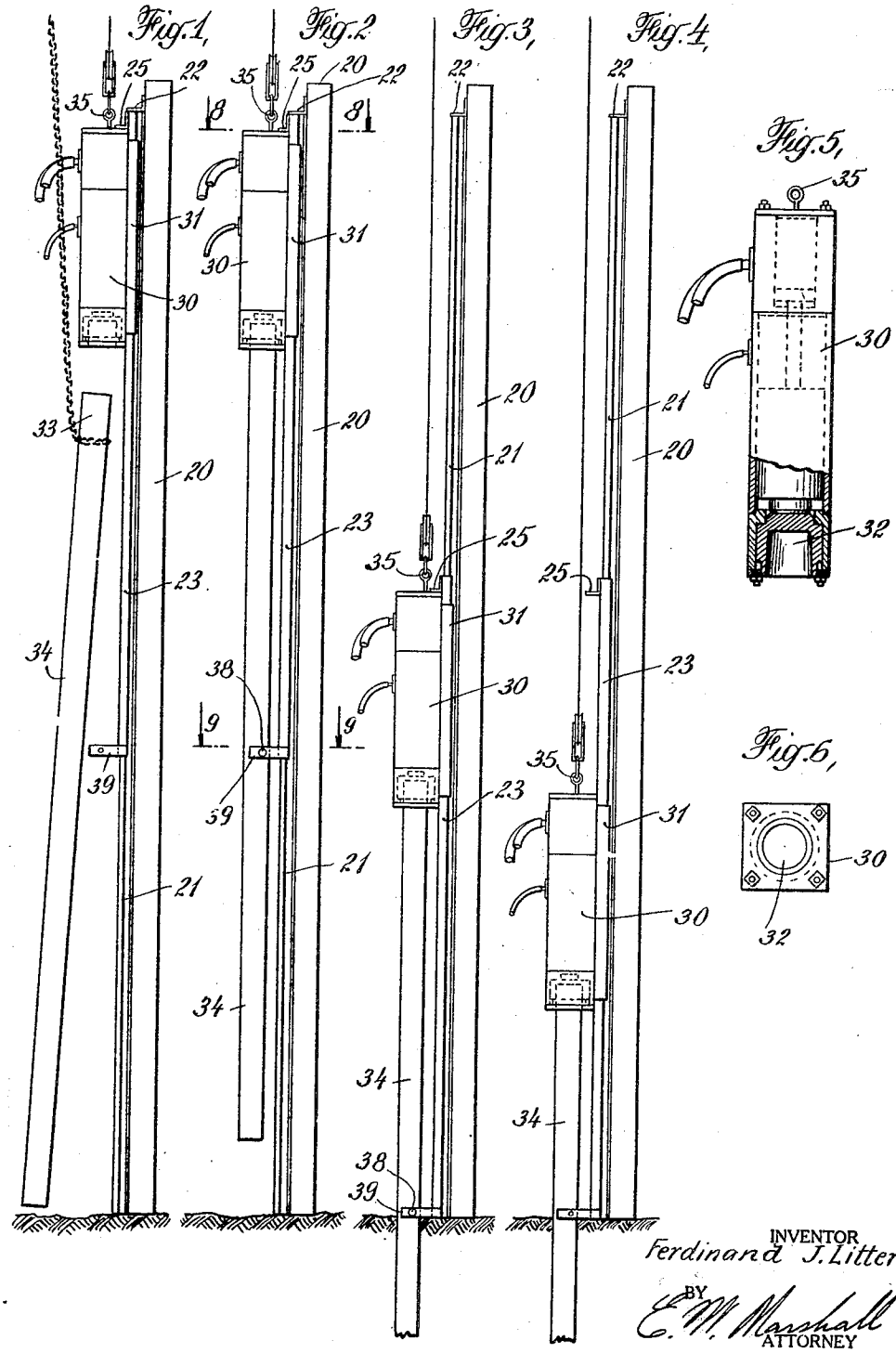
Jan. 12, 1926. **1,569,763**

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METHOD OF AND APPARATUS FOR DRIVING PILES

Filed July 10, 1923 2 Sheets-Sheet 1



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Fig. 7.

