

Sept. 17, 1935.

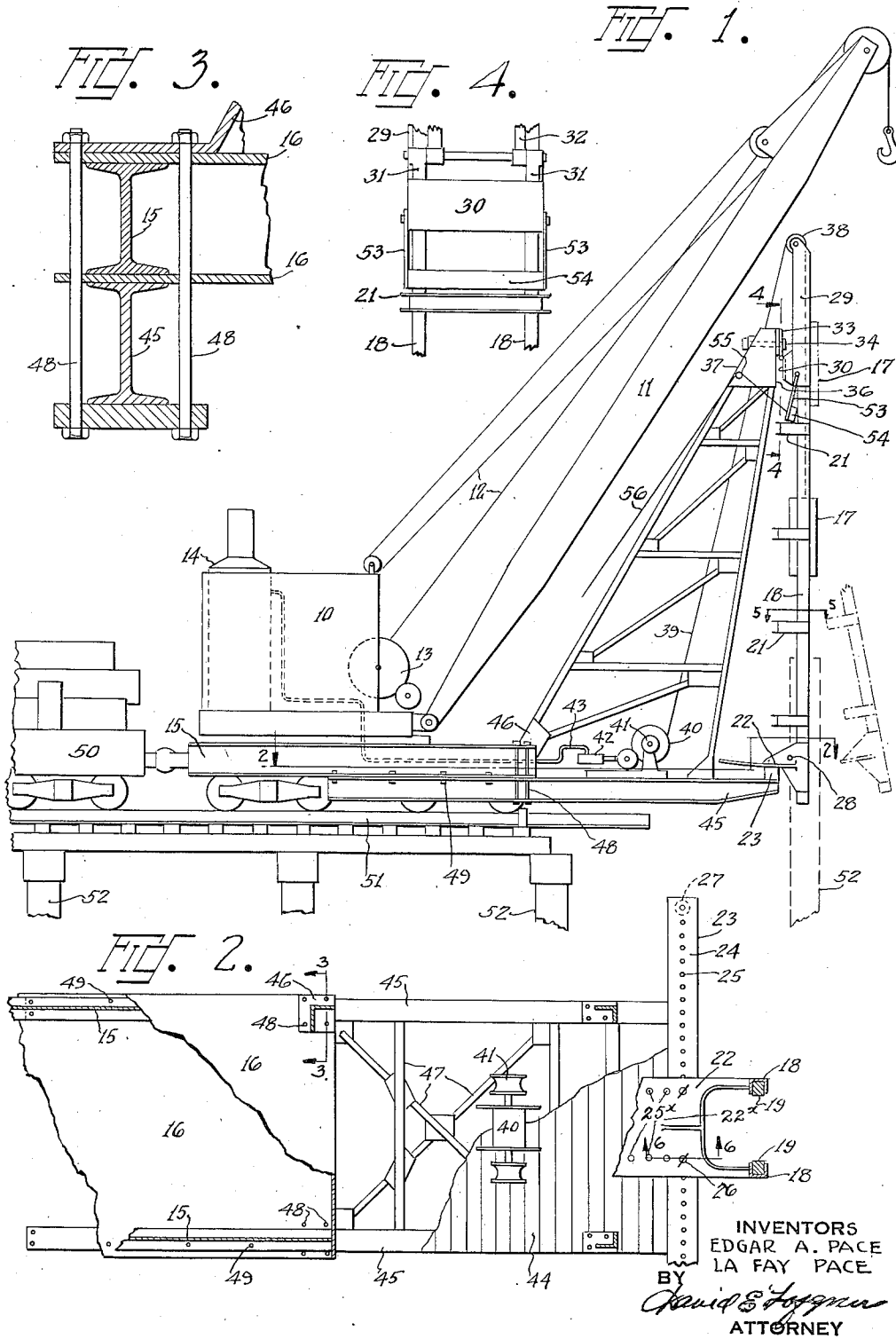
E. A. PACE ET AL

2,014,631

PILE DRIVER

Filed July 31, 1934

2 Sheets-Sheet 1



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FIG. 8.

