July 1, 1947. W. R. FAIRCHILD 2,423,301

PORTABLE PILE DRIVER

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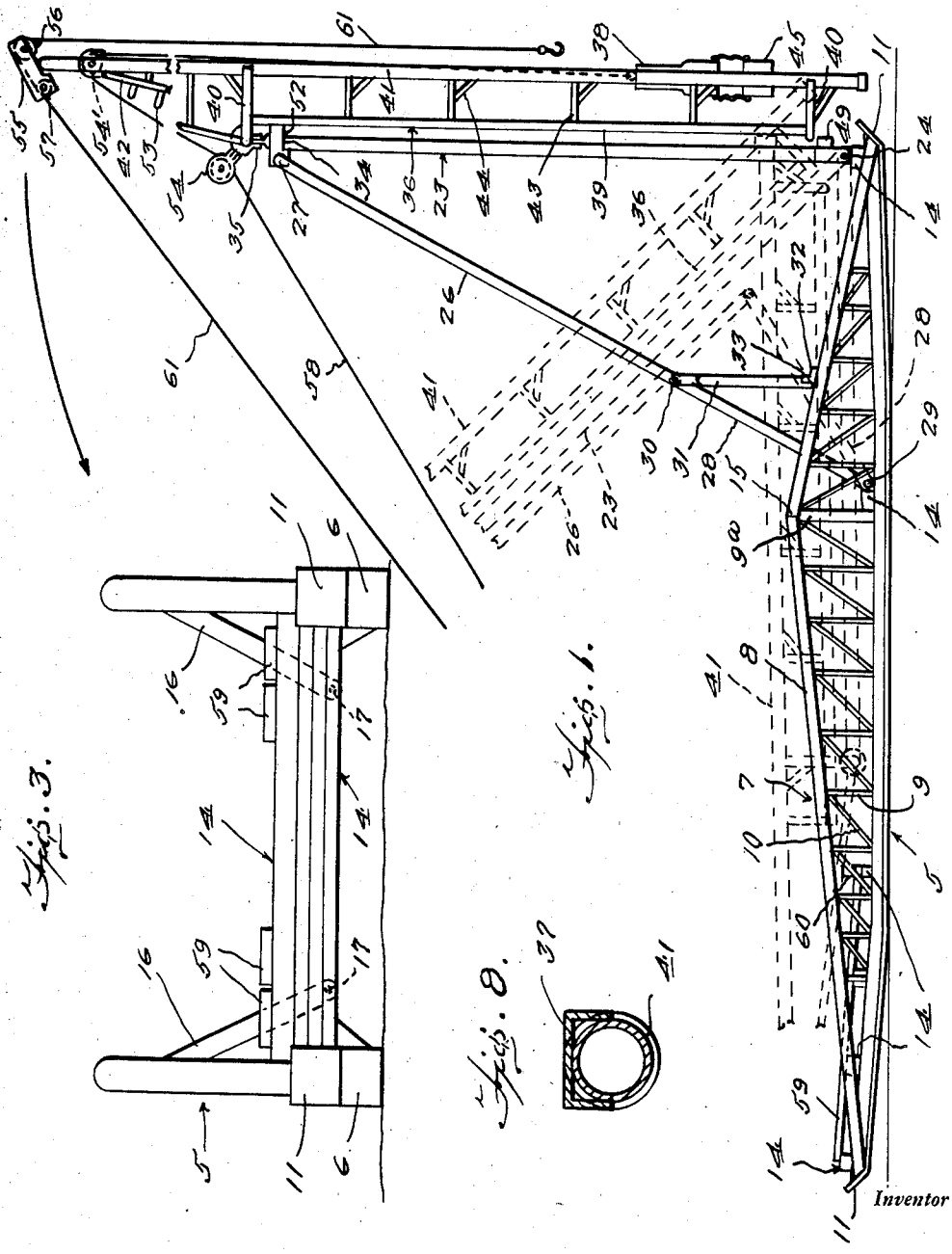


Fig. 1.

