

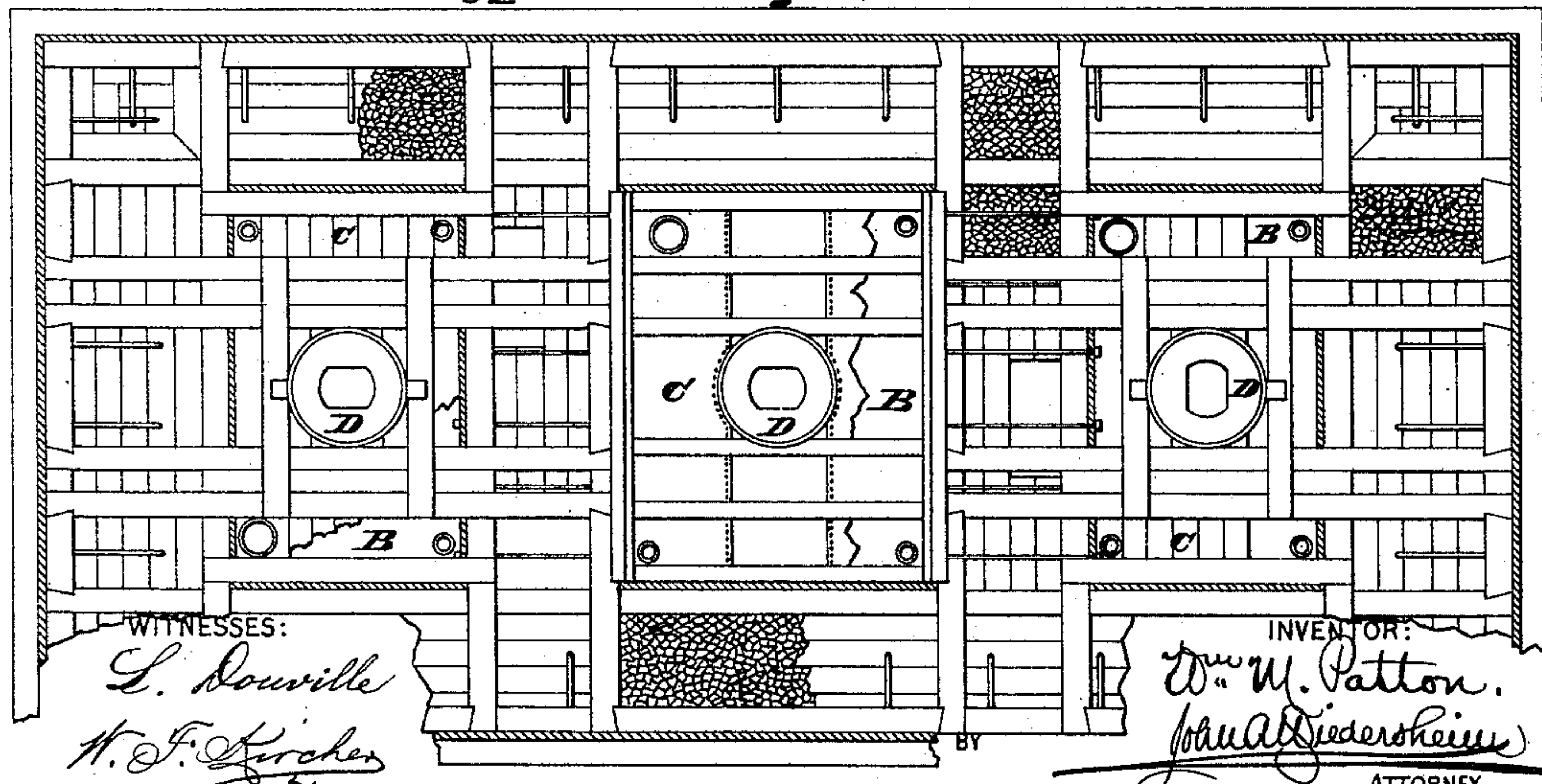