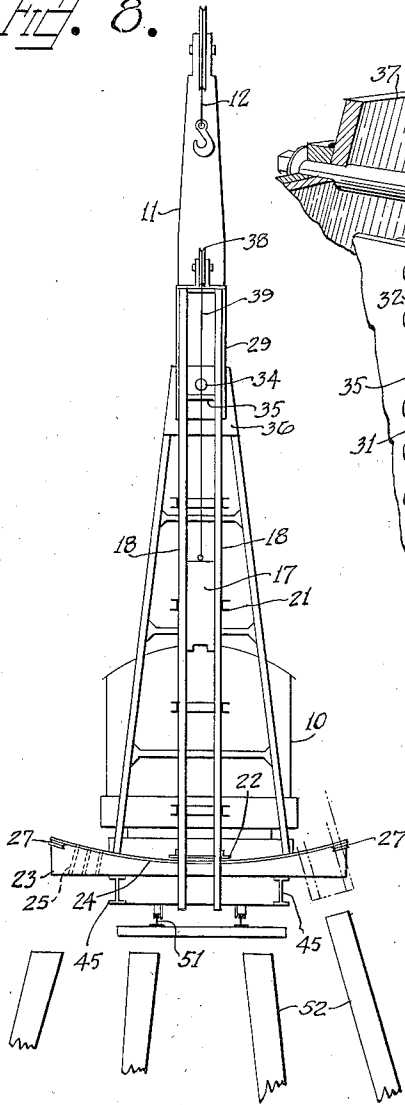


FIG. 7.

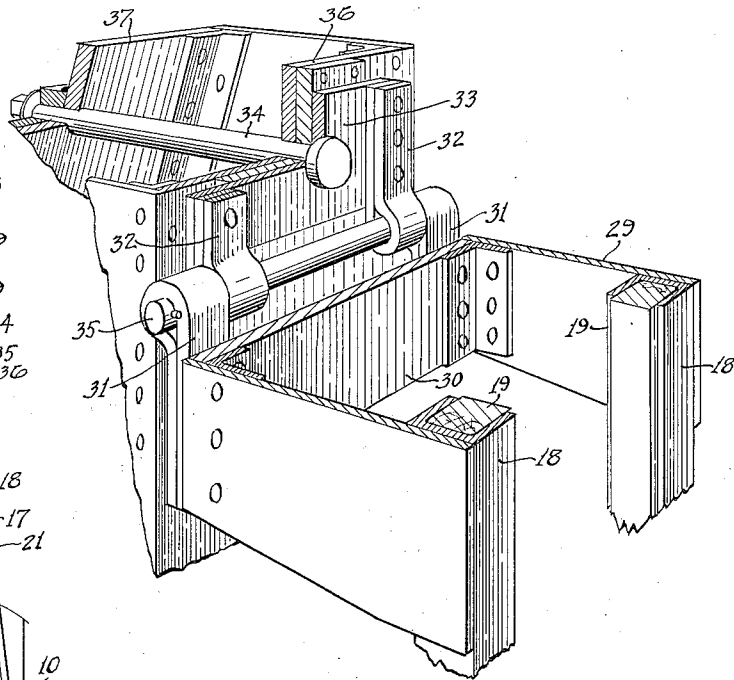


FIG. 6.

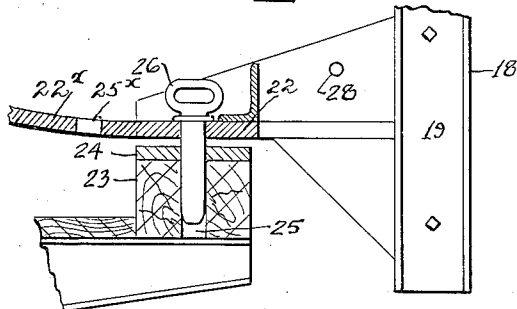
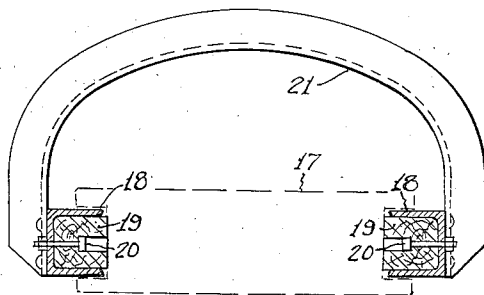


FIG. 5.



