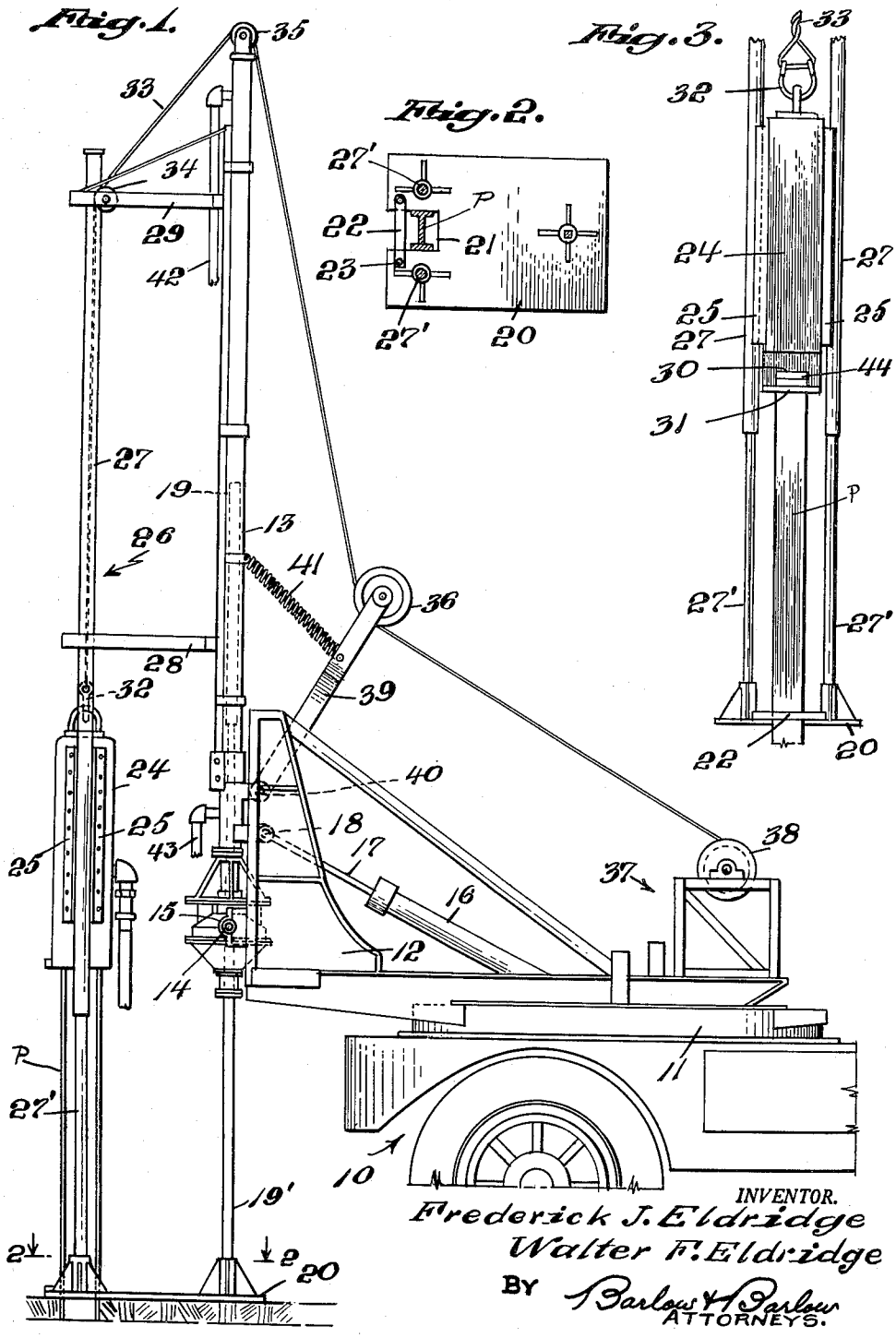
March 27, 1962 F. J. ELDRIDGE ET AL 3,026,949