Fig. 3.

Fig. 8.

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Fig. 2.

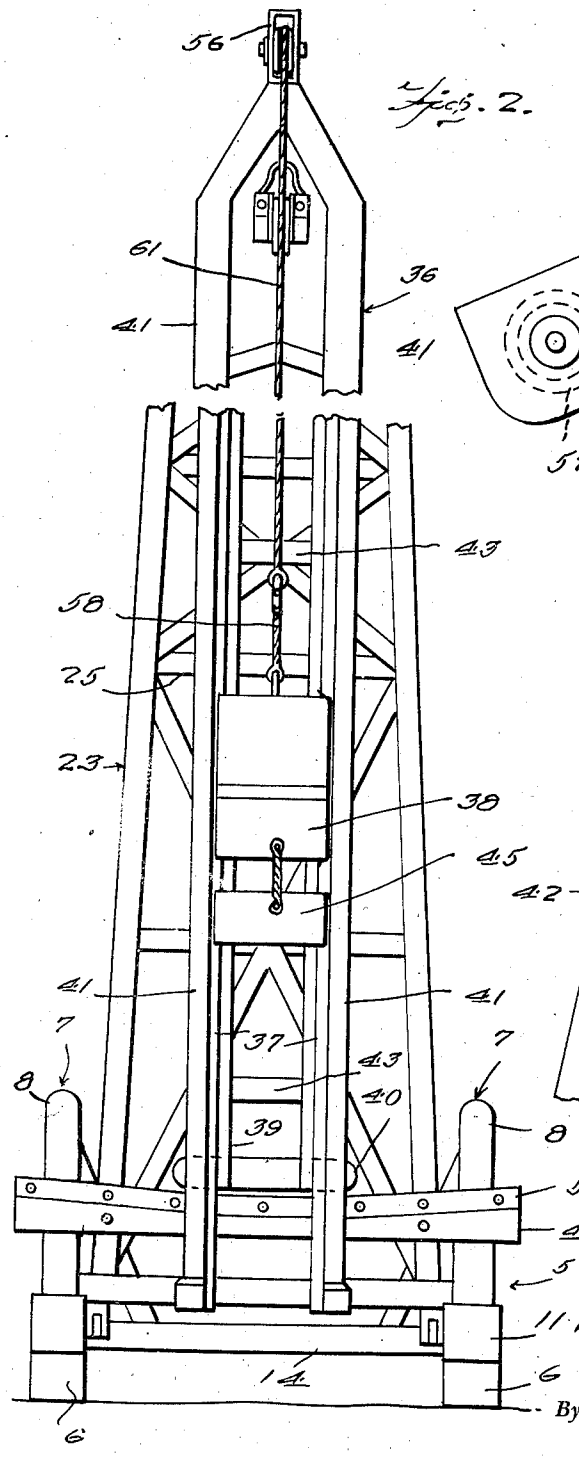
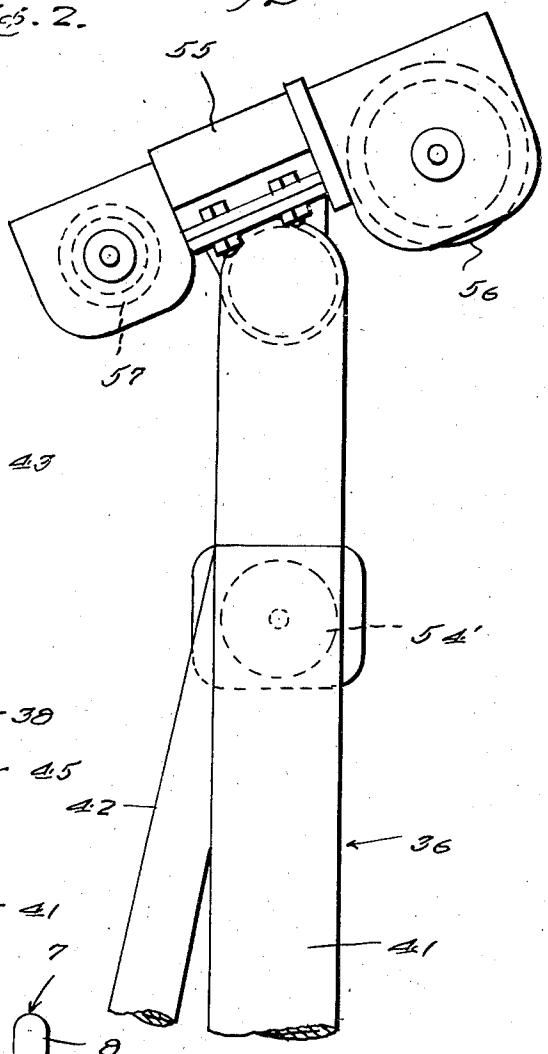


