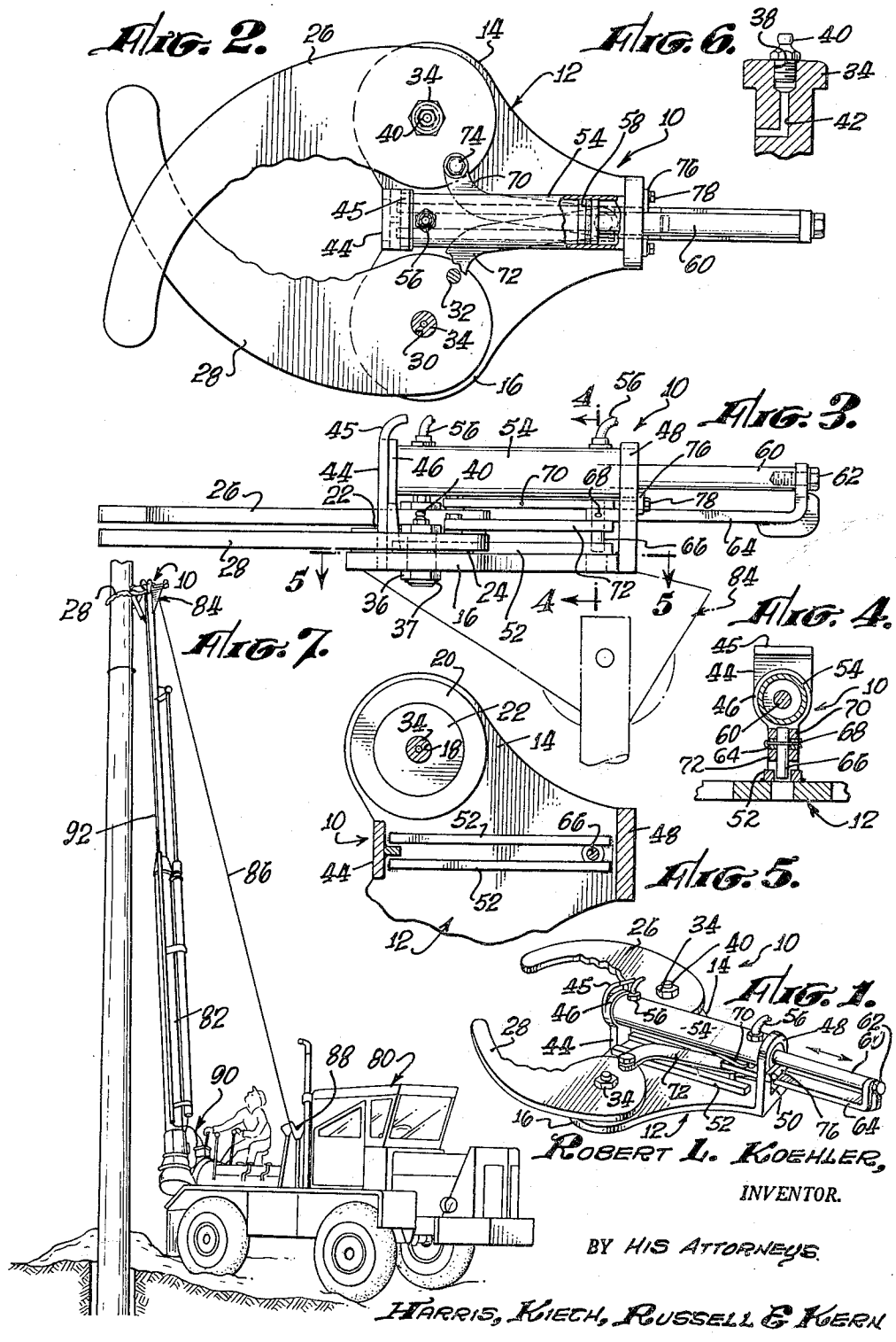
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TONG ASSEMBLY

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TONG ASSEMBLY

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The present invention relates generally to the construction and erection art, and more particularly to a novel tong assembly for use in erecting telephone poles and the like.