POST DRIVER

Filed April 15, 1959 2 Sheets-Sheet 1

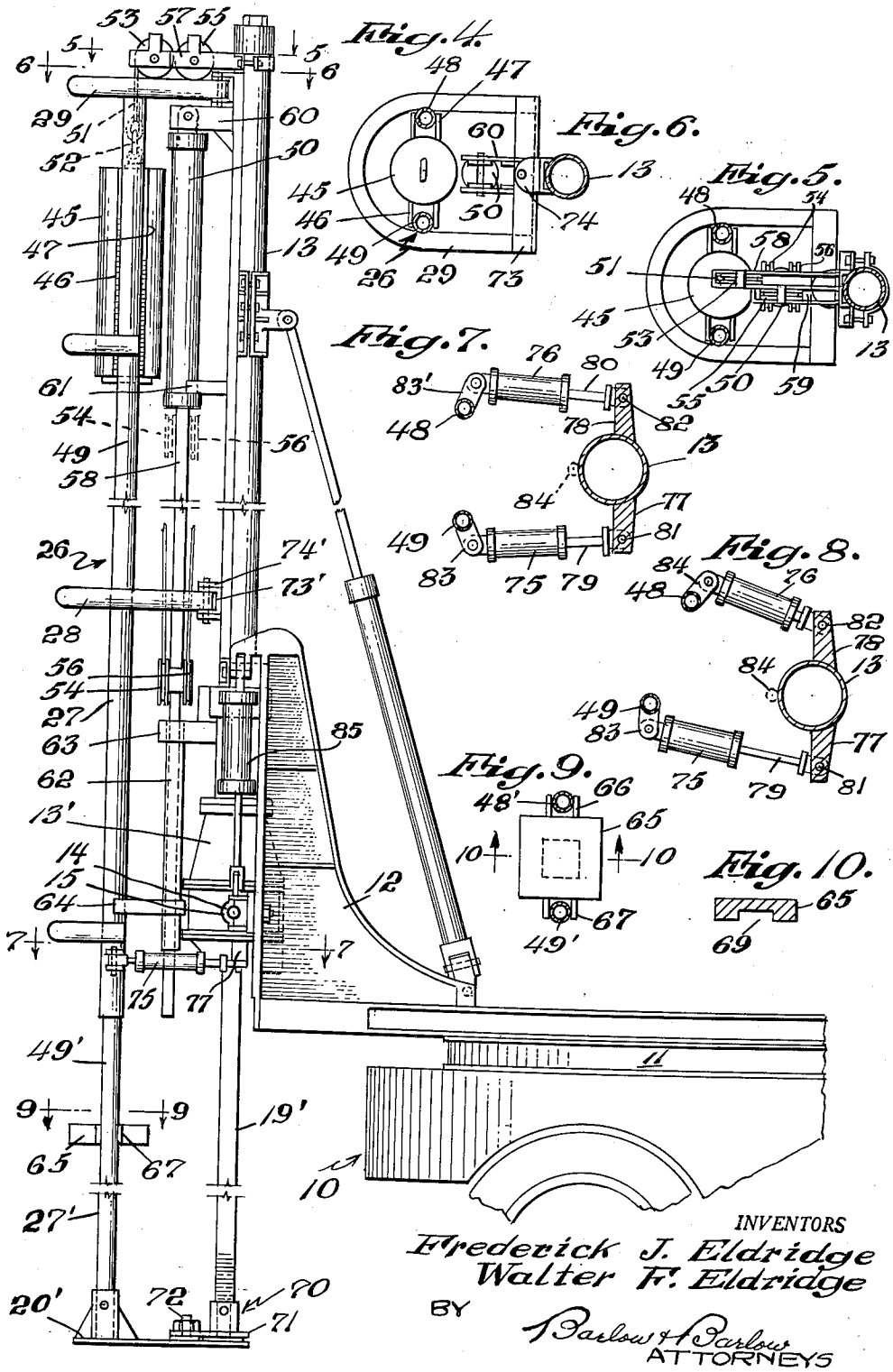


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POST DRIVER

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This invention relates to a post driving apparatus particularly an apparatus adapted for driving rail posts, fence posts and the like and is continuation-in-part of application Serial Number 752,125 filed July 30, 1958, now abandoned.