Fig. 7.



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Fig. 4.

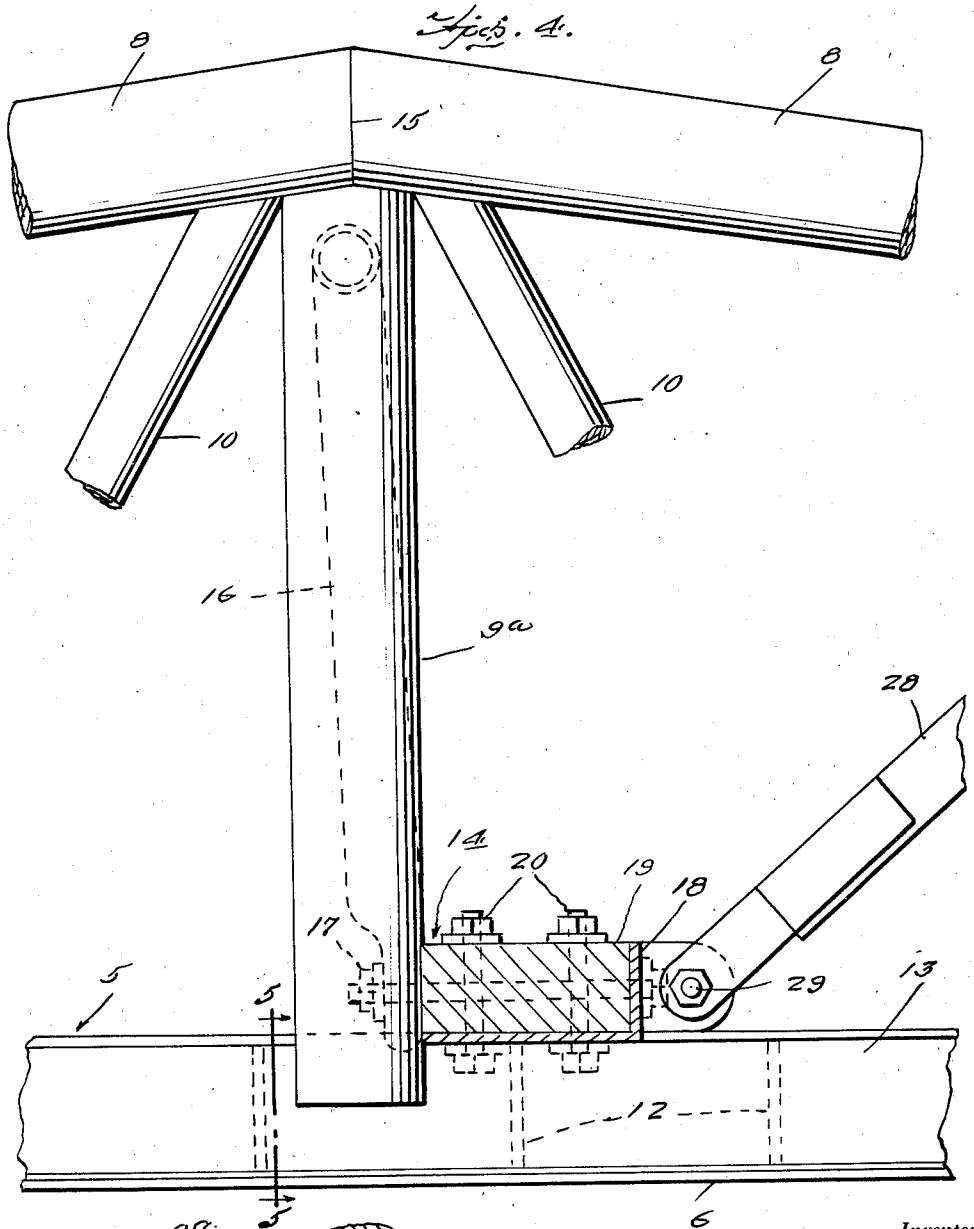
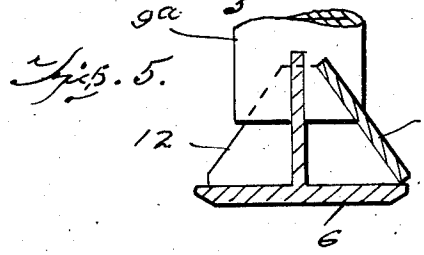


