No. 675,124. Patented May 28, 1901.

C. H. BROWN.

APPARATUS FOR EXCAVATING FROM RIVER BEDS.

(Application filed July 23, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

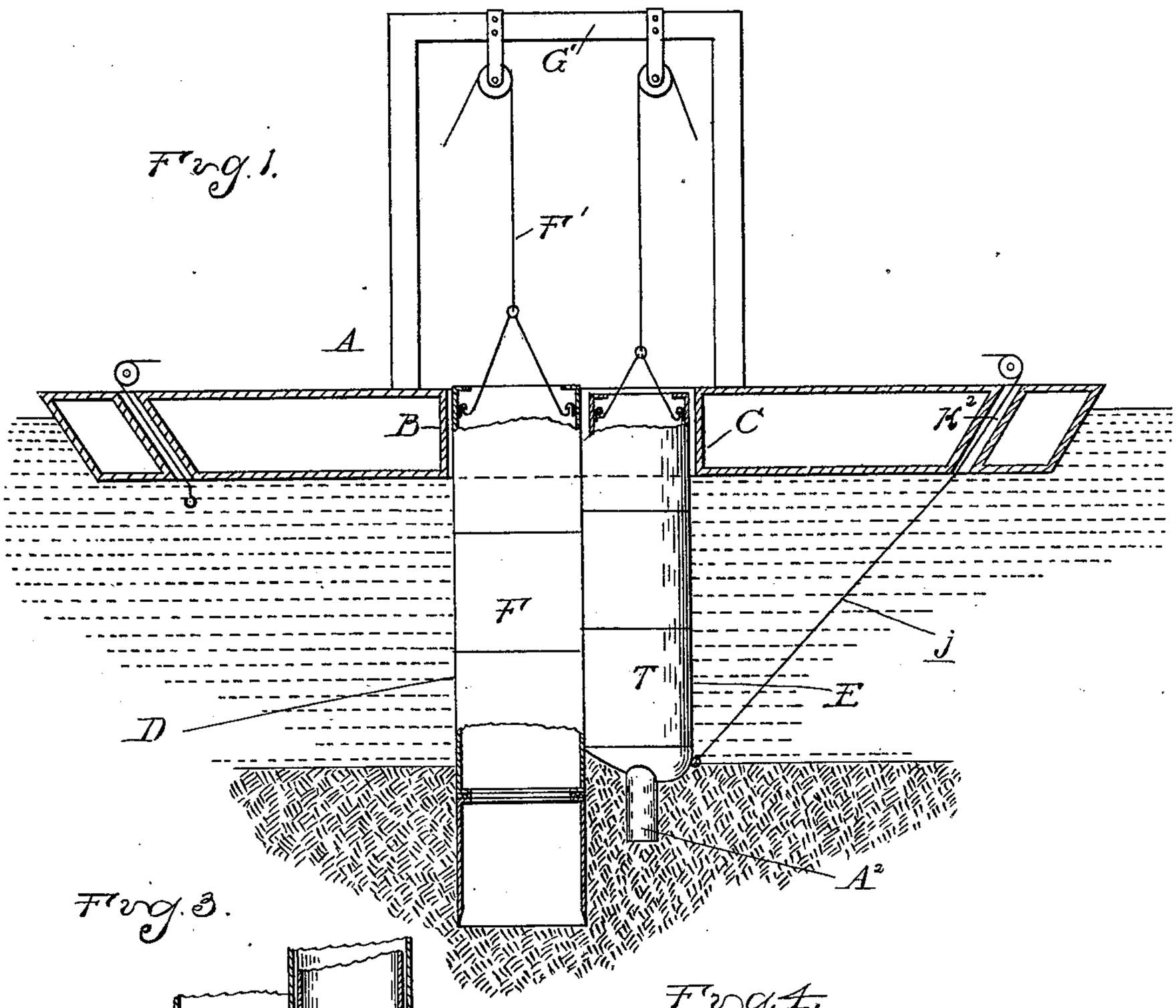


Fig. 3.

