DEVICE FOR EXTENDING A DRYDOCK

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2 Claims

ABSTRACT OF THE DISCLOSURE

A device for extending a drydock. The device has an extension having a body portion with a generally U-shaped rectangular cross section which is the same as the cross section of the drydock to be extended, a drydock gate over one end thereof, and the other end being adapted to be engaged against and sealed to the end of the drydock at the water's edge. The body portion has bottom and side walls with ballast tanks therein. Bases are provided adapted to be mounted on the bottom of the body of water adjacent the mouth of the drydock to be extended and on which the extension rests with the inside surface of the bottom level with the surface of the inside of the surface of the bottom of the drydock. Wiring fixtures are positioned on the shore adjacent the drydock and the bottom of the body of water adjacent the drydock, and wire ropes or the like are attached between the extension and the wiring fixtures for securing the extension against the forces of the tides, winds and the like.

This invention relates to a device for extending a drydock.

The usual way to increase the length of a drydock is either to dig farther into the shoreline or build the dock longer at the inner end thereof, or to build up an embankment in the water around the drydock entrance. These methods, however, are very expensive and require much time for the construction work, and use of the drydock has to be suspended for too long a time. Moreover, once a drydock has been thus extended, there is the disadvantage that a great quantity of water in the thus extended part has to be evacuated in addition to the water in the original dock when a small ship is docked.

It is an object of the present invention to provide an extension which can be attached to the end of the drydock at the water's edge when it is needed, and can be detached and moved away when it is not needed.

It is a further object of the invention to provide a drydock extension which is relatively inexpensive as compared to extending the inland end of the drydock or building a wall around the end at the water's edge, and which can be quickly attached to the drydock so that the drydock is out of use only a short time.

These objects are achieved by a drydock extension which is comprised of a generally U-shaped rectangular cross section body portion having ballast tanks in the bottom and side walls and having a drydock gate over one end thereof, the other end being adapted to be engaged against and sealed to the end of a drydock at the water's edge. Bases are provided in the bottom of the body of water adjacent the mouth of the drydock on which the extension rests with the inside surface of the bottom level with the surface of the inside of the drydock. Wire ropes or the like are attached between the extension and wiring fixtures on the shore and the bottom of the body of water for securing the extension against the forces of the tides, winds and the like.

The invention will now be described in the following specification together with the accompanying drawings, in which:

FIG. 1 is a vertical sectional view of an extended drydock showing the extension according to the invention in place;
FIG. 2 is a plan view of the dock of FIG. 1;
FIG. 3 is a view similar to FIG. 1 showing the process of placing the extension in place; and
FIG. 4 is a sectional view showing a further way of securing the extension according to the invention to an embankment.

In FIG. 1 and FIG. 2, a drydock 1 which is to be extended is shown as being excavated from a bank on the shore. A buoyant drydock extension 2 is attached to the drydock 1 and watertight packings 3 are inserted between the opposed edges of the drydock walls and bottom and the walls and bottom of the drydock extension 2.

The drydock extension 2 is a generally rectangular U-shaped body having the same cross sectional size and shape as the drydock 1 and is made of the same material and is constructed the same as the gate of an ordinary drydock. Ballast tanks 6 are provided in the sides and bottom and a dock gate 5 is fitted over one end of the body at the end remote from the end to be attached to the drydock 1. In practice, the walls and bottom of the extension 2 constitute the ballast tanks. Mounted on the tops of the side walls of the body near the gate end thereof are wire rope attaching fixtures 9 for the attachment of wire ropes thereto for holding the dock extension 2 in place.

Bases 4 are positioned in the bottom of the body of water adjacent the drydock 1, and the extension 2, when it is in position, rests on the bases so that the inside bottom surface thereof is level with the bottom surface of the drydock 1.

Wire ropes 7 or the like extend from the fixtures 9 to like fixtures 8 both on the shore and in the bottom of the body of water off shore, the fixtures 8 being spaced laterally of the drydock 1, and the ropes 7 can be tightened by winches or the like (not shown).