Generally speaking, it is usual in setting rail post, fence posts and the like to dig a hole for receiving the post, and thereafter fill the hole and tamp the fill about the post to firmly anchor the same in place. Digging post holes is time consuming even when the operation is performed with a post digging apparatus, such as shown in the Jaques Patent No. 2,415,572, the present invention being an attachment to the structure shown therein.

An object of the present invention is to provide an apparatus for driving rail posts, fence posts and the like.

A more specific object of the invention is to provide a post driver with a post guide which will be firmly held in position during the driving of the post into the ground.

A further object of the invention is to provide a post driver so constructed so as to enable the same to be moved to different positions with a minimum movement of the vehicle upon which the mechanism is supported.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

FIGURE 1 is an elevational view of an apparatus embodying my invention for driving posts into the ground;

FIGURE 2 is a sectional view taken substantially along line 2—2 of FIGURE 1;

FIGURE 3 is a front elevation view of the means for applying a driving force for driving a post into the ground;

FIGURE 4 is an elevational view of a modified construction of apparatus in which provisions are made for enabling the post guide to be swivelled about arcs of different radii;

FIGURE 5 is a sectional view taken substantially along line 5—5 of FIG. 4;

FIGURE 6 is a sectional view taken substantially along line 6—6 of FIG. 4 with parts omitted;

FIGURES 7 and 8 are sectional views taken substantially along line 7—7 of FIG. 4 drawn to a larger scale with the apparatus in different relations, certain parts being omitted for clarity;

FIGURE 9 is a sectonal view taken substantially along line 9—9 of FIGURE 4; and

FIGURE 10 is a sectional view taken substantially along line 10—10 of FIGURE 9.

In general the invention comprises a standard which in its lowered position is generally horizontal and may be raised hydraulically to a vertical position. The standard carries at the lower end a plate which is hydraulically held firmly against the ground about the area at which the post is to be driven. The plate is provided with a guide opening in which is received the post to be held against shifting during the driving operation. The means effective for supplying the driving force may take any of various forms such as a drop weight for applying hammer blows on the post or a pneumatic hammer may be employed, the hammer being guided for movement on the guide standard which is secured to the said guide plate to be lowered and raised therewith.

Referring to the drawing, the invention is shown as

embodied in an apparatus mounted for mobility upon a motor vehicle 10 provided with a turn table 11 on which there is secured upright supports 12. A tubular member 13 is provided at its lower portion with trunnions 14 which are journalled in adjustable pillow-block bearings 15 carried by the supports 12. The member 13 may be swung from the vertical position shown in FIGURE 1 to a position (not shown) to lay lengthwise of the vehicle for transportation of the apparatus from one location to another. This is accomplished by means of an air cylinder or hydraulic motor 16 secured in known manner to the turn table 11 and having the piston rod 17 thereof pivotally attached to member 13 as at 18. The motor 16 operates in known way under fluid pressure and will swing the housing 13 in the bearings 15 in one or the other direction depending upon the manner in which pressure is applied to the motor 16.

The member 13 provides a cylinder or casing for a hydraulic operated piston, indicated generally 19, having a piston rod 19' projecting outwardly from the lower end of said member 13, the details of which are more fully shown in Patent No. 2,415,572, a generally flat rectangular guide plate 20 (see FIGURE 2) has a socket welded thereto for receiving and securing the piston rod 19' therein. The plate 20 is provided with a guide opening 21, which extends inwardly from the front edge of the plate, and is adapted to receive a post P to be driven into the ground. The post is held against shifting by a latch bar 22 which is pivoted at one end on the plate so as to be swung across the opening 21 and locked in position by a fastening 23.