Fig. 5.



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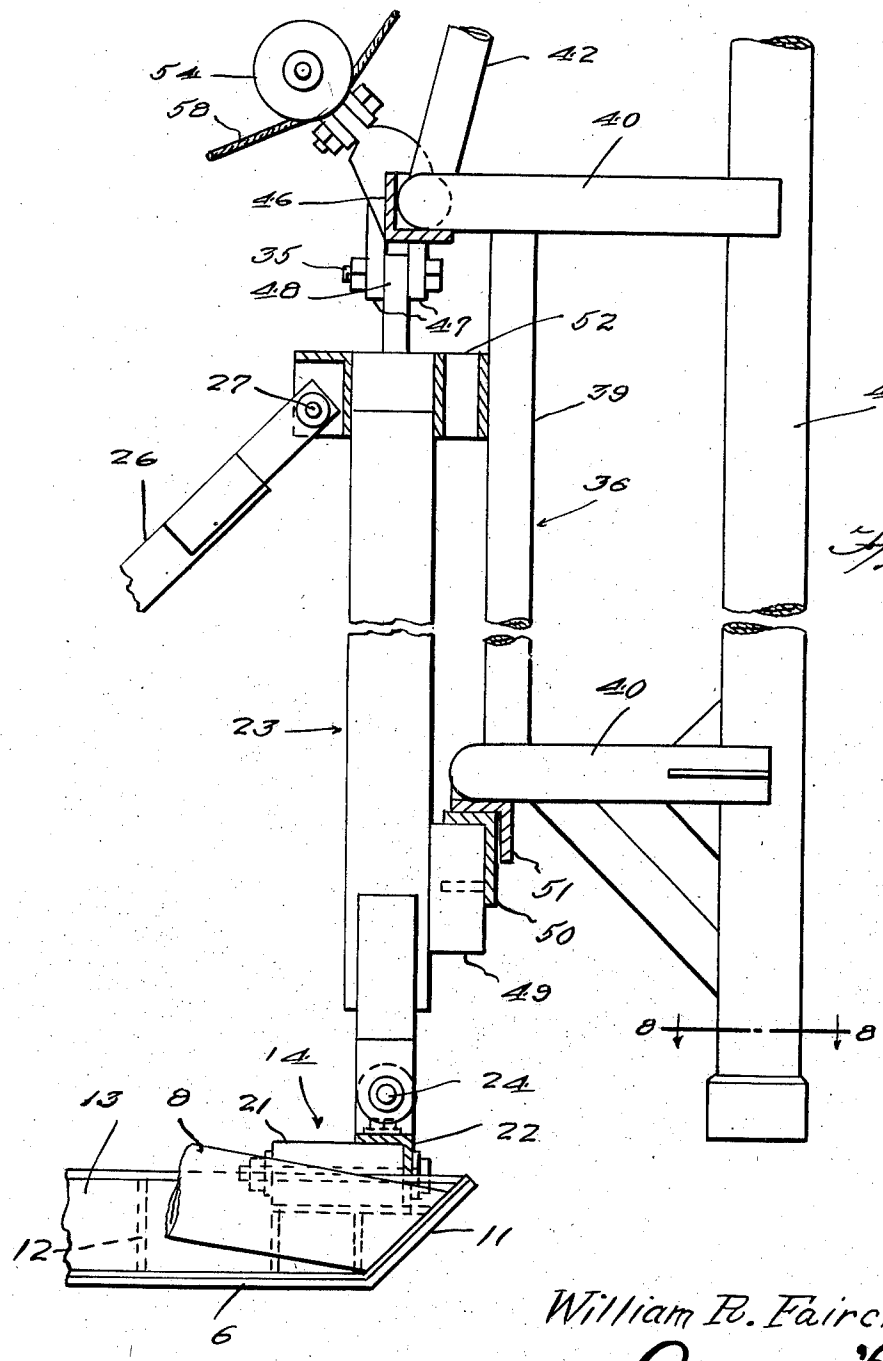


