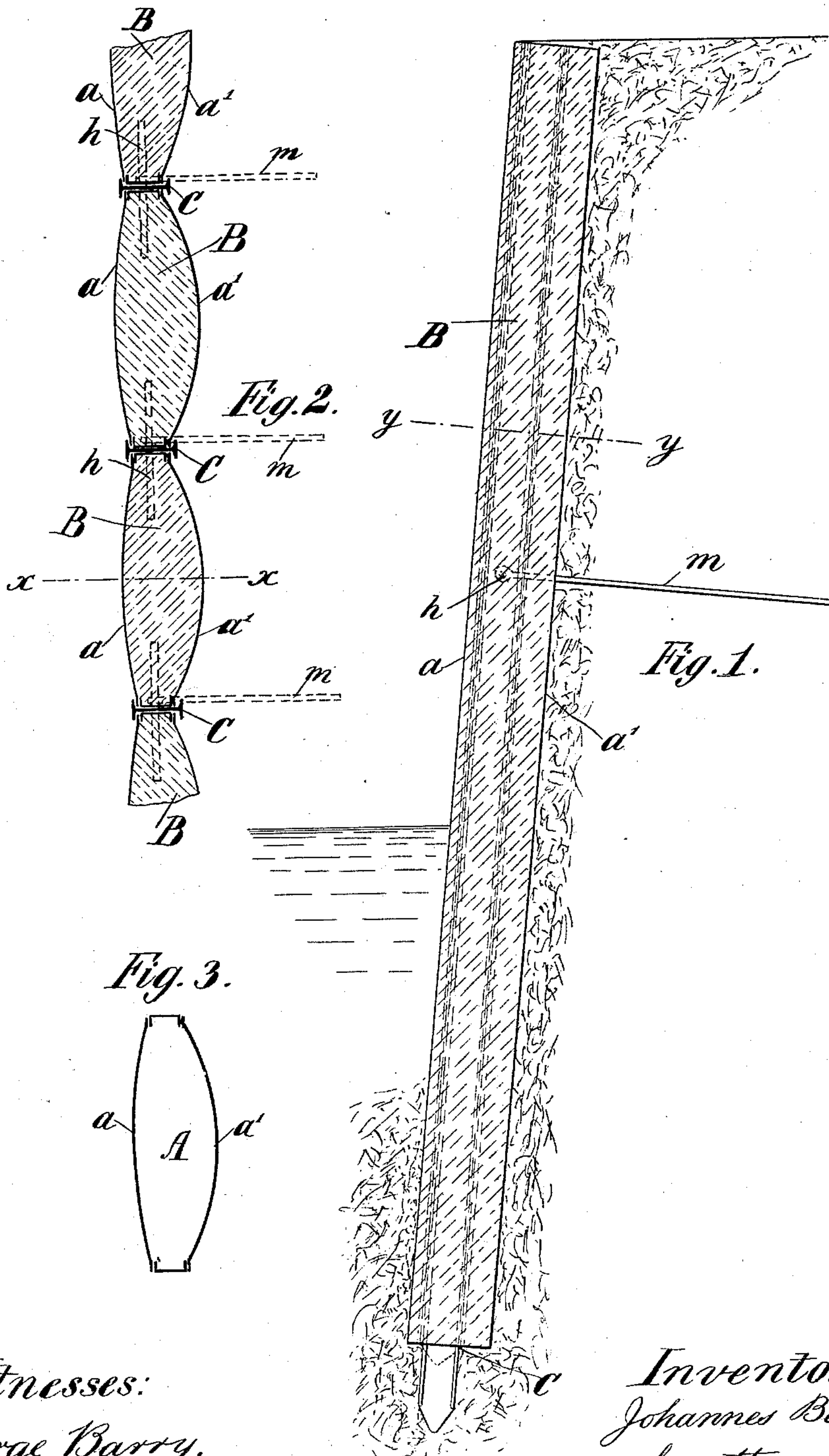


(No Model.)

J. BECKER.
IRON RETAINING WALL.

No. 465,107.

Patented Dec. 15, 1891.



Witnesses:
George Barry,
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UNITED STATES PATENT OFFICE.

JOHANNES BECKER, OF ALTONA, GERMANY.

IRON RETAINING-WALL.

SPECIFICATION forming part of Letters Patent No. 465,107, dated December 15, 1891.

Application filed August 29, 1891. Serial No. 404,078. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES BECKER, engineer, of Altona, in the German Empire, have invented a new and useful Improvement in Iron Retaining Walls or Sheathings, of which the following is a specification.

This invention consists in a new or improved construction of iron wall suitable for and intended to be used as a retaining wall or sheathing, principally in hydraulic engineering, in the place of wooden camp or pile sheathing, or the like wooden or other retaining walls or constructions at present employed. The nature of this new or improved construction is as follows: Between suitable iron piles at convenient distances apart are iron caissons open below fitting to the iron piles at their ends and intended to be driven into the earth at the same time as the said piles are driven. The earth entering these caissons, as and when they are driven into the earth, is removed—for instance, by washing out with water or by dredging—and its place is taken by concrete with which the caissons are filled after they are driven into place. Suitably-shaped anchors or kedges may be inserted to keep the caissons in place against the thrust of the earth and to connect the caissons one to the other.

The construction is shown in the accompanying drawings, in which—

Figure 1 is a vertical section of the finished wall on line *x x*, Fig. 2, which represents a horizontal section on line *y y* of Fig. 1. Fig. 3 represents a horizontal section through one of the caissons when empty, showing the construction thereof.

The caissons *A* are formed of the two walls of sheet-iron *a a'*, the ends of which are connected by and fixed to the flanges of *V*-irons or channel-irons, as shown. The breadth of these channel-irons is such that the side edge of the caisson may move within and fit sufficiently accurately to the side recess in the *I*-beams which are used for the iron piles *C* and are of sufficient length that they may be driven deep enough into the earth and project to the required height. The caissons may be but slightly shorter than the piles. It is preferable in driving this sheathing to arrange the piles and caissons in engagement

one with the other and support them in a suitable way, while the driving is done by successive strokes alternately on the piles and on the caissons along the length of the wall, so that the operation of driving is substantially equally distributed along the whole wall and then progresses equally throughout until the whole wall is driven in place to the required depth. The earth with which the hollow caissons *A* will have become filled by the operation of driving is then removed and the caissons filled up with concrete. During this operation, in order to dowel the concrete fillings together each to the next in series, cross bars or plates *h* may be passed through holes in the piles *C* and in the channel-irons of the caissons and be embedded in the concrete, so that when the iron-work eventually rusts away the concrete fillings remain connected together in a firm wall. To these dowel bars or plates kedges may be attached by rods *m* to hold up the wall against the thrust of the earth by being embedded in the latter. The lower ends of the piles *C* and of the channel-irons of the caissons *A* may be pointed to facilitate their being driven into the earth.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed, I declare that what I claim is—

1. A retaining wall or sheathing composed of iron piles the spaces between which are occupied by hollow caissons open below and engaging with the piles at their edges, the said caissons being filled with concrete, substantially as herein described.

2. A retaining wall or sheathing composed of iron *I*-piles the spaces between which are occupied by caissons composed of plate-walls *a a'*, connected by channel-irons engaging between the flanges of said *I*-piles, substantially as set forth, the said caissons being open below and when driven and the earth removed from within them filled with concrete or equivalent filling, substantially as herein set forth.

JOHANNES BECKER.

Witnesses:

F. ENGEL,
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