No. 657,980. Patented Sept. 18, 1900.

J. G. FALCON.

PILE HOLDER FOR PILE DRIVING MACHINES.

(Application filed Feb. 7, 1900.)

(No Model.)

Fig. 1.

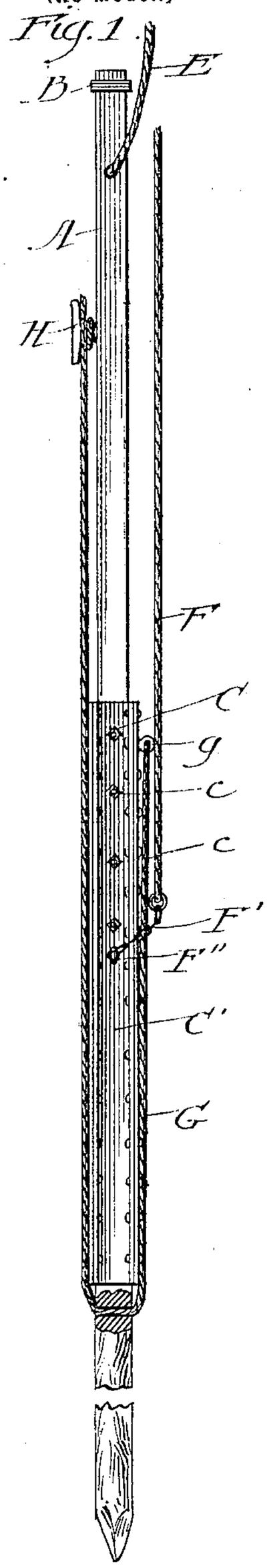


Fig. 2.

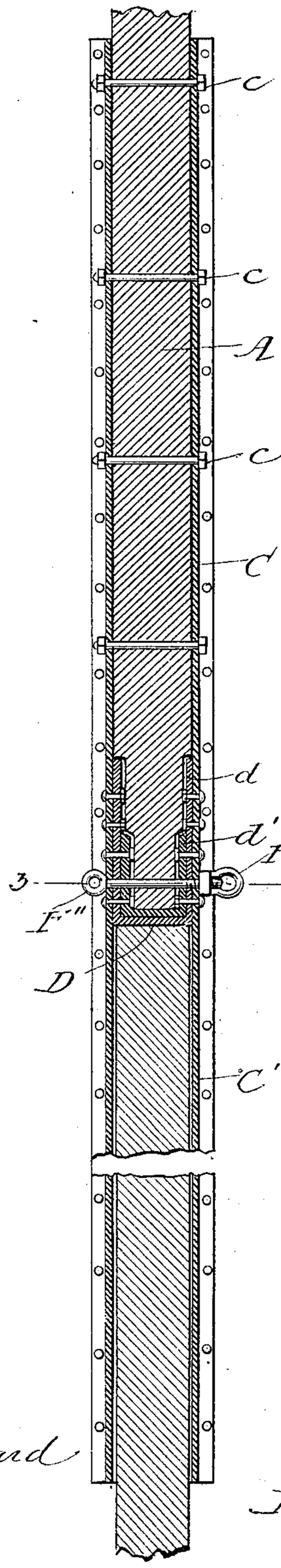


Fig. 3.

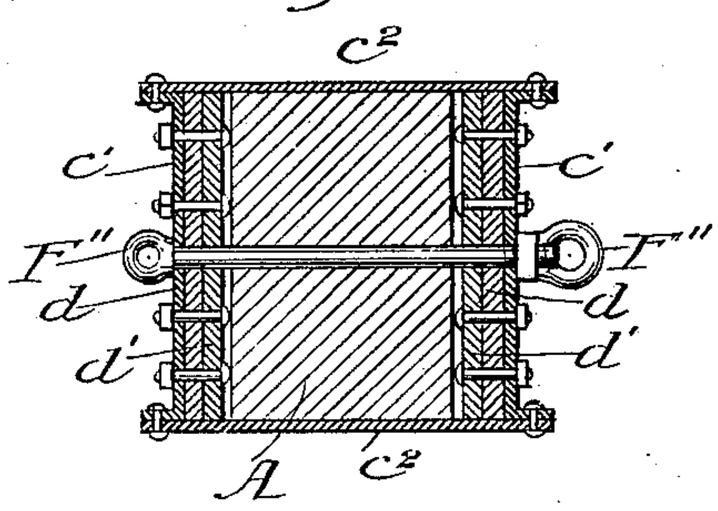
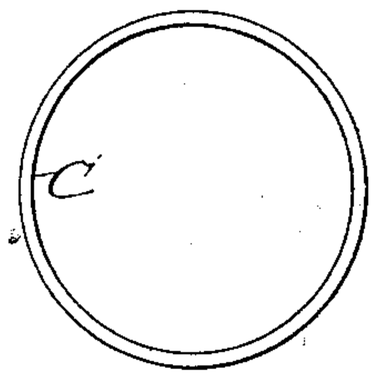