The means for driving the post P is in the present instance a pneumatic hammer 24 of known construction, for example as shown in U.S. Patent No. 2,004,180, on which we attach guide plates 25 which slidably secure the hammer to a standard 26. The standard comprises two spaced tubular portions 27 in which similar shaped portion 27' are slidably received in telescopic relation. The portions 27 are secured to brackets 28, 29 which are carried by member 13, while the portions 27' are fixed to the plate 20 and move therewith. The tubular portions are positioned on opposite sides of opening 21, as seen in FIGURE 2, and extend parallel to each other and to member 13. The lower end of the pneumatic hammer 24 within which the hammering action takes place has an opening 30 for receiving the upper end of post P and is provided with a latch 31 consisting of a plate fastened to the bottom of the hammer, the plate being provided with the proper size opening to hold the end of the post confined therein. Thus it will be seen that the post is held at one end in the opening 21 in the guide plate 20 and at the other end to the pneumatic hammer. A clevis 32 is attached to the other end of the hammer 24 for raising the same by means of a cable 33 which is secured to the clevis and leads therefrom to pass over a sheave 34 carried by the bracket 29, thence over a second sheave 35 at the upper end of member 13 and about an idler sheave 36 to the take up drum 38 of a winch designated generally 37 mounted on the turn table 11. The take up drum 38 is rotated in known manner to take up on the cable 33 to raise the hammer 24 or to pay out cable to allow lowering of the said hammer. The idler sheave 36 is mounted on an arm 39 which is pivotally attached to member 13 as at 40, a pull spring 41 being attached at one end to arm 39 and at the other end thereof to member 13 so as to bias the sheave 36 to yieldingly engage the cable.

In operation, the apparatus is manipulated by means of the motor 16 so as to position the member 13 in the vertical position shown in FIGURE 1, and by means of the vehicle 10 and its turn table, the opening 21 of the plate 20 is located centrally at the location at which a

post P is to be driven into the ground. The plate 20 and hammer 24 are normally held in the elevated relation. Now with the apparatus in the relation above mentioned, hydraulic pressure is applied on to the hydraulic cylinder or motor 19 through conduit 42 in a direction to lower the piston rod 19' so as to engage the plate 20 with the ground and at the pressure required so as to prevent any shifting of the plate during the driving of the post P into the ground. The pressure may be exerted up to the weight of the truck on which the mechanism is supported. The lowering of the plate will withdraw the portions 27' from portions 27 of the standard 26, since said portions 27' are fixed to said plate 20. Thus the member 13 and standard 26 will be held against shifting at the proper vertical or angle at which the post is to be driven. A post P may now be inserted into opening 21 and the latch bar 22 moved to locking relation. The hammer 24 may now be lowered so that the opening in the latch 31 engages the upper end of the post and prevents the post from sliding out of the hammer opening 30. A hammering plate 44 may be positioned between the upper end of post P and the bottom of opening 30 and the hammer 24 be set into operation in the known manner so as to drive the post into the ground. Upon moving the apparatus to a new location, hydraulic pressure is applied to the other end of piston 19 through conduit 43 to raise plate 20 and structure secured thereto from the ground.

In the modification shown in FIGURES 4 to 10 in which similar parts bear like numerals, a drop weight type hammer 45 is employed for applying a driving force on a post to be driven into the ground. The hammer may be of any suitable shape and is shown as being of cylindrical form and having opposite pairs of flanges 46, 47 which slidably engage the uprights 48, 49 of the standard 26 which form a trackway for said hammer. The weight is hydraulically raised to the limit of its upper motion by means of a hydraulic cylinder 50, and dropped, as for example, by release of hydraulic fluid, the mechanism being substantially identical to that disclosed in Patent No. 2,476,390. A cable 51 is attached to the upper end of hammer 45 in the known manner, as by way of example, by means of a shackle 52, and runs upwardly over a sheave 53, downwardly and over sheave 54, upwardly over sheave 55, downwardly over sheave 56 and thence upwardly to be secured in an appropriate manner to a support 57 on which are mounted the sheaves 53 and 55.

