

(No Model.)

2 Sheets—Sheet 1.

J. M. THORP.
MINING CAISSON.

No. 576,003.

Patented Jan. 26, 1897.

Fig 1

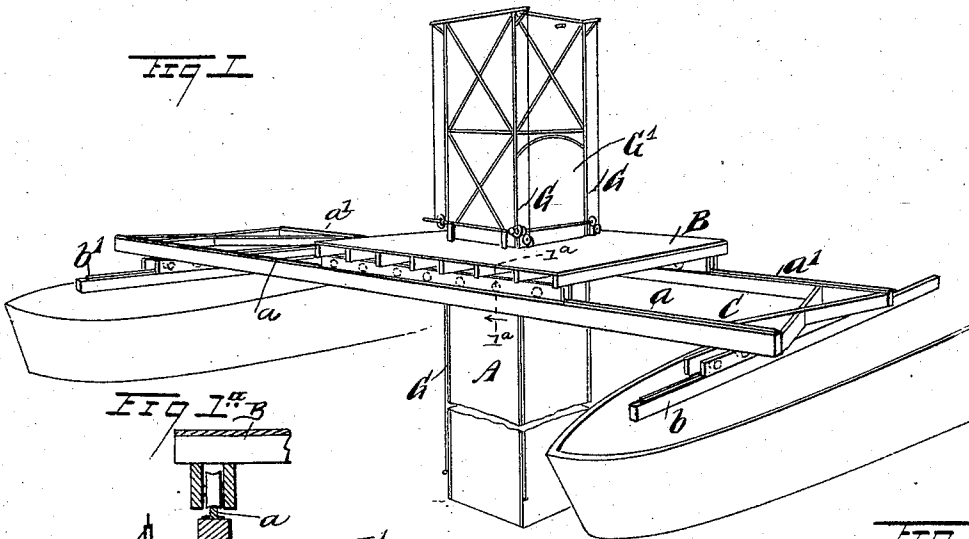
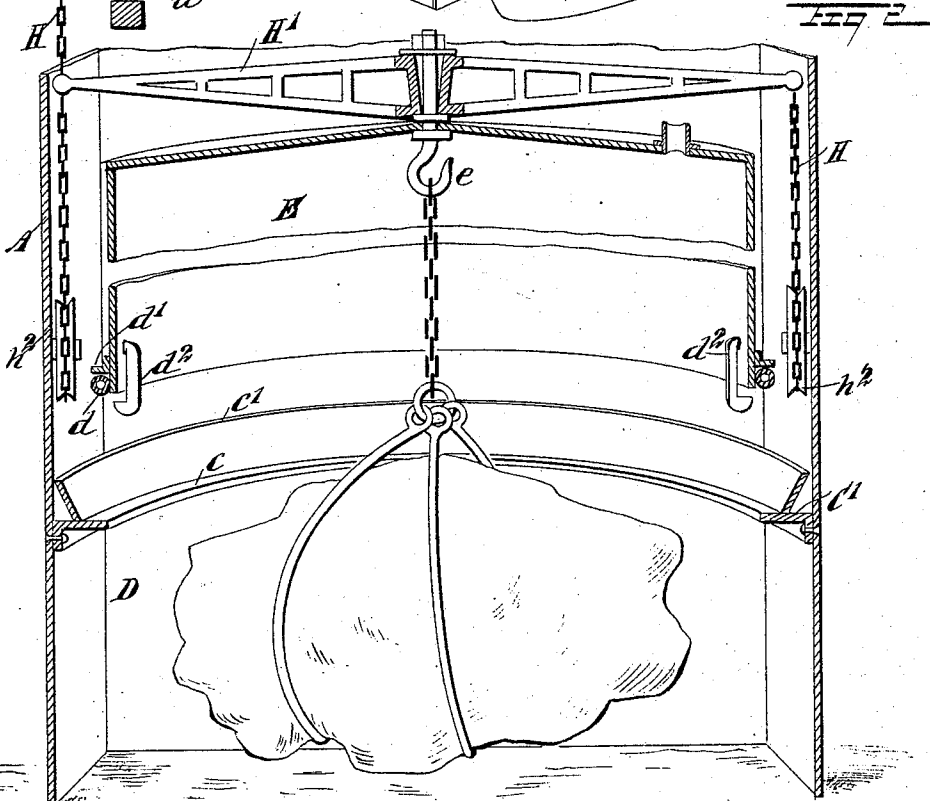


Fig 1st B



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BY

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ATTORNEYS.