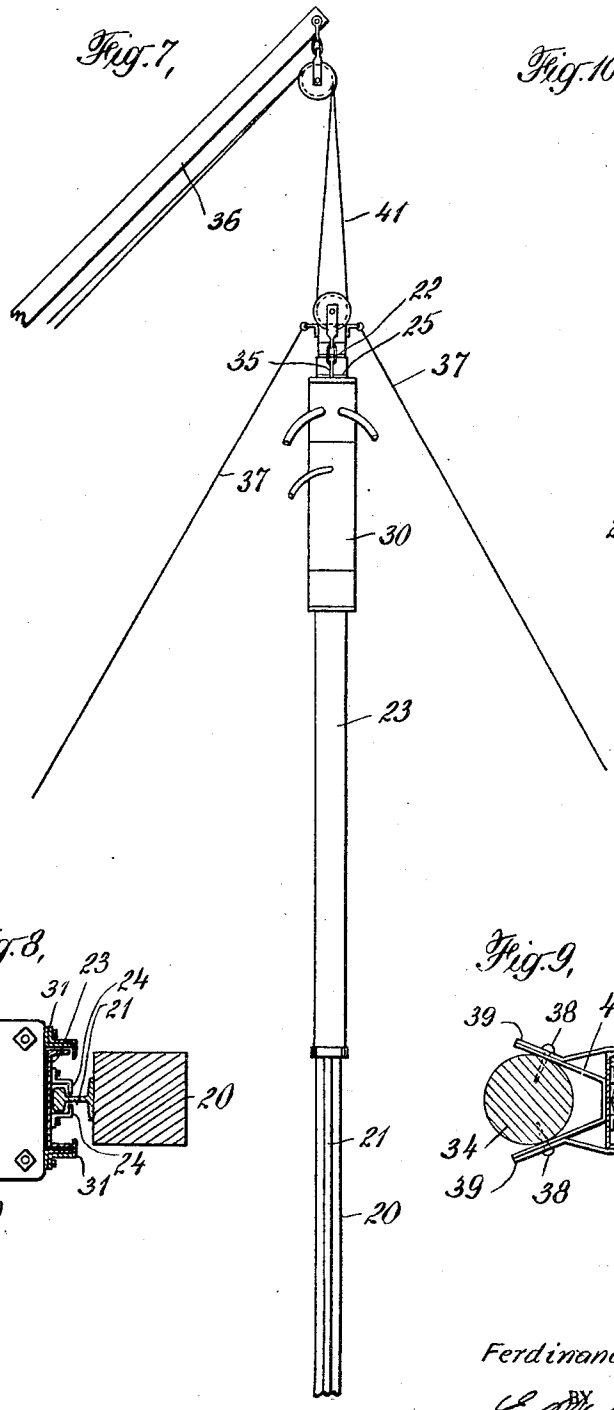


Fig. 10.

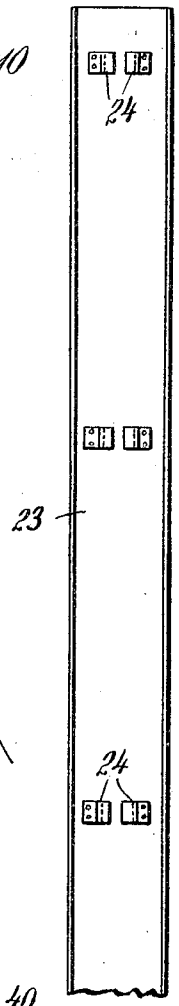
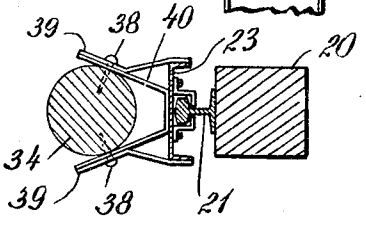


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR DRIVING PILES.

Application filed July 10, 1923. Serial No. 650,576.

To all whom it may concern:

Be it known that I, FERDINAND J. LITTER, a citizen of the United States, and a resident of New York city, county of the Bronx, and State of New York, United States of America, have invented certain new and useful Improvements in Methods of and Apparatus for Driving Piles, of which the following is a specification.

This invention relates to methods of and apparatus for driving piles.

When piles are diven into a sub-aqueous bed, it is very difficult to properly guide and position them. This is particularly true of piles such as batter piles, which are driven at an angle to the vertical or to the bed.