Briefly stated, the device comprises a base member which contains a pair of tong arms pivotally mounted adjacent one end thereof in opposed spaced relationship. An hydraulic actuating cylinder containing a piston rod is removably mounted above the base member between the tong arms. A connecting rod has one end connected to the end of the piston rod, and the other end thereof extends beneath the hydraulic cylinder and is fastened to control arms which actuate the tong arms. Means are provided for guiding the movement of the connecting rod to assure equal and uniform movement of the tong arms.

At the present time, telephone poles and the like are usually moved into a vertical position and set in holes in the ground by a gang of workmen using so-called pike poles. This method is unsatisfactory for a number of reasons. One disadvantage is that it requires at least three men to move and maintain a pole in an upright position and ofttimes the pike poles slip, permitting the telephone pole to fall and cause injury to the workmen and damage to the equipment. A further disadvantage is that setting poles by hand is a slow and laborious process.

It is an object of the present invention, therefore, to provide a novel tong assembly which can be used with existing power equipment contained on utility trucks, whereby telephone poles and the like can be easily and quickly set in a vertical position in previously dug holes without the use of manual labor. More particularly, it is an object to provide such a device which is hydraulically actuated and which can bemounted on derrick and earth-boring trucks and operated from the existing hydraulic power equipment contained on said trucks.

Another object is to provide a novel tong assembly which is simple in design and rugged in construction, and which is dependable in its operation. More particularly, it is an object to provide such a device which has relatively few parts and which is positive and reliable in its operation so as to minimize malfunctions and the maintenance thereof.

Further objects and advantages of the present invention will be apparent from the following detailed description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is shown.

In the drawing:

FIG. 1 is a perspective view of a tong assembly constructed in accordance with the teachings of the present invention;

FIG. 2 is an enlarged top plan view of the tong assembly with a portion of the device broken away to show the internal construction thereof;

FIG. 3 is a side elevational view of the tong assembly taken from the bottom of FIG. 2, showing it mounted on a sheave housing;

FIG. 4 is a vertical sectional view taken on the line 4—4 in FIG. 3;

FIG. 5 is a fragmentary horizontal sectional view taken on the line 5—5 in FIG. 3;

FIG. 6 is an enlarged side elevational view of the top portion of a mounting bolt; and

FIG. 7 is a perspective view showing a derrick truck in operation with the tong assembly mounted on the top of the sheave housing.

Referring to the drawing more particularly by reference numerals, specifically FIG. 1, 10 indicates a tong assembly embodying the teachings of the present invention, which includes a butterfly-shaped base plate 12. The base plate 12 contains right-hand and left-hand protuberant portions 14 and 16, respectively, each of which contains an opening 18 adjacent the center thereof. An annular spacer plate 20 is positioned on the right-hand portion 14 in alignment with the aperture 18 therein, and a shim 22 is mounted on top of said spacer plate. A similar shim 24 is mounted on the left-hand protuberant portion 16 in alignment with the opening 18 contained therein. Positioned on the aforementioned shims are right-hand and left-hand tong arms 26 and 28, respectively, each of which includes a base portion which contains a first opening 30 adjacent the center thereof and a tapped opening 32 adjacent its innermost edge. A mounting bolt 34 (FIG. 6) extends downwardly through the opening 30 in each tong arm and the aligned opening 18 in the base plate so as to mount the arm on the base plate with the shim therebetween. As previously mentioned, the tong arm assembly on the right-hand side also includes a spacer block so that when the free ends of the tong arms are moved together, they overlap as shown in FIG. 2. A nut 36 is threaded on the lower end of each mounting bolt 34 and tack-welded as at 37 to hold it in position to permit pivotal movement of the tong arm mounted thereon. As shown in FIG. 6, each bolt 34 contains a tapped hole 38 in the head portion thereof which receives a grease fitting 40. Leading from the tapped hole 38 is a right-angle passageway 42 which terminates at the side of the bolt, whereby grease can be introduced into the space between the bolt and the various parts mounted thereon.

Welded to the base plate 12 in an upright position between the protuberant portions 14 and 16 is a head retainer member 44 which has a curved upper guard flange portion 45, and a cuplike portion 46. Welded to the other end of the base plate 12 in opposed relationship with said head container member is a rear retainer member 48 which contains a keyhole type slot 50 having a substantially circular upper portion of approximately the same size as the aforementioned cup-like portion 46. Two parallel, spaced guide blocks 52 are welded to the base plate 12 so as to extend between the head retainer member 44 and the rear retainer member 48 (FIG. 5) for a purpose to appear.