The support 57 projects outwardly at the upper end portion of member 13 and is constructed to provide slot portions as at 58 and 59 (see FIGURE 5) to receive said sheaves 53 and 55 which rotate about their axis therein. The lower sheaves 54, 56 are attached to the piston rod 58 of the piston (not shown) of the hydraulic cylinder 50. Hydraulic fluid under pressure is supplied to the said cylinder and is controlled in known way (not shown) for reciprocating the piston of the cylinder. The hammer 45 is shown in FIG. 4 as being raised at the upper limit of its motion and it will be apparent the release of hydraulic fluid from the upper end of the cylinder 50 will permit the hammer 45 to descend, which in turn will withdraw the hydraulic piston within the cylinder and carry the sheaves therewith to the upper position thereof indicated in broken lines. It will likewise be apparent that the movement of the hydraulic piston 50 in the other direction will carry sheaves 54, 56 downwardly to the position shown in full lines and thereby through the cable 51 raise the hammer to its upper limit of motion.

In hydraulic drop hammer constructions similar to the one disclosed, the upper end of the hydraulic cylinder has been pivotally suspended to permit free swinging movement and thereby allow the sheaves carried thereby to be self-aligned in the direction of the force applied by the cable. It has been found that in so doing, the cylinder has a tendency to block free movement of the cable. In order to overcome this difficulty, the upper end of the cylinder is mounted generally centrally between member 13 and standard 26 on a bracket 60 which is attached to member 13 and projects toward the standard 26. The lower end portion of the cylinder is secured to a block 61 which is also fixed to member 13. The piston rod 58 is extended beyond the sheaves 54, 56 and may pass through an elongated guide 62, the upper end portion of which is secured to a block or strap 63 extending from the member 13, the lower end portion of which is secured to a bracket 64 fixed to the uprights 48 and 49. Alternately other forms of guides may be utilized to secure the desired result of cylinder 50 and its piston rod 58 being held stationary relative to member 13.

There is slidably mounted on the inner portions 48' and 49' of the standard 26 a follower block 65 which is best seen in FIGURES 9 and 10. The block may be made of any appropriate shape and is shown as being rectangular in cross-section with oppositely disposed pairs of side flanges 66, 67 which slidably engage the inner telescoping portions 48' and 49' of standard 26. The block 65 is provided with a blind opening 69 of rectangular shape extending inwardly from the lower side of the guide, the upper end portion of a post to be driven into the ground being adapted to be received in said opening. The guide is interposed between the post and hammer 45 and accordingly serves as a cap for the post and protects the upper end of the post from being mutilated by the blows of the hammer, the hammer thus striking the cap instead of the post direct. It will of course be obvious that the shape of the opening 69 will be made appropriate to the particular shape in cross-section of the said post.

The post-driving apparatus as previously described is mounted on a turn table 11 which permits the apparatus to be swung on an arc of substantial radius relative to the vehicle 10. The turn table and the vehicle usually provide sufficient mobility to readily and accurately locate the position at which the post is to be driven. There are, however, instances wherein additional adjustment of the apparatus is desired without moving the vehicle. To this end the standard 26 is mounted for additional swinging movement about an arc of lesser radius. Accordingly, the piston rod 19' is provided at the outer end thereof with a fitting 70 which has a base plate portion 71. The plate 20' carried at the end of the standard portion 26 is pivotally mounted to plate 71 as at 72. The free end of the U-shape bracket 29 (see FIG. 6) is secured to a cross member 73 which is in turn pivotally mounted to a support 74 attached to member 13, bracket 28 being similarly pivotally mounted to member 13 as at 73', 74'. This mounting permits the standard and the parts secured thereto to be swung about the said pivotal mounting on an arc of a radius less than the radius of the arc of swing provided by the turn table 11. Thus, greater adjustment is provided which allows for accurate positioning of the apparatus at the required position with less maneuvering of the motor vehicle. This added adjustment also provides for quicker positioning of the apparatus at the required location.

