

No. 699,144.

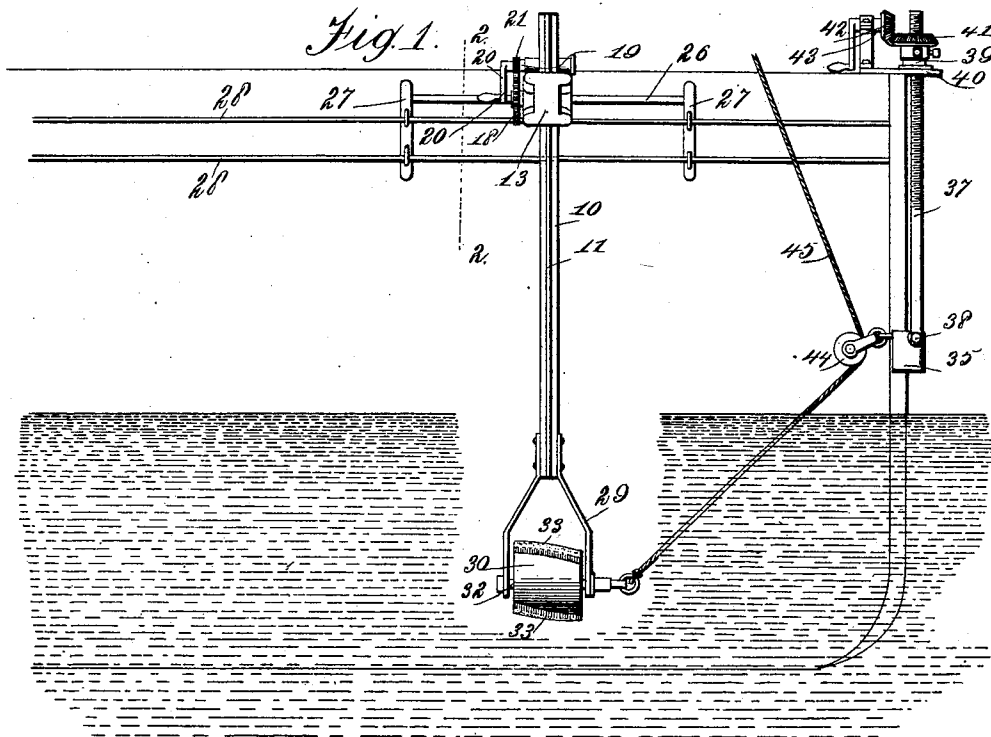
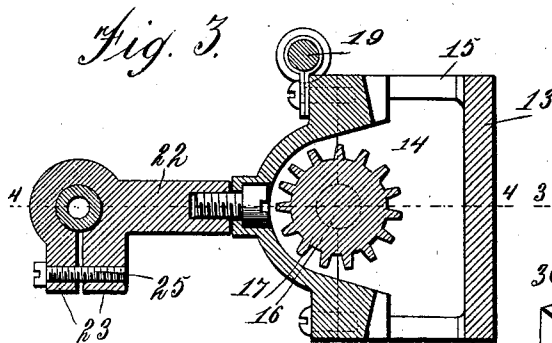
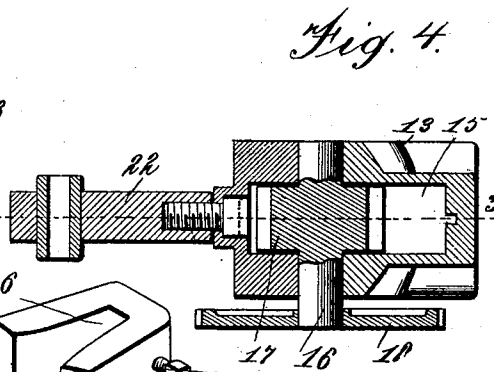
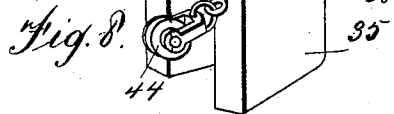
Patented May 6, 1902.