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2,014,631

PILE DRIVER

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5 Claims. (Cl. 61—74)

This invention is directed to an improvement in pile driving attachments to be secured to the base of a locomotive crane for driving piles or similar work at any desired location.

Locomotive cranes are usually track-traveling and carry a boom by which supplies may be lifted from a flat car in rear of the crane and carried to a position desired for use. The improved pile driving attachment is designed to be fixedly secured to the crane proper and to operate in advance of the same, the arrangement of the pile driving attachment being such as to avoid any interference with the usual handling or movement of the crane boom and, in fact, is arranged so as to permit the crane boom to pick up and deliver piles to be driven by the pile driver attachment.

The primary object of the present invention is the provision of a pile driving attachment in which the guides for the ram or hammer may be selectively moved at different vertical or horizontal angles in order that the driving action may be other than directly vertical to accommodate different conditions of driving.

A further object of the invention is the provision of a steel tower as a part of the pile driving attachment, which tower serves to support the hammer guides and to provide for the adjustment of the guides at different angles, the tower also providing at convenient heights independent platforms for the convenience of workmen.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation showing the improved pile driving attachment connected to a locomotive crane car.

Figure 2 is a broken plan of the same.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view on the line 4—4 of Figure 1.

Figure 5 is a plan view, partly in section, showing the means for connecting the hammer guides at various points throughout their heights.

Figure 6 is a broken view in elevation, partly in section, showing the means for providing for adjustment of the hammer guides to different vertical angles.

Figure 7 is a perspective view, partly in section, showing the means for swingingly supporting the hammer guides in two planes.

Figure 8 is a front elevation of the attachment.

The attachment is shown in connection with a locomotive crane car indicated at 10 and adapted for travel on tracks 51 and connected to one or

more flat cars 50 for supplies. Secured to and beneath the metallic I-beams 15 of the locomotive crane car are I-beams 45 forming part of the attachment. These beams 45 extend in advance of the ends of the beams 15 and are secured thereto by bolts 49 to the flanges of the beams and tie-bolts 48 which extend through plates above and below the beams 15 and 45, as indicated more particularly in Figure 3.

The extended portions of the beams 45 of the attachment, suitably braced by cross-pieces 47, carry a platform 44. A skeleton tower of metallic uprights secured at the bottom to angle pieces 46 bolted to the beams 45 is erected on the platform 44 for an appropriate height. It is to be particularly noted that this beam is set at an angle, so that its upper end is substantially in line with the forward ends of the beams 45 in order to provide a proper support for the upper ends of the hammer guides.

The upper end of the tower is provided with a hollow head 37 in the walls of which is fixed a heavy duty bolt or shaft 34 on the forward end of which is swingingly supported a plate 33 having hinged knuckles 32 and carrying a pivot pin 35 on the ends of which are supported other hinged knuckles 31 secured to a hollow casting 29 which extends materially above the hollow head 37 for a purpose which will later appear. The casting 29 is open on its forward end and secured to the forward edges of the side walls of this casting are hammer guides made up of U-shaped bars 18 in which is fixed a wooden insert 19, the relatively inner surface of which extends inwardly beyond the edges of the bars 18.

The bars 18 and wooden strips 19, which constitute the guides for the hammer, extend vertically, terminating at their lower ends below the beams 45 in order to permit an effective stroke of the hammer below said beams for driving piles and the like to a greater depth or lower level than ordinarily permissible in devices of this type. At appropriate points throughout their lengths, the guides are held in rigid spaced relation by tie members constituting holding members and made up of metal bars 21 of substantially semi-circular shape in plan, to the inner surfaces of the ends of which the guides are rigidly secured, as for example by bolts 20, as indicated in Figure 5.

