(No Model.) 2 Sheets—Sheet 1.

R. H. F. SEWALL.

PILE DRIVING MECHANISM.

No. 579,900. Patented Mar. 30, 1897.

Fig. 1.

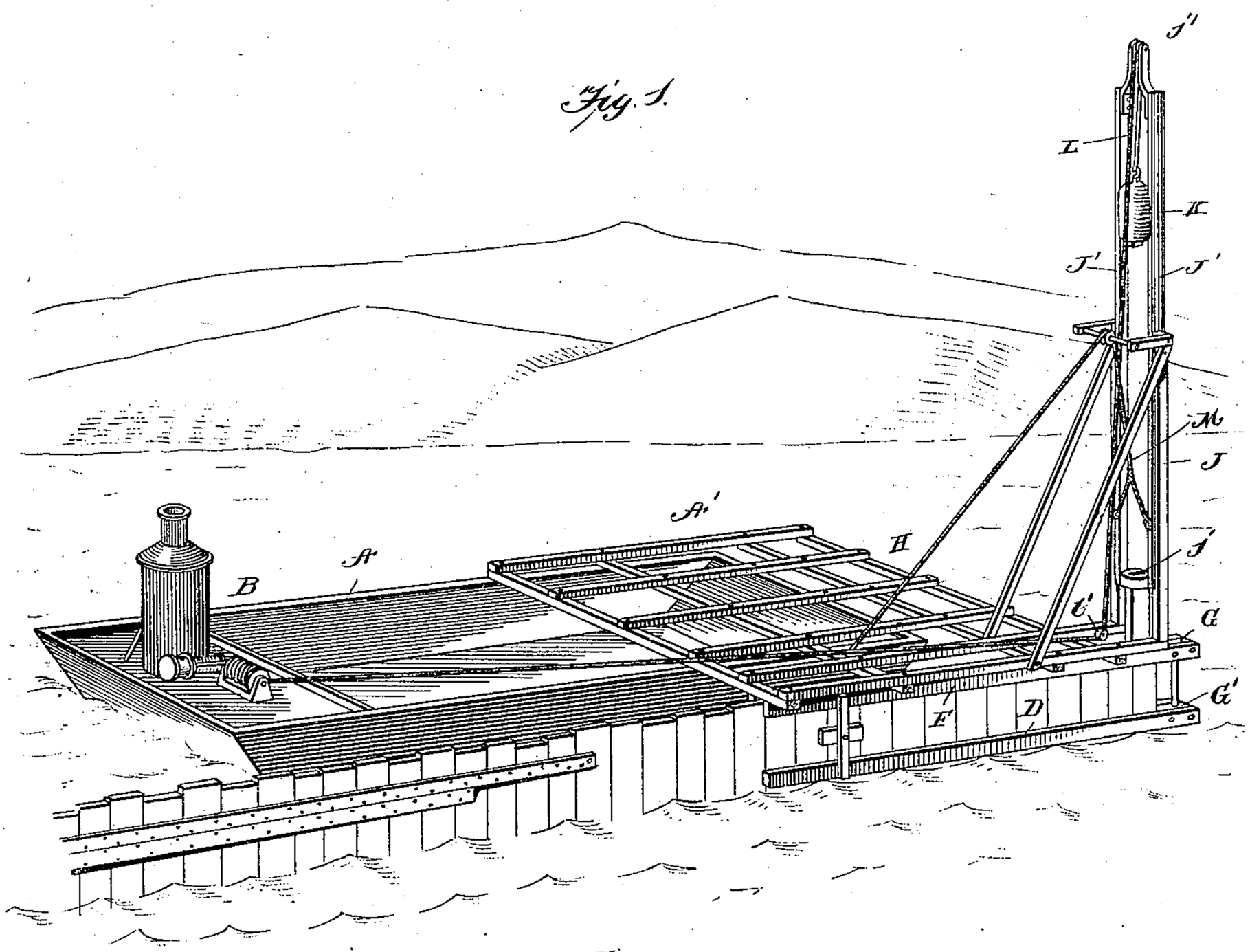


Fig. 2.