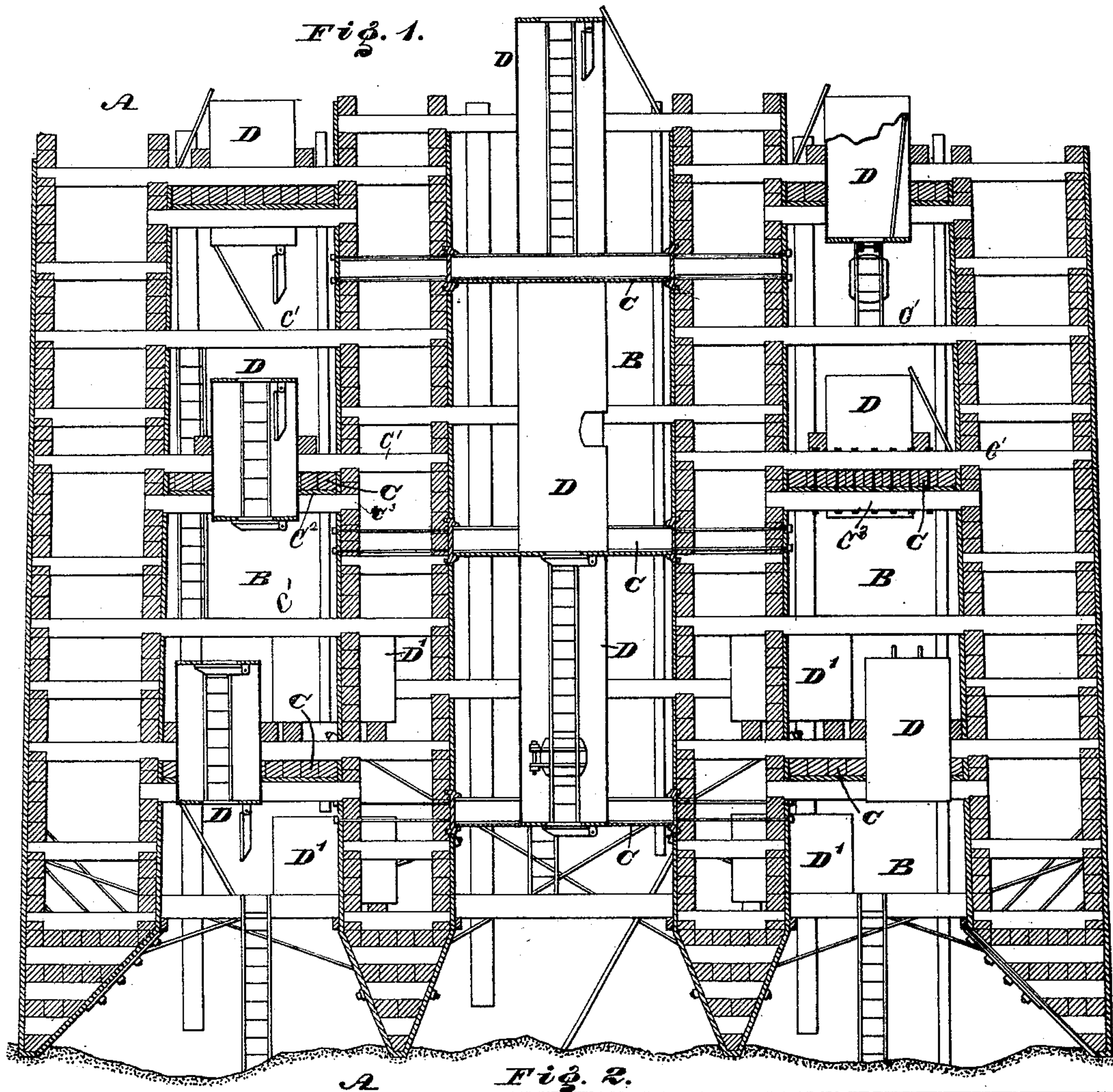
(No Model.)

