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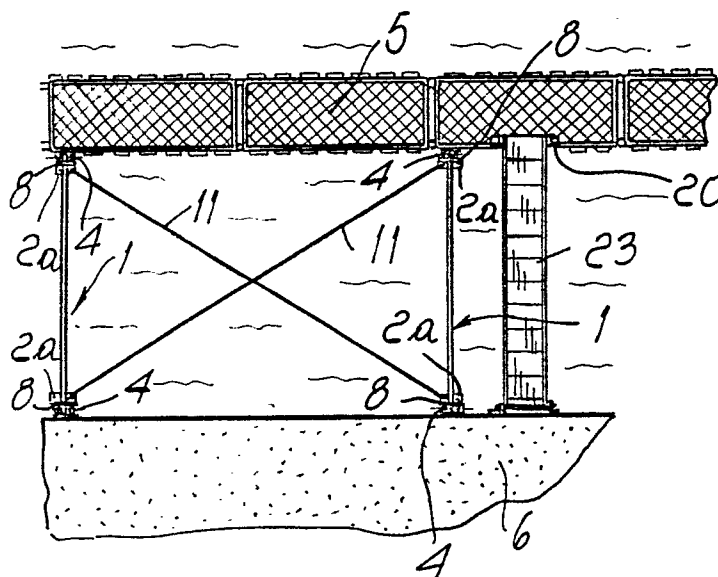
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**Fixing structure particularly for floating wharves.**

The fixing structure comprises a plurality of oscillatable rods (1) having at each end thereof a coupling flange (2a) defining eyelets which are pivotally connected via a pin (8) to the eyelet of a respective plate (4) for connection to the wharf (5) and the shore (6). Braces (11) are provided between the rods (1) and brackets (20) pivotally connect a gangplank (23) extending from the shore (6) to the wharf (5).



*Fig. 2*

**EP 0 351 679 A2**

## FIXING STRUCTURE PARTICULARLY FOR FLOATING WHARVES

The present invention relates to a fixing structure particularly for floating wharves.

As known, moorings for boats, provided by using floating wharves, have long been commercially available; such solutions are alternative to concrete piers and satisfy the requirements of being quick to construct, allowing modifications and having reduced equipment and operating costs.

Floating wharves must be coupled to fixed points, so as to remain in place under the action of the wind, waves and the traction forces imparted by the moored boats, though they must be able to perform vertical excursions which vary in extent as a function of the height of the waves and of the variability of the water level.

Moorings blocks made of concrete are currently used for fixing; such blocks are placed on the sea bed or lake bed and constitute fixed points to which the wharves are connected by means of connecting cables and chains. This kind of solution, however, allows lateral movements of the pier which vary in extent according to the length of the chains and changes in water level.

Another kind of fixing consists in providing poles driven into the sea bed or lake bed, to which the wharf is connected by means of guiding rings which allow it to slide vertically.

However, the above described solutions cannot be used in many cases, such as for example in lake beds or sea beds which are very deep or which have considerable depth gradients.

Other difficulties arise if the anchorage of the poles or the correct placement of the mooring blocks is excessively expensive or impossible.

Considerable difficulties are furthermore currently encountered when fixing floating wharves which are arranged parallel to the quay and in which boats are moored only on one side.

The aim of the invention is indeed to solve the above described problems by providing a fixing structure for floating wharves which can be provided simply and rapidly by performing the assembly with operations which can be performed exclusively on land.

Within the scope of the above described aim, a particular object of the invention is to provide a fixing structure which keeps the wharf firmly in place, avoiding any lateral movements.

Another object of the present invention is to provide a fixing structure which is particularly suitable especially for those cases in which the wharf is provided parallel to the quay and with the boats moored only on one side.

A not least object of the present invention is to provide a fixing structure which is easily obtainable

from commonly commercially available elements and materials and which is furthermore advantageous from a merely economical point of view.

The above described aim, as well as the objects mentioned and others which will become apparent hereinafter, are achieved by a fixing structure particularly for floating wharves, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic top plan view of the wharf;

figure 2 is an enlarged-scale top plan view of a detail of the wharf coupled to a quay;

figure 3 is a sectional view of the coupling of the wharf with different water levels;

figure 4 is an exploded perspective view of the coupling between the oscillatable rods and the wharf;

figures 5 and 6 are partially sectional views of the pivotal connection of the oscillatable rods respectively to the wharf and to the shore;

figures 7 and 8 are respectively a plan view and a sectional view, taken along a vertical plane, of the coupling of the gangplank to the wharf.

With reference to the above described figures, the fixing structure particularly for floating wharves, according to the invention, is constituted by a plurality of oscillatable rods or beams, generally indicated by the reference numeral 1, which have, at their ends, a pair of eyelets indicated by the reference numeral 2 for pivoting to a coupling eyelet 3 provided with a plate 4 which allows the eyelet 3 to be fixed to the wharf 5 and to the shore, which is generally indicated by the reference numeral 6.

The coupling is performed by means of a pivoting pin 8, with the interposition of a bearing or sleeve 9 made of self-lubricating plastic material and possibly reinforced with glass fiber, which has the function of providing a silencing element.

Gussets 10 are coupled to the rods at the coupling flange 2a from which the eyelets 2 extend, and constitute a fixed point for cables or bracing tension elements 11 which are arranged so as to keep the rods firmly in place.

The device furthermore comprises a bracket 20 which is associable with the floating wharf 5 and has an eyelet like seat 21 which allows to pivot the gangplank 23 by means of a bush 22.

With this kind of coupling, provided by means of the oscillatable rods, it is possible to correctly arrange the floating wharf with respect to the quay or shore 6, furthermore providing the great advantage of allowing to easily follow the various level oscillations of the water level, as illustrated schematically in figure 3.