Fig. 4.



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PILE-HOLDER FOR PILE-DRIVING MACHINES.

SPECIFICATION forming part of Letters Patent No. 657,980, dated September 18, 1900.

Application filed February 7, 1900. Serial No. 4,316. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH G. FALCON, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pile-Holders for Pile-Driving Machines, of which the following is a specification.

The present invention relates to a device adapted to be used in connection with a pile-driver for holding a pile while being driven into the bed of a body of water. In submarine pile-driving it has heretofore been the practice to use a pile the length of which is the length of the pile required in the completed work plus an additional length equal to the distance from the grade-line to the surface of the water and plus about fifteen feet to extend above the surface of the water and into the leads of the pile-driver for steadying the pile until the driving is completed. Thus if the completed work required a pile fifty feet long driven ten feet into the bed of the body of water and terminating at its upper end at a grade-line, say, five feet above the bed, according to the former practice a pile about seventy-five feet long would be required. This pile would be driven ten feet into the bed of the body of water and then sawed off at the grade-line. This is open to many objections. In the first place, such piles are classed as "spars" and are very expensive. Furthermore, the cost of sawing them off at a grade-line which is under water is a material one. Aside from this, in deep water with a swift current the sawing must be done before the upper end of the pile is released, else the current will quickly throw the pile out of plumb and will even pull it out altogether.

The object of the present invention is to provide a device by which a pile of the exact length required in the completed work may be driven into the bed of a body of water of any depth (within the possibilities of submarine engineering of this class) and left with its upper end at the grade-line, thus saving the additional expense incident to the use of piles of a length exceeding that required in the completed work and the expense of cutting such piles off at the grade-line. To this end I use my improved holder, which is adapted to hold a pile of the exact length required in the completed work while it is being driven to grade.

The improved pile-holder consists of a spar or timber of a length sufficient to extend from the grade-line to the necessary height above water and means at the lower end of the spar for holding the pile to be driven, suitable tackle being provided for handling the pile-holder thus constructed. The means at the end of the spar for holding the pile to be driven preferably consists of a socket secured to the spar by some suitable means, said socket being preferably constructed of heavy metal, so that in addition to resisting the strains put upon it in the process of driving the pile it will also, by reason of its great weight, tend to resist the current and hold the spar plumb during the process of sinking it. Preferably, also, this socket takes the form of a sleeve of any desired cross-sectional shape, one end of which is occupied by the lower end of the spar, the two being firmly secured together, preferably by bolts. In addition to the bolts the sleeve is provided with a strong seat, upon which the lower end of the spar bears, the seat being firmly secured to the walls of the sleeve.

Preferably the tackle for handling the pile-holder consists of two lines, one of which is attached to the holder above its center of gravity and the other of which is attached to the holder below its center of gravity, the attachment of the latter line being preferably made in the vicinity of the socket and by means of a bridle-chain.

The invention consists in the features of novelty that are herein fully described, and in order that it may be fully understood I will describe it with reference to the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 is an elevation of a pile-holder embodying the invention. Fig. 2 is a longitudinal section of a portion thereof on a larger scale; Fig. 3, transverse sections on the lines 3 3, Fig. 2, on a still larger scale. Fig. 4 is a transverse section of the sleeve under a slight modification.