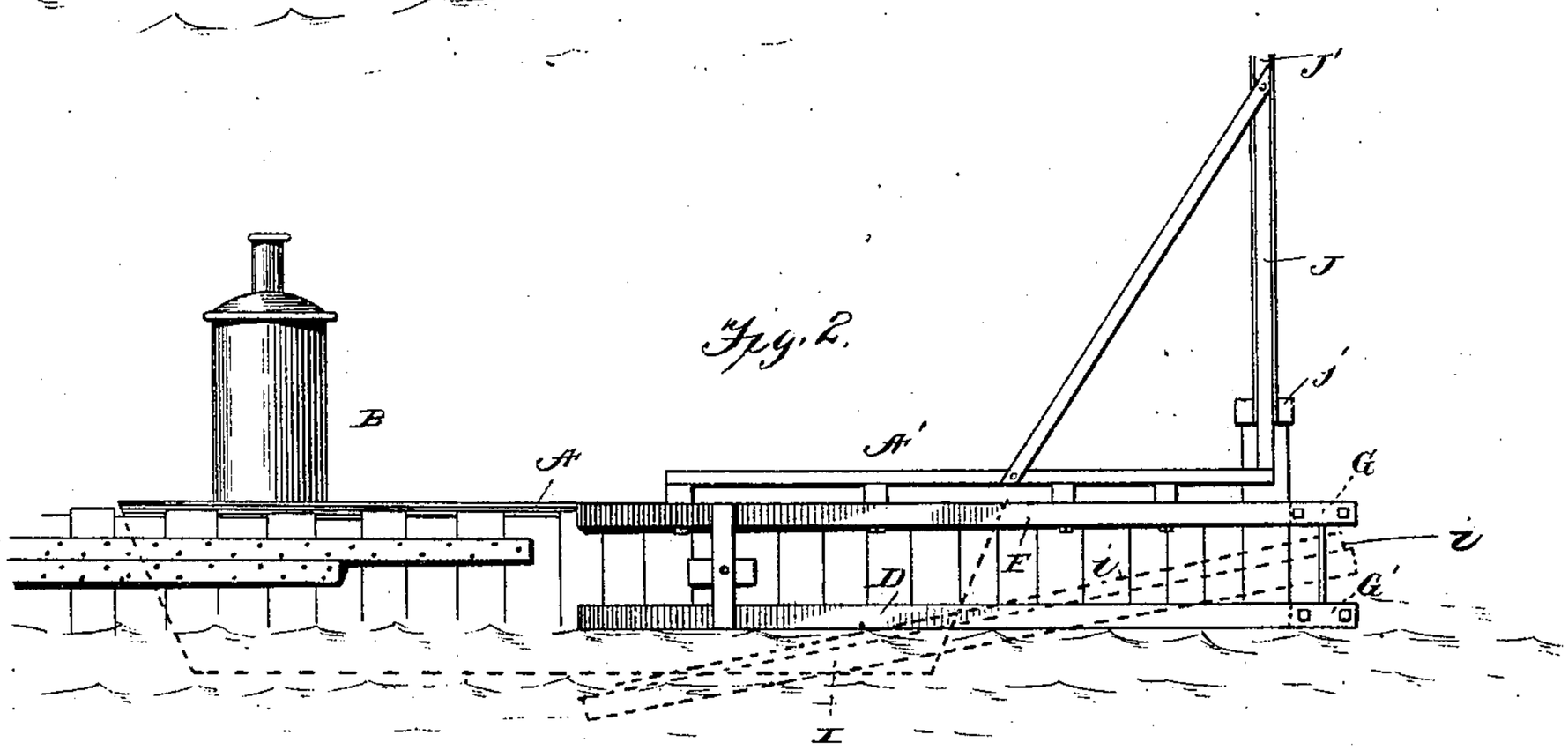
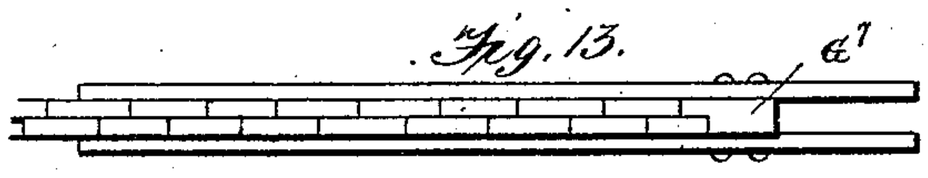


