

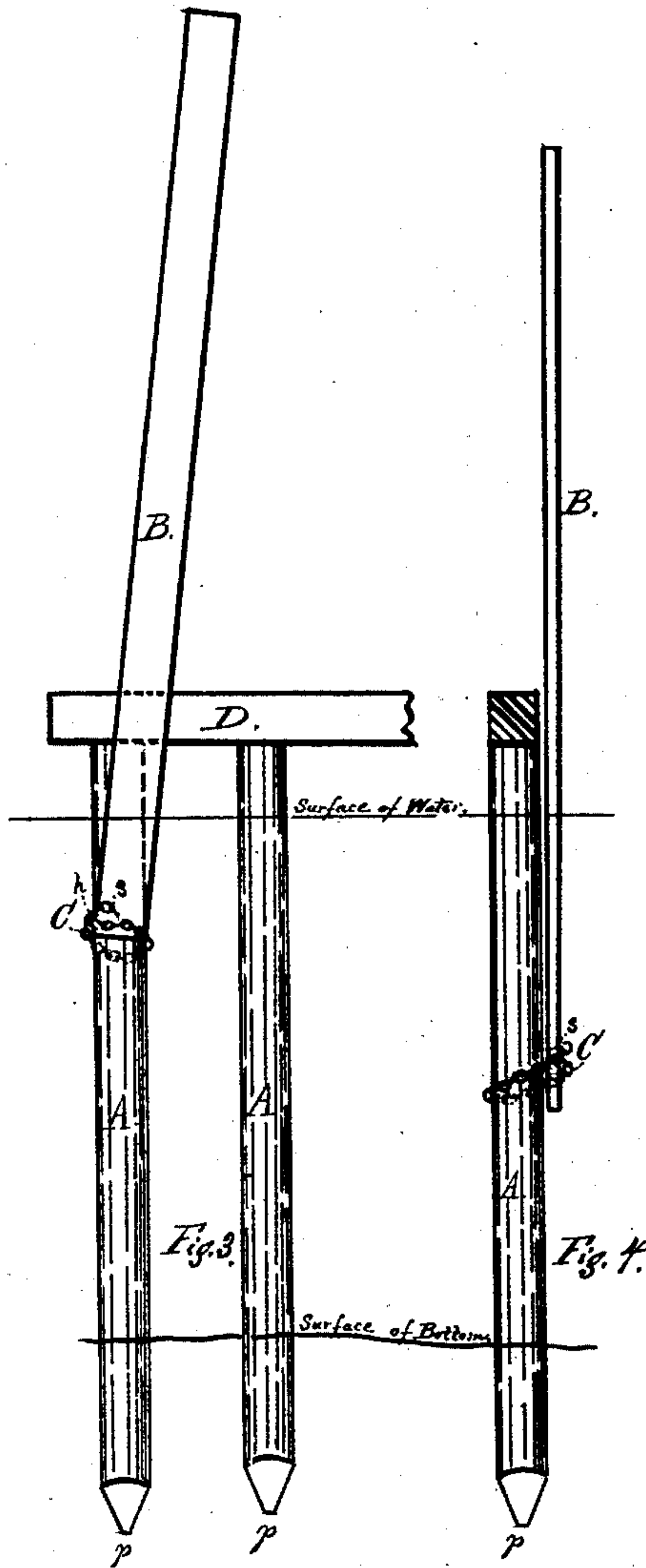