Fig. 6.

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2,423,301

UNITED STATES PATENT OFFICE

2,423,301

PORTABLE PILE DRIVER

William R. Fairchild, Seminary, Miss.

Application July 19, 1944, Serial No. 545,690

6 Claims. (Cl. 61—73)

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This invention relates to an improved portable pile driver including a supporting base in the form of an elongated skid adapted to be drawn along the ground to move the pile driver from one place to another, and wherein an A-frame is pivoted at its lower end to one end of the skid for folding downwardly onto the latter when the pile driver is not in use, a pendulum frame being pivoted on the upper end of the A-frame for lateral swinging movement and including hammer leads or guides for a gravity hammer.

Objects of the invention are to provide a durable construction of skid forming the base of the pile driver; to provide simple and efficient means for releasably maintaining the A-frame in an upwardly swung operative position perpendicular to the supporting base or skid; to provide simple and efficient means for pivotally mounting the pendulum frame on the A-frame and for guiding it in its lateral swinging movement; to provide an improved construction of pendulum frame; and to provide a pendulum frame having hammer leads or guides of simple and improved construction.

Other and more specific objects of the invention will become apparent from the following description when considered in connection with the accompanying drawings, and the invention consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the drawings and claimed.

In the drawings, wherein like reference characters indicate corresponding parts throughout the several views:

Figure 1 is a side elevational view, partly broken away, of a portable pile driver constructed in accordance with the present invention.

Figure 2 is a front elevational view thereof, partly broken away.

Figure 3 is an enlarged rear elevational view of the supporting base or skid.

Figure 4 is a fragmentary view, partly in elevation and partly in section, showing an intermediate portion of the supporting base or skid.

Figure 5 is a fragmentary vertical section taken on line 5—5 of Figure 4.

Figure 6 is a fragmentary view, partly in vertical section and partly in side elevation, and illustrating the pivotal mounting of the A-frame on the front end of the supporting base or skid, the pivotal mounting of the pendulum frame on the A-frame, and other details including the cooperating guiding elements for guiding the pendulum frame in its swinging movement relative to the A-frame.

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Figure 7 is an enlarged fragmentary side elevational view of the upper portion of the pendulum frame.

Figure 8 is a horizontal section through one of the hammer leads or guides, taken on line 8—8 of Figure 6.