2 Sheets—Sheet 1.

W. M. PATTON.  
PNEUMATIC CAISSON.

No. 414,244.

Patented Nov. 5, 1889.



WITNESSES:  
*L. Dowville*  
*H. F. Archer*

INVENTOR:  
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(No Model.)

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Fig. 3.

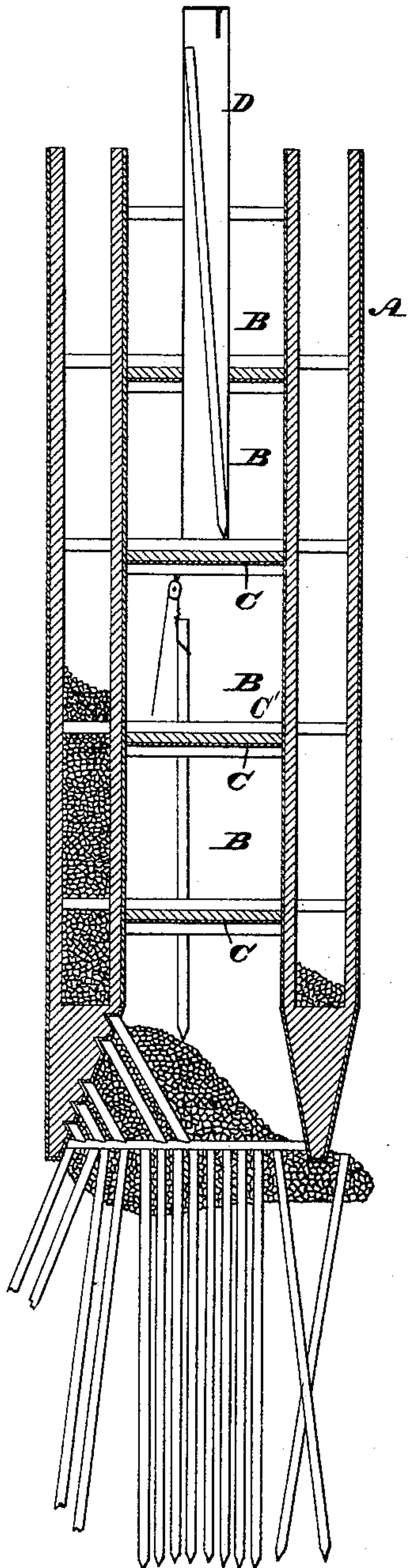
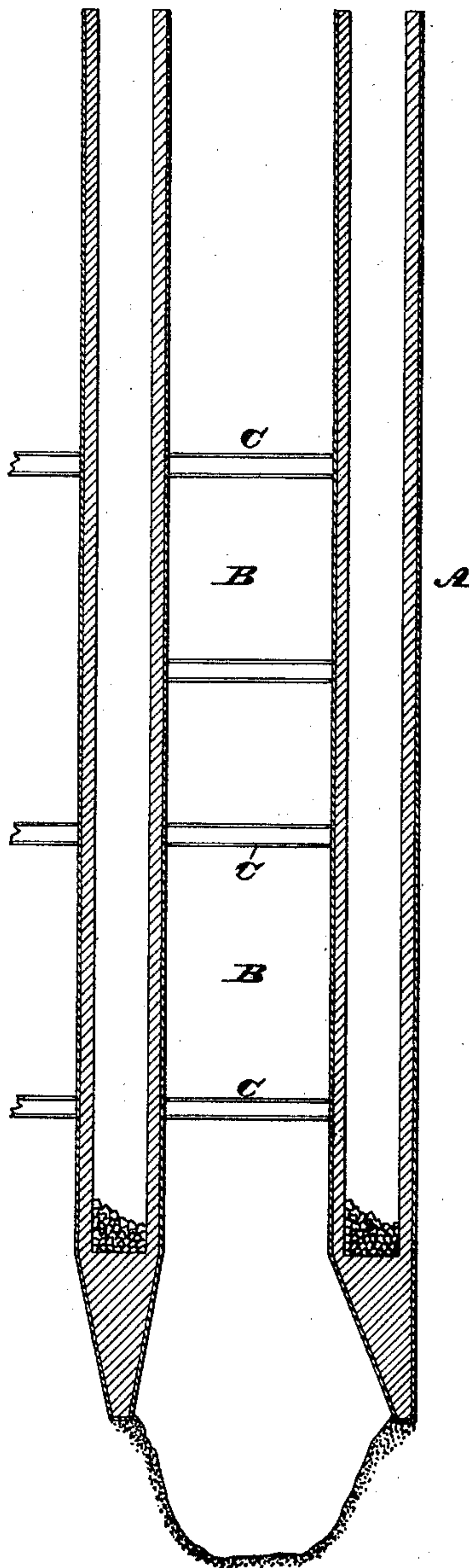


Fig. 4.



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# UNITED STATES PATENT OFFICE.

WILLIAM M. PATTON, OF PHILADELPHIA, PENNSYLVANIA.

## PNEUMATIC CAISSON.

SPECIFICATION forming part of Letters Patent No. 414,244, dated November 5, 1889.

Application filed April 2, 1886. Serial No. 197,566. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. PATTON, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Caissons, which improvement is fully set forth in the following specification and accompanying drawings, in which—

10 Figure 1 represents a vertical section of a pneumatic caisson embodying my invention. Fig. 2 represents a horizontal section thereof. Figs. 3 and 4 represent vertical sections of modifications.

15 Similar letters of reference indicate corresponding parts in the several figures.

My invention has for its object the adaptability of a pneumatic caisson to be used in any depth of water or solid material; and it consists in forming the air space or shaft into working-chambers located one above the other, the partitions between the same being removable, whereby adjacent chambers may be thrown into one. Other features are presented, as will be hereinafter fully set forth.

20 Referring to the drawings, A represents a caisson, which may be made of wood or metal, or both, consisting of a crib or wall inclosing a space or shaft B, of any desired shape, the walls whereof are air-tight, the caisson being provided with appurtenances usual in such cases.