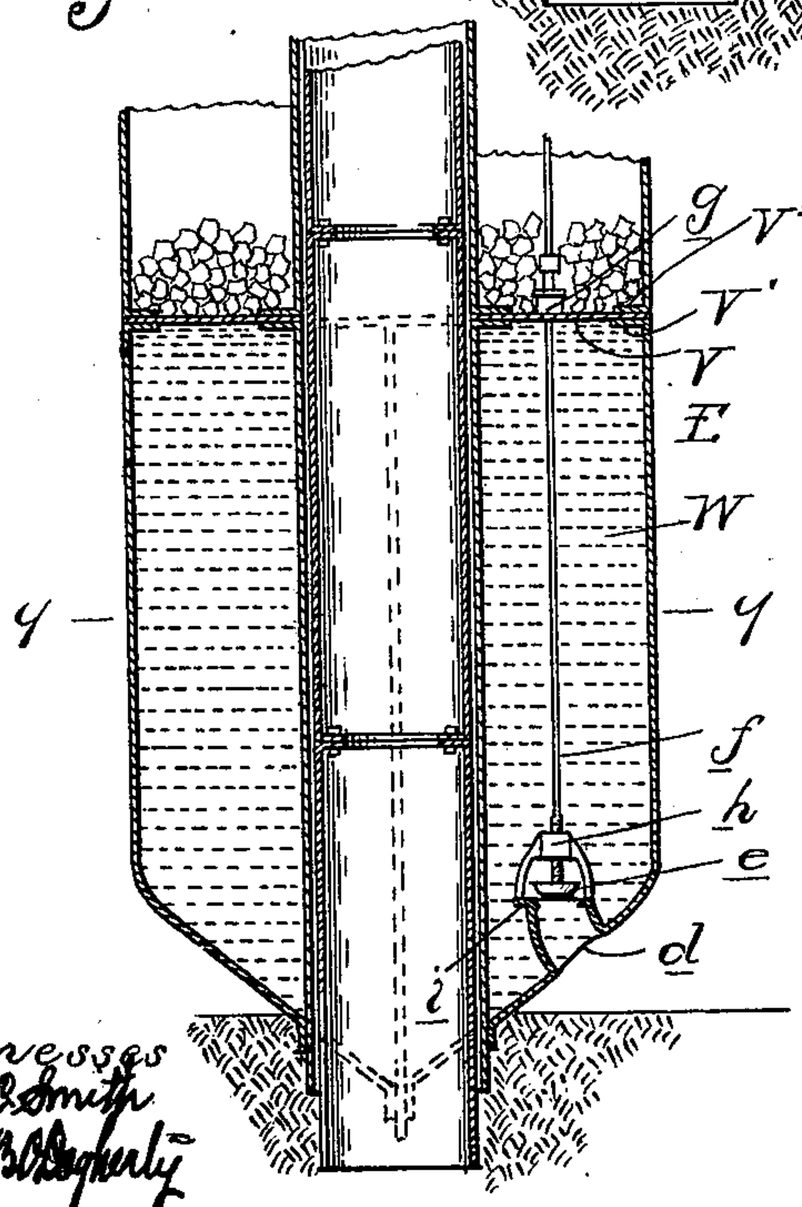
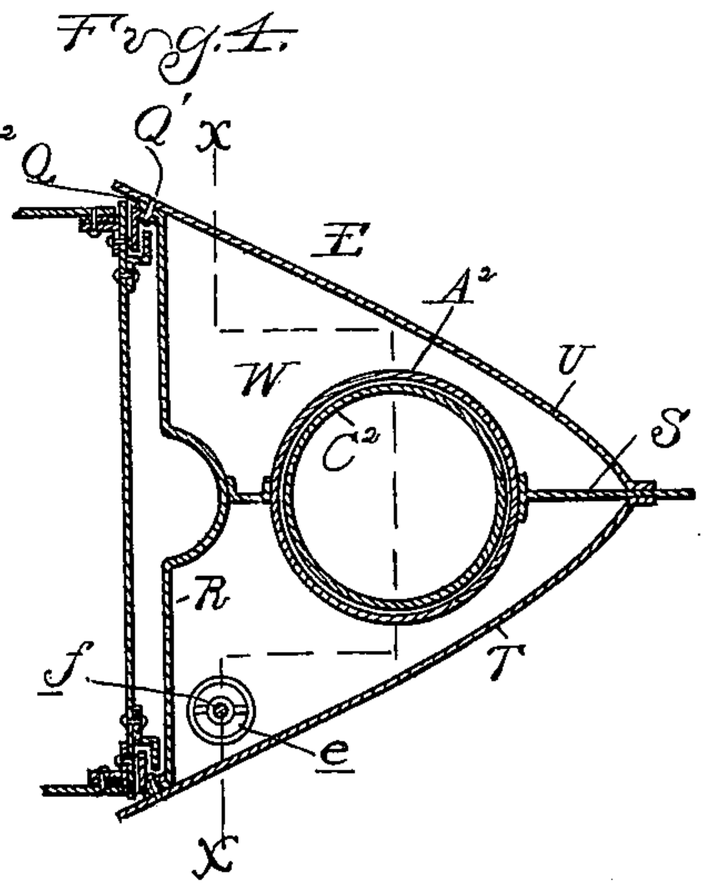


