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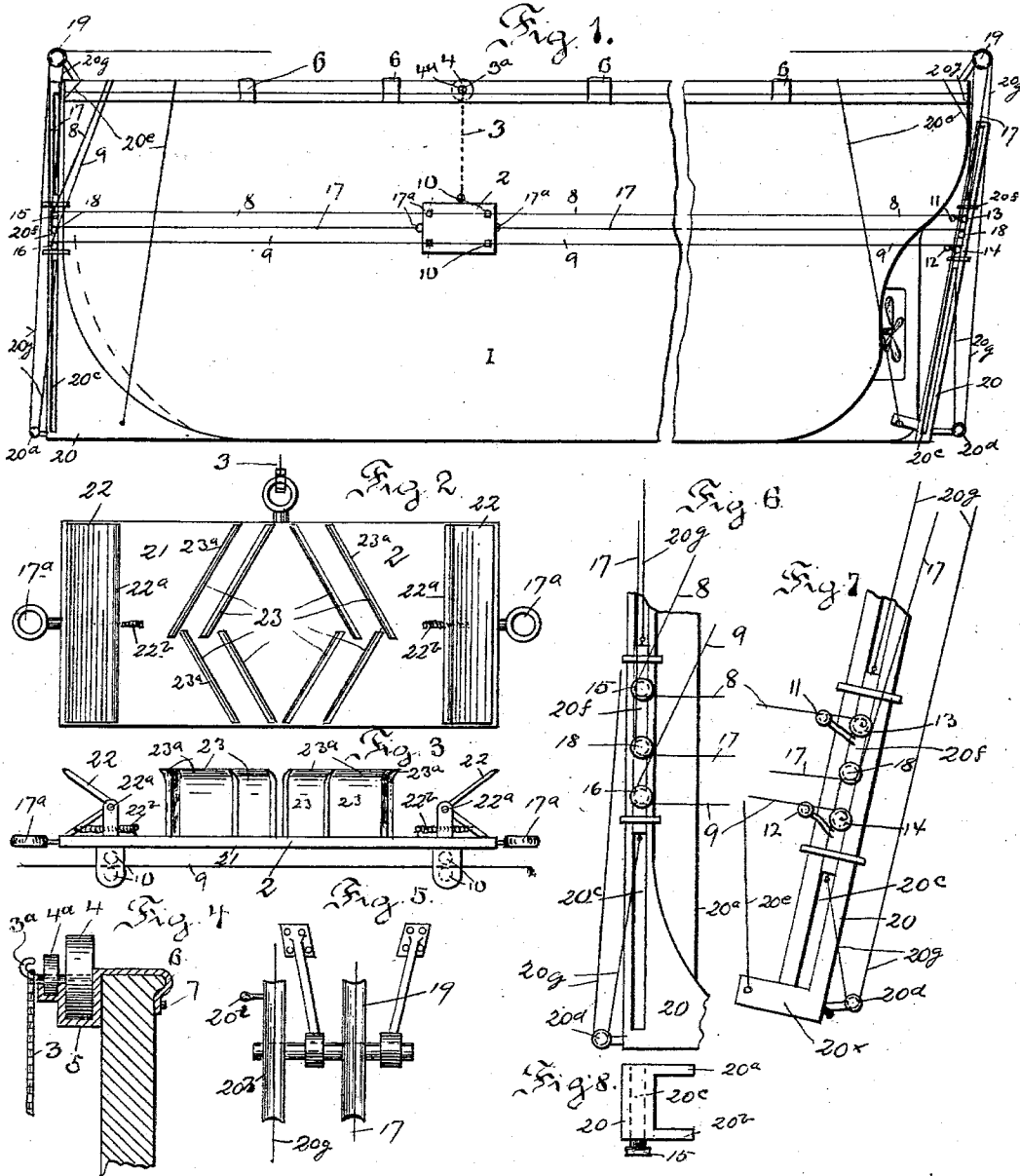
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E. COLE.

SHIP CLEANING DEVICE.

APPLICATION FILED JUNE 13, 1900. RENEWED JULY 21, 1903.

NO MODEL.



WITNESSES:

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SHIP-CLEANING DEVICE.

SPECIFICATION forming part of Letters Patent No. 752,142, dated February 16, 1904.

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To all whom it may concern:

Be it known that I, EDWARD COLE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Ship-Cleaning Devices, of which the following is a specification.

My invention relates generally to ship-cleaning devices, and more particularly to means utilized for the purpose of removing the marine growth which is constantly accumulating on the submerged portions of vessels.

Various attempts have from time to time been made to produce a practical device of the character described; but in all of these attempts the underlying idea has been to clean the vessel by passing a scraping device held under tension vertically up and down the hull of the ship to be cleaned. This method has been found to be impractical for several reasons, one obstacle residing in the fact that when it has been attempted to operate the scraping means by other than manual labor it has usually been found that the mechanism has not been adapted for such purpose, and accordingly it has been found necessary to use manual labor only, with the result of not obtaining enough power to effect the cleaning. Still another difficulty has been found in holding the scraping means with sufficient tension up against the side of the vessel, and, lastly, the means utilized to perform the actual scraping have been defective and unsuited for the work.