Referring in detail to the drawings, the present pile driver includes a supporting base in the form of an elongated skid 5 adapted to be drawn along the ground to move the pile driver from one place to another and comprising a pair of spaced parallel runners 6 of downwardly bowed form and trussed or braced in this form by longitudinal trusses 7 arranged along opposite sides of the skid. One truss 7 is associated with each runner, and each truss is of the Pratt type with inclined topchords 8 and vertical posts 9 and inclined braces 10 extending between said chords and the runners 6. As shown, the chords 8, posts 9 and braces 10 are in the form of pipe sections welded together and to the respective chords and runners, the ends of the chords being welded to the upturned ends 11 of the runners 6. As shown more clearly in Figures 4 to 6, inclusive, the runners are in the form of inverted T-irons having bracing webs 12 at suitable intervals between the flanges thereof and an upwardly and inwardly inclined strip of stiff sheet metal 13 extending across and welded to the inclined outer edges of the webs 12 at the outer sides of the runners, as well as extending from the outer edge of the outer head flange of the runner to a point adjacent the upper edge of the vertical flange of said runner, as shown more clearly in Figure 5. In this way, a very rigid and durable runner construction is had, particularly when provided with the trusses 7. The posts 9 are slotted at their lower ends to fit over the vertical flanges of the runners and to receive the upper edge portions of the strip 13 and webs 12. In this way, the posts 9 are effectively interengaged with the parts 12 and 13 and the vertical flanges of the runners and may be effectively welded to them so as to provide an efficient permanent connection between the posts and the runners. The same sort of connection is provided between the lower ends of the braces 10 and the runners 6, while the upper ends of the posts 9 and braces 10 are merely butt-welded to the chords 8. The runners 12 are suitably connected in spaced parallel relation by means of transverse or cross members 14. At the point where the chords 8 meet, they are butt-welded, as at 15, and at this point, the main post 9a is preferably larger than the remaining posts 9. An inwardly and downwardly inclined lateral brace

16 is provided between the upper end of each main post 9a and the adjacent transverse or cross member 14, the upper end of said grace being butt-welded to the adjacent side of the post 9a and having its lower end flattened and bolted to a longitudinal edge of the cross member 14, as at 17 (see Fig. 4). This effectively braces the trusses against lateral strains, and it will be seen that the particular cross member 14 to which the braces 16 are bolted preferably includes an angle iron 18 secured across and welded to the runners, and a filler plank 19 fitted in the angle iron 18 and bolted to the latter, as at 20.

One of the cross members 14 is arranged at the front end of the supporting base or skid, as shown in Figure 6, and includes a plank 21 having an angle iron 22 fitted and bolted upon the upper forward corner thereof. The lower ends of the side rails of an A-frame 23 are pivoted at 24 to the angle iron 22 upon axes transverse to the supporting base or skid, said A-frame including suitable braces 25 between the side rails of said frame 23. Due to the pivotal mounting at 24, the A-frame 23, together with parts carried thereby, may be folded rearwardly and downwardly onto the supporting base or skid, as indicated by dotted lines in Figure 1, to facilitate transporting of the pile driver from one place to another when the pile driver is not in use. In order to releasably support the A-frame 23 and parts carried thereby, in an upwardly swung operative position perpendicular to the supporting base or skid, as shown in Figure 1, a jointed brace is provided including a link 26 pivoted at its upper end to the upper end of the A-frame 23, as at 27, and a link 28 pivoted at its lower end to the angle iron 18, as at 29, (see Fig. 4) the other adjacent ends of said links 26 and 28 being pivotally connected together at the point 30 so that they can swing rearwardly only, to bring them in alignment but may be swung forwardly to fold them and permit collapsing of the A-frame onto the supporting base or skid. In order to releasably sustain the links 26 and 28 in aligned relation and thereby support the A-frame in its operative vertical position, a prop 31 is pivoted to the links 26 and 28 at the point 30 and has its lower end detachably secured or bolted at 32 to a keeper 33 supported by the forward chords 8 of the trusses 7. Obviously, by detaching the lower end of the prop 31 from the keeper 33, it may be folded parallel with the link 28, whereupon the links 26 and 28 may be swung forwardly to fold them and permit rearward swinging movement of the A-frame 23 downwardly onto the supporting base or skid 5.