The forward ends of the beams 45 support a transverse bar 23 which extends in both directions beyond the beams 45 and the upper surface of which is curved from a center at the pivot 34. The upper surface of the bar 23 is provided with a plate 24, or, if desired, such plate may consti-

tute the upper surface of the bar 23. This plate is formed with a series of openings 25 extending longitudinally thereof, and the plate or the upper surface of the bar 23, as the case may be, has a curved formation, the curvature of which is struck from the pivot 34.

The extreme lower support for the hammer guides is in the form of a plate 22 designed to overlie and rest upon the plate 24. The forward portion of the plate is formed on a curvature corresponding to that of the intermediate guide braces 21, and the guides 18 and 19 are rigidly secured to the forward edges of the plate 22. The plate 22, which overlies the plate 24, is formed with openings to receive pins 26 which may be removed at will in order that the plate 22 may be moved to any series of holes longitudinally of the plate 24, as will be plain from Figure 2.

As the hammer guides are rigidly supported at the upper ends by the casting 29, at the lower end by the plate 22 and intermediate the ends by any appropriate number of braces 21, it is apparent that the guides will move as a unit and that by reason of this rigid support being swung on the bolt 34 and the lower rigid support capable of being arranged in any position longitudinally of the plate 24, it is apparent that the guides may be given any vertical angle within the limits of the plate 24 or held in a vertical position at will.

Furthermore, it will be understood that as the casting 29 is supported for swinging on the hinge bolt 35 in a direction at right angles to its movement on the bolt 34, the lower ends of the guides may be moved outwardly from the beams 45 to various angles in such adjustment with corresponding inclination for the movement of the hammer.

The hammer is operated by means of a drum 40 mounted upon the platform 44 operated by an engine 42 from steam conveyed through a pipe 43 from the usual boiler 14 on the crane car. Of course, this pipe will extend through the center pin of the crane car and be provided with a universal connection to permit turning of the crane car without interfering with the steam supply to the engine 42. Obviously, of course, where electric power is available, the engine 42 may be in the form of a motor.

A cable 39 is wound on the drum 40 carried over a guide 38 at the upper end of the casting 29 and connected to the hammer 17, the ends of which, of course, are recessed to cooperate with the guides. It will be noted that the recessed ends of the weight contact more particularly with the wooden surfaces of the wood strips 19. This avoids the usual noise and provides a more effective operation. The drum 40 is provided with auxiliary drums 41 over which cables (not shown) are led over guide pulleys 27 on the end of the plate 24 and connected to the plate 22 to facilitate the movement of the plate in either direction desired when changing the vertical angle of the guides for angular driving.

The relation of the pile driver guides for angular driving is illustrated more particularly in Figure 8, a series of piles 52 being indicated which may be directly driven through the different angular positions of the guides.

The crane car is provided with the usual crane boom 11 having the usual hoist hook operated by a cable 12 driven from the crane car engine 13. This hook overlies the driving attachment in advance of the same and permits the crane car to be swung back to pick up supplies from the flat car 50 and move them into position to be driven by

the pile driver attachment, the hook being also available for pulling piles or other parts to be withdrawn when desired.

As previously stated, the casting 29 extends materially above the pivotal supports of such parts at 34 and 35. Thus, when the hammer 17 has been moved into the upper portion of said casting above said pivotal supports, it acts as a counter-weight to facilitate the inclined adjustment of the guides for inclined driving. A stop element 54 is arranged to underlie the hammer when it is in its uppermost position, this stop element being carried by arms 53 swingingly mounted in the casting 29 and controlled manually by a cable 55.

In order to permit the weight guides to be moved at varying angles from the vertical in line with the tower, the plate 22 may be extended longitudinally as indicated at 22* and slightly curved to provide the necessary contact with the plate 24 in the angular adjustment. The extension 22* of the plate 22 is formed with openings 25* which may cooperate with any of the openings 25 of the plate 24, the pins 26 serving to hold the weight guides in adjusted position either in alignment with the tower or transversely thereof, thus providing for both the vertical adjustments indicated in dotted lines in Fig. 1 and in dotted lines in Fig. 8.