A represents a spar or timber of any desired length, surrounded at its upper end by a ring B for preventing it from splitting dur-

ing the process of driving the pile. The lower end of this spar occupies and fits snugly in a sleeve C, which may be of any desired construction or cross-sectional shape. In Figs. 1 to 3, inclusive, I have shown the spar and sleeve as being square; but, as shown in Fig. 4, they may be round, the cross-sectional shape being entirely immaterial. Of whatever shape they may be they are permanently secured together by bolts *c*, and in addition to these the lower end of the spar rests firmly upon a seat D, which is located within and permanently secured to the sleeve, preferably at about its mid-length, leaving below it a socket C′ for receiving the upper portion of the pile to be driven. The sides of the socket (considered longitudinally) are parallel with each other, or practically so, and the socket is of considerable length, so that it will maintain the pile in line with the spar while the latter is being handled. In this it differs from that class of pile-driving devices in which the upper end of the pile fits in a shallow bell-shaped socket carried at the lower end of the spar. In the preferred form of the invention the sleeve is constructed of two plates *c*′, having at their edges outwardly-presented flanges, and two plates c^2, which overlap the flanges and are firmly secured to them by bolts, rivets, or other suitable devices, thus making a rectangular sleeve. The seat in the preferred form of the invention consists of a heavy steel plate having two rectangular bends, bringing it to substantially U shape, its two sides *d* being parallel and lying against the inner faces of the two sides *c*′ of the sleeve C, and a second heavy steel plate similarly bent, so that its two sides *d*′ are parallel and lie against the inner faces of the two sides *d* of the plate first aforesaid. The parts *d* and *d*′ are permanently secured to the plates *c*′, forming the opposite sides of the sleeve C, by means of bolts, rivets, or other suitable devices. The lower end of the spar A is cut away in order to conform to the space left between the parts *d* and *d*′.

In assembling the parts the seat constructed as described is first secured in place between the two plates *c*′. The spar is then placed between said plates and secured thereto by the bolts *c*. The remaining plates c^2 are then put in place and secured to the flanges of the plates *c*, thus completing the structure.

For the purpose of handling the pile-holder thus constructed I prefer to use a line E, attached to the holder above its center of gravity and extending to a point above the leads of the pile-driver, where it is passed over a suitable pulley and extends thence to a winding-drum or other suitable device, by which it may be wound up or paid out, as necessary, and a second line F, attached to the holder at a point below its center of gravity, whence it extends upward to a level above the surface of the water, where it passes over a suitable pulley and thence to a winding-drum. Preferably the line F is attached to the pile-holder at about the middle of the sleeve C, the attachment being effected by means of a bridle-chain F′, the ends of which are secured to the opposite ends of an eyebolt F″, which passes through the sides *c*′ of the sleeve, the sides *d d*′ of the seat D, and the lower end of the spar A.

In order to use the pile-holder thus constructed, it is first brought to a horizontal position at the level of the water. This may be done by a proper manipulation of the lines E and F. The pile, if buoyant, may then be floated into the socket C′. The upper end of the spar A is then raised by the line E until the line F is slack, after which the lower end of the line F may be detached from the holder. The line E is then paid out until the point of the pile rests upon the bottom, after which the line E is allowed to remain slack and pay out during the process of driving the pile, which is precisely the same as if a pile of a continuous length were being driven. After the pile is driven the line E is again wound up until the point of attachment for the line F is about at the water's edge, after which the line F is again attached and the line E paid out until the holder again assumes a horizontal position at the level of the water in readiness to receive the next pile.

With piles that are not buoyant the operation is precisely the same, excepting that means must be provided for holding the pile in place in the socket C′ until the end of the pile is brought into contact with the ground. For this purpose any suitable means may be used; but I prefer to use a line G, one end of which is attached to the sleeve C, as shown at *g*, and the other end of which is detachably fastened to the side of the spar A, near the top thereof, by some suitable means—as, for example, a cleat H. With this arrangement a hole may be bored through the pile in that portion thereof which projects from the socket C′. The free end of the line G is then passed through the hole and after being drawn taut is made fast to the cleat H. The operations are then the same as above described, with this addition, that after the pile comes to a bearing on the ground the free end of the line G is detached and the line drawn out of the perforation through the pile.

In actual practice I have found that with a holder constructed as above described piles may be driven so accurately to a grade-line that it is not necessary to cut them off after the driving is completed. I have found also that they may be driven to a level with the bed of the body of water. In this case the entire socket C′ is driven into the ground with the pile; but this is not objectionable, since the socket can be readily withdrawn, leaving the pile in place.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A pile-holder of the class described, hav-

ing a spar of any suitable length, means for receiving the upper end of the pile to be driven and holding the pile in line with the spar while the latter is being handled, and means for attaching said holding means directly to the spar, substantially as set forth.