Fig. 13.



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(No Model.)

2 Sheets—Sheet 2.

R. H. F. SEWALL.

PILE DRIVING MECHANISM.

No. 579,900. Patented Mar. 30, 1897.

Fig. 3.

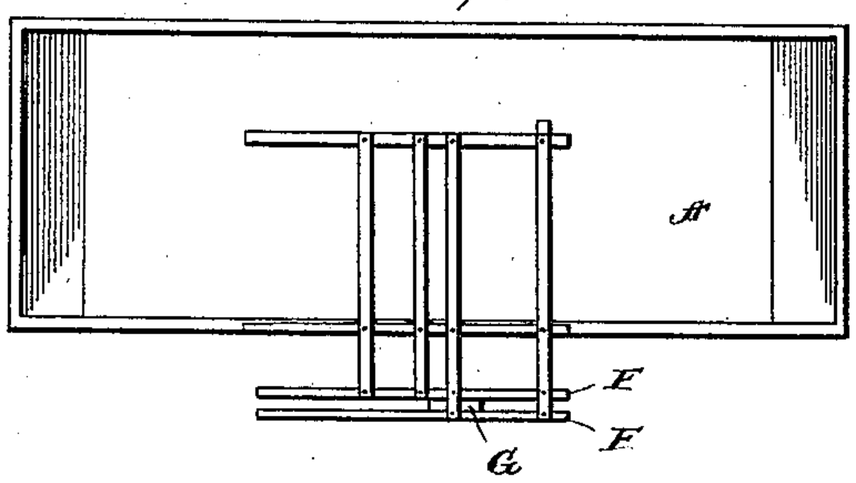


Fig. 5.