This invention has for its salient object to provided a method of and apparatus for driving piles and for properly positioning and guiding piles as they are being driven.

Another object of the invention is to provide a method of and means for driving piles below the surface of water and for properly positioning and guiding the pile as it is being driven.

Another object of the invention is to provide a method of and apparatus for effectively driving piles to "grade" or down to the bed surface.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which—

Fig. 1 is an elevational view illustrating one step in the method and one form of apparatus adapted to carry out the method of driving piles, this view showing the pile about to be inserted in a socket in the lower end of the hammer.

Fig. 2 is a view similar to Fig. 1, but showing the pile positioned and held in position for driving.

Fig. 3 is a view similar to Fig. 2, but showing the pile partially driven into the bed.

Fig. 4 is a view similar to Fig. 3, but showing the pile and hammer in another position.

Fig. 5 is an elevational view partly broken away and partly in section of the pile hammer.

Fig. 6 is a bottom plan view of the structure shown in Fig. 5,

Fig. 7 is an elevational view showing the manner of suspending the apparatus.

Fig. 8 is a transverse sectional elevation on an enlarged scale taken substantially on line 8—8 of Fig. 2.

Fig. 9 is a transverse sectional elevation taken substantially on line 9—9 of Fig. 2 and showing the parts on an enlarged scale, and

Fig. 10 is an elevational view of the pile guiding means taken at right angles to the showing of this means in Figs. 1 to 4.

The method of driving piles consists briefly of holding a pile at a plurality of longitudinally spaced points and driving the pile while it is so held. By this method the pile can be driven in any desired direction and can be properly positioned and retained in such position as it is being driven. The apparatus for carrying out the method as illustrated includes an elongated abutment member termed in the art a "spud." This member has guiding means or, as shown, a rail on which a carriage is slidably mounted, the carriage having elements embracing the rail. The carriage in turn has slidably mounted thereon a hammer, preferably a pneumatic hammer. This hammer is provided with a socket for receiving the upper end of the pile and the carriage is secured in any suitable manner at a point spaced from the upper end thereof to the pile. The pile is thus held or positioned at a plurality of longitudinally spaced points. The carriage is provided with a stop for limiting the upward movement of the hammer and the rail is provided with a stop for limiting the upward movement of the frame. The operation of this structure will be described after the detailed description thereof.

Referring to the drawings, the particular form of apparatus illustrated comprises an elongated timber or spud 20 having a T-rail 21 secured thereto and extending longitudinally thereof substantially throughout the length of the spud. At the upper end of the T-rail there is secured to the spud a stop 22.

A channel frame or carriage 23 has secured thereto a plurality of lugs 24 adapted to embrace the T-rail as shown in Fig. 8 and guide the channel thereon.

The carriage 23 has secured thereto adjacent its upper end a laterally extending stop 25,

A hammer 30, preferably of the pneumatic type, is slidably mounted on the carriage 23 and has secured thereto lugs 31 embracing the edge portions of the channel frame 23. (See Fig. 8.)

The hammer 30 has formed in its lower end a socket 32 adapted to receive, as shown in Figs. 1 to 4, the upper end 33 of the pile 34. An eye bolt 35 is provided on the hammer for suspending the hammer from a derrick boom 36 as shown in Fig. 7. The pneumatic operating means for the hammer may be of any desired construction such, for instance, as that shown in Patent #1,257,762 granted February 26, 1918, to Sturtevant. Guy wires 37 are preferably secured to the upper end of the spud for bracing the spud and retaining it in the desired position. (See Fig. 7.)

Fig. 1 illustrates the parts in their initial position, the pile 34 being raised to a position in which the upper end 33 thereof will be located in the socket 32 of the hammer. Fig. 2 illustrates the pile so positioned and after the pile has been so located spikes 38, (see Fig. 9), are driven into the pile through lugs 39 carried by a yoke 40 secured to the carriage 23. The pile will thus be held by the spikes and by the socket of the hammer which positions the upper end thereof. Fig. 2 illustrates the parts in the position just described and before the pile has been driven. It will be noted that in this figure the carriage 23 engages the stop 22 carried by the spud and the hammer 30 engages the stop 25 carried by the carriage. The cable 41 from which the hammer is suspended will, therefore, support the hammer, pile, carriage and spud and the spud may be positioned in any desired manner depending on the location and direction in which the pile is to be driven.

