

June 21, 1955

C. L. GUILD
PILE DRIVER CONSTRUCTION

2,711,078

Filed Dec. 15, 1950

3 Sheets-Sheet 1

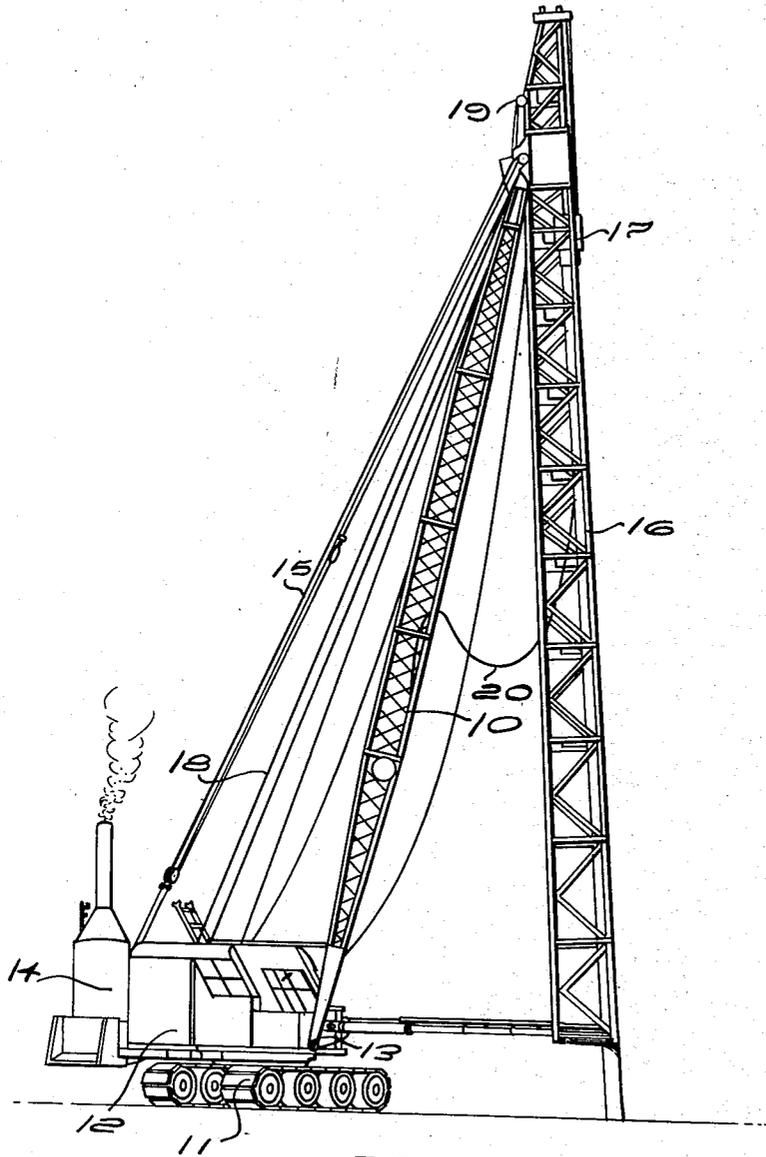


FIG. 1

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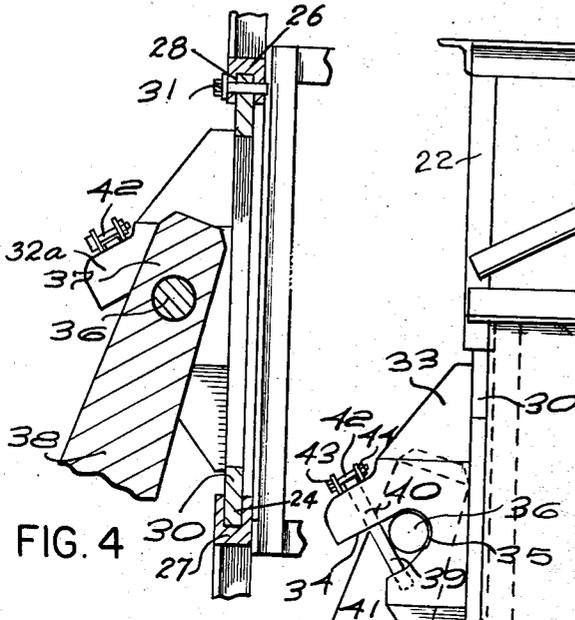