Fig. 4.



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APPARATUS FOR EXCAVATING FROM RIVER BEDS.

(Application filed July 23, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

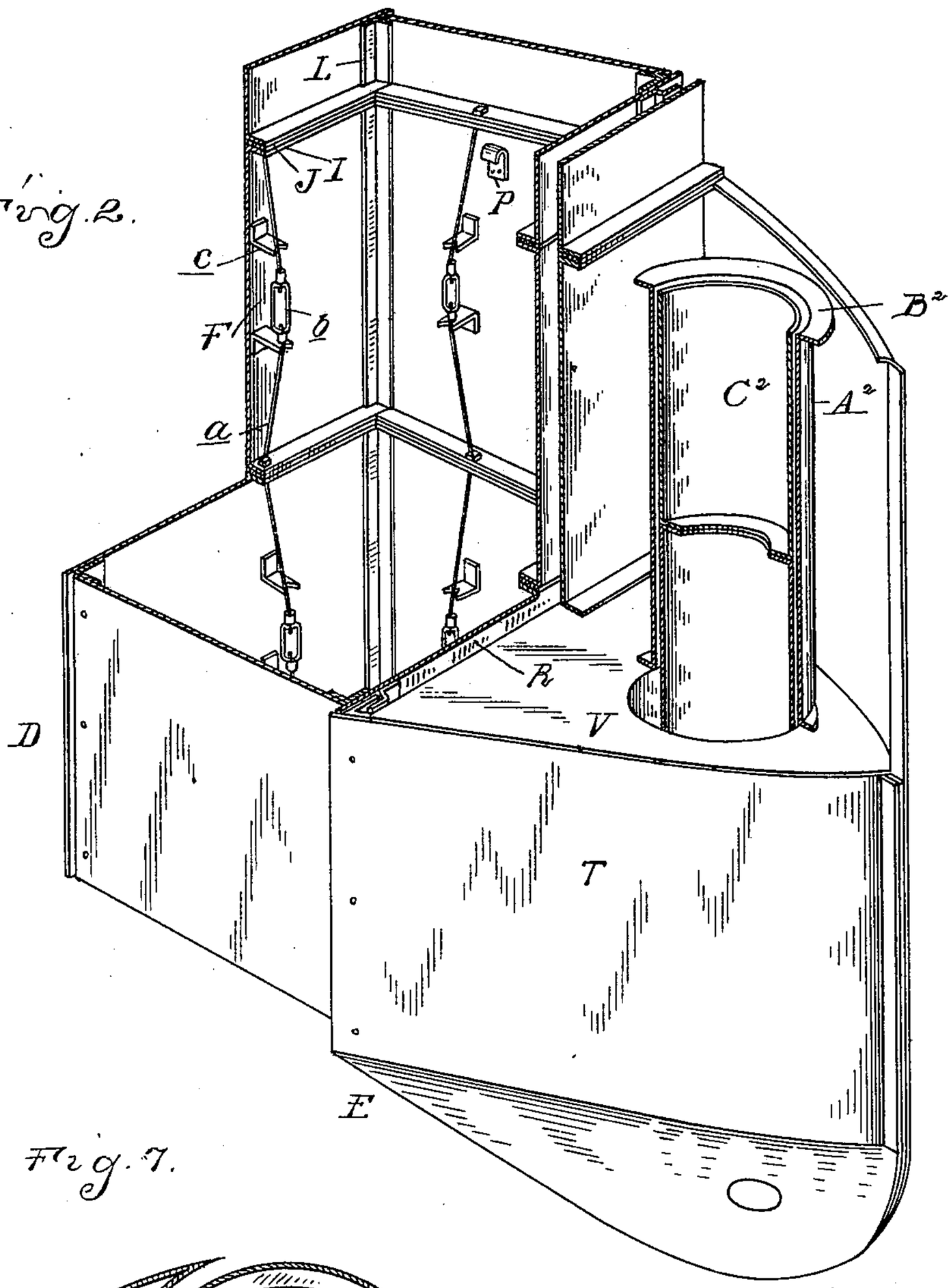


Fig. 7.

