T. L. REDDING.

PILE DRIVING MACHINE.

APPLICATION FILED JAN. 30, 1913.

1,088,927.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 1.

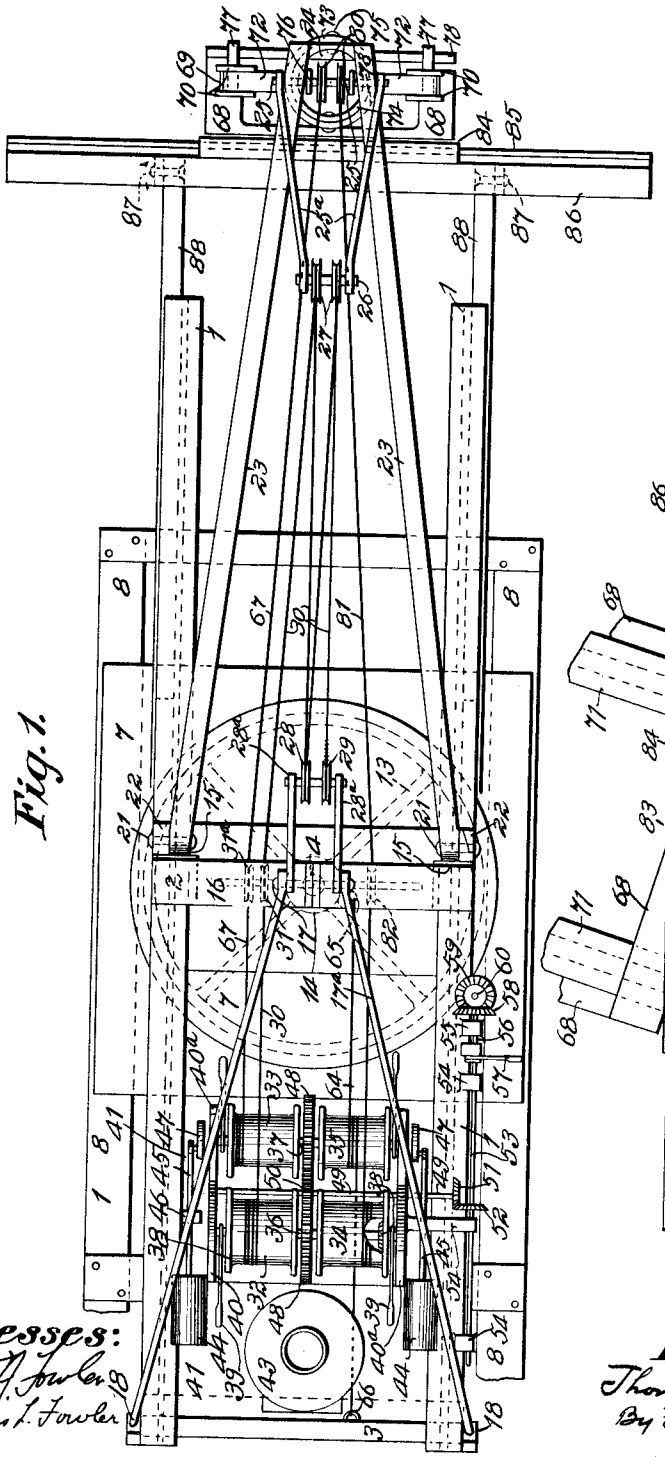


Fig. 1.