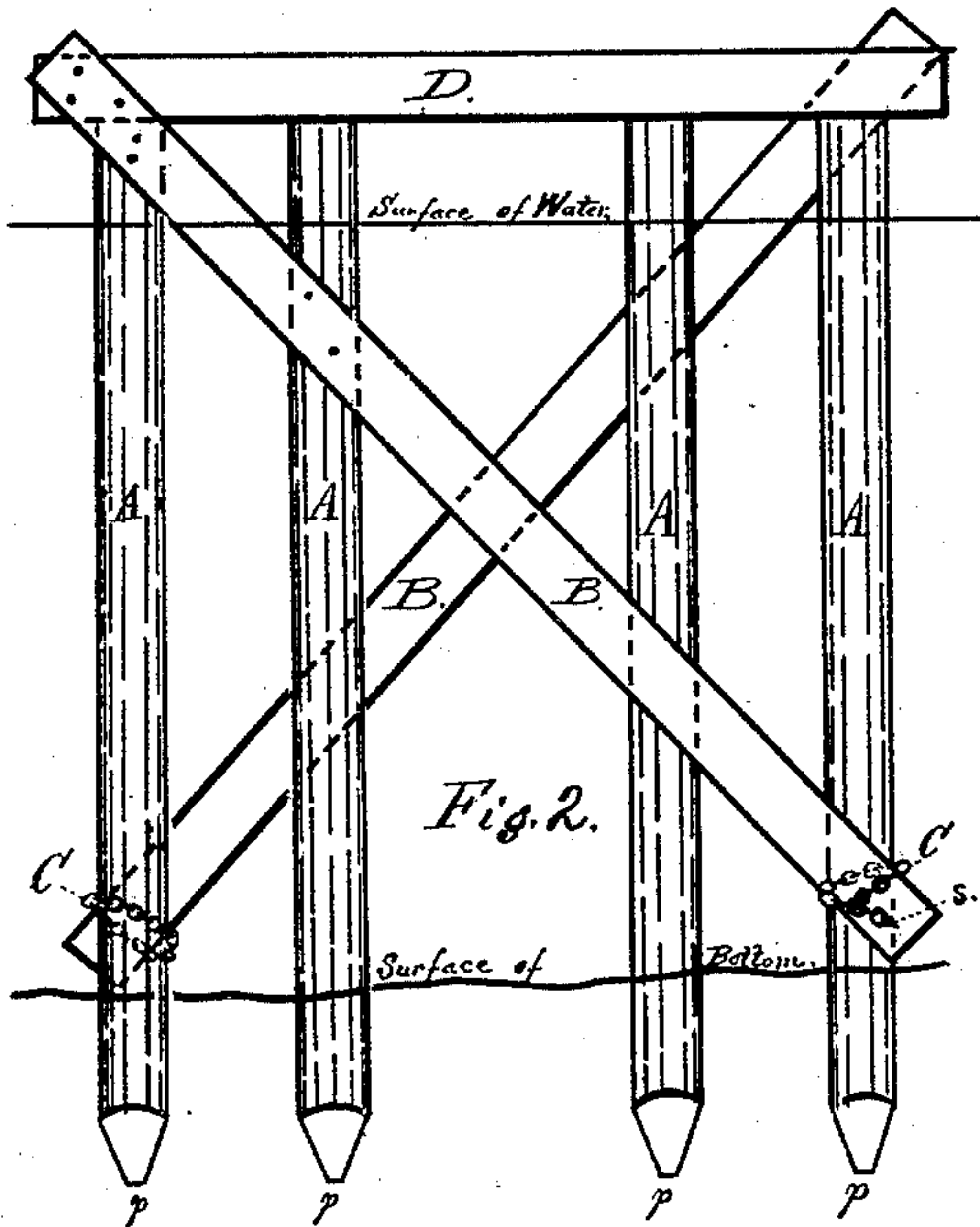
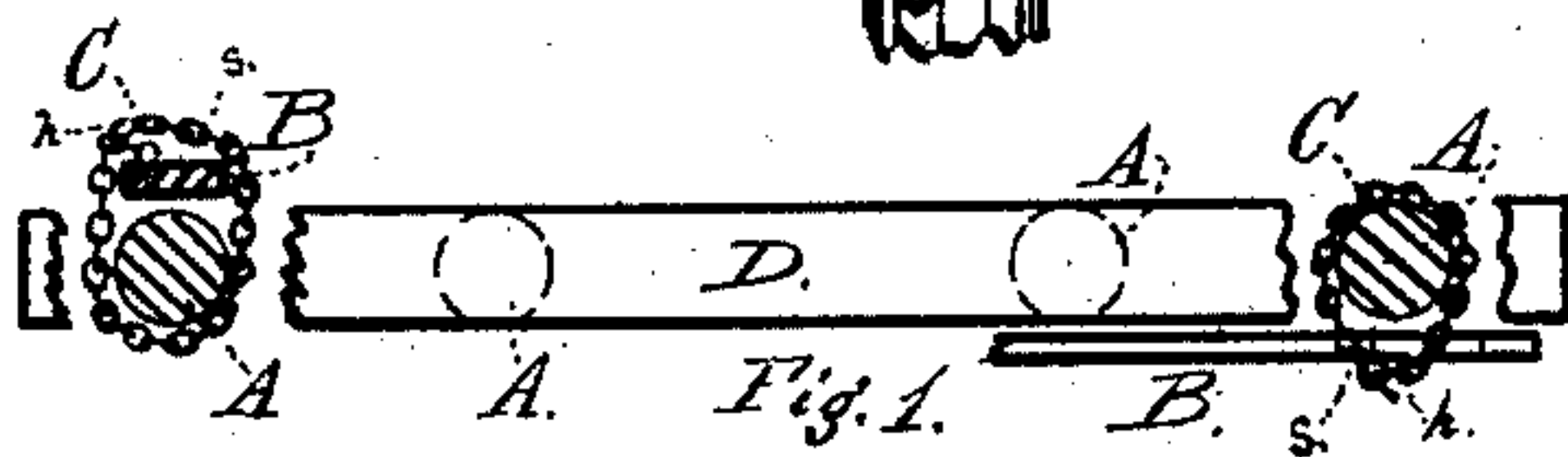