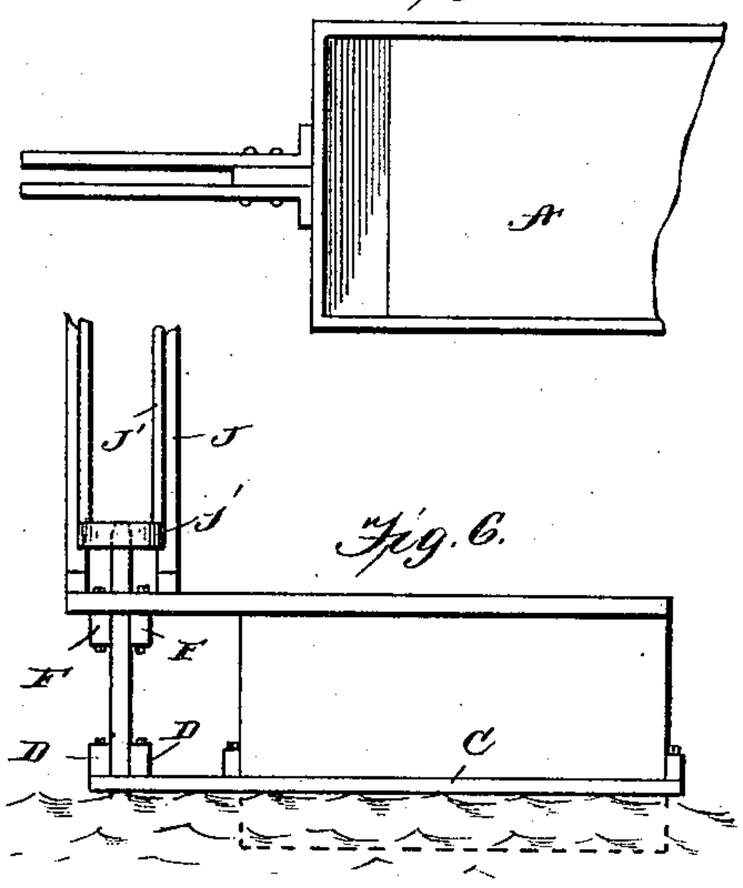


Fig. 4.

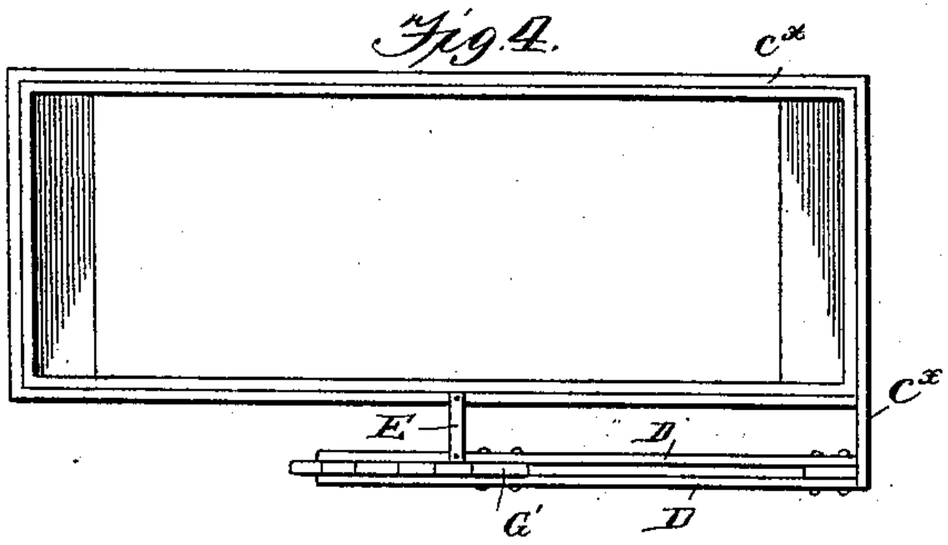


Fig. 6.

Fig. 8.

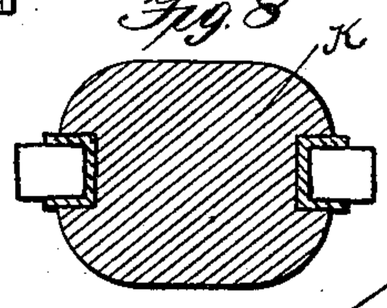


Fig. 7.

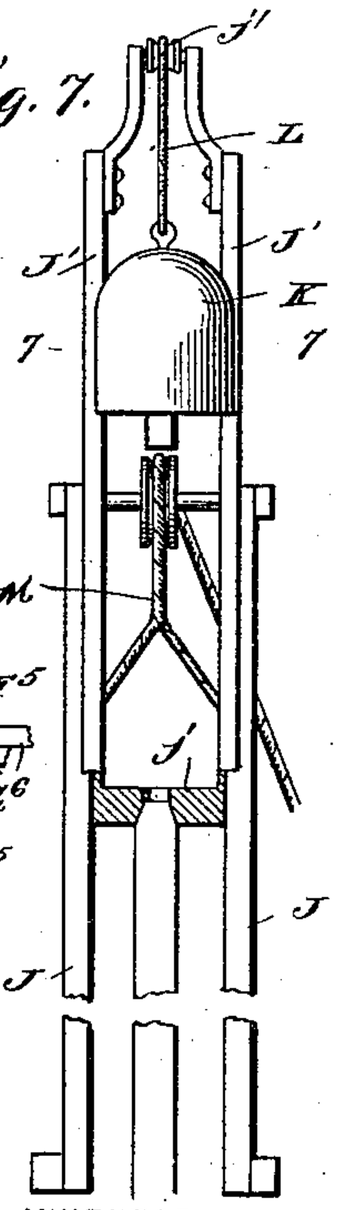


Fig. 10.