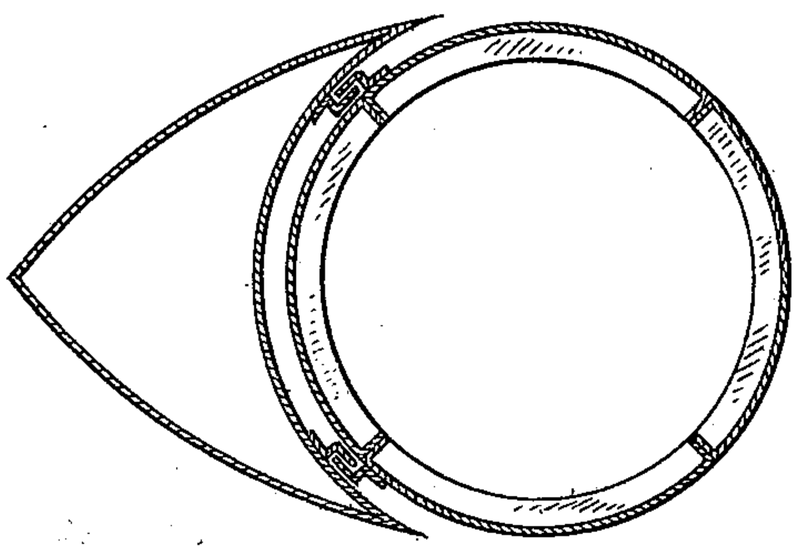


Fig. 6.

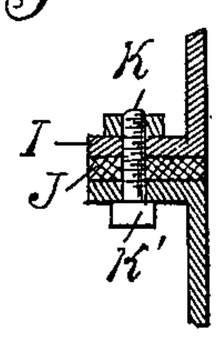
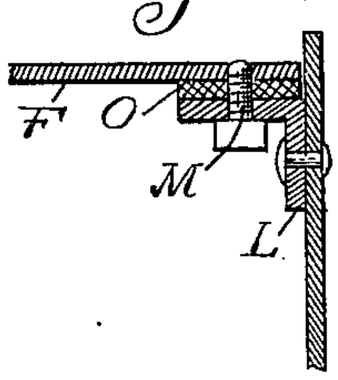


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES H. BROWN, OF PORT HURON, MICHIGAN, ASSIGNOR OF ONE-HALF TO STEPHEN G. MARTIN AND ABRAHAM S. MARTIN, OF SAME PLACE.

APPARATUS FOR EXCAVATING FROM RIVER-BEDS.

SPECIFICATION forming part of Letters Patent No. 675,124, dated May 28, 1901.

Application filed July 23, 1900. Serial No. 24,582. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. BROWN, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Apparatus for Excavating from River-Beds, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has reference to caissons adapted to be sunk in the bottom of bodies of water for various kinds of submarine operations; and it consists in the peculiar construction of the caisson and in the novel combination and arrangement of its parts.

The invention further consists in the novel formation of an anchor for the caisson adapted to hold the latter in place and to shield the same from the action of the tides or currents.

The invention still further consists in the construction of a lock for holding the anchor to the caisson and in various other details of construction, as will be more fully hereinafter referred to and shown in the drawings, in which—

Figure 1 is a longitudinal section through the apparatus, the parts being shown as in use. Fig. 2 is a sectional perspective view of the caisson and anchor. Fig. 3 is a section taken on line *x x*, Fig. 4. Fig. 4 is a horizontal section on line *y y*, Fig. 3. Fig. 5 is a sectional view of a corner of the caisson, showing manner of securing the plates. Fig. 6 is a vertical sectional view illustrating the connecting mechanism for the caisson-sections, and Fig. 7 is a horizontal section through a modified form of caisson.