W. S. BURT.
MEANS FOR CLEANING SHIPS' HULLS.

(Application filed July 12, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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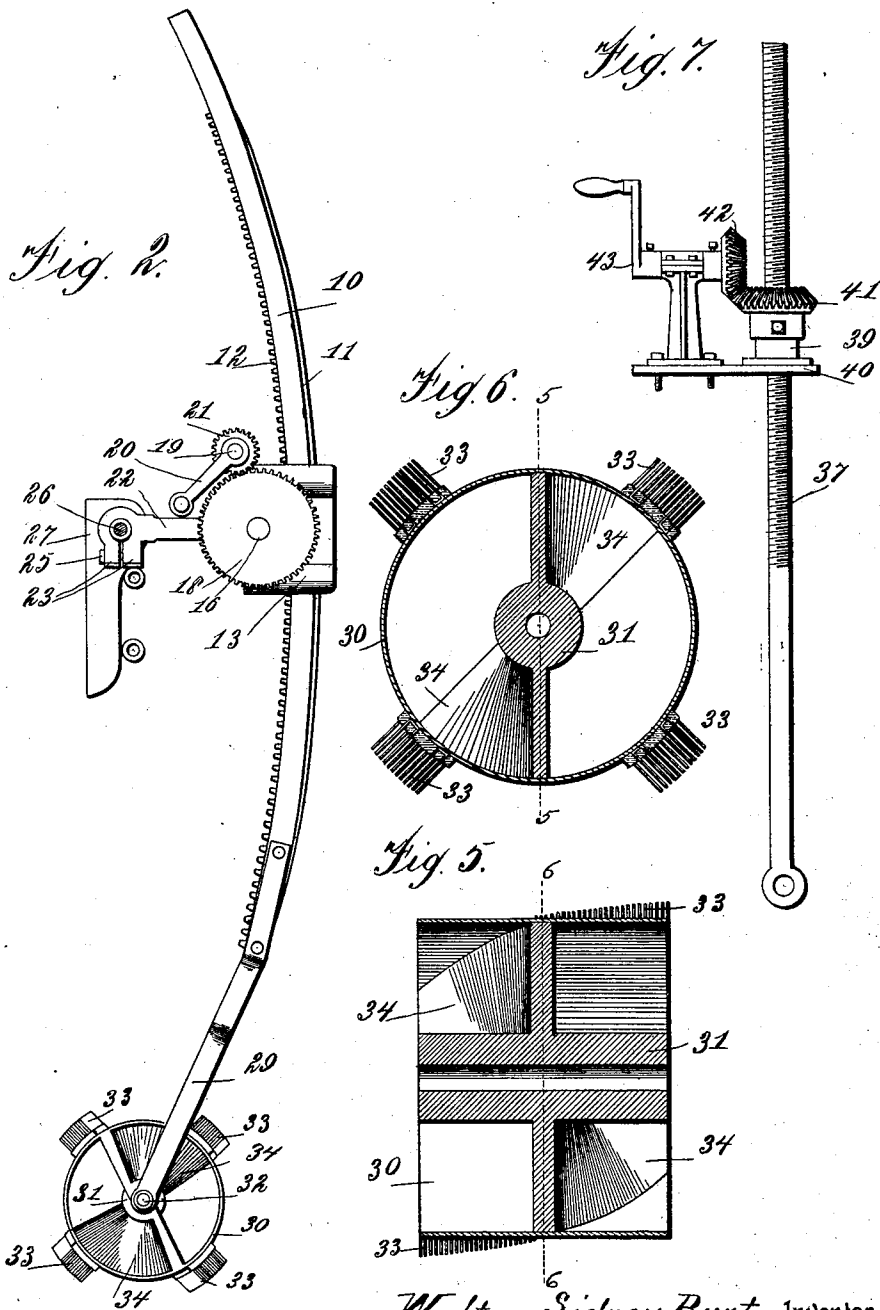
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UNITED STATES PATENT OFFICE.

WALTER SIDNEY BURT, OF ALBURY, NEW SOUTH WALES, AUSTRALIA.

MEANS FOR CLEANING SHIPS' HULLS.

SPECIFICATION forming part of Letters Patent No. 699,144, dated May 6, 1902.

Application filed July 12, 1901. Serial No. 67,948. (No model.)