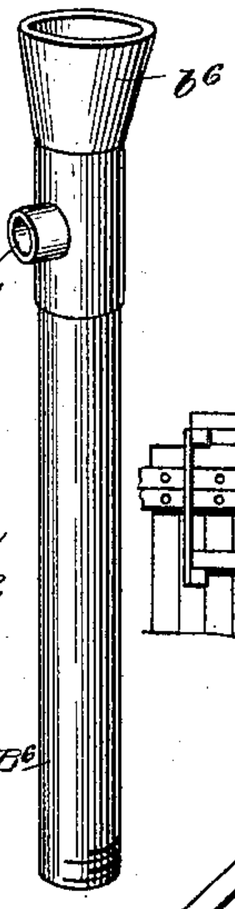


Fig. 9.

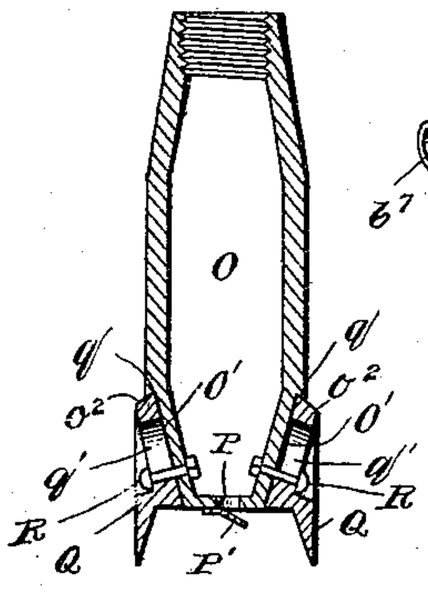


Fig. 11.

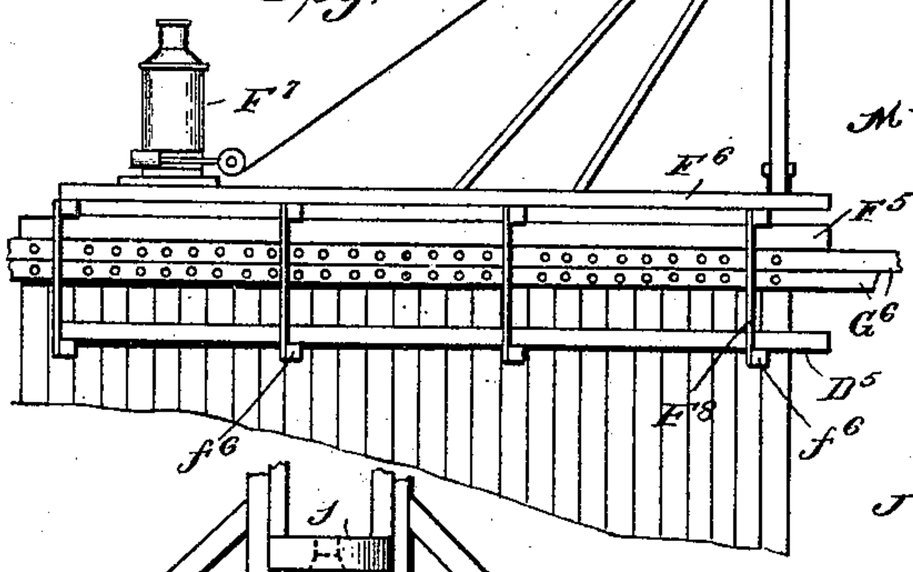
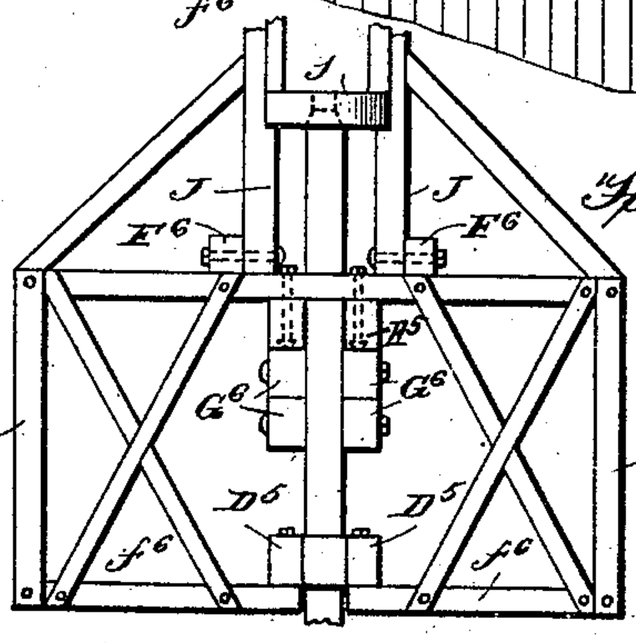