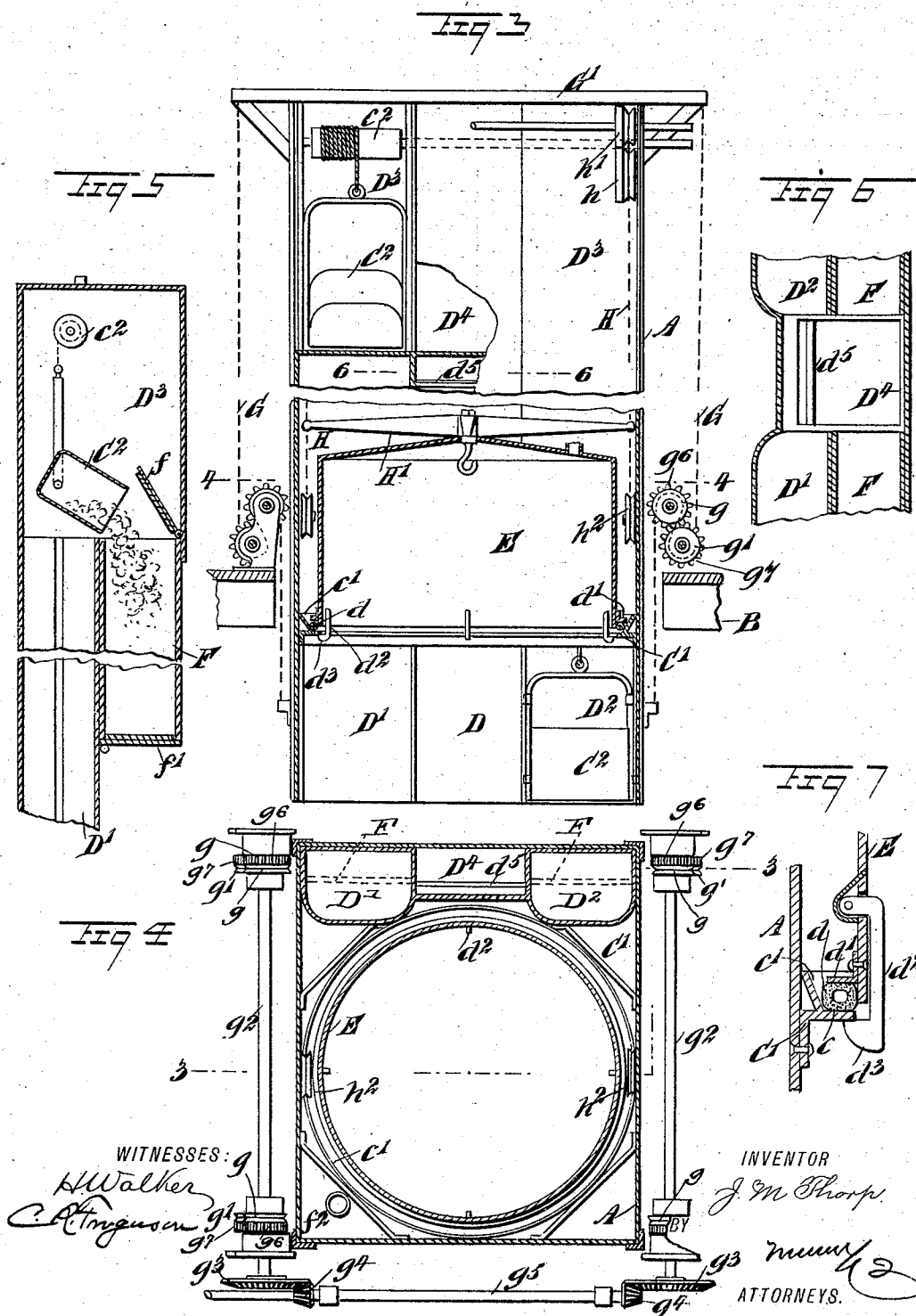
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2 Sheets—Sheet 2.

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Patented Jan. 26, 1897.



UNITED STATES PATENT OFFICE.