Another important aspect of the invention is furthermore constituted by the fact that the coupling work may be performed directly from the shore with rapid and simple operations.

Another important aspect of the invention is constituted by the fact that it is possible to apply a number of rods which is a direct function of the operating conditions and of the size of the floating wharf.

In practice, the materials employed, so long as compatible with the specific use, as well as the dimensions and contingent shapes, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

## Claims

1. Fixing structure, particularly for floating wharves, characterized in that it comprises a plurality of oscillatable rods (1) which are pivoted, at their ends, respectively to the wharf (5) and to the shore (6).

2. Fixing structure, according to the preceding claim, characterized in that said rods (1) are provided, at their axial ends, with flanges (2a) from which a pair of eyelets (2) extends.

3. Fixing structure, according to the preceding claims, characterized in that it comprises a pivoting eyelet (3) provided with a base plate (4) for coupling to the wharf (5) and to the shore (6), said eyelet (3) being associable, by means of a pivoting pin (9), with said eyelets (2) provided on the rods (1).

4. Fixing structure, according to one or more of the preceding claims, characterized in that it comprises bearings (9) made of self-lubricating plastic material interposed between said pivoting pin (8) and said eyelets (2,3).

5. Fixing structure, according to one or more of the preceding claims, characterized in that it comprises brackets (20) which can be fixed to said wharf (5) and are provided with a seat (21) for the pivoting of the end of the gangplank (23).

6. Fixing structure, according to one or more of the preceding claims, characterized in that it comprises, at the ends of said oscillatable rods (1), gussets (10) for coupling cables or crossed tension elements (11) adapted to act as bracing for said oscillatable rods (1).

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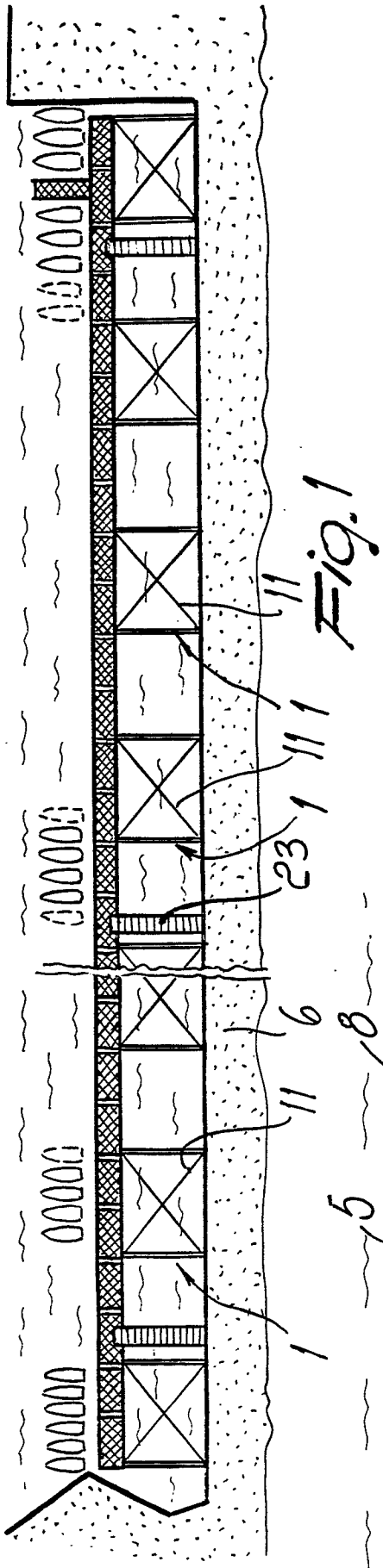


Fig. 1

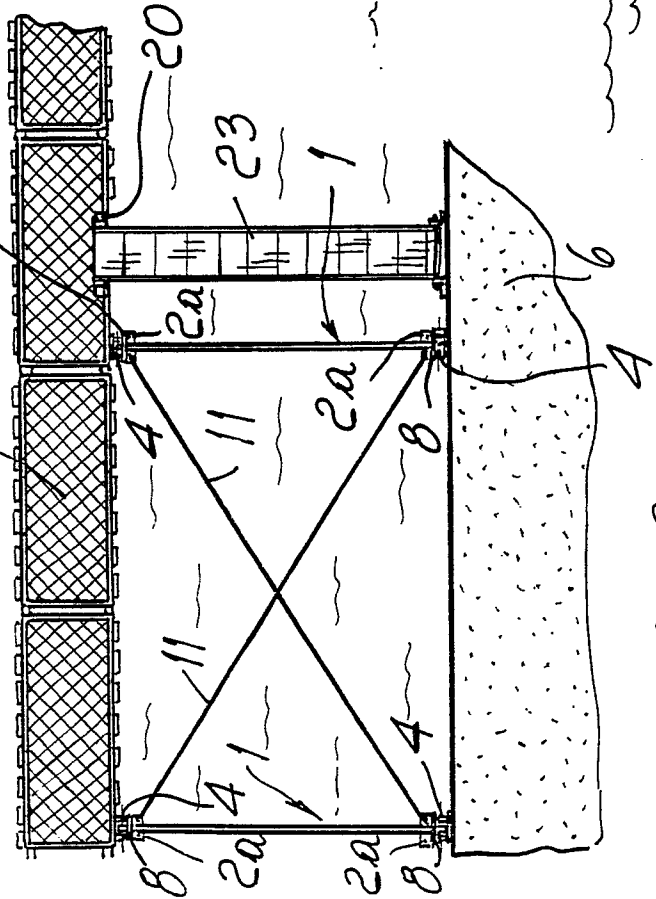


Fig. 2

Fig. 3