Fig. 12.



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UNITED STATES PATENT OFFICE.

ROBERT H. F. SEWALL, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-THIRD TO GORDON S. ORME, OF SAME PLACE.

PILE-DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 579,900, dated March 30, 1897.

Application filed January 23, 1896. Serial No. 576,576. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. F. SEWALL, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and Improved Pile-Driving Mechanism, of which the following is a specification.

My invention relates to a pile-driving means, and it more particularly refers to a pile-driving mechanism especially adapted for use for driving close piling for dikes, &c.; and such invention primarily has for its object to provide mechanism of the character stated which can be easily manipulated and moved up to or over the work, which is of a stable but economical construction, and which will effectively serve for its intended purposes.

My invention also has for its object to provide a mechanism of the character stated having suitable guide means for holding the piles in position during driving and close up against each other, whereby a tongue-and-groove or abutting pile structure can be quickly and effectively produced.

My invention also has for its object to provide a hammer-guide frame so constructed for a drop-hammer that the weight of the hammer at all times will be on the pile, whereby to obtain the advantages of a steam-hammer.

With other objects in view, which will hereinafter appear, my invention consists in such peculiar combination and novel arrangement of parts, as will be first described in detail, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved pile-driving mechanism as applied for use in closing crevasses when the current is too strong to allow the end of the float to be in advance of work. Fig. 2 is a side elevation of a portion of a dike, illustrating my improved pile-driving mechanism on the opposite side thereof in its operative position for closing crevasses. Fig. 3 is a plan view of the boat, indicating the deck-guides for holding the work in place arranged at the sides to permit the boat to travel at the side of the work. Fig. 4 is similar view of the boat at the water-line, showing the water-line stringers arranged to form guides in connection with the side deck-guides. Fig. 5 is a diagrammatic view illustrating the arrangement of the guides when it is desired to back off from work. Fig. 6 is a front view of the driving mechanism shown in Figs. 2 and 3. Fig. 7 is a detail section elevation of the drop-hammer frame and guides therefor. Fig. 8 is a cross-section of the same on the line 7 7 of Fig. 7. Fig. 9 is a view of a root and stump cutting attachment adapted for use in connection with my pile-driving mechanism. Fig. 10 is a view of a hollow tube attachment therefor, hereinafter referred to. Fig. 11 is a side view of a modified structure hereinafter referred to. Fig. 12 is an end view thereof, and Fig. 13 is a detail view hereinafter referred to.

