METHOD OF SECURING A LARGE-DIAMETER TUBE TO A CASING UNDERWATER

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Filed: Apr. 30, 1973
Appl. No.: 355,482

ABSTRACT
This invention relates to a method of securing a large-diameter tube to a casing that is submerged under water e.g. in a river or the sea, and wherein one end of this casing rests on a submerged bed with one end of the tube being driven into this bed within the casing, while the other end of the tube is in free air. According to the invention, concrete is injected from the base of said casing into the annular space defined by said tube and said casing so as to drive the water therefrom. The water located within the said tube is removed after forming a concrete plug at the base of said tube, and after this concrete has set in the annular space, longitudinal openings are made in the interior of the said tube so as to expose the inner surface of said casing through the thickness of the set concrete. The edges of these openings are connected to the inner surface of said casing by means of packing pieces arranged in the space between said casing and said tube.

2 Claims, 3 Drawing Figures
3,839,872

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The present invention relates to a method of securing a large-diameter tube to a casing under water, in particular where harbour or river installations are concerned.

In general, to connect two members under water, in particular two metal parts, it is necessary to employ special means and trained personnel equipped with diving-suits or diving bells. Several drawbacks result from this, chiefly the slowness of the operation and the high cost.

To overcome these drawbacks, the invention suggests a method, the application of which requires only simple means.

The invention thus has as an object a method of securing a large-diameter tube to a casing submerged under water, one end of which casing rests on a submerged bed, one end of the tube being driven into the underwater floor inside the casing while the other end is in free air.

According to this method, concrete or mortar (these two terms being used interchangeably in what follows) is injected via the base of the casing into the annular space defined by the tube and the said casing so as to drive the water therefrom, and the water situated inside the tube is then removed after a concrete plug has been formed at the base of said tube. Furthermore, after the mortar has set in the annular space, longitudinal openings are made in the inside tube so as to expose the inner surface of the casing, and the edges of the openings are finally connected, by welding for example, to the inner surface of the casing by means of packing-pieces arranged in the space between the casing and the tube.

Advantageously, an elastic annular chamber arranged inside the upper part of the casing, before it is submerged, is inflated with high-pressure air and then with concrete, before the mortar is injected into the annular space, so as to grasp the tube and cut off the upper part of the annular space from the surrounding water, the water contained in this space being then expelled through orifices formed for this purpose in the casing and equipped with means for retaining the mortar.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show one embodiment thereof by way of, and in which:

FIG. 1 is a diagram giving a general concept of the method,
FIG. 2 is a detail view showing one phase of the method, and
FIG. 3 is a section along line III—III of FIG. 2.

Referring now to the drawings and in particular to FIG. 1, one end of a tube 1 is driven into the bed e.g. of a river, through a casing 2 which is completely submerged and rests on this bed, while the other end of the tube 1 is in free air. At its upper end, the casing 2 is provided with an annular elastic chamber 7 arranged therewithin. The method consists firstly in inflating this chamber 7 through an orifice 8 thereof with high-pressure air, and then in replacing this air with mortar.

Then, with the tube 1 and the casing 2 defining an annular space 3, mortar is injected under pressure into this annular space 3 via an opening 4 formed in the base of the casing 2. Other openings formed in the cas-
flating said chamber with high-pressure air and, then filling said chamber with concrete to grasp said tube and cut off the upper part of the annular space from the surrounding water, whereby the water contained in said annular space is expelled through orifices in said casing during said injecting step, said orifices being equipped with means for retaining the concrete.

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