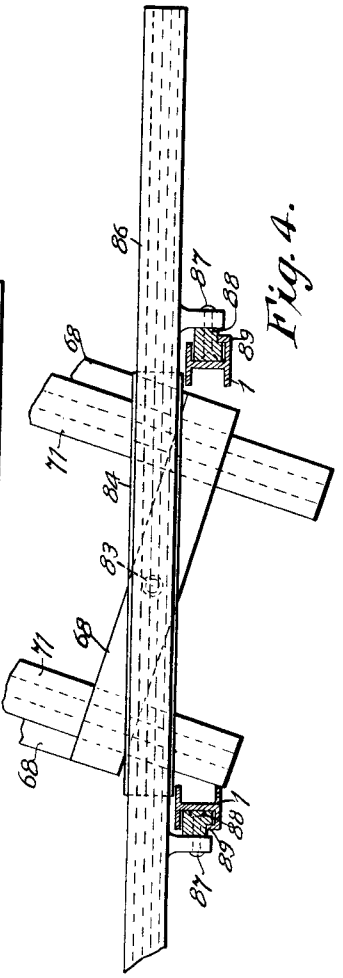


Fig. 4.

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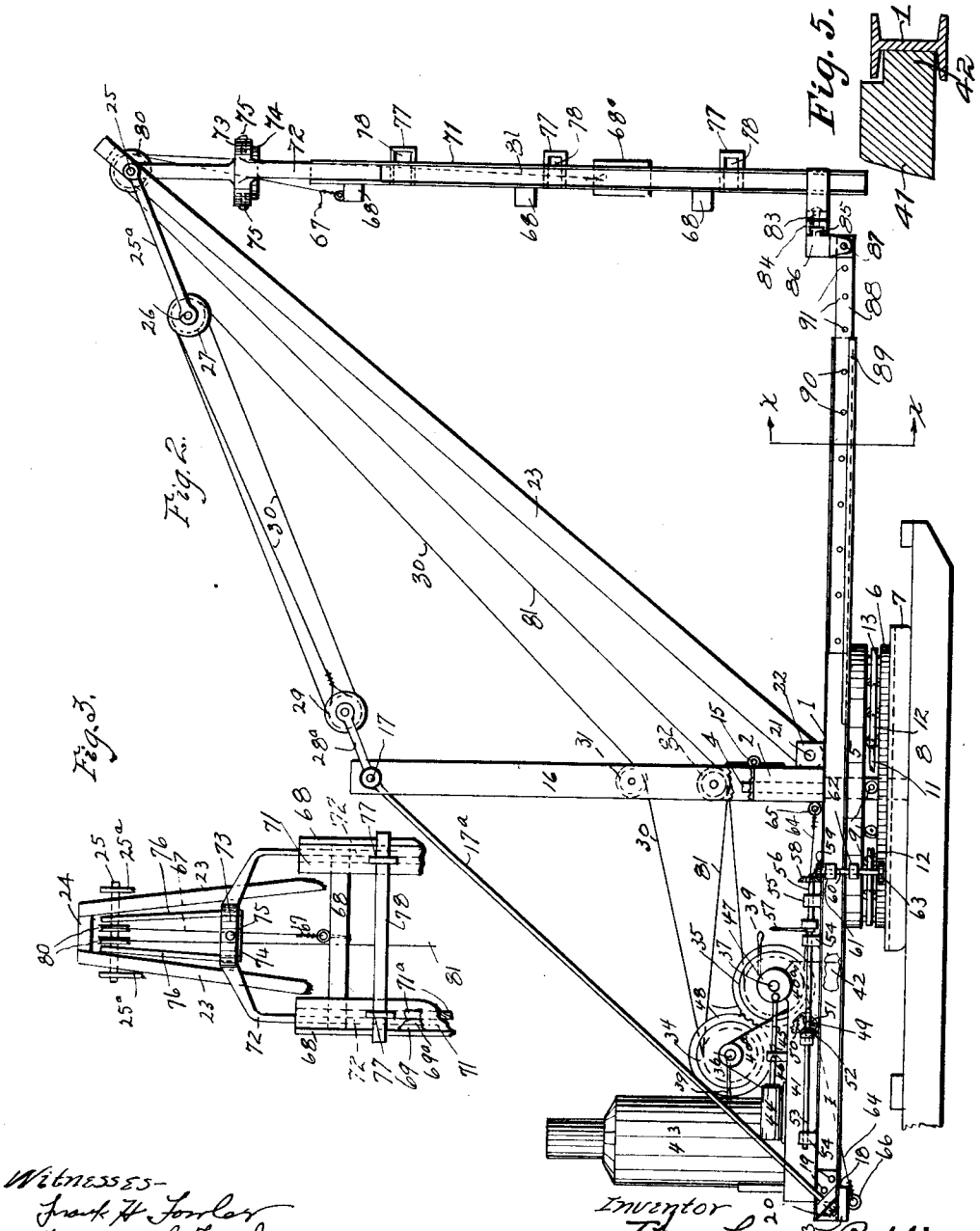
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UNITED STATES PATENT OFFICE.