2. A pile-holder of the class described, having a spar and a socket, having parallel sides, attached to and carried by the lower end of the spar, for receiving the upper end of the pile to be driven, the socket being of considerable weight, whereby it holds the pile-holder plumb while sinking it, substantially as set forth.

3. A pile-holder of the class described, having a spar, a sleeve into which the lower end of the spar projects so as to leave beyond the extremity of the spar a socket of considerable length, having practically-parallel sides, for receiving the upper end of the pile to be driven and for holding the pile in line with the spar, and means for preventing the endwise movement of the spar relatively to the sleeve, substantially as set forth.

4. A pile-holder of the class described, having a spar and a sleeve into which the lower end of the spar projects leaving beyond the extremity of the spar a socket of considerable length, having parallel sides, for receiving the upper end of the pile to be driven and for holding the pile in line with the spar, the spar and sleeve being secured together so as to prevent their relative endwise movement, substantially as set forth.

5. A pile-holder of the class described, having a spar and a sleeve into which the lower end of the spar projects leaving beyond the extremity of the spar a socket of considerable length, having practically-parallel sides, for receiving the upper end of the pile to be driven and for holding the pile in line with the spar, and a seat upon which the lower end of the spar bears, the seat being immovable relatively to the sleeve, substantially as set forth.

6. A pile-holder of the class described, having a spar, a rectangular sleeve into which the lower end of the spar projects, leaving below the extremity of the spar a socket for receiving the upper end of the pile to be driven, said sleeve being constructed of four plates secured together at their angles of intersection, and means for preventing the endwise movement of the spar within the sleeve, substantially as set forth.

7. A pile-holder of the class described, having a spar, means attached to and carried by the lower end of the spar for receiving the upper end of the pile to be driven and for holding the pile in line with the spar, and tackle for handling the holder thus constructed, said tackle comprising lines attached to the pile-holder above and in the vicinity of its center of gravity, respectively, substantially as set forth.

8. A pile-driver of the class described, having a spar, means at the lower end of the spar for receiving the upper end of the pile to be driven, and tackle for handling the holder thus constructed, said tackle consisting of a line attached to the holder above its center of gravity, and a second line attached to the holder below its center of gravity, substantially as set forth.

9. A pile-holder of the class described, having a spar, a socket at the lower end of the spar for receiving the upper end of the pile to be driven, and tackle for handling the holder thus constructed, said tackle consisting of a line attached to the spar near its upper end, and a second line attached to the holder in the vicinity of the socket, substantially as set forth.

10. A pile-holder of the class described, having a spar, a sleeve into which the lower end of the spar projects, leaving beyond the extremity of the spar a socket for receiving the upper end of the pile to be driven, and tackle for handling the holder thus constructed, said tackle consisting of a line attached to the spar above its center of gravity, and a second line attached to the sleeve, substantially as set forth.

11. A pile-holder of the class described, having a spar, a rectangular sleeve into which the lower end of the spar projects, leaving below the extremity of the spar a socket for receiving the upper end of the pile to be driven, and a seat within the sleeve upon which the lower end of the spar bears, said seat being of substantially U shape and having its sides secured to opposite sides of the sleeve, substantially as set forth.

12. A pile-holder of the class described, having a spar, a rectangular sleeve into which the lower end of the spar projects, leaving below the extremity of the spar a socket for receiving the upper end of the pile to be driven, said sleeve being constructed of four plates secured together at their angles of intersection, means for securing the spar to the sides of the sleeve, and a seat within the sleeve upon which the lower end of the spar bears, said seat being of substantially U shape and having its sides secured to the sides of the sleeve, substantially as set forth.

13. A pile-holder of the class described, having a spar, a socket at the lower end of the spar for receiving the upper end of the pile to be driven, and means for securing the pile in the socket, substantially as set forth.

14. A pile-holder of the class described, having a spar, a socket at the lower end of the spar for receiving the upper end of the pile to be driven, and means for securing the pile in the socket, said means consisting of a line, and means for securing its ends to the holder, substantially as set forth.

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