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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Surface Sweeping Ship

We, MITSUBISHI JUKOGYO KABUSHIKI KAISHA, a Japanese corporation, of No. 10, 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 surface sweeping ship for removing debris and oil floating on the surface of or suspended in water in harbors, rivers, lakes and the like.

According to the present invention there is provided a surface sweeping ship characterized in that the ship is provided in its middle portion in end view with a longitudinal hollow space permitting water to flow therethrough, in which space is arranged a conveyor belt which is so inclined upwardly in the forward direction of the ship that in use its forward part is exposed above the surface of the water to be swept and its rearward part is submerged in said water, there being means for driving the conveyor belt so that its lower run moves toward the stern of the ship, means provided in association with that part of the belt which is exposed above the water surface for scraping from and collecting material adhering to the belt, and means for collecting floating or suspended debris arranged behind said conveyor.

This invention will now be explained in detail with reference to an embodiment schematically shown in the accompanying drawing, in which

Fig. 1 is a longitudinal section view of the embodiment of this invention,

Fig. 2 is a plan view of the embodiment,

Fig. 3 is a sectional view along line III—III in Fig. 1 and

Fig. 4 is a sectional view along line IV—IV in Fig. 1.

Referring to the drawing, 1 denotes generally the ship body of a surface sweeping ship according to this invention. The ship body includes two spaced apart pontoons 1a, 1b which

are connected together by a bottom plate 2, a stern plate 3 etc. Each of the pontoons 1a, 1b is divided by transverse partition walls 4, 5 into a middle oil tank 6, a front buoyancy tank 7 and a rear buoyancy tank 7. In the front half of the ship body 1 an inclined conveyor belt 9 is so arranged in the space between the pontoons 1a and 1b that with respect to the normal water line WL of the ship body approximately the front half of the conveyor belt 9 is above, and the rear half is below, the water line WL. The endless belt 9 is driven, in the direction shown by arrows A and A' in the drawing, by drive rollers through a suitable transmission device from a prime mover 11 installed on the upper deck of the ship.

At the front end of the ship body an oil sump 12 is so arranged in the vicinity of the upper deck as to touch with the top of its rear end wall 13 the downwardly facing surface of the lower run of the conveyor belt 9. The oil sump 12 communicates through rearwardly inclined oil delivery pipes 14, 14 with the oil tanks 6, 6 in the respective pontoons. A box-shaped wire rope net 16 is inserted into a cubic hollow space formed by the rear parts of the pontoons, the stern plate 3 and a transverse partition wall 15. The wall 15 extends from the upper deck downwardly to the vicinity of the lower end of the conveyor belt 9 and is located at the middle portion of the longitudinal hollow space between the pontoons 1a, 1b.

This wire rope net 16 is open at the front and top and is provided on its upper edges with a plurality of eyelet rings 17, 17 for suspension, so that the wire net 16 can be lifted out of or lowered into the ship body by a hoisting apparatus 18 installed optionally on the ship or elsewhere. Raking blades 19, 19 which extend above and below the water line WL are pivoted to the outside edge of the front end of the ship body so as to be capable of being held in the position shown in Fig.

ship

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2 by struts 20, 20 during sweeping of the water surface by the ship. The stern plate 3 is provided with openings 21, 21 for permitting water to flow therethrough, as well as with a bracket 23 for mounting an outboard motor 22. An in-board motor could, of course, be used if desired.

In use of the sweeping ship constructed as described above, the ship is propelled by the outboard motor 22 to a desired stretch of water with the raking blades 19, 19 positioned in close contact with the respective outsides of the pontoons 1a, 1b as shown by chain lines in Fig. 2 of the drawing. Water which enters the middle hollow space between the pontoons 1a, 1b from the front end opening of the ship body flows through the openings 21, 21 in the stern plate 3. After the ship reaches the stretch of water to be swept the raking plates 19, 19 are swung forwardly to extend angularly outwardly and are fixed in this position by the struts 20, 20 as shown by full lines in Fig. 2. The prime mover 11 is then started to move the conveyor belt 9 in the direction shown by arrows A, A¹ in Fig. 1, i.e., with the lower run travelling rearwardly, while the ship is moved forward slowly by running the outboard motor 22 at a low speed. Thus, debris and oil floating on or suspended in the water in front of the ship are gathered by the raking plates 19, 19 and fed into the space between the pontoons so that the oil and debris encountered the underside of the lower run of the conveyor belt 9 which transports the oil and debris rearwards. Wood-pieces and other debris float up again behind the conveyor 9 and are collected in the wire rope net 16 through the open front end of said net 16. Oil which encounters the underside of the lower run of the belt adheres to the belt very effectively and is carried along the upper run of the conveyor belt from which it is scraped by the upper edge of the rear wall 13 of the oil sump 12 to be accumulated in this sump, from which the oil then flows through the oil delivery pipes 14,

14 into the oil tanks 6, 6. When as a result of sweeping debris, and oil are collected in amounts sufficient to fill, the wire rope net 16 and the oil tanks 6, 6 respectively, sweeping operation of the ship is stopped and the ship returns to port. The wire rope net 16 is brought out of the ship by a crane or the like to unload the debris while the oil is sucked up by a pump to be transported to a container on land.