FIG. 4

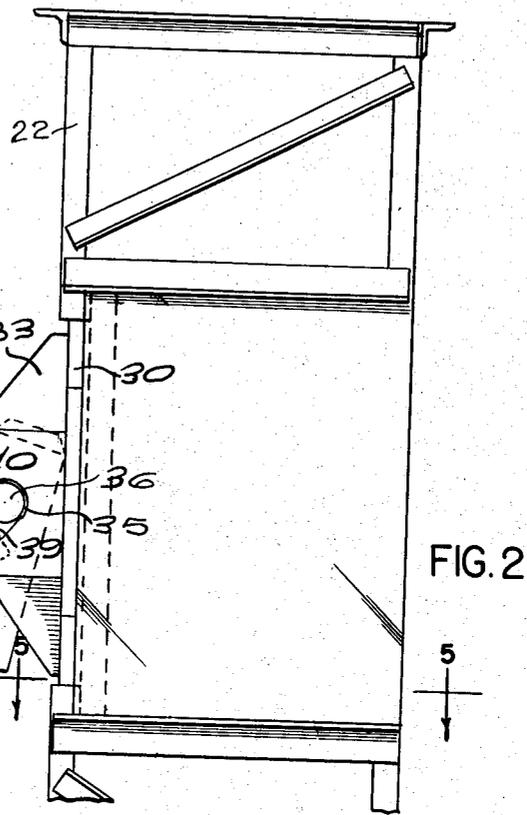


FIG. 2

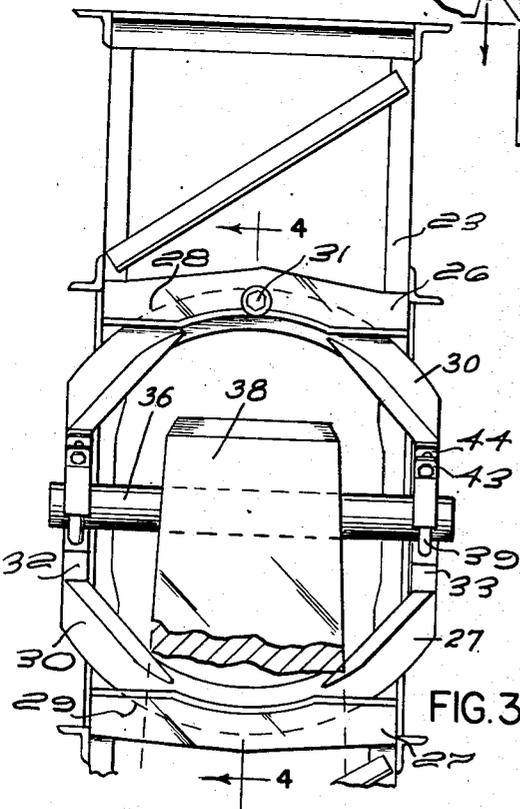


FIG. 3

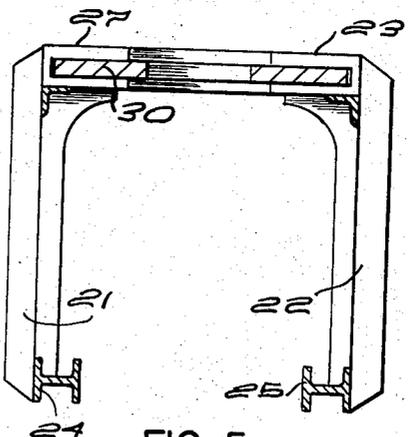


FIG. 5

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3 Sheets-Sheet 3

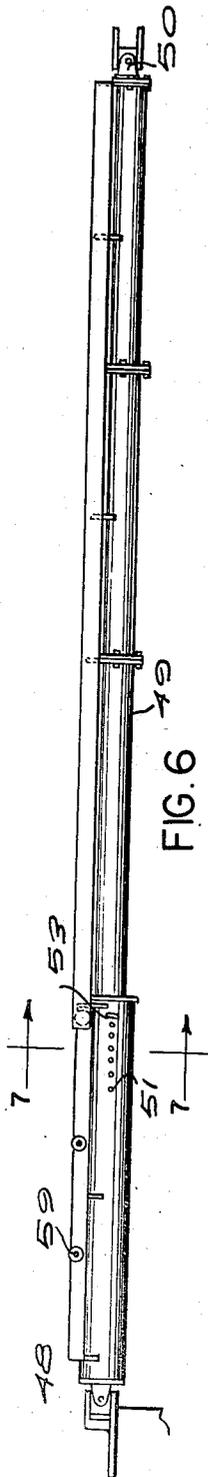


FIG. 6

FIG. 7

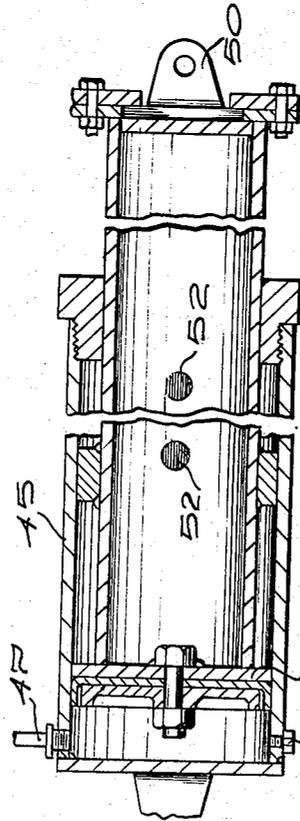
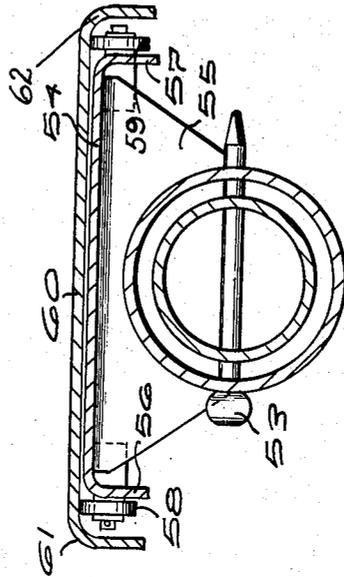


FIG. 8

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PILE DRIVER CONSTRUCTION

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2 Claims. (Cl. 61-74)

The present invention relates to pile driving equipment, and has particular reference to a novel power arrangement for positioning the drop hammer lead frame.

The principal object of the invention is to provide a novel power control for controlled setting of a pivoted lead frame.

Another object of the invention is to provide a novel trunnion support for the lead frame.

A further object is to provide an extension plunger arrangement for power shift of the lead frame base to a desired ground location.

An additional object of the invention is to provide mechanism for locking the plunger arrangement at a desired extension.

With the above and other objects and advantageous features in view, the invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

In the drawings,

Fig. 1 is a side elevation of an illustrative crane boom embodying the invention;

Fig. 2 is a side detail view of the trunnion mounting parts;

Fig. 3 is a front view of Fig. 2;

Fig. 4 is a section on the line 4-4 of Fig. 3;

Fig. 5 is a section on the line 5-5 of Fig. 2;

Fig. 6 is a side view of the plunger mechanism in extended position;

Fig. 7 is an enlarged section on the line 7-7 of Fig. 6; and

Fig. 8 is an enlarged longitudinal section through the piston cylinder, parts being broken away.