The A-frame 23 is provided at its upper end with a suitable cap 34 to which is pivoted at 35 for lateral swinging movement, a pendulum frame 36 including hammer leads or guides 37 for a gravity or drop hammer 38. The pendulum frame 36 comprises a pair of spaced ladder posts 39 having their upper and lower ends welded to the legs of horizontal U-shaped members 40 adjacent the intermediate portions of the latter, lead supporting posts 41 disposed in spaced parallel relation and in spaced relation to and forwardly of the ladder posts 39 and embraced by the ends of the U-shaped members 40, and upwardly and forwardly inclined posts 42 connecting the intermediate portion of the upper U-shaped member 40 with the upper end portions of the lead supporting posts 41. Auxiliary U-shaped members 43, braced as at 44, are provided for rigidly holding the lead supporting posts

41 in proper spaced relation, and the U-shaped members 40 and 43 may comprise lengths of pipe bent into U-form and welded to the posts 39 and 41. The upper end portions of the posts 41 converge and are joined together by welding or the like, as illustrated in Figure 2. As shown clearly in Figures 2 and 8, the leads 37 for guiding the hammer 38 are formed of channels vertically disposed in parallel relation to each other and with the flanges turned outwardly, said channels receiving and being welded to the supporting posts 41. This provides a very durable and efficient mounting for the leads 37, and the hammer 38 may be of conventional form and provided with longitudinal grooves in the sides thereof to receive the leads 37. Also, the hammer 38 may cooperate with a conventional follower 45, as disclosed in the U. S. Patent to A. M. Bellony, No. 1,395,895, dated November 1, 1921. As shown clearly in Figure 6, the intermediate portion of the upper U-shaped member 40 is seated in and welded to a horizontal transverse angle iron 46 that has depending ears 47 receiving between them an upstanding ear 48 on the cap 34, the pivot 35 extending through the ears 47 and 48 to pivotally mount the pendulum frame on the A-frame. In order to steady and guide the pendulum frame in its lateral swinging movement, a transverse bar 49 extends across and is secured to the lower ends of the side rails of A-frame 23. The bar 49 has an arcuate upper edge on which is secured a similarly shaped angle iron 50 forming a wear plate coacting with a similar but shorter angle iron wear plate 51 welded to the under side of the intermediate portion of the lower U-shaped member 40 of the pendulum frame. The depending flange of the angle iron 51 abuts the angle iron 50 to sustain the pendulum frame in a substantially vertical position, as viewed in Figure 6, or against rearward strains. The upper horizontal flange of angle iron 51 engages the top of the angle iron 50 to help sustain the weight of the pendulum frame so that the entire weight of the latter is not imposed on the pivot 35. Obviously, with this arrangement, the pendulum frame may assume a vertical position without necessitating leveling of the supporting base or skid, and the pendulum frame may be adjustably swung laterally when it is desired to drive the piles at an angle. The posts 39 of the pendulum frame also abut a bracket 52 near their upper ends, which bracket is fitted and secured upon the cap 34 and has the link 26 pivoted thereto at 27. As indicated at 53 in Figure 1, the inclined posts 42 of the pendulum frame may be braced in proper spaced relation by means of U-shaped members 53 similar to the members 43.

Suitably rigidly mounted on the angle iron 46 directly above the top of the A-frame 23 is a guide or pulley block 54 that extends upwardly and reawardly from the angle iron 46. A further pulley mount 56 is mounted upon the joined upper ends of the lead supporting posts 41, and said mount carries a pulley 56 disposed forwardly of the posts 41 and a second pulley 57 disposed rearwardly of the latter. A cable 58 for raising the hammer 38 is attached at one end to the top of said hammer and extends upwardly over a pulley 54' mounted directly under mount 55, then under the pulley 54, after which it is extended rearwardly of the supporting base or skid for attachment to the hoisting drum of any suitable portable hoisting truck or vehicle driven onto the rear end of the supporting base or skid.