Extending between the head retainer member 44 and the rear retainer member 48 is an hydraulic actuating cylinder 54 which as one end suported in the cup-like portion 46 and the other end thereof supported in the circular upper portion of the keyhole slot 50. Said hydraulic cylinder 54 has two spaced conduit connections 56 in the upper portion thereof and contains a piston 58 and a piston rod 60 which extends beyond the rear retainer member 48. Connected to the free end of the piston rod 60 by a machine screw 62 is an L-shaped connecting rod 64 which extends inwardly through the slot 50, the inner end of said connecting rod containing a vertically extending guide pin 66 which is held in place by a removable retaining pin 68. As shown in FIGS. 4 and 5, the lower end of the guide pin 66 is positioned between and guided by the spaced guide blocks 52. Right-hand and left-hand curved control arms 70 and 72, respectively, are pivotally mounted on the guide pin 66 and extend therefrom to the base portions of the right-hand

and left-hand tong arms, the ends of said control arms being connected to the tong arms by means of machine cap screws 74 positioned in the aforementioned tapped openings 32.

As shown in FIG. 1, a retainer plate 76 is removably fastened to the rear retainer member 48 by machine cap screws 78 so as to extend across the slot 50 between the piston rod 60 and the connecting rod 64 thereby maintaining the hydraulic cylinder 54 in operative position. When it is desired to remove the hydraulic cylinder 54, or disassemble the unit for inspection or maintenance work thereon, it is only necessary to remove the retaining plate 76 and disconnect the piston rod 60 from the connecting rod 64, and the cylinder 54 can be removed through the upper portion of the keyhole slot 50.

It will be readily apparent from the foregoing description that when the unit is assembled and fluid is admitted to the hydraulic cylinder 54 through the conduit connections 56 so as to move the piston 58 and the piston rod 60, the connecting rod 64 is moved longitudinally relative to the base plate 12. When the connecting rod 64 is actuated, the guide pin 66 moves in the slot formed between the guide blocks 52 and causes the control arms 70 and 72 to pivot the tong arms 26 and 28, respectively, thereby causing them to move between an open position and a closed position.

In FIG. 7 there is shown a derrick truck 80 which contains a telescoping derrick pole 82 having a sheave housing 84 at the upper end thereof, the sheave receiving a line 86 which is controlled by a winch 88. In most instances, the base member 12 of the tong assembly can be welded (or otherwise fastened) directly to the upper surface of the sheave housing 84 (FIG. 3). The same also holds true with respect to installing the device on earth-boring machines which usually contain a sheave housing at the upper end of the auger bar housing. The hydraulic cylinder 54 can be operated through the hydraulic power equipment 90 on the truck, and means can be provided for retracting the hydraulic lines 92 which are connected to the conduit connections 56, as when the derrick pole 82 is being extended or retracted.

Thus, it is readily apparent that there has been provided a novel tong assembly which fulfills all of the objects and advantages sought therefor. It contains relatively few parts and is simple and compact in construction, yet strong and rugged in operation. When mounted on the top of a derrick pole or the like and hydraulically operated, one man can easily and quickly lift and set a pole using the control equipment on the truck, thereby obviating the necessity of having workmen with pike poles "manhandle" the pole into position.

With the hydraulic cylinder 54 mounted over the control arms 70 and 72, the length of the device is appreciably decreased without adversely affecting any of the operating features thereof. Also, with the pin 66 guided between the bars 52 there is no chance of twisting or springing the connecting rod 64 or the piston rod 60, as may tend to occur if a pole were to fall sideways and twist the tong arms. The guiding of the pins 66 also results in equal pressure being applied through the tong arms 26 and 28. In addition, the guard flange 45 prevents the pole from being gouged if it were to twist and fall against the hydraulic cylinder. Furthermore, the simple yet highly effective lubricating means contained in the mounting bolts 34 assures adequate lubrication of the tong arms to permit easy pivotal movement thereof.

It is to be understood that the foregoing description and accompanying drawing have been given only by way of illustration and example and that changes and alterations in the present disclosure which will be readily apparent to one skilled in the art are contemplated as within the scope of the present invention.

