

PATENT SPECIFICATION

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(54) BOAT FOR COLLECTING FLOATING MATERIAL

(71) We, MITSUBISHI JUKOGYO KABUSHIKI KAISHA, a Japanese Body Corporate of 5-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a vessel for collecting floating material, such as refuse, from the surfaces of harbours, rivers and other bodies of water.

The present invention resides in a boat for collecting floating material, of twin-hulled construction and comprising a water-jet unit or units for producing a rearward flow of water from the forward part of a water channel defined between the hulls, and a collector for floating material, the or each said water-jet unit being in the form of a cylinder held horizontally across said channel adjacent to the bows of said hulls and controllably rotatable, said cylinder having a plurality of nozzles arranged to eject jets of water obliquely downwards means being provided for supplying water to the nozzles.

The present invention will be further described in connection with the accompanying drawings, in which:

Fig. 1 is a schematic side view, in vertical section, of a known boat for collecting floating material;

Fig. 2 is a plan view of the boat shown in Fig. 1;

Fig. 3 is a schematic side view, in vertical section, of a boat for collecting floating material, embodying the invention;

Fig. 4 is a plan view of the boat shown in Fig. 3;

Fig. 5 is a detail, partly in section, of the circled part V of Fig. 4; and

Fig. 6 is a cross-sectional view taken on the line VI—VI of Fig. 5.

Figs. 1 and 2 show a twin-hulled boat with a semi-submerged rotor *a* supported by the bows of the twin hulls and adapted to rotate and induce a current of water with which

floating matter in front of the bows is attracted and forced into the channel *b* formed between the hulls and thence into a collecting cage *c* held in a downstream part of the channel.

The rotor *a* can be damaged by collision with solid floating matter. It is unable to create a current strong enough to collect floatage satisfactorily. Moreover, the rotor may cause a backflow if it is submerged past its center of rotation.

Figs. 3 and 4 show a twin-hulled boat having external-water suction ports 2 formed, one for each, on the rear inner sides of the twin hulls facing each other across the interhull water channel 1. Each of the suction ports 2 is connected through a line 4 to the suction side of a pump 3 driven by the main engine of the boat or by an exclusive prime mover.

The suction ports 2 may be provided with suitable guide plate means so that they can draw in water by suction from the upstream or forward part of the channel and thereby produce streams directed downstream or rearwardly of the vessel.

Above the front part of the channel 1, a first water-jet unit 8 and a second water-jet unit 9 are held horizontally between the inner sides of the bows of the twin hulls, both units being connected to the discharge sides of the pumps 3 via lines 5 and valves 6, 7, respectively.

As shown better in Figs. 5 and 6, the first water-jet unit 8 is an elongated cylinder mounted horizontally with a row of nozzles 8*a* to emit jets of water obliquely rearwards and downwards. Flanges 8*b* formed at both ends of the cylinder are supported rotatably by cylindrical stationary bearings 10 through seals 11, each of the bearings being integral with a line 6*a* connected to the valve 6.

Thus, water from each line 6*a* is admitted to the water-jet unit 8 through the cylindrical stationary bearing 10 and the flange 8*b* at one end of the cylinder. The seals 11 interposed between the bearings and flanges permit rotation of the water-jet unit 8 without the danger of water leakage.

The rotation of the water-jet unit 8 is controlled by driving pinions 12 in mesh with gear wheels 8c fixedly formed on the peripheries of the flanges 8b, by means of suitable drives. In this manner the directions of the water jets from the nozzles 8a can be controlled as desired.

The first water-jet unit 8 is mounted between the bows of the twin hulls of the vessel so that the water jets from the nozzles 8a may be primarily used to draw in and guide the floating matter to be collected.

Like the first water-jet unit, the second unit 9 has a bank of nozzles adapted to eject jets of water obliquely rearwards and downwards and is rotatable about its horizontal axis. It is located slightly behind the first unit 8, and the jets of water from this second unit are intended principally to induce a combined backward flow of water from the forward end of the channel 1.

In the channel 1, a collector 13 in the form of a refuse-collecting screen cage is partly submerged and is liftable by hoist means 14 aboard the vessel. Forward of the collector there is submerged a stationary or movable water guide plate 15 comprising either a solid plate or meshwork supported by the twin hulls.

Although two water-jet units 8, 9 are used in the embodiment being described, it is possible of course, to replace these units by a single unit or more than two units.

The boat operates as follows. When the boat meets floating matter to be collected, the collector 13 is lowered into the interhull channel 1, and the pumps 3 are driven to eject jets of water from the water-jet units 8, 9 obliquely against the water surface. The jets of water then force and guide the floating matter efficiently into the channel 1 and thence into the collector 13 for recovery.

Adjusting the openings of the valves 6, 7 controls the rate of water delivery for jetting. Also, the directions of the water jets are controllable by rotating the units 8, 9 to suitable angles relative to the water surface. Thus, the collecting operation can be efficiently performed under conditions best suited for the type of floating matter to be handled, speed of the vessel, sea conditions, etc.

Since the boat does not use any device like the semi-submerged rotor of the collecting vessel shown in Figs. 1 and 2, there is no possibility of damage by floating matter, and a desired current of water is produced most efficiently and safely with the jets of water ejected obliquely rearwards and downwards from the nozzles of the water-jet unit or units held across the space above the forward part of the channel.

WHAT WE CLAIM IS:—

1. A boat for collecting floating material, of twin-hulled construction and comprising a water-jet unit or units for producing a rearward flow of water from the forward part of a water channel defined between the hulls, and a collector, for floating material, the or each said water-jet unit being in the form of a cylinder held horizontally across said channel adjacent to the bows of said hulls and controllably rotatable, said cylinder having a plurality of nozzles arranged to eject jets of water obliquely downwards, means being provided for supplying water to the nozzles.
2. A boat as claimed in claim 1 including means for extracting water from the body of water in which the boat floats, in operation, and for supplying it to the nozzles.
3. A boat according to claim 1, wherein said hulls also comprise pumps capable of pumping up water from the body of water along side the vessel, and said water-jet unit is or units are connected to the discharge sides of said pumps.
4. A boat according to claim 1, 2 or 3 wherein the or each said water-jet unit is rotatably supported at both ends of said cylinder by respective supports on said hulls, with the rotation of said unit being controlled by drive means.
5. A boat for collecting floating material, substantially as herein described with reference to Figs. 3 to 6 of the accompanying drawings.

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The first water-jet unit 8 is mounted between the bows of the twin hulls of the vessel so that the water jets from the nozzles 8a may be primarily used to draw in and guide the floating matter to be collected.

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In the channel 1, a collector 13 in the form of a refuse-collecting screen cage is partly submerged and is liftable by hoist means 14 aboard the vessel. Forward of the collector there is submerged a stationary or movable water guide plate 15 comprising either a solid plate or meshwork supported by the twin hulls.

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