WHAT WE CLAIM IS:—

1. A surface sweeping ship characterized in that the ship is provided in its middle portion in end view with a longitudinal hollow space permitting water to flow therethrough, in which space is arranged a conveyor belt which is so inclined upwardly in the forward direction of the ship that in use its forward part is exposed above the surface of the water to be swept and its rearward part is submerged in said water, there being means for driving the conveyor belt so that its lower run moves toward the stern of the ship, means provided in association with that part of the belt which is exposed above the water surface for scraping from and collecting material adhering to the belt, and means for collecting floating or suspended debris arranged behind said conveyor.

2. A surface sweeping ship as claimed in claim 1, and including means provided at the front of the ship for raking into said space during forward motion of the ship oil and debris floating on or suspended in the water before the ship, and a tank arranged in the ship for receiving material scraped from said belt.

3. A surface sweeping ship substantially as hereinbefore described with reference to the accompanying drawing.

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2 by struts 20, 20 during sweeping of the water surface by the ship. The stern plate 3 is provided with openings 21, 21 for permitting water to flow therethrough, as well as with a bracket 5 23 for mounting an outboard motor 22. An in-board motor could, of course, be used if desired.

In use of the sweeping ship constructed as described above, the ship is propelled by the 10 outboard motor 22 to a desired stretch of water with the raking blades 19, 19 positioned in close contact with the respective outsides of the pontoons 1a, 1b as shown by chain lines in Fig. 2 of the drawing. Water which enters 15 the middle hollow space between the pontoons 1a, 1b from the front end opening of the ship body flows through the openings 21, 21 in the stern plate 3. After the ship reaches the stretch of water to be swept the raking 20 plates 19, 19 are swung forwardly to extend angularly outwardly and are fixed in this position by the struts 20, 20 as shown by full lines in Fig. 2. The prime mover 11 is then started 25 to move the conveyor belt 9 in the direction shown by arrows A, A¹ in Fig. 1, i.e., with the lower run travelling rearwardly, while the ship is moved forward slowly by running the outboard motor 22 at a low speed. Thus, debris and oil floating on or suspended in the water in 30 front of the ship are gathered by the raking plates 19, 19 and fed into the space between the pontoons so that the oil and debris encountered the underside of the lower run of the conveyor belt 9 which transports 35 the oil and debris rearwards. Wood-pieces and other debris float up again behind the conveyor 9 and are collected in the wire rope net 16 through the open front end of said net 16. Oil which encounters the underside of the lower run of the belt adheres to the belt very effectively and is carried 40 along the upper run of the conveyor belt from which it is scraped by the upper edge of the rear wall 13 of the oil sump 12 to be accumulated in this sump, from which the oil 45 then flows through the oil delivery pipes 14,

14 into the oil tanks 6, 6. When as a result of sweeping debris, and oil are collected in amounts sufficient to fill, the wire rope net 16 and the oil tanks 6, 6 respectively, sweeping 50 operation of the ship is stopped and the ship returns to port. The wire rope net 16 is brought out of the ship by a crane or the like to unload the debris while the oil is sucked up by a pump to be transported to a container on land. 55

WHAT WE CLAIM IS:—

1. A surface sweeping ship characterized in that the ship is provided in its middle portion in end view with a longitudinal hollow space 60 permitting water to flow therethrough, in which space is arranged a conveyor belt which is so inclined upwardly in the forward direction of the ship that in use its forward part is exposed above the surface of the water to be swept and its rearward part is submerged 65 in said water, there being means for driving the conveyor belt so that its lower run moves toward the stern of the ship, means provided in association with that part of the belt which is exposed above the water surface for scraping 70 from and collecting material adhering to the belt, and means for collecting floating or suspended debris arranged behind said conveyor.

2. A surface sweeping ship as claimed in claim 1, and including means provided at the 75 front of the ship for raking into said space during forward motion of the ship oil and debris floating on or suspended in the water before the ship, and a tank arranged in the ship for receiving material scraped from said belt. 80

3. A surface sweeping ship substantially as hereinbefore described with reference to the accompanying drawing.

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