The object of my invention is to produce a device in which these defects are obviated and which embodies not alone a practical scraping means, but also an efficient mechanism for operating said scraping mechanism.

To this end my invention consists, broadly, in an adjustable scraping means peculiarly constructed, in adjustable means for suspending and holding said scraping means under tension against the side of the vessel, and in means for continuously moving said scraping means horizontally or longitudinally along the vessel, so as to scrape the hull of same in horizontal sections, and, finally, in means for adjusting the scraping means vertically up and down.

It also consists in the combination of cooperative elements hereinafter described.

While changes of course may be made without departing from the spirit of my invention or exceeding the scope of the claims, I have shown in the accompanying drawings what I consider the best embodiment of my invention.

In said drawings, Figure 1 is a side view of a vessel, showing my scraping device in working position and showing also the auxiliary means for operating the scraping device. Fig. 2 is a view of the under side of the scraping device. Fig. 3 is a side view of same. Fig. 4 is a detail view of the bulwark and the rail on which the guiding-wheels travel. Fig. 5 is a detail view of the pulleys located on the deck of the ship over which the guiding and operating ropes or cables pass. Figs. 6, 7, and 8 are detail views of the lower pulleys over which the guiding and operating ropes pass.

Similar letters of reference indicate corresponding parts in the different views.

I shall describe a ship-cleaning device embodying my invention and afterward point out the novel features in the claims.

1 indicates the hull, and 2 is the scraping device suspended by means of the graduated chain 3, attached to the hook 3^a, carried by the guiding-wheels 4 and 4^a, adapted to travel longitudinally in the double rail 5, which is fastened to the bulwark at intervals by suitable means, such as by clamps 6 and screws 7. This rail runs the entire length of the ship and conforms to the contour of the vessel. The scraping device travels horizontally or longitudinally on two horizontal cables or ropes 8 and 9, which pass through the pulleys 10. The ropes 8 and 9 pass over the pulleys 11 and 12 and are fastened with one end at 13 and 14, while at the other end they pass over the pulleys 15 and 16 and from thence up to the deck, where they are made fast in any suitable manner and from whence they can be adjusted when the scraping device is lowered or raised, it being of course always necessary to keep these ropes or cables taut. The scraping device is caused to travel back and forth longitudinally by means of the

ropes 17, fastened to the eyelets 17^a on either side of the scraper. These ropes pass over the pulleys 18 and up over the pulleys 19 on the deck of the vessel, from which they pass to the drums of a donkey-engine, (not shown,) by means of which latter the scraper is pulled back and forth longitudinally along the hull of the vessel, traveling on the ropes 8 and 9, which latter being located in the same vertical plane as the said scraper also hold the scraper under tension against the side of the vessel, which function the graduated chain also assists in, the wheels 4 and 4^a traveling, of course, as the scraper is moved. When one longitudinal section of the ship has been cleaned, it becomes necessary to lower the device to the next section, and this is accomplished in the following manner: Attached to the bow and the stern of the vessel are two detachable guide-holders 20. One of these two guide-holders is made to clasp the bow with the two arms 20^a and 20^b, which may either be made fast temporarily with screws or by means of the ropes 20^c, as shown, and is further provided with a vertical guiding slot 20^e and with a pulley 20^d, located at its lower end. In this slot 20^e slides a vertically-adjustable guide 20^f, having attached the rope 20^g, which passes over the pulley 20^d and up over the pulley 20^h, which is operated by the hand-wheel 20ⁱ, whereby the guide is caused to travel up or down, according to the motion imparted. The guide-holder on the stern of the vessel is constructed in substantially the same way, with the exception that only the lower portion of the vessel is clasped by means of two short arms 20^k. The two guides 20^f carry the pulleys described above, and by their adjustment and the adjustment of the chain 3 the scraper can be worked at different heights.

The scraping device is composed of a flat plate 21, having on one side the pulleys 10 and the eyelets 17^a. On the other side it is provided with a plurality of knives for the removal of the barnacles. Of these knives the two outer ones, 22, are placed at right angles to the line of travel and pivoted, as at 22^a, and held in position against the surface over which the scraper travels by means of one or more springs 22^b. These springs are of a sufficient tension to enable the knives to cut the barnacles and remove the same, but are adapted when the knives strike an overlapping plate on the vessel to yield without injuring same and to lift the scraper over the projection. Besides these outer yielding knives there are a plurality of fixed and radially-placed knives 23. These knives 23 are set at an obtuse angle to the line of travel of the scraper and have their lower edges 23^a turned outward, one half of them in one direction and the other half in the other direction, so that the device will scrape when pulled to either side.