THOMAS LEROY REDDING, OF SEATTLE, WASHINGTON.

PILE-DRIVING MACHINE.

1,088,927. Specification of Letters Patent. Patented Mar. 3, 1914.

Application filed January 30, 1913. Serial No. 745,084.

To all whom it may concern:

Be it known that I, THOMAS LEROY REDDING, a citizen of the United States, and a resident of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Pile-Driving Machines, of which the following is a specification.

This invention relates to pile driving machines, and has for its principal object to provide a machine of this character in which the equilibrium of the machine is maintained in a novel and peculiar manner, and by means of which piles may be driven at any degree of angularity.

Novel features also are that the vertical parts of the device are adapted to be quickly and conveniently folded so that the machine may be easily transported, and easily made ready for use either for its principal purpose of driving piles, as a derrick or as a steam shovel frame.

The invention will be fully described in the following specification, and shown in the accompanying drawing—in which,

Figure 1 is a plan view of my device, with parts broken away. Fig. 2 is a similar view in side elevation. Fig. 3 is an enlarged fragmentary view of the topmost portion of the device. Fig. 4 is a similar view of the lower portion, upon the line *x*—*x* of Fig. 2. Fig. 5 is an enlarged fragmentary view of the engine casting 41 and the ways in which it slides.

The main frame of the device is formed by the parallel I beams 1, which are joined together, about midsection, by the cross timber 2 and, at their left hand ends, by the cross plate 3. Passing loosely through the cross timber 2 is the king bolt 4, which extends downwardly through the disk 5, fixed to the I beams 1, thence through the companion disk 6, fixed to the sled 7, and finally through the said sled, where the lower end of the bolt is firmly fixed. The sled 7 is slidable upon the larger sled 8, for greater convenience in positioning the device, in the direction of the lengths of the sleds, as will be understood. Between the disks 5 and 6 are the anti-friction rollers 9, which are held in place by the two rings 11 and 12, which are joined together, as indicated in dotted outline, the inner ring 11 having the spokes 13, which radiate from the hub 14, which is revolubly mounted upon the bolt 4. Hinged, at 15, to the cross timber 2, is the A frame 16, through the upper end of which, and the tie rods 17ª, passes the bolt 17. The lower ends of the said tie rods pass through the outwardly flared plates 18 which are riveted, at 19, to the webs of each of the I beams 1, and, when the parts are in the positions shown, are secured by the nuts 20. Pivoted, at 21, to the blocks 22, upon the I beams 1, are the boom timbers 23 which converge upwardly and are joined together at their upper ends by the short block 24. Passing through the upper ends of the said boom timbers, and the metallic straps 25ª, is the rod 25, and through the opposite ends of the said straps passes the pin 26 upon which are mounted the sheaves 27. Mounted upon the rod 17, upon the A frame, are the straps 28ª, between the outer ends of which are the sheaves 28 and 29, to the latter of which is fixed one end of the line 30, which is threaded back and forth between the said sheaves, as shown, whence it runs downwardly and around the sheave 31, upon the A frame, and finally to the drum 32, to which it is secured. The drums 32, 33, 34 and 35 are all loose upon the shafts 36 and 37 and are adapted to be made to revolve with the said shafts by means of the cone clutches 38, which are splined upon the shafts 36 and 37, and movable in and out of engagement with the said drum by means of the levers 39, pivoted to the extensions 40 and 40ª upon the casting 41, and through which extensions the shafts 36 and 37 revolubly pass. Upon each side of the lower portion of the casting 41 is the extension 42 which slidably fits between the inner flanges of the I beams 1, and, mounted upon the said casting, is the boiler 43, at each side of which are the steam chests 44, with which coöperate the pitman rods 45 which extend forwardly from the engine cross heads 46, and to which are pivotally connected the wheels 47, secured to each end of the shaft 37. Fixed to the shafts 36 and 37 are the gear wheels 48, which are constantly in mesh with each other. Revolubly mounted within the casting 41 is the shaft 49, to which is fixed the pinion wheel 50, which is constantly meshed with one of the gear wheels 48. To one end of the shaft 49 is fixed the miter pinion 51 with which meshes the similar pinion 52, splined upon the shaft 53, which revolubly passes through the projections 54 upon one of the I beams 1.