Planks 59 are preferably laid across and secured to certain of the transverse members 14 of the supporting skid at the rear end of the latter, and disposed upon and secured to the forward ends of the planks 59 transversely of the skid is a bumper bar 60 that is contacted by the inclined posts 42 of the pendulum frame when the latter is folded with the A-frame 23 rearwardly and downwardly onto the supporting base or skid 5. The planks 59 form tracks for the hoisting truck, and the bar 60 a chock therefor.

A second hoist line 61 passes over pulleys 56 and 57 for handling piles and timbers.

From the foregoing description, it is believed that the construction, operation and advantages of the invention will be understood by those skilled in the art.

What I claim is:

1. In a portable pile driver, the combination of a horizontal elongated skid adapted to be drawn over the ground, pile driving means pivotally mounted on one end of the skid for swinging movement between vertical operative and horizontal folded positions, said pile driving means including a drop hammer and means including a hoisting cable for hoisting said drop hammer, and tracks on the other end portion of said skid disposed longitudinally of the latter to facilitate the backing thereon of a hoisting truck for actuating the hoisting cable and counter-balancing the pile driving means when the latter is in its operative position.

2. In a portable pile driver, the combination of a horizontal elongated skid adapted to be drawn over the ground, pile driving means mounted on and rising from one end of the skid, said pile driving means including a drop hammer and means including a hoisting cable for hoisting said drop hammer, and tracks on the other end portion of said skid disposed longitudinally of the latter to facilitate the backing thereon of a hoisting truck thereon for actuating the hoisting cable and counter-balancing the pile driving means, and said pile driving means being of substantially the same length as said skid and further including an A frame pivoted at its lower end on said one end of the skid to provide for folding of the pile driving means downwardly fully onto the skid when the hoisting truck is driven off of the latter, and means to releasably maintain the A frame in a vertical upwardly swung operative position.

3. In a pile driver, a supporting base, pile driving means including an A frame pivoted at its lower end on one end of the supporting base for folding downwardly fully onto the latter, means to releasably support the pile driving means in an upwardly swung operative position including a link pivoted at one end to upper end of the A frame, a second link pivoted at one end to the other end of said first named link and at its other end to the base, and means to hold said links in aligned relation including a prop pivoted at one end to the pivotally connected ends of said links and a keeper for the other end of the prop mounted on the base.

4. In a pile driver, metallic hammer leads comprising tubular supporting posts rigidly secured in spaced parallel relation, and hammer guides embodying angular channels disposed on the inner sides of said supporting posts, said supporting posts being of a diameter less than the width of the channels and snugly received in and welded to said channels in contact with the central and side portions of the latter.

5. In a pile driver, a supporting base in the form of a horizontal elongated skid having downwardly bowed spaced parallel runners, transverse bars rigidly connecting said runners, means to mount a pile driving means upon one end of the supporting base for folding rearwardly and downwardly onto the latter, and longitudinal tracks laid on said transverse bars at the other end of the base to facilitate backing of a hoisting truck thereon for actuation of the hammer raising cable of the pile driving means.

6. In a pile driver, a supporting base in the form of a horizontal elongated skid having downwardly bowed spaced parallel runners, transverse bars rigidly connecting said runners, means to mount a pile driving means upon one end of the supporting base for folding rearwardly and downwardly onto the latter, longitudinal tracks laid on said transverse bars at the other end of the base to facilitate backing of a hoisting truck thereon for actuation of the hammer raising cable of the pile driving means, and a wheel chuck rigidly mounted on the supporting base at the inner ends of said tracks.

WILLIAM R. FAIRCHILD.

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