The scraper 2 may be made of the same width as the width of the plate of the ship, so that one plate will be scraped and cleaned its entire length with each manipulation of the scraper, and to this end the chain 3 may be graduated to lower it just a sufficient distance each time.

It is of course obvious that two scraping devices may be employed and two operating mechanisms utilized, one on each side of the ship; but as its construction would be identical with the one just noted there is no necessity for repeating the description.

From the above it will appear that by my construction an efficient, practical, and easily-adjustable cleaning mechanism has been produced.

What I consequently claim as new, and desire to secure by Letters Patent, is—

1. In a ship-cleaning device, the combination of a scraping mechanism, a vertically-adjustable and longitudinally-extending suspending means adapted to remain stationary while the scraping mechanism travels over the same, and an adjustable, vertical suspending means adapted to travel longitudinally with the scraping mechanism, substantially as described.

2. In a ship-cleaning device, the combination of a scraping mechanism, a vertically-adjustable and longitudinally-extending suspending means adapted to remain stationary while the scraping mechanism travels over the same, an adjustable, vertical suspending means adapted to travel longitudinally with the scraping mechanism, and means for effecting a back-and-forth movement of the scraping mechanism, substantially as described.

3. In a ship-cleaning mechanism, the combination of a rail adapted to be suspended from the bulwark and provided with bearing portions of different heights, with a plurality of guiding-wheels of a number equal to the number of different bearing portions of the rail, and corresponding in size to said bearing portions and adapted to travel freely over same, substantially as described.

4. In a ship-cleaning device, the combination of a scraping mechanism of the character set forth, with a vertically-suspending means adapted to travel longitudinally with the scraper, a plurality of horizontal guiding ropes or cables over which the scraping mechanism is adapted to travel, and means for effecting such movement, substantially as described.

5. In a ship-cleaning device, the combination of a scraping mechanism of the character set forth, with a graduated and vertically-adjustable suspending means adapted to travel longitudinally with the scraper, a plurality of horizontal guiding-ropes vertically adjustable, over which the scraping mechanism is adapted to travel, and means for effecting such movement, substantially as described.

6. In a ship-cleaning device, the combination of two detachable guide-supporters one each at the bow and stern of a vessel and adapted to be fastened there in a suitable manner, 5 a scraping device, a longitudinally-extending suspending means adapted normally to remain stationary and to form a support over which the scraper travels, means for causing the scraper to travel longitudinally over the 10 suspending means, and means vertically adjustable on the guide-supporters for adjusting the vertical position of the suspending means and of the means for operating the scraper, substantially as described.

15 7. In a ship-cleaning device, a scraping mechanism comprising a plate adapted to travel longitudinally over the hull of the vessel, two outer, pivoted scraping-knives adapted to yield to an excessive pressure, and a plurality of radially disposed and fixed scraping- 20 knives located intermediate between the outer yielding knives, the knives being so arranged that the scraper will perform its function when moved in either direction, substantially as described.

25 8. In a ship-cleaning device, a scraping mechanism comprising a plate adapted to travel longitudinally over the hull of the vessel, two outer, oppositely-located and pivoted 30 scraping-knives adapted to yield to an excessive pressure, and a plurality of radially-disposed and fixed scraping-knives located intermediate between the outer yielding knives, the knives being so arranged that the scraper 35 will perform its function when moved in either direction, substantially as described.

9. In a ship-cleaning device, a scraping mechanism comprising a plate adapted to travel longitudinally over the hull of the vessel, two outer, oppositely-located and pivoted 40 scraping-knives adapted to yield to an excessive pressure and placed at right angles to the

line of motion of the plate, and a plurality of radially-disposed and fixed scraping-knives located intermediate between the outer yielding 45 knives and placed at an obtuse angle to the line of travel of the plate, the knives being so arranged that the scraping mechanism will perform its function when moved in either direction, substantially as described. 50

10. In a ship-cleaning device, a scraping mechanism comprising a plate adapted to travel longitudinally over the hull of the vessel, two outer oppositely-located and pivoted 55 scraping-knives adapted to yield to an excessive pressure and placed at right angles to the line of motion of the plate, and a plurality of radially-disposed and fixed scraping-knives located intermediate between the outer yielding 60 knives and placed at an obtuse angle to the line of travel of the plate, one half of said fixed knives having their outer edges turned in one direction, while the other half have their outer edges turned in the opposite direction, whereby the scraping mechanism will 65 perform its function when moved in either direction, substantially as described.

11. In a ship-cleaning device, the combination with the hull of the vessel of a detachable guide-supporter, two arms extending from 70 said supporter adapted to be attached to either the bow or the stern of the vessel and to fit snugly over the same, a vertical guiding-slot in said supporter, a guide adapted to slide in said slot, and means for effecting the up-and- 75 down movement of the guide, substantially as described.

Signed at New York, in the county of New York and State of New York, this 12th day of June, A. D. 1900.

EDWARD COLE.

Witnesses:

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