By referring now to the accompanying drawings, A indicates a boat or the floating platform, upon which, at the rear end or side, as occasion may require, is mounted an engine and windlass mechanism B of any approved construction, and at the opposite side or end a pile-driver derrick and hammer. The platform A, when it is desired to drive the work at one side of the float, has at the front end at the water-line laterally-projecting beams C, to which is connected a pair of stringers D D, extended rearward parallel with the side of the boat A and held braced at the rear end by a stud member E, bolted to the floating frame $c^{\times}$, which extends entirely around the boat, as shown in Fig. 4, and to which beams C are connected, such stringers D D being in practice of heavy timber, preferably eight by twelve, and disposed several feet away from the side of the boat. At the deck-line the stringers F F are secured, which project over the side of the float in line with the stringers D D, which stringers F F are connected to the said stringers D D and are arranged just wide enough apart to allow the sheathing to be driven between them.

G and G′ indicate space-blocks which are connected to the stringers D and F and serve the double purpose of holding such stringers spaced apart and also that of pressing the pile against the work while driving.

By this construction it should be stated that as soon as the last pile has been entered the frame and boat is pulled hard back, the block G′ pressing against the last pile en-

tered, such arrangement dispensing with the use of ropes for holding the boat in position or guiding the pile, except such as is necessary to pull the boat backward or forward.

The deck-stringers are preferably made lighter and shorter than the water-line stringers and in connection with the said water-line stringers serve to keep the work always perpendicular. The deck-stringers also have a stud member E and are bolted to the driver-frame II, so that as soon as the pile is driven below the hammer-guides the boat can be pulled forward to enter another pile, the stringers D and F embracing the work and serving to hold the boat in line with the work, the rear end of the stringers being held close to the work in both cases by the use of clamps, as shown in Figs. 1 and 2.

When it is desired to use the driver at the end of the boat and to back it away from the work, which is a common way, the stringers are fastened to the rear end of the boat, (where the hammer is,) as shown in Fig. 5.

In Fig. 2 I have shown how in very deep water the piling is braced by submerged stringers I, which are usually disposed to hold the work in line while driving, such stringers I being pulled forward by ropes *i*, as shown. The submerged stringers I have found very useful to brace the work, especially when the piles are formed of sectional or spliced timbers.

J indicates a frame formed of vertical members projected up from the driver-frame H, which have extensions J′ J′, formed of channel steel or iron, to fit between the leads, the hammer K being held to slide in this frame. This frame J has a base *j*, which fits on the head of the pile, and at the top it has sheaves *j′* for the hoisting-rope L, which passes under guide-sheaves *l′* at the base of the guide and back to the windlass-hoist mechanism. The frame J′ can be of any desired length and is pulled up after the pile is driven, hammer and all, by means of a rope M, passing over the sheave at the top of the wooden frame or driver. By thus arranging the hammer-guide frame very long piles can be driven far below the base of the driver, as in the practical construction this frame is thirty feet in length and can be lowered twenty feet with safety. Furthermore, in such construction the weight of the hammer is always on the pile, insuring a steady penetration and embodying all the advantages of a steam-hammer and doing away with the enormous weight and expense of such steam-hammer.

If desired, a double set of hammers may be used, one for each side of the boat, so as to drive right or left at will, each following the other, or to drive a double row of piles, if desired.

In Figs. 11 and 12 I have shown my improvements as applied to a creeper pile-driving mechanism which is designed to travel over the work as it is finished or set up. In this construction the deck-line stringers or guides (indicated by F^5) are adapted to travel on the stringers or braces G^6, which are made fast to the piling. Upon the stringers F^5 is mounted the driver-frame F^6, which carries the engine F^7, which engine in practice is also connected to the finished work at the rear or to a fixed member on the shore, so that it (the engine) can also be utilized to move the entire pile-driving frame backward and forward upon the fixed stringers G^6 to bring the hammer in line with the work and cause the back-block G^7 to press the pile to be driven against the pilework. F^8 indicates pendent members secured to the driver-frame, which extend down to or below the water-line and carry inwardly-extended members f^6, which abut the work and to which the water-line stringers (indicated by D^5) are secured, such stringers and the members f^6 serving to hold the driver-frame steady from sidewise tipping and also form suitable supports for a platform for the workmen.