It has been found desirable to pivot mount a pile driver lead frame on a crane boom, and to swing the lead frame to a desired location by means of a power plunger mechanism, whereby the crane tractor may be positioned at any convenient place and the lead frame may then be moved to the exact location for driving a pile. To this end, I provide a trunnion mounting adjacent the upper end of the lead frame to which the upper boom terminal is secured, and I provide a power driven plunger which is secured to the lower end of the lead frame and which is shifted to position the lower end of the lead frame as desired, the parts then being locked.

Referring to the drawings, the crane boom 10 may be mounted on any suitable movable support, a caterpillar tractor 11 being preferred. The crane body 12 is rotatable on its support, and the boom 10 is pivoted at its lower end 13 to the front end of the crane body, which includes a steam power unit 14 of standard type. The boom is moved by the usual cable 15 controlled by a power winch in the crane body.

The lead frame 16 is pivotally mounted on the upper end of the boom, and carries a hammer 17 which is raised by a cable 18 passing over one pulley of a double

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pulley 19, the other pulley receiving a cable 20 for lifting a pile.

The lead frame 16 includes two sides 21, 22, see Fig. 5, and a rear wall 23, the sides and rear wall being preferably of truss type to provide strength and reduce weight. Two upright H bars 24, 25 are secured to the forward portions of the sides 21, 22 to receive the usual side grooves of the hammer 17, whereby the hammer may be raised up the lead frame and dropped downwardly against the top of a pile.