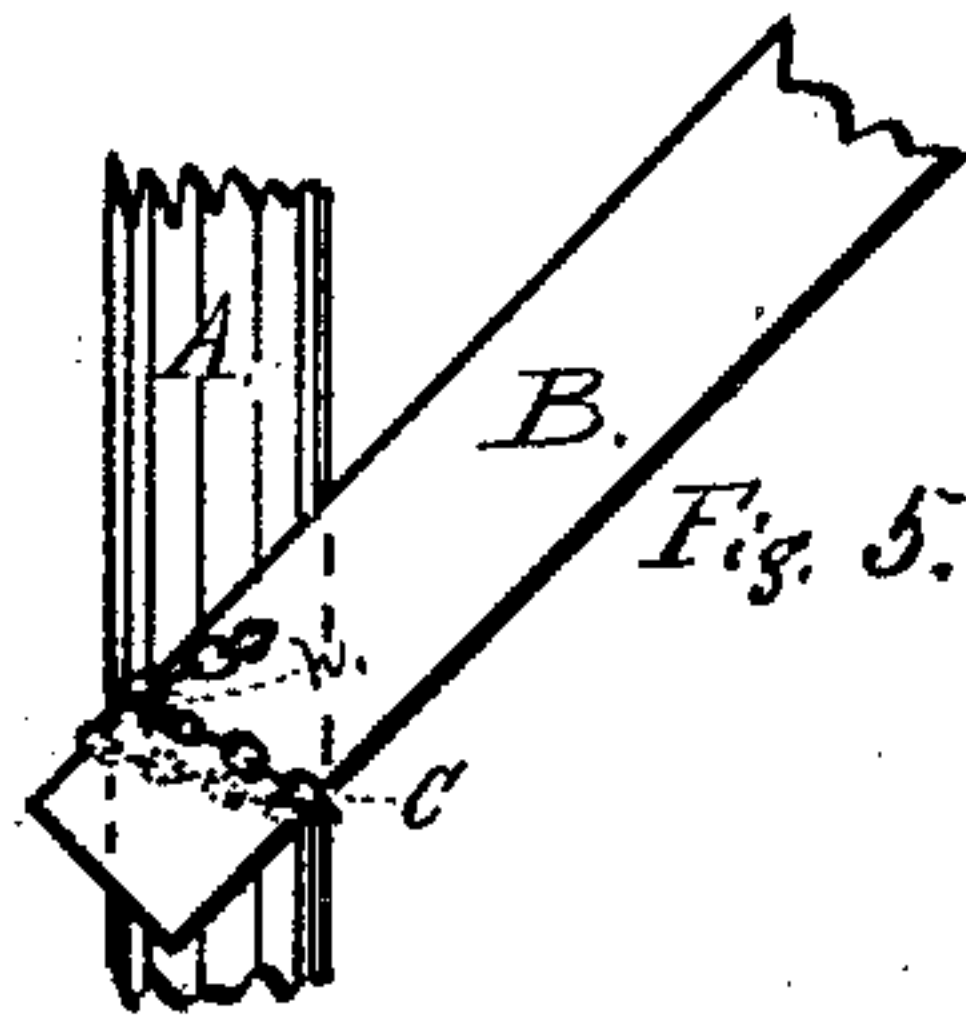
(No Model.)