Revolubly passing through the projection 55, upon one of the I beams 1, is the stub

shaft 56, between one end of which and the shaft 53 is a clutch lever, 57, which controls a cone clutch of the same description as the clutches 38, already described, and by means of which the two shafts 56 and 53 may be made to revolve together, or the shaft 53 to revolve independently of the shaft 56. Fixed to the right hand end of the shaft 56 is the miter pinion 58 with which meshes the similar pinion 59, fixed to the shaft 60, which revolves in the bearings 61 and 62 upon one of the I beams 1, and the disk 5 respectively, and upon the lower end of which is fixed the pinion 63 which constantly meshes with the disk 6, which is toothed, as shown. Passing around the drum 35, is the line 64, one end of which is secured to the eye 65, secured to the cross timber 2, and its opposite end is similarly secured to the eye 66, fixed in plate 3. 67 indicates the line which controls the lead 68, within which the piles are adapted to slide as they are being driven. The said lead is of substantially U shape, in cross section, and along its inner surface are the tongues 69 which are firmly secured between the flanges 70 of the I beams 71. The webs 71^a of the I beams 71, are in spaced relation with respect to the tongues 69, so that the channels 69^a are formed to slidably receive the free ends of the straps 72, which extend downwardly from the ring 73, within which is the smaller ring 74 which is pivotally connected, at 75, to the ring 73, and extending upwardly from the smaller ring 74 are the straps 76 which are pivoted upon the pin 25. Extending from the I beams 71, at intervals, are the loops 77, through which loosely pass the timbers 78. To the top of the lead 68 is secured one end of the line 67 which passes over one of the sheaves 80, thence downwardly and around the sheave 31^a and finally to the drum 33, to which it is secured. Slidable within the lead 68, and suspended from the line 81, is the hammer 68^a, its line, 81, also passing over one of the sheaves 80, downwardly and rearwardly around the sheave 82, and finally to the drum 34, to which it is secured. Pivoted, at 83, to the lower end of the lead 68, is the block 84, which is suitably grooved to slidingly receive the tongue 85 which projects from the cross head 86 which is secured, at 87, to the bars 88, which slide against the webs of the I beams 1, and are held to their work by the up-turned lips 89, upon the said I beams.

