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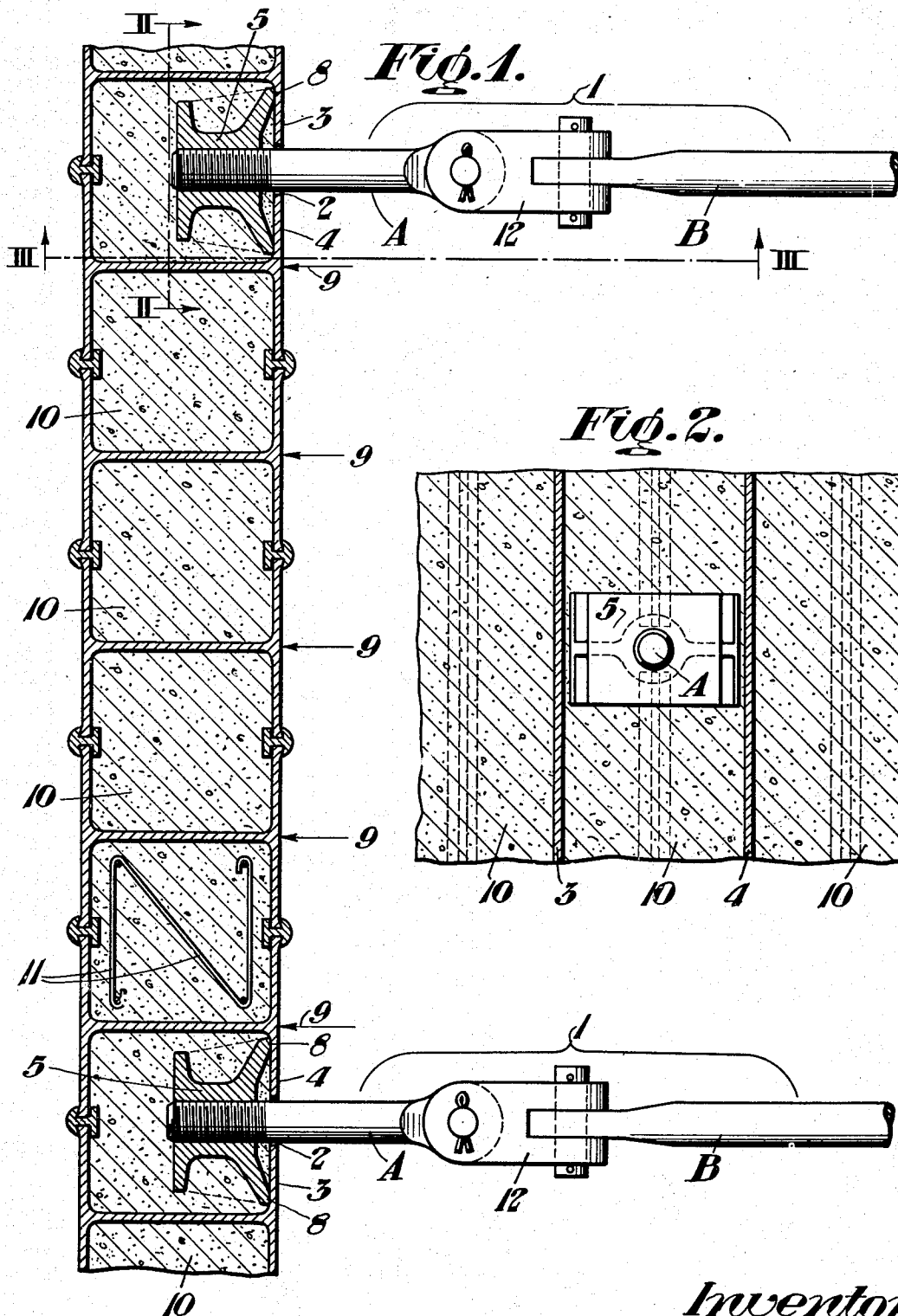
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METAL PILING

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2 Sheets-Sheet 1



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METAL PILING

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This invention relates to metal piling of the box-type, preferably of the H-beam type, the elements of which are connected by H-shaped locking bars which connect the flanges of the successive H-beam elements, and has for one of its objects the provision of a novel piling construction including an anchorage which is connected directly to the piling and avoids the use of waling members and the like.

Steel piling bulkheads and the like are usually held in place by tie rods, and in order to transmit the loads from the piling to the tie rods, a waling made up of two channel sections or other suitable shapes is used which is placed at the elevation of the tie rods, either in front or in back of the piling wall. Placing of the waling in front of the wall is objectionable when a piling wall is used in connection with docks and the like since boats, during rising or falling of the tides, are forced against the waling and protruding structural elements. The nuts and ends of the tie rods protrude through the waling, and when the waling is in front of the piling wall these nuts and tie rod ends severely damage vessels contacting therewith. The placing of the waling in back of the piling wall has a disadvantage in that the nuts do not rest directly on the channel waling, but are connected with two riveted or welded connecting pieces carried by the waling, and this construction is very heavy and expensive.