H. M. CARPENTER & J. WATSON.

SUBMERGED BRACING FOR PILE BRIDGES.

No. 362,144.

Patented May 3, 1887.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

HERBERT M. CARPENTER AND JOHN WATSON, OF MINNEAPOLIS, MINN.

## SUBMERGED BRACING FOR PILE BRIDGES.

SPECIFICATION forming part of Letters Patent No. 362,144, dated May 3, 1887.

Application filed February 7, 1887. Serial No. 226,799. (No model.)

*To all whom it may concern:*

Be it known that we, HERBERT M. CARPENTER and JOHN WATSON, both citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, jointly and severally have invented certain new and useful Improvements in Submerged Bracings for Pile Bridges, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of our invention is to provide an easy and practical method of bracing or stiffening that part of a pile bridge which is below the surface of water. Where the water is of great depth, this bracing is frequently partially or entirely omitted on account of the difficulty of fastening the lower end of the brace to the pile. How this difficulty may be obviated will appear in the following description of our invention, reference being had to the accompanying drawings.

Figure 1 is a plan of one bent or section of an ordinary pile bridge. Fig. 2 is a side view of the same, showing its appearance when braced. Figs. 3 and 4 are side and end views showing a brace in the act of being lowered into place. Fig. 5 shows the connection of the lower end of a brace and a pile on a somewhat enlarged scale. Fig. 6 is a detail showing the chain used.

The same letters apply to all the figures.

A is the pile; B, the plank used for bracing; C, the chain; D, the cap-timber as generally placed on top of the piles, constituting a bent or section. These are generally sharpened at their lower ends, as at *p*.

*s* is a small pin linked to one end of the chain C. The end of *s* away from the chain C is pointed like a spike, so as to drive into a plank-brace, B. This pin *s* is thus driven into the lower end of the plank B, as shown in the drawings. The plank B is then held in a vertical position against the top of pile A, and the chain C coiled once around plank B and pile A, and then the hook *h* on the other end of chain C is hooked into any convenient link of said chain C, so that the chain C may slip easily along the pile when the plank B is

pushed vertically down into the water. As soon as the plank B is down far enough, the top end is inclined over to the other outer pile of the bent, and there nailed or spiked, as usual, to the top part of the pile A, and also to the cap D. It will be seen that this act of inclining the plank serves to make the chain C clasp tighter around said pile A and plank B, and thus the end of the plank in the water is securely connected and bound to the pile A.

The drawings show a chain as being used; but a rope of wire or any material suitable or anything which has sufficient flexibility may be used in lieu of the chain C, if so desired. This manner of bracing may be applied to any part whatever of the bridge and in any direction.

Having thus described our invention, we desire to secure and claim by Letters Patent as follows:

1. In a pile bridge, the combination of a chain or rope, C, the brace B, the pile A, and cap D, for the purpose of thoroughly stiffening any row of piles in said bridge, said chain or rope C being formed at one end of same with a pin, *s*, whereby a firm fastening to the plank B may be effected, said chain or rope C being coiled around both brace B and pile A and hooked at other end of chain or rope C into any link on or formed on said chain or rope C, the inclination of the brace B serving to firmly tighten the grasp of chain or rope C around said plank B and pile A after top end of brace B is spiked as usual finally to place, and all substantially as described.

2. In combination with any pile bridge, the chain or rope C, having at one end a hook, *h*, and at the other end a pin, *s*, linked thereon to unite said chain or rope C to brace B, and all as and for the purposes hereinbefore set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

HERBERT M. CARPENTER.  
JOHN WATSON.

Witnesses:

FRED H. THOMPSON,  
JAMES E. MERRITT.