ABSTRACT: A hopper barge comprises two longitudinal buoyancy chambers hinged together beneath the deck and defining over a part of their lengths a passageway interposed therebetween, which chambers can be adjusted relative to each other by means of at least one hydraulic cylinder located above the deck and hingedly connected thereto. According to the invention, the or each hydraulic cylinder has both the hinged connection of the piston rod and the hinged connection of the cylinder to the associated barge section spaced the same distance from the vertical longitudinal center plane of the barge and located near the middle of the piston rod and the middle of the cylinder, respectively.
HOPPER BARGE

The present invention relates to a hopper barge comprising two longitudinal buoyancy chambers hinged together beneath the deck and defining over a part of their length a passageway interposed therebetween, which chambers can be adjusted relative to each other by means of one or more hydraulic cylinders located above the deck and hingedly connected thereto.

Barges of this type are known, for example from Dutch Patent specification No. 106,086. In these prior art barges it is conventional that of the or each hydraulic cylinder the cylinder and its associated piston rod, including a piston, are hingedly coupled with their distal ends to bearing brackets mounted on the deck of the adjoining barge sections. In the building of barges of the subject type, with ever increasing dimensions, both lengthwise and breadthwise, the requirements imposed on the hydraulic cylinders are becoming increasingly stricter, and particularly so to prevent the hydraulic cylinders from flexing downwards to an unduly high extent in the region the piston rod forces itself into the associated cylinder, which would enhance the danger of collapse when the cylinder is exposed to pressure.

In large barges, when in addition a large unloading opening is required, and in which high pressures are applied in the hydraulic cylinders, the cylinders become so heavy that, when the distal ends of the cylinder and its associated piston rod are hingedly connected to the vessel sections in the conventional manner, the safety regulations cannot be satisfied any longer.

It is an object of this invention to overcome the above-mentioned difficulties by an improved construction of a hydraulic cylinder for the present purpose and the greater possibilities for assembling resulting therefrom.

To this effect a hopper barge according to the present invention is characterized in that the or each hydraulic cylinder has both the hinged connection of the piston rod and the hinged connection of the cylinder to the associated barge section spaced the same distance from the vertical longitudinal center plane of the barge and located near the middle of the piston and the middle of the cylinder, respectively.

In illustration of this invention one embodiment of the hopper barge will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a front elevational of a part of the barge in its closed state, of which
FIG. 2 is a plan view;
FIG. 3 is a front elevation of the same part of the barge in its open state, of which
FIG. 4 is a plan view.

Referring to the drawings, the two barge sections 1 and 2, which are hinged together beneath the deck, are provided on deck with pairs of bearing brackets 3 and 4 which are to receive hingedly therein a hydraulic cylinder 5 consisting of a piston rod 6 and a cylinder 7. The bearings of the bearing brackets of the two barge sections are spaced the same distance from the longitudinal center plane of the barge.

The outwardly extending end of the piston rod 6 is firmly secured to the body 8 of a U-shaped beam. The legs 9 of this beam, which are parallel to the piston rod 6, have each of their free ends mounted for hinging movement in the associated bearing bracket 4 by means of a shaft 10 disposed near the middle of the piston rod.

The cylinder 7, near its middle, is firmly accommodated in a sleeve 11 which has two coaxial pivots 12 mounted for rotation in the bearing brackets 3.

By virtue of the piston rod and the cylinder being hingedly supported adjacent their middle portions in the manner described, the forces imposed on these parts, especially the bending moments caused by their weight, will be considerably more favorable than in the manner of hingedly coupling a hydraulic cylinder to the sections of a barge of the subject type, as has been conventional hitherto. This is even strengthened by the fact that counteracting moments come into being in the two halves of the piston rod, as a result of which the maximum bending moment of the hydraulic cylinder in the extended position is reduced to a minimum on account of its own weight.

I claim:

1. A hopper barge comprising two longitudinal buoyancy chambers hinged together beneath the deck and defining over a part of their length a passageway interposed therebetween, which chambers can be adjusted relative to each other by means of at least one hydraulic cylinder and piston assembly located above the deck and hingedly connected thereto, said assembly having both the hinged connection of the piston rod and the hinged connection of the cylinder to the associated barge section spaced the same distance from the vertical longitudinal center plane of the barge and located near the middle of the piston rod and the middle of the cylinder, respectively, the cylinder near its middle being provided with two coaxial radially extending pivots and the free end of the piston rod being firmly secured to the body of a U-shaped beam, the legs of said U-shaped beam extending on both sides of the piston rod in parallel relationship thereto and each of said legs being provided with coaxial hinge means adjacent the middle of the piston rod.

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