JAMES M. THORP, OF COLLEGE PARK, CALIFORNIA, ASSIGNOR OF TWO-THIRDS TO FRANK D. WOLFE AND MITCHELL PHILLIPS, OF SAN JOSE, CALIFORNIA.

MINING-CAISSON.

SPECIFICATION forming part of Letters Patent No. 576,003, dated January 26, 1897.

Application filed February 19, 1896. Serial No. 579,943. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. THORP, of College Park, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Mining-Caissons, of which the following is a full, clear, and exact description.

This invention relates to caissons for use in mining the bed-rock of rivers or other places where water would fill the excavation; and the object is to provide such a device that may be easily transferred from place to place in a river or other body of water, and in which the miners are enabled to work directly on the river-bed and take out the material down to the bed-rock and then work the mineral out of the crevices of the same.

I will describe a caisson embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of a caisson embodying my invention. Fig. 1^a is a section through the line 1^a 1^a of Fig. 1 drawn on an enlarged scale. Fig. 2 is a transverse section, on an enlarged scale, of a portion thereof. Fig. 3 is a vertical elevation. Fig. 4 is a section on the line 4 4 of Fig. 3. Fig. 5 is a vertical section of a portion of the device. Fig. 6 is a section on the line 6 6 of Fig. 3, and Fig. 7 is a detail showing a certain locking device employed.

The caisson A is supported vertically by a platform B, which is supported and adapted to travel on rails *a a'* of a framework C, which in turn is adapted to travel on rails *b b'*. The parts may have roller-bearings on the rails, as indicated in Fig. 1^a. The four ends of the rails *b b'* are supported on floats which form practically a double-hull boat. By this construction it will be seen that the space to be worked out without moving the floats is quite extended in two directions at right angles to each other and the distance between the rails *b b'* in the other direction.

The caisson comprises the outer casing A, here shown as rectangular in cross-section,

and it has at its lower portion a working chamber, open at the bottom and consisting of the fixed chamber portion D and a vertically-movable chamber portion E. The side walls of the fixed chamber portion are formed by the casing A, and the upper wall is formed by a plate C', securely bolted to the casing A and having a central circular opening, the upper side of the wall thereof forming a seat *c* for the lower open end of the movable chamber-section E. Extended around the seat *c* is an upwardly - extended and outwardly - flared flange *c'*, against which a cushion *d*, of rubber or similar material, surrounding the lower end of the chamber-section E, is adapted to engage to make a tight joint. A flange *d'* extends outward from the chamber-section E and engages over the top of the cushion *d*, thus preventing an upward displacement of the cushion.

I provide an automatic locking device for holding the chamber portion E in engagement with the seat *c*. This locking device consists of plates *d²*, pivoted within the chamber portion E and having hooked lower ends to engage the under side of the seat *c*. The lower ends of the plates *d²* are rounded or curved, as at *d³*, so that when the chamber portion E is moved downward into its seat the curved surfaces, engaging against the inner edge of the seat *c*, will cause the plates to swing inward until the hook portions are below the seat, when the plates will swing by gravity to their locking position.

D' D² indicate bucket-shafts which open at the bottom into the working chamber and terminate at the top in air-tight chambers D³. Buckets C² for carrying small boulders and large gravel are located in these shafts and are raised and lowered by means of chains extended from the buckets to drums *c²*, located in the chambers D³. Communicating with the chambers D³, and into which the buckets are dumped, are chutes F, each having a closure *f* at its upper end and a closure *f'* for its lower end.

Sand and fine gravel may be pumped out by means of a suitable pump, the suction-pipe of which is shown at *f²* in Fig. 4.

Large boulders may be hoisted out by en-

gaging the same with grappling devices attached to the interior of the chamber portion or section E.

Workmen may ascend the caisson through the bucket-shafts and may descend through an air-lock shaft D^4 , arranged between the shafts D' D^2 and in which is placed a ladder d^5 . This air-lock shaft is provided with doors similar to the doors f f' .

As a means for hoisting the caisson I employ four cables G , one at each corner. The cables at their lower ends are secured to the lower portion of the casing A and are carried around pulleys g g' , having bearings in posts secured to the platform B , and the upper ends of the cables are attached to the top beams G' . Pairs of pulleys g' are attached to shafts g^2 , which are provided at one end with bevel-gears g^3 , meshing with bevel-gears g^4 on a drive-shaft g^5 , to which motion may be imparted in any desired manner. To increase the friction between pulleys g g' , they may be provided with intermeshing gears g^6 g^7 .