The standard 26 is hydraulically swung about the pivotal mounting thereof by means of a pair of hydraulic cylinders 75 and 76. To this end a pair of opposite diammetrically disposed lugs 77 and 78 are provided on the enlarged portion 13' of member 13. The connecting rods 79, 80 of the cylinders are pivotally attached as at 81—82 to said lugs. The other end of the cylinders are pivotally attached to lugs or the like 83 and 83' which project from the uprights 48, 49 of standard 26. The axis about which the standard is swung is indicated by the circle 84 shown in broken lines in FIGURES 7 and 8. It will be apparent upon admitting hydraulic fluid to one side or the other of the pistons (not shown) of the said hydraulic cylinders 75, 76, the standard may be swung to one side or the other of the axis 84.

The pillow block bearings 15 may be vertically adjusted by the hydraulic cylinder or motor 85 when desired as described in Patent No. 2,415,572.

From the foregoing it will be apparent that there is disclosed an apparatus in which a post guide is arranged to be held firmly against the ground about the location at which a post is to be driven into the ground and which may be readily maneuvered into position. It will be also apparent that since the standard which holds the hammer is held against shifting by pressure of the plate 20 with the ground, the post P will be accurately driven at the required vertical or angle.

We claim:

1. An apparatus for driving a post into the ground comprising a vehicle, a support mounted thereon, a guide plate, means mounted on said support for forcing the plate against the ground including a hydraulic piston and a piston rod, said plate having a guide opening for receiving one end of a post, a standard, means securing one end portion of the standard to said plate, means connected to said support to hold the standard parallel to said support, a hammer slidably mounted on said standard, and means for actuating the hammer to apply hammer blows to said post for driving the same into the ground.

2. An apparatus as set forth in claim 1 wherein said standard comprises a pair of telescoping members.

3. An apparatus for driving a post into the ground comprising a support, a tubular member pivotally mounted on said support for movement to and from a vertical position, a hydraulically operated piston rod extending from said member and movable in and out of said member, a guide plate secured to the outer end of said piston rod and movable therewith for engaging the ground about the location at which the post is to be driven, a telescoping standard having an outer casing and inner rod like means, the outer casing coupled to said member in spaced relation and extending parallel thereto, the inner means of said standard being secured to said plate for movement therewith, said plate having a guide opening therethrough for receiving one end of said post, and a hammer slidably secured to said standard and operable for driving the post into the ground.

4. In combination with a motor vehicle having a turn table, a post driver mechanism mounted on and carried by said turntable, said mechanism comprising a hammer and a standard, said standard forming a trackway for said hammer, means for pivotally mounting said mechanism relative to said turn table on an axis parallel to the axis of the turn table, a guide plate secured to the lower end of said standard, said guide plate being provided with an opening for receiving the lower end of a post, a hydraulic piston coupled to said plate and to the turntable to hold said guide plate against the ground, said pivot means for said standard being on an axis parallel to the axis of said hydraulic piston for swinging movement relative thereto and relative to said turn table.

5. In a post driver having a standard forming a trackway for a hammer adapted to be raised and lowered along said trackway, a tubular member adapted to be vertically positioned, a hydraulically operated piston rod extending from said member and movable in and out of said member, a plate pivotally secured to said piston rod on an axis parallel therewith and movable therewith for engaging the ground, said standard being mounted at the lower end thereof to said plate, said standard being pivotally mounted at the upper end thereof to said tubular member for swinging movement relative to said tubular member.

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