The reference-letter A designates a scow or float provided with two adjoining wells B and C, arranged centrally therein, as shown. Within these wells are located, respectively, the caisson D and the anchor therefor E. In construction the caisson comprises a plurality of detachable sections, such as F. Each section, with the exception of the lowest, the lower edge of which is free and slightly beveled, is provided at its top and bottom with inturned flanges I, and between the flanges of adjoining sections are arranged gaskets J. The sections are detachably connected together by bolts K and nuts K′, the former extending through the flanges and gaskets in the manner indicated in Fig. 6. Each caisson-section is also preferably composed of a plurality of plate members, preferably four in number, which are detachably connected together, as shown. The connections for the plates comprise angle-bars L, arranged at the section-corners, and bolts connecting the angle-bars to the plate members. As shown in Fig. 5, one wing or member of each angle-bar is riveted to the plate, while the complementary member is detachably connected to the adjacent caisson side by a tap-bolt M. To form a tight joint between the parts, a packing O is interposed between the wing of the angle-bar through which the tap-bolt passes and a caisson-plate, as shown in the figure before referred to.

To dispense with the use of the usual cross-beams within each section, I brace each section-plate in the manner indicated in Fig. 2. This I accomplish by truss-rods *a*, extending through the flanges of the adjoining sections and having their meeting ends threaded and connected by a turnbuckle *b* and struts *c*, secured in any suitable manner to the caisson side; also, each plate is provided with a hook P, for the purpose hereinafter set forth.

From the description of the caisson construction as above set forth it will be obvious that the caisson may be raised in sections or, if desired, plate by plate. In following the latter step a number of cables (not shown) leading from the scow are connected to the several plates by means of the hooks referred to, so that when the connecting-bolts are removed the caisson may be raised in the manner set forth.

The caisson-anchor E, before referred to, is in the form of a column, preferably triangular in configuration and composed of a series of detachable sections. Each section of the column is formed of three steel plates secured together by suitable flanges Q and bolts Q′, as shown in Fig. 4, the bolts being in the form of tap-bolts to permit of their ready removal when desired. The base-plate R of each section is arranged immediately adjacent to the caisson and the side plates are of a width to

permit of their extending some little distance beyond the base-plate and beyond the corners of the caisson, as shown in Fig. 4.

The several anchor-sections, with the exception of the lowest, are similar in construction and are connected together by mechanism similar to that employed in connecting the caisson-sections.

The lower section of the anchor-column is closed at its lower end and is tapered to an edge, as shown in Fig. 2, means being thus provided whereby the column when lowered upon the river-bed may be enabled to slide over rocks and other obstructions, and thus avoid injury. In forming the tapered portion I provide the section with a keel-plate S, which projects below the section and also some distance upwardly within the latter. The section sides T and U have their lower portions bent into engagement with the keel and are secured thereto in any suitable manner.

Upon the upwardly-extending portion of the keel-plate I arrange a partition or platform V, securing the latter in place between the inturned flanges V′ of the lower section and the corresponding flanges V^2 of the next adjoining section. In this manner I form a water-chamber W, which when filled by the mechanism hereinafter described will cause the anchor to sink and rest upon the river-bed. In cases where the depth of the water is so great that the filled water-chamber alone will not answer ballast may be dumped upon the platform in sufficient quantities for that purpose, or, if desired, suitable weights (not shown) may be lowered by cables upon the platform. One plate of the lowest anchor-section is provided with a water-inlet port *d*, formed within its bent portion, which port is controlled by a valve *e*. The stem of the valve *f* is formed in sections detachably secured together and passes through a stuffing-box *g* in the partition or platform. A portion of the stem in proximity to the valve is suitably threaded and is engaged within a threaded stationary bearing *h*, mounted upon the valve-seat *i*, as indicated in Fig. 3. Thus the flow of water within the water-chamber may be controlled by the operator in the scow or float by turning the rod *f*.

The caisson is secured to the anchor-column in such manner as will permit of the former having a sliding engagement with the latter, so that the caisson during the operation of raising or lowering will be constantly connected to its anchor. The locking mechanism consists, essentially, of **Z**-bars arranged in pairs upon the sides of the caisson adjacent to the base-plate of the anchor and similar bars upon said base-plates. The bars are so arranged as to form two pairs of continuous rails, one extending the length of the caisson and the other the entire length of the anchor-column.