What is claimed to be new is:

1. A pile driving attachment for locomotive crane cars, including a platform, a tower carried thereby, a head at the upper end of the tower, a hammer guide casting, means for connecting said casting to the head to permit the casting to swing in either of two relatively right angled directions, hammer guides fixed to and depending from the casting, an arcuate guide plate for the lower ends of the hammer guides, a member carried by the hammer guides and movable over said plate in either of two right angled directions, and a pin 40 for securing the member and plate in desired positions of adjustment in both such relative positions of the member and plate.

2. A pile driving attachment for locomotive crane cars, including a platform, a tower carried thereby, a head at the upper end of the tower, a hammer guide casting, a plate to which said casting is swingingly supported, means for pivotally mounting the plate with respect to the head, the swinging movement of the plate and the swinging movement of the casting being at relatively right angles, hammer guides carried by and depending from the casting, means arranged at the lower ends of the hammer guides to permit the hammer guides to be secured in any relative position responsive to movement of the guides on the connection between the casting and plate or on the connection between the plate and tower head, the casting at the upper ends of the guides projecting sufficiently above the connection between the plate and casting and the connection between the casting and head to receive the weight which cooperates with the guides to permit said weight to serve as a counter-weight in the adjustment of the lower ends of the guides.

3. A pile driving attachment for locomotive crane cars, including a platform, a tower carried thereby, a head at the upper end of the tower, a plate swingingly supported on the head for movement in a direction transverse the longitudinal plane of the platform, a casting swingingly supported on the plate for movement in a direction longitudinally of the platform, hammer guides carried by the casting and depending below the platform, a plate secured to the platform and hav-

ing an arcuate shape formed with the pivotal support between the head and plate as a center, a member carried by the guides and designed to cooperate with said plate, said member being of arcuate form with the connection between the plate and casting as a center, said plate and member being formed with openings to be brought into registry in the movement of the member longitudinally of or transversely of the plate, and a pin to cooperate with the registering openings to secure the member in adjusted relation to the plate.

4. A pile driving attachment for locomotive crane cars, including a platform, a tower carried thereby, a head at the upper end of the tower, a plate swingingly supported on the head for movement in a direction transverse the longitudinal plane of the platform, a casting swingingly supported on the plate for movement in a direction longitudinally of the platform, hammer guides carried by the casting and depending below the platform, a plate secured to the platform and having an arcuate shape formed with the pivotal support between the head and plate as a center, a member carried by the guides and designed to cooperate with said plate said member being of arcuate form with the connection between the plate and casting as a center, said plate and member being formed with openings to be brought into registry in the movement of the member longitudinally of or transversely of the plate, and a pin to cooperate with the registering openings to secure the member in adjusted relation to the plate, the casting extending mate-

rially above the connection between said casting and plate and the connection between the plate and head to permit the weight which cooperates with the guides to be arranged above said swinging supports to provide a counter-weight for easy adjustment of the lower ends of the guides.

5. A pile driving attachment for locomotive crane cars, including a platform, a tower carried thereby, a head at the upper end of the tower, a plate swingingly supported on the head for movement in a direction transverse the longitudinal plane of the platform, a casting swingingly supported on the plate for movement in a direction longitudinally of the platform, hammer guides carried by the casting and depending below the platform, a plate secured to the platform and having an arcuate shape formed with the pivotal support between the head and plate as a center, a member carried by the guides and designed to cooperate with said plate, said member being of arcuate form with the connection between the plate and casting as a center, said plate and member being formed with openings to be brought into registry in the movement of the member longitudinally of or transversely of the plate, and a pin to cooperate with the registering openings to secure the member in adjusted relation to the plate, the member carried by the guides being formed in part as an arcuate brace terminally connected to the guides.

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