30 C represents horizontal partitions, which are secured to the walls of the shaft B of the caisson and located one above the other, dividing the shaft into chambers, denominated "working-chambers," said partitions forming the roofs or decks of said chambers, and are so constructed of joist-bearings, guides, &c., either of wood or metal, or both, bolted or screwed together, whereby they may be removed in part or entirely, as may be required, in sinking to great depths. These partitions may be of several thicknesses of material, if so desired, and are secured to the walls in such manner as to be practically air-tight, yet readily admit their removal when necessary. Connected with each roof or deck is an air-lock D, which may be of any well-known order, its ends being in adjacent chambers.

Air-locks D' may also be provided, leading from one air-shaft to another.

The open-built walls of the caisson are filled as the caisson sinks with concrete, masonry or other heavy substance, the same providing the necessary weight to sink the caisson, and forming part of the foundation proper, if desired.

After the caisson is sunk to the depth permitted by the maximum practical pressure for working, the pressure being kept constant, the water remains at the same level regardless of the further descent of the cutting-edge of the caisson below this level; consequently as each successive roof reaches this level so much of it is removed as is necessary to open a sufficient space to permit working below from the chamber above, which then becomes the working-chamber, the roofs being thus successively removed as greater depths are reached. In sinking below the pneumatic limit the sand or other material may be dredged out and raised to the level of the lowest existing roof and deposited in a suitable trough or receptacle thereon, and thence removed to the outside by suction or pump ordinarily used, or blown out by air itself through pipes, thereby saving great loss of time and expense as compared with the open-caisson method.

80 In cases where a pile foundation would be sufficient after reaching the limit of depth of the pneumatic process or a less depth, a sufficient number of roofs may be removed to give sufficient depth to the lower working-chamber to permit the driving or setting of piles. Above this a single air-lock of sufficient length is provided. By these means long piles may be passed into the working-chamber below and driven into the underlying material by an engine worked by compressed air or sunk by the use of the jet. During the sinking of the caisson, and before reaching the depth of maximum pressure, the air may be kept constantly at that pressure, due to the depths, the actual pressure in the several chambers decreasing from the bottom to the top. Means are provided for passing from one chamber to another either by isolated air-locks or by continuous shafts from top to bottom with



side doors. Air-locks D' may also be provided leading from the chambers into open shafts left in the walls or cribs, all of which features tend to the comfort, health, and safety of the workmen.

By the use of the partitions C in the central shaft, having air-locks communicating between the chambers of said central shaft and the side shafts, not only is the air-supply to the lower chambers or the side chambers made more certain, but the increased avenues of communication afford more opportunities for escape, if necessary, from the lower side chambers to the upper chambers, thereby adding to the safety of the workers. At the same time the chambers thus made aid in controlling the sinking of the caisson as desired.

It is evident that by the use of chambers located one above the other, the air-pressure in each being that due to their relative position, and the chambers being connected by locks, the workmen will be forced to pass through the chambers, whose pressure gradually decreases as they ascend, thereby greatly adding to their health, and this is without interfering with the proper working of the caisson. The pressure in the separate chambers will be regulated by suitable valves. The upper chamber may constitute a dressing or waiting chamber for the workmen and be under any desired pressure.

In the side shafts shown in Fig. 1 the beams or supports C' C<sup>3</sup>, between which the flooring of the partition C' is secured, are shown as having their ends built or embedded in the walls of the caisson. The flooring or partition may consist either of cross-beams of timber, bolted or otherwise fastened together, and having packing between them, so as to render

the partition air-tight, as shown in said side shafts, or it may be composed of metallic plates riveted together and secured to the supports, as in the central shaft, Fig. 2. In the said central shaft the supports or beams are secured in caps which are fastened to the walls of the shaft. When it is desired to remove a partition the bolts or other means by which the flooring or partition is secured together and to the supports are removed, so that the said partition can be readily taken away from the supports, leaving the latter in place, the same offering little or no obstruction in the way of the workmen and serving as braces for the walls of the shaft.

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

1. A caisson having an air-shaft formed into a series of working-chambers located one above the other, substantially as described.

2. A caisson having an air-shaft divided by horizontal partitions having air-locks forming a series of chambers located one above the other, substantially as described.

3. A caisson having an air-shaft divided by horizontal partitions forming a series of working-chambers located one above the other, said partitions being partly or entirely removable, whereby adjacent chambers may be united as one, substantially as described.

4. A caisson having an air-shaft formed with a series of working-chambers and a series of air-locks, an air-lock communicating with adjacent chambers, substantially as described.

W. M. PATTON.

Witnesses:

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