When the extension 2 is in position against the end of the drydock 1, it is subjected to vertical forces A and A' due to the buoyancy of the water and the weight of the ship in the drydock, as well as the rising and falling tides, and is subjected to lateral force C due to the weight of water against the gate 5.

The vertical forces A and A' are balanced primarily by ballasting the extension body by ballast in the tanks 6, and secondarily by the vertical component of the tension in the ropes 7. The lateral forces B and B' are taken up by the horizontal lateral component of the tension in the ropes 7. The force C is at first supplied by the tension in the ropes 7 until the water is evacuated from the drydock and the extension, at which time the pressure of the water against the gate 5 produces the force C.

The process of attaching the extension 2 to the drydock 1 being with the floating of the extension 2, with the ballast tanks empty or nearly so that the extension is buoyant, in position with the end edges of the walls of the extension 2 opposed to and aligned with the end edges of the walls of the drydock 1 (FIG. 3 position). The packing can be previously provided either on the extension 2 or drydock 1. The ballast tanks are then gradually filled and the extension sinks until it rests on the bases 4. If desired, guide means can be provided on either the drydock 1 or the extension to guide the movement of the extension 2.

After the extension 2 is properly seated on the bases 4, the ropes 7 are tightened in order to hold the extension tightly against the drydock 1. The extended drydock is then ready to receive a ship. The docking of a ship in the extended drydock is carried out in exactly the same way as with the unextended drydock, i.e. the gate 5 is removed, the ship moved into the water filled dock, the
gate closed and the water pumped out of the dock. During the time the water is being pumped out, the ballast in the tanks 6 is regulated so that the buoyancy of the extension 2 is kept at a safe value.

It will be seen that after the water in the dock has been pumped out, the pressure of the water against the dock gate 5 at C reinforces the connection of the two parts of the dock with each other and assures the water tightness of the packing 3.

It is thus seen that all that is necessary to extend an existing drydock is to build an extension 2 and the bases 4. This can, of course, be done while the dock is in use for a smaller ship. Where the extension 2 is already available, all that is necessary is to build the bases 4.

Many changes and additions will readily suggest themselves to those skilled in the art. For example, the amount of ballast in the tanks 6 must be adjusted as the tide rises and falls. It is a simple matter to automate this adjusting of the ballast. Moreover, it is easily possible to provide two or more extensions 2, and second and successive ones having one edge complementary to the door receiving edge of the first, so that they can be attached in a line to the drydock 1, and the gate 5 positioned only in the last or most remote extension from the drydock 1. Sufficient bases can easily be provided for the multiple extensions.

A method for securing the extension 2 more safely to the drydock where an embankment for mooring ships is built outwardly from the end of the drydock and parallel to the center line of the drydock 1, and a suitable means for fixing the extension 2 side by side to the embankment is provided, is shown in FIG. 4.

The extension 2 is provided with holes 11 at the top of one side and grooves 12 at the bottom of the same side, which side is adjacent the embankment 10. Removable pins 13 engaged with the top of the embankment are engaged in holes 11 and projections 14 rigidly secured in the earth at the bottom of the embankment are engaged in groove 12 at the bottom of the side. The bases 4 and at least some of the fixtures 8 and wire ropes 7 are also provided (not visible in FIG. 4).

What is claimed is:

1. A device for extending a drydock, comprising an extension having a body portion with a generally U-shaped rectangular cross section which is the same as the cross section of the drydock to be extended, a drydock gate over one end thereof, and the other end being adapted to be engaged against and sealed to the end of the drydock at the water's edge, said body portion having bottom and side walls with ballast tanks therein, bases adapted to be mounted on the bottom of the body of water adjacent the mouth of the drydock to be extended and on which the extension rests with the inside surface of the bottom level with the surface of the inside of the surface of the bottom of the drydock, wiring fixtures on the shore adjacent the drydock, and wire ropes or the like attached between the extension and the wiring fixtures for securing the extension against the forces of the tides, winds and the like.

2. A device as claimed in claim 1 further comprising means on said extension for securing the extension in side by side parallel position relative to an embankment extending outwardly from the end of the drydock parallel to the centerline of the drydock.

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