To all whom it may concern:

Be it known that I, WALTER SIDNEY BURT, a subject of the King of Great Britain and Ireland, residing at Albury, New South Wales, Australia, have invented certain new and useful Improvements in Means for Cleaning Ships' Hulls; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in means for cleaning a vessel's hull; and the object in view is to provide a simple apparatus having its hull-cleaning element arranged to be submerged and rotated by the passage of water therethrough or thereover when the vessel is in motion.

Further objects are to provide means for raising, lowering, and adjusting in any direction the submerged cleaning element, to provide means arranged to stay the cleaning element against backward or other displacement by the action of water thereon, and to secure adjustment of such stay devices in conformity to the changes in position of said cleaning element.

With these ends in view my invention consists in the novel combination, construction, and arrangements of parts, which will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side view of a vessel with my hull-cleaner applied thereto. Fig. 2 is a transverse section on the line 2 2 of Fig. 1. Figs. 3 and 4 are transverse sections through the adjustable carriage, the plane of section of Fig. 3 being indicated by the dotted line 3 3 on Fig. 4 and the plane of section of Fig. 4 being indicated by the dotted line 4 4 on Fig. 3. Fig. 5 is a longitudinal section through the revoluble cleaning-cylinder. Fig. 6 is a cross-section thereof. Fig. 7 is a detail view of the spindle and the parts associated therewith. Fig. 8 is a detail perspective view of the bow-plate.

The same numerals of reference denote like parts in each figure of the drawings.

10 designates a carrier-rod which is preferably curved in the direction of its length and is intended to be arranged in a substantially upright position alongside of a ship's

hull. This carrier-rod is provided on its back edge with a longitudinal rib 11 and on its front edge with a toothed rack 12. Slidably fitted to the carrier-rod is a shiftable carriage 13, the same having a passage or opening 14 and a longitudinal slot 15, adapted to receive the rod 10 and the rib 11 thereof, respectively. The carrier-rod and its rib are slidably fitted in the carriage, so as to be capable of a free movement therein, the rib preventing the carriage-rod from having any tendency to twist in the carriage. A transverse shaft 16 is journaled in the carriage and provided with a gear-pinion 17, which is arranged to extend into the opening of the carriage and to have intermeshing engagement with the rack 12 of the carrier-rod. One end of said shaft 16 is extended or prolonged to receive a gear-wheel 18, the latter having intermeshing engagement with a gear-pinion 21, which is fixed on the crank-shaft 19. Said crank-shaft is journaled on the carriage and is adapted to be operated by hand through the agency of a crank 20.

22 designates a pivotal post, which is arranged to have a swiveled connection at one end with the carriage 13, said post extending outwardly from the carriage for a suitable distance. The other end of this post is formed with the jaws 23, which are joined together by a clamping-screw 25 and thereby made to form a clamp which may be compressed tightly around a transverse slide-tube. This slide-tube is fixed in the post to occupy a position at one side of the carriage and the carriage-rod, and said tube is slidably fitted on a substantially horizontal slide-rod 26, the latter being secured at its end portions in the pair of spaced bearing-bars 27. These bearing-bars are arranged to rest against the outside of the ship's hull, near the upper edge thereof, and said bars may be shiftable supported on the hull in any suitable way—for example, as by the ropes, cables, or rods 28, which may be stretched from bow to stern along the outside of the ship, whereby the bearing-bars are adapted to be slidably fitted on said ropes, cables, or rods, so as to support the cleaning mechanism in operative position and allow the cleaning mechanism to be shifted to different points along the ship. The lower part of the vertically-disposed

carrier-rod 10 is formed or equipped with the fork 29, which serves as a support for the revoluble cleaner-cylinder 30. This cleaner-cylinder is provided with a longitudinal hub 31, which is loosely sleeved on the cylinder-arbor 32, the latter being fixed in the fork 29 by any suitable means. The revoluble cleaner-cylinder is open at both ends and it is arranged generally in the direction of the length of the ship, whereby the front end of the cleaner-cylinder opens toward the ship's bow, thus disposing said cleaner-cylinder in a position for the water to rush therethrough when the ship is in motion. This cleaner-cylinder is provided with a plurality of cleaning elements, which are preferably embodied in the form of stiff metallic brushes disposed on the circumference of the cylinder and in positions to scrape against the surface of the ship's hull, so as to remove vegetable growths and other matters which may accumulate on the hull and which have a tendency to foul the latter. I employ a series of these cleaning elements, which are arranged equidistant on the surface of the cylinder, and these brushes are preferably made of stiff wires arranged to present active surfaces of considerable area. The rotary motion is imparted to the cylinder when the ship is moving through the water by the action of the water upon the spiral propellers 34, the latter being arranged within the cylinder and suitably joined to the hub and the inner circumference of the cylinder itself. These propellers permit the water to pass through the cylinder from one end thereof to the other, and such passage of the water impinges the spiral surfaces of the propellers, so as to impart the desired rotation to the latter and to the cylinder.

A special feature of my invention is the formation of the cleaning elements or brushes 33 on spiral lines and externally to the cylinder. The pitch or convolution of the external brushes conform substantially to the pitch of the spiral propellers, whereby the cleaning-brushes are adapted to assist the propellers in the rotation of the cleaner-cylinder.

I will now proceed to describe the means by which the cleaning mechanism is held in its operative position and against displacement by the pressure of the water when the vessel is in motion, and this stay mechanism is adjustable, so as to assume different positions in conformity with the adjustment of the cleaning mechanism. One element of the said mechanism is a bow-plate 35, which is formed with a recess 36, and is thereby given the shape of a clip, said clip-shaped plate being adapted to snugly fit the bow-stem of a vessel upon which the plate may be adjusted either up or down. A screw-spindle 37 serves as the means for supporting said bow-plate, the latter being connected to the foot of the spindle by a pivot 38, which renders the bow-plate adjustable and reversible

on the spindle. This spindle is threaded for a suitable distance for the purpose of engaging with the female thread provided in the revoluble nut 39, the latter finding a suitable bearing in any kind of a support 40 on the ship. Said nut is provided with a bevel-gear 41, arranged to mesh with a driving-gear 42 on a suitable shaft 43, that is adapted to rotate by any kind of power, whereby the rotation of the nut serves to raise or lower the screw-spindle and the bow-plate, as may be desired. The bow-plate and the arbor of the cleaner-cylinder are operatively connected 80 by a suitable tackle, which includes a pulley 44, that is mounted on the bow-plate and is arranged to receive a cable or line 45, that is fastened to the cleaner-arbor and is extended upwardly, so as to be within convenient reach 85 of an attendant on the ship's deck.

When it is desired to use my cleaning mechanism on a moving ship, the bearing-bars 27 are adjusted to the cables, ropes, or rods. The carrier-rod is arranged over the vessel, so as to be submerged with the cleaner-cylinder, and to enable the post of the slidable carriage to have engagement with the slide-rod 26 the screw-spindle is adjusted for the bow-plate to engage with the bow, and the tackle 95 is adjusted to connect the cleaner-arbor with the bow-plate. The motion of the ship carries the cleaner through the water, so that the latter will be rotated by the action of the water on the propeller and the spiral cleaner elements, whereby the latter are caused to brush or sweep against the ship's hull. The curvature of the carrier-rod enables the cylinder to be brought into contact with the curved surfaces of the ship's hull below the water-line, and the inward adjustment of the carrier-rod and the cylinder is also made possible by the loose fitting of the post on the slide-rod. The cleaner mechanism may be shifted back and forth in a horizontal direction on the slide-rod, and the carrier-rod and the cylinder may be raised or lowered by the operation of the crank-shaft 19, thus disposing the cleaner mechanism in different positions, so as to operate on different parts of the hull. Of course the entire cleaning mechanism and the bearing-bars may be shifted along the ship by sliding said bearing-bars on the rods or cables; but any other suitable means may be adopted for this support of the cleaner mechanism. Of course the tackle should be manipulated according to the position of the cylinder, and the screw-spindle may be raised or lowered in order to correspondingly adjust the bow-plate.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Although I have shown and described means

by which the cleaner-cylinder may be raised and lowered manually, I do not limit myself strictly to this hand-operated mechanism, because I am aware that fluid-pressure devices may be substituted for the hand-operated devices. The carrier-rod may be made in one or more pieces, as desired. The pitch of the cleaning-brushes corresponds to the pitch of the