The rear wall 23 has an upper channelled member 26 and a lower channelled member 27 secured thereto, provided with arcuate channels 28, 29 whereby a trunnion support plate 30 of generally ring shape may be set into the channels for free swinging movement of the lead frame thereon, or may be locked in place by a through bolt 31. The two sides 32, 33 of the plate 30 are linear and are provided with spaced trunnion bearing plates 33a which extend upwardly from the plate in spaced relation to the peripheral plate surface which is rotatable within the channelled members and of generally triangular form, each bearing plate being recessed as indicated at 34 to provide aligned arcuate seats 35 for a trunnion pin 36 which extends across the plate 30 and through the upper end 37 of a solid boom tip 38. Lock pins 39 extend through aligned bores 40, 41 in the sides 32, 33 and across the recesses 34, and are locked in place by cross bolts 42 extending across spaced ears 43, 44 positioned on each side of the bores 40.

The ring shape of the trunnion support plate 30 permits a free swinging movement of the lead frame on the trunnion pin, as the upper end of the boom tip has ample clearance, whereby the lead frame may be swung, and the trunnion plate may be taken out from the channelled members for interchange of lead frames of different lengths, as hereinafter described.

The power mechanism for setting the lower end of the lead frame includes a cylinder 45, see Figs. 6 and 8, in which a piston 46 is slidably seated, steam or air under pressure being admitted through an inlet and exhaust connection 47 and through the usual control valves, not shown. Although it is preferred to have a single acting piston and cylinder, a double acting piston and cylinder may be used if desired. The cylinder 45 is pivoted to the crane platform at one end as indicated at 48, see Fig. 6, and the piston, which is preferably hollow, is of sectional type so that a number of sections 49 may be bolted together to provide a piston of any desired length. The end section has a pivot ear 50, see Fig. 8, for pivotal attachment to the lower end of the lead frame.

The cylinder and piston are provided with a number of wall openings 51, 52, which are aligned at different piston positions, whereby a lock pin 53, see Fig. 7, may be inserted to lock the piston at a desired extension. A walk ledge 54 may be mounted on the cylinder by depending support blocks 55, the ledge 54 having depending edges 56, 57 and roller disks 58, 59 which are rotatably carried by the edges 56, 57 at spaced intervals and extend above the ledge 54. A walk ledge 60, which may be sectional, is similarly mounted on the extension sections 49, and has depending edges 61, 62, whereby the ledge 60 may roll over the disks 58, 59 and telescope over the ledge 54.

The operation of the novel crane boom attachment is believed clear. When it is difficult to seat the crane closely adjacent a location for a pile, the crane is brought as close as possible or desirable. The boom is then lowered and the crane body swung to bring the upper end of the lead frame into alignment with the pile location; steam or air pressure is applied to the piston to swing the lead frame and shift its lower end to the pile

location, and the piston is locked in place, whereby the pile is readily driven.

All the metal parts of the lead frame are preferably welded, and truss construction is preferred, but standard type channel construction may be used if desired. The trunnion plate, however, is removable from the lead frame, so that different lengths of lead frames may be mounted to the same crane boom.

Although I have disclosed a specific embodiment of my invention, it is obvious that changes in the size, shape, and arrangement of the parts may be made to suit different requirements for pile driving cranes, without departing from the spirit or the scope of the invention as defined in the appended claims.

I claim:

1. In a crane construction having a boom and a pile driver lead frame with a rear wall and side walls and a channel for slidably guiding a reciprocating hammer, a universal connection between the boom and the lead frame including an upper channeled member and a lower channeled member mounted in spaced relation on the rear frame wall, each member having an arcuate channel, a ring shaped trunnion support plate rotatably mounted in the spaced arcuate channels, the support plate having

two parallel linear sides and spaced trunnion supports adjacent the linear sides and extending rearwardly therefrom, said trunnion supports having recessed arcuate trunnion pin seats for rotatably receiving the ends of a trunnion pin extending through the tip of the boom, and trunnion lock pins for said seats, whereby the lead frame may swing backwards and forwards on the trunnion pin ends and may rotate about the support plate.

2. In combination with the structure of claim 1, a lock pin and openings in said support plate and one channel member adapted to be aligned for releasably receiving said lock pin.

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