From the foregoing description it will be seen that, when the pitman rods 45 are reciprocated, the I beams 1 and their attached disk 5 are caused to rotate with respect to the disk 6, through the wheels 47, shaft 37, gears 48, pinions 50, shaft 49, pinions 51 and 52, shafts 53 and 56, pinions 58 and 59, stub shaft 60, pinion 63, so that the forward portion of the device may be turned in any desired direction. If the strain upon the right hand, or working side, of the device should, for any reason, become so great as to tend to overbalance the device, it is only necessary to throw in the clutch of the drum 35, which causes the same to revolve in anti-clockwise direction, and, since the said drum is encircled by the line 64, it will, due to the friction of the said line, cause the engine bed to slide with respect to the I beams 1, and away from the center of the device, thus counterbalancing the pull or force upon its working end. Piles, of course, may be driven vertically when the parts are in the positions shown in Fig. 2, by raising and lowering the hammer 68^a, to do which the drum 34 is connected to its shaft 36 and the line 81 caused to wrap around the drum until the hammer 68^a has been carried to a sufficient height, when the clutch may be thrown out and the said drum disconnected from its shaft which allows the hammer to drop upon the upper end of the pile, the timbers 78 preventing the pile from displacement forwardly. The free end of the boom 23 is raised by throwing in the clutch which connects the drum 32 to the shaft 36 and allowing the line 30 to wind around the said drum, any approved means being employed to hold the drum against retrograde movement.

It is obvious that piles may be driven at any degree of angularity. For instance, if it is desired to drive a pile at about the angle of the boom, all that is necessary is to slide the bars 88 rearwardly with respect to the I beams 1 until the desired point is reached, insert an ordinary bolt through one of the openings 90 and one of the openings 91 which are in register with each other, so as to hold the lead in its adjusted position, and then operate the hammer as already described. A pile may be driven to the right of the vertical, as viewed in Fig. 2, by a similar adjustment of the bars 88, and to drive a pile to the right or left of the vertical, as viewed in Fig. 4, it is only necessary to slide the block 84 to the right or left as may be required, and then operate the hammer.

The device may be quickly collapsed for transportation from place to place, upon flat cars or the like, by removing the nuts 20 from the rods 17^a, and allowing the A frame 16 to fold back upon the hinges 15, the lower end of the lead, of course, being moved either forwardly or backwardly, and the upper end of the boom 23 correspondingly lowered.

While I have shown a particular form of embodiment of my invention, many minor changes therein will readily suggest themselves to others skilled in the art, without departing from the spirit and scope of the invention, and I do not, therefore, desire to

be limited to exact form shown and described, except as indicated by the appended claims.

What I claim as new, and desire to protect by Letters Patent, is—

1. The combination in a device of the class described, having a centrally pivoted main frame and an engine slidable radially upon the said frame, of means for adjusting the boom and lead of the device whereby a pile may be driven at any degree of angularity with respect to the horizontal.

2. The combination in a device of the class described having a boom and a swingable lead and a centrally pivoted main frame, of an engine slidable radially with respect to the main frame and means for swinging the lower end of lead whereby a pile may be driven which diverges upwardly from the vertical plane of the pivot of the main frame.

3. The combination in a device of the class described having a centrally pivoted main frame, boom, swingable lead and engine, of a bed for the engine which is slidable radially with respect to the main frame, and means for holding the engine in its various moved positions, an A frame hinged centrally of the main frame and tie rods for holding the same in its operative position, slides at the forward part of the main frame which are movable radially with respect to the said frame, connections between the said slides and the lead whereby the latter may be moved to direct a pile inwardly on a slant toward the plane of the pivot of the main frame.

4. The combination in a pile driving machine having a centrally pivoted main frame, boom, swingable lead and engine, of a bed for the engine which moves radially with respect to the main frame in ways along the inner side of the frame, sliding bars which also move radially, but upon the opposite side of the main frame, means for securing the said bars in their adjusted position, a pivoted connection between the lower end of the lead and the said bars whereby the lower end of the lead may be moved toward the pivot of the main frame.

5. The combination in a pile driving machine having a swingable lead, of parallel I beams joined together to form a main frame, an engine bed slidably supported between the projections from the I beams, sliding bars similarly supported upon the sides of the main frame opposite to that which supports the engine, a cross head connected to the forward ends of said bars, a block slidably mounted upon said cross head and pivoted connections between the said block and the lower end of the lead of the machine.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."