I claim:

1. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an upstanding head retainer member mounted on the base member between the tong arms; an upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member; an hydraulic actuating cylinder containing a piston rod removably supported on said retainer members; and control arms interconnecting the piston rod and the tong arms for moving the latter between the open and the closed positions upon actuation of the hydraulic cylinder.

2. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod positioned above said base member and between said tong arms; an upstanding head retainer member mounted on the base member between the tong arms and containing a cavity for receiving and supporting one end of said hydraulic cylinder; an upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member and containing an aperture for receiving and supporting the other end of the hydraulic cylinder; and means interconnecting the piston rod and the tong arms for moving the latter between the open position and the closed position upon actuation of the hydraulic cylinder.

3. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod positioned above said base member and between said tong arms; an upstanding head retainer member mounted on the base member between the tong arms and containing a socket-like portion for receiving and supporting one end of said hydraulic cylinder; an upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member and containing an aperture for receiving and supporting the other end of the hydraulic cylinder and being of a size whereby said cylinder can be withdrawn therethrough; removably retaining means mounted on the rear retainer member preventing the withdrawal of the hydraulic cylinder; and means interconnecting the piston rod and the tong arms for moving the latter between the open position and the closed position upon actuation of the hydraulic cylinder.

4. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod positioned above said base member and between said tong arms; an upstanding head retainer member mounted on the base member between the tong arms and containing a socket-like portion for receiving and supporting one end of said hydraulic cylinder; an upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member and containing a keyhole type aperture with an upper portion and a lower portion, the upper portion of the aperture receiving and supporting the other end of the hydraulic cylinder; a connecting rod having one end connected to the piston rod and the other end thereof extending through the lower portion of said aperture to a position beneath the hydraulic cylinder; and means interconnecting said other end of the connecting rod and the tong arms for moving the latter between the open position and the closed position upon actuation of the hydraulic cylinder.

5. A tong assembly, comprising: a base member; a pair

of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod positioned above said base member and between said tong arms; an upstanding head retainer member mounted on the base member between the tong arms and containing a socket-like portion for receiving and supporting one end of said hydraulic cylinder; an upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member and containing a keyhole type aperture with an upper portion and a lower portion, the upper portion of the aperture receiving and supporting the other end of the hydraulic cylinder; a connecting rod having one end connected to the piston rod and the other end thereof extending through the lower portion of said aperture to a position beneath the hydraulic cylinder; means mounted on the base member for guiding the movement of said other end of the connecting rod in a path parallel with the axis of the hydraulic cylinder; and means interconnecting said other end of the connecting rod and the tong arms for moving the latter between the open position and the closed position upon actuation of the hydraulic cylinder.

6. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod mounted above the base member and between the tong arms; an elongated slot provided in the base member below and parallel with the axis of the hydraulic cylinder; a connecting rod having one end fastened to the piston rod and the other end thereof extending to adjacent said slot, said other end including guide means positioned in said slot; and means interconnecting said other end of the connecting rod with the tong arms for moving the latter between the open position and the closed position upon actuation of the hydraulic cylinder.

7. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member adjacent one end thereof in opposed spaced relationship for relative movement between an open position and a closed position; an upstanding head retainer member mounted on the base member between the tong arms; and upstanding rear retainer member mounted on the base member in opposed relationship with the head retainer member; an hydraulic actuating cylinder containing a piston rod removably supported on said retainer members; an elongated slot provided in the base member beneath and parallel with the hydraulic cylinder, the slot extending between said retainer members; and L-shaped connecting rod having one end fastened to the piston rod and the other end thereof extending below the cylinder to adjacent said slot; a guide pin having a lower portion supported on said outer end of the connecting rod, the lower portion being positioned in said slot; and curved control arms having one end pivotally mounted on the guide pin and the other end thereof pivotally connected to one of said tong arms.

8. A tong assembly, comprising: a base member; a pair of tong arms pivotally mounted on the base member in spaced relationship for relative movement between an open position and a closed position; an hydraulic actuating cylinder containing a piston rod mounted between the tong arms and extending longitudinally of the base member; a connecting member fastened to the end of the piston rod and movable therewith in the longitudinal direction; linkage means interconnecting the tong arms and said connecting member; and guide means separate from the hydraulic actuating cylinder confining the movement of the connecting member to the longitudinal direction.

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