The present invention has many advantages over the prior art structures. In the first place the box-type of piling to which this invention is particularly adapted for use lends itself particularly well to receive a filling of concrete, and when filled with concrete the box-type piling forms a flat arch between successive tie rods so as to carry the earth pressure load from the piling members to the tie rods. Another advantage is that the invention lends itself to a construction in which the nuts for securing the tie rods to the piling members or elements are adapted to be mounted within the box-type elements and bear against the inside faces of the rear flanges of the piling sections.

By filling the boxes with concrete to or above the elevation of the tie rods, the necessity for waling is eliminated and the whole structure is materially stiffened and protected against corrosion. The concrete may be extended down into the piling to any point desired by placing suitable filler members or blocks therein. The additional cost of the concrete is less than the cost of waling.

The placing of the nuts for the tie rods with-

in the box-like piling structure is a simple operation. These nuts may be lowered into position by the use of any suitable tool and a short length of tie rod may be threaded therein in a manner to be hereinafter described.

If a waling should be found desirable in any instance, it is still of material advantage to place the nuts inside of the box-like structure since the placing of the nuts on the inside of the structure will eliminate the necessity for the expensive connecting pieces which are required in the types of piling heretofore used. Also, a considerably lighter waling may be used if waling is found necessary since with the nuts on the inside of the box-like piling a material part of the load of the tie rod may be carried directly by the piling structure itself.

In the accompanying drawings I have illustrated a specific form of H-beam piling assembled in a box-like structure and having tie rods connected thereto in accordance with my invention.

Figure 1 is a horizontal sectional view of piling and tie rod assembled in accordance with my invention,

Figure 2 is a sectional elevation taken on the line II—II of Figure 1,

Figure 3 is a sectional view in elevation through the piling showing one end of the tie rod in position; and

Figure 4 is a sectional view in elevation similar to Figure 3 showing the piling entirely filled with concrete.

Referring more particularly to the drawings, numeral 1 designates the tie rod as a whole composed of a relatively short forward section or piece A and a rear section or anchor portion B; the sections A and B being joined by a universal joint 12. The forward section A of the rod 1 is projected through a hole 2 which may be burned in the piling structure or otherwise suitably formed. The holes 2 are preferably formed at the juncture of two piling sections, the piling being designated by the numerals 3 and 4. A nut 5 is provided into which the end of the tie rod 1 is threaded. The nut 5 is preferably of such size that it will not turn within the piling structure, that is, it is of a width substantially equal to the distance between the webs of the adjacent piling sections. The nut may be lowered into position by the use of any suitable tool, or, if desired, a cable may be used to lower the nut 5 into position. The nut is positioned with its one face in contact with the inside faces of the rear flanges of the piling sections 3 and 4, as at 8.

After the rods 1 are threaded into the nuts 5 the concrete filling 10 is poured into the piling sections. It is essential that the concrete filling be at the elevation at which the stresses of the earth or other matter are being applied, therefore, the concrete filling 10 may extend from a point slightly below to a point slightly above the point of application of such stresses. I prefer, however, to entirely fill the piling sections with concrete since this stiffens the whole structure and protects the whole structure against corrosion.

When the concrete filling 10 is terminated short of the lower end of the piling or short of the earth or rock level in the piling, stop or filler members 10^a are inserted therein. The stresses of the earth pressure are indicated in the drawings by the arrows 9. Such stresses are carried by the concrete filling 10 and the piling sections to the tie rods 1. If the spacing of the tie rods should be extremely wide, or the earth pressure be extremely high, suitable reinforcing indicated by the numeral 11 in Figure 1 of the drawings, may be used to further strengthen the structure. It will be understood also that if the tie rods 1 are spaced sufficiently close together, or if the stresses against the wall are of a low magnitude, the piling assembly may be used with very satisfactory results without the concrete filling 10.

It will be understood that while I have shown my invention as particularly adapted for the use of piling of the H-beam type, the invention is not limited thereto, but it is adapted for use with any form of piling of the box-type.

I claim:

1. The combination with piling walls of the box-type, of tie rods spaced at predetermined distances along said wall and connected to nut members mounted entirely within said wall and bearing against the inner rear face thereof, said wall being provided with a filling of concrete placed at the elevation at which stresses of earth pressure are applied so as to form a flat arched effect between the successive tie rods.

2. The combination with piling walls of the box-type composed of H-beam sections connected by locking bars, of tie rods spaced at predetermined distances along the said wall and connected to nut members mounted entirely within said wall and bearing against the inner face thereof, said wall being provided with a filling of concrete placed at the elevation at which stresses of earth pressure are applied so as to form a flat arched effect between the successive tie rods.

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