As a means for hoisting the chamber-section E , within the casing A , I employ endless cables H , each of which passes around a series of pulleys h h' , journaled in the upper portion of the casing A , and around a pulley h^2 , located in the lower portion of the casing. The pulleys h h' may be geared together similar to the pulleys g g' .

Extended across the top of the chamber-section E and pivotally connected to its center is an evener H' , the ends of which are connected to opposite cables H . By employing this evener allowance is made for the slipping of the cables, so that the chamber-section E may be raised and lowered without binding.

In operation, by forcing compressed air into the working chamber the water is held down to a level with the bottom of the caisson. The space around and above the working-chamber section E is to be filled with water up to or above the level of the river-surface, thus giving weight to force the caisson down, the upward pressure being equal to the displacement in the working chamber, or substantially so, and the displacement of the immersed sections of the bucket-shafts D' D^2 .

When it is desired to raise the outer caisson, the water above the chamber E is pumped out, thereby giving an upward pressure equal to the displacement of the immersed portion of the caisson. The hoisting-cables will assist in both upward and downward movements.

When it is necessary to hoist a boulder, the grappling-hooks are attached (see Fig. 2) and the chain attached to the hook e in the chamber E , and said chamber is hoisted through the water contained in the outer caisson and the boulder removed with a suitable derrick through the opening G' , Fig. 1.

The separation of the working-chamber sections will allow the water to rise and fill the lower portion D , the air meanwhile escaping up through the water contained in the

caisson around and above the chamber E . The water in the chamber D will be again forced down by the air pumped in after the chamber E has been returned and seated. 70

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

1. A caisson comprising a casing having a working chamber consisting of a fixed section and a vertically-movable section, a platform on which the casing is supported, a frame on which the platform is movably mounted, and floats upon which the frame is movably mounted at right angles to the movement of the platform, substantially as specified. 75 80

2. A caisson, comprising an outer casing having in its lower portion a working chamber formed of a fixed chamber-section, and a vertically-movable chamber-section, whereby a single chamber capable of separation will be formed, substantially as and for the purpose set forth. 85

3. A caisson, comprising a casing formed with a chamber in its lower portion, a vertically-movable chamber portion in the casing above the chamber thereof and forming therewith a working chamber, and a sealing-cushion between the lower end of the movable chamber and the upper end of the fixed chamber, substantially as described. 90 95

4. A caisson comprising an outer casing having a working chamber in its lower portion, consisting of a fixed section, the side walls of which are formed by said outer casing, and a vertically-movable section, and means for attaching a boulder-grappling to said movable section, substantially as specified. 100

5. A caisson, comprising a casing formed with a chamber in its lower portion, a vertically-movable chamber in the casing above the chamber thereof and forming therewith a working chamber, the vertically-movable chamber being of less diameter than the casing forming a space around said movable chamber for the reception of water, and a sealing-cushion between the lower end of the movable chamber and the upper end of the fixed chamber, substantially as described. 105 110 115

6. A caisson comprising a casing having a working chamber in its lower portion, consisting of a fixed section and a movable section, locking devices for the sections, and a cushion between a seat at the upper portion of the fixed section and the lower portion of the movable section, substantially as specified. 120

7. A caisson comprising an outer casing having a working chamber at its lower portion, consisting of a fixed section and a movable section, a bar having a rocking pivotal connection with the movable section, and hoisting-cables connected to said bar, substantially as specified. 125

8. A caisson comprising a casing, a platform supporting the same, pulleys arranged in pairs and geared together on the platform, 130

cables connected to the upper and lower portions of the casing and engaging around the pulleys, and means for driving the pulleys, substantially as specified.

5 9. A caisson comprising a casing having a working chamber in its lower portion consisting of two sections, bucket-shafts opening at the bottom into the working chamber and

terminating at the top in practically air-tight chambers and chutes communicating with 10 said air-tight chambers and having end closures, substantially as specified.

JAMES M. THORP.

Witnesses:

JOHN B. KERWIN,
M. SALAS.