The apparatus above described operates as follows:

When the spud has been positioned as shown in Fig. 2, the carriage is lowered carrying with it the hammer and pile, the flotation of the timber spud tending to hold the combination plumb and enabling the operator to spot the pile accurately in the desired location. The carriage is then lowered, taking the hammer and pile with it until the pile strikes the ground or bed into which is it to be driven. The hammer is then put into operation thereby driving the pile into the bed. As the pile is driven into the bed the spikes 38 will eventually be loosened, when the yoke 40 reaches the position shown in Fig. 3. The pile can be driven to "grade" or until its upper end is flush with the surface of the bed into which it is driven and during this operation the pile will be guided by the cap 32 in the hammer.

When the pile has been driven in to the desired extent, the hammer can be raised by the cable, and when the hammer engages the stop 25 of the carriage, the carriage will be raised on the T rail and will engage the stop 22. Then the entire apparatus will be raised and can then be located in position to drive the next pile.

From the foregoing description, it will be seen that the pile is positively held and directed while it is being driven and because of the fact that the pile is held at a plurality of longitudinally spaced points it can be driven in any desired direction and the direction can be maintained throughout the driving operation.

Although one particular method and one specific form of apparatus have been outlined, it will be understood that the method may be changed and changes in the construction and in the arrangement of the various parts of the apparatus may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. Pile driving and guiding apparatus comprising an elongated member, a carriage slidably mounted thereon, a hammer carried by said carriage and means for engaging and holding a pile at a plurality of longitudinally spaced points on said pile.

2. Pile driving and guiding apparatus comprising an elongated member, a carriage slidably mounted thereon, a hammer slidably carried by said carriage and means for engaging and holding a pile at a plurality of longitudinally spaced points on said pile.

3. Pile driving and guiding apparatus comprising an elongated member, a carriage slidably mounted thereon, a hammer carried by said carriage and means on said hammer and carriage for engaging and holding a pile at a plurality of longitudinally spaced points on said pile.

4. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer on said carriage and means on the carriage for holding a pile intermediate its ends.

5. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer slidably mounted on said carriage and means on the carriage for holding a pile intermediate its ends.

6. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer on said carriage and means on the carriage for temporarily holding a pile intermediate its ends, said hammer having a socket in its lower end for receiving the upper end of the pile.

7. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer on said carriage, means on the carriage for holding a pile

intermediate its ends, and stop means on the rail for limiting the upward movement of the carriage thereon.

8. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer slidably mounted on said carriage, means on the carriage for holding a pile intermediate its ends, and stop means on the carriage for limiting the upward movement of the hammer thereon.

9. Pile driving and guiding apparatus comprising a guide rail, a carriage slidably mounted thereon, a hammer slidably mounted on said carriage, means on the carriage for holding a pile intermediate its ends, stop means on the rail for limiting the upward movement of the carriage thereon, and stop means on the carriage for limiting the upward movement of the hammer thereon.

10. Pile driving and directing means comprising a hammer having means engaging and holding the end of a pile and means movable with the pile for guiding and directing the pile as the pile is driven.

11. Pile driving and directing means comprising a hammer, a guide and means engaging the guide and secured to the pile for directing the pile as the pile is driven.

12. Pile driving and directing mechanism comprising a guide, a hammer slidable thereon, and means slidable on the guide and secured to the pile for guiding the pile as it is driven.

13. Pile driving and directing mechanism comprising a guide, a hammer slidable thereon, and means slidable on the guide and secured to the pile for guiding the pile as it is driven, said hammer having a socket for receiving the upper end of the pile.

14. Pile driving and guiding apparatus comprising a spud, a guide rail mounted thereon, a carriage slidable on said rail, means on said carriage for temporarily securing a pile thereto and a hammer slidable on said carriage for driving the pile.

15. Pile driving and guiding apparatus comprising a rail, a carriage slidably mounted thereon, means for temporarily securing a pile to the carriage, a hammer slidably mounted on the carriage, stop means at the upper end of the carriage for limiting the upward movement of the hammer on the carriage and suspension means connected to the hammer for supporting the hammer, carriage and pile.

In witness whereof, I have hereunto set my hand this 5th day of July, 1923.

FERDINAND J. LITTER.