In arranging the parts for operation the section of the anchor-column having the closed end is suspended within its well in the scow by means of a suitable cable F′, depending from the derrick G′. The anchor is extended in length by adding sections to the suspended section and is caused to sink and rest upon the river-bed by admitting water within the water-chamber or by weighting the platform in the manner before referred to. The anchor is also guided in its downward movement by a cable *j*, which is connected to the lower portion of the column and extends upwardly through a well K^2 in the float to the top of the latter. After the anchor is in place the caisson is formed and lowered within its well in the same manner as the anchor-column, each section of the caisson being first engaged and locked to the column, so that a sliding connection will be formed between the parts. When it is desired to raise the caisson, the securing-bolts are removed from the sections, also from the section-plates, and, as before stated, the caisson is raised in parts by means of the cables referred to, thus dispensing with heavy hoisting apparatus for raising the entire caisson.

It is frequently found desirable to make test-drills in the river-bottom before commencing the excavating. I have therefore provided means whereby this can be done immediately after the anchor is placed. The means consist, essentially, in a second caisson arranged within the anchor-column, adapted to extend entirely therethrough and to be sunk within the river-bed. In forming this test-caisson I provide a guide for the same in the form of a tubular casing A^2, formed in sections, the lowest of which is fixed to the lowest section of the anchor-column and extends through the closed end of the latter, as shown in Fig. 3. Each section of the tubular casing is provided with outwardly-extending flanges B^2 on its opposite edges, which are bolted together in the manner before described. Within this tubular casing is arranged the caisson C^2, composed of a series of sections detachably connected together in the same manner as the sections of the main caisson.

In Fig. 7 I have shown a slightly-modified form of caisson and anchor. In this construction the section-plates of the caisson are curved, so that when assembled the caisson will be tubular in configuration. The base-plates for the anchor in this case are also curved to conform to the external contour of the caisson.

Various other modifications may be made in the apparatus without in any manner departing from the spirit of my invention, and while I have shown what I consider the preferable form of apparatus I do not desire to be limited to the same.

What I claim as my invention is—

1. In apparatus for submarine operations, the combination with a float, of a caisson, and a shield arranged adjacent to and movable independently of the caisson, substantially as described.

2. In apparatus for submarine operations, the combination with a float, of a caisson, and a combined shield and anchor for said caisson comprising a column arranged adjacent to and movable independently of the caisson, substantially as described.

3. In apparatus for submarine operations, the combination with a float, of an anchor column adapted to extend from the float to the river-bed, a caisson adjacent to the anchor-column, and means for locking said caisson to said column.

4. In apparatus for submarine operations, the combination with a float, an anchor-column adapted to extend from the float to the river-bed, and a vertically-movable caisson adjacent to and having a sliding engagement with said anchor-column.

5. In apparatus for submarine operations, the combination with a float, of an anchor-column composed of detachable sections adapted to extend from the float to the river-bed, and a vertically-movable caisson adjacent to and having a sliding engagement with the column.

6. In apparatus for submarine operations, the combination with a float, of an anchor-column, composed of a plurality of detachable sections, adapted to extend from the float to the river-bed, and a vertically-movable caisson having a sliding engagement with said column consisting of a series of sections detachably secured to each other.

7. In apparatus for submarine operations, the combination with a float, of a vertically-movable caisson, an anchor-column adapted to extend from the float to the river-bed and having a sliding engagement with said caisson, and a similar caisson within and extending through said anchor-column.

8. In apparatus for submarine operations, the combination with a float, of a hollow anchor-column composed of a plurality of vertically-arranged detachable sections adapted to extend from the float to the river-bed, and a vertically-movable caisson within said column.

9. In apparatus for submarine operations, the combination with a float, of an anchor-column adapted to extend from the float to the river-bed, a tubular casing corresponding in length to and extending through the column, and a vertically-movable caisson within the tubular casing.

10. In an apparatus for submarine operations, the combination with a float, of a hollow triangular anchor-column adapted to extend from the float to the river-bed, and a caisson adjacent to one side and movable independently of said column, substantially as described.

11. In an apparatus for submarine operations, the combination with a float, of a hollow triangular anchor-column adapted to extend from the float to the river-bed, said column having a water-chamber formed therein provided with a valve-controlled inlet-port, and a caisson adjacent to one side and movable independently of said column, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES H. BROWN.

Witnesses:
L. J. WHITTEMORE,
H. C. SMITH.