In Fig. 9 I have shown a root-cutter which comprises a hollow body O, open at the top and provided with a small opening P in the bottom, provided with an outwardly-opening flap-valve P′. The side walls of the cutter are inclined inwardly at the lower ends and provided with guideways O′ to receive the steel cutter-blades Q Q, the outer edges of which extend vertically downward, while their inner edges are inclined to fit the inclined portions of the body O, the upper ends having wedge portions *q q*, which are adapted to fit the undercut keeper-flanges o^2 o^2 when the blades are at their uppermost position. The blades are held for vertical movement on the body O, and for such purpose the blades are slotted, as at *q′*, and held on bolts R R, as shown.

By providing a cutter constructed in the manner described it is manifest that on the downstroke such cutter will clear a path wider than pile-passage required, and by inclining the side walls of the body O and the cutters such cutters will pull inward as the body is pulled up, and thereby be freely disengaged from the cut roots or brush. This cutter will be found very useful to cut a passageway through swamps or marshy points.

The object in providing the valve in the bottom and making the body hollow is for the use of hydraulic means for forcing the cutter loose in case it cannot be pulled up in the ordinary way. For this purpose a hollow tube B^6 is provided, which is adapted to connect with the body O, through which water may be forced by a suitable pumping means. The tube B^6 has a head portion b^6, in which is adapted to be fitted a follower to receive the blow of the hammer and an inlet b^7 for the water. The valve at the bottom of the body O being a swing or gravity valve, it is manifest that when the cutter descends the opening in the bottom will be closed by such valve.

In Fig. 13 I have shown a modified form of back-pressure block G, which in this construc-

tion has its bearing-face made stepped, so as to admit of its use with a double row of piling, which are arranged to break joints, in the manner clearly understood from the drawings.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete operation and advantages of my invention will readily appear to those skilled in the art to which it appertains. The mechanism shown and described will be found very desirable for driving piles for dikes, waterways, &c., where a solid and compact structure is required. The construction shown provides a means for building a solid dike in swift-running water in a quick, substantial, and economical manner.

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

1. A pile-driving mechanism comprising a float, having water-line stringers and deck-line stringers held in line to form guides to hold the work perpendicular and arranged to embrace the work and a driver held over the said stringers as set forth.

2. The combination in a pile-driving mechanism as described, with the float, adapted to carry the hoist mechanism for the driver, of stringers secured to the float, at the water-line and the deck, each comprising parallel members adapted to embrace the work and having blocks G and G′, adapted to press against the pile; and the driver to work over the stringers as set forth.

3. In a pile-driving mechanism, a main driver guide-frame, and a supplemental driver-frame vertically movable in the main frame and adapted to be normally supported on the pile, said supplemental frame having driver-supporting sheaves as the top and guides for the driver as set forth.

4. In a pile-driving mechanism as described, a driver having a detachable root-cutting member having a diagonal or cutting edge as set forth.

5. A pile-driving mechanism comprising a boat, guides held at one side thereof formed of stringers to embrace the piling and thereby guide the boat, and having block or impact portions adapted to press against the pile when the boat is pulled back as set forth.

6. In a pile-driving mechanism as described, a root-cutter comprising a hollow body having a flap-valve at the bottom, and a drive-tube connected therewith having a water-inlet substantially as shown and for the purposes described.

7. In a pile-driving mechanism as described, in combination with the driver-frame, horizontally-disposed stringers, or guide members held to embrace and guide the sheathing at a point above the water-line and a similar set of floating guide members or stringers connected with the upper guides, substantially as shown and described.

ROBERT H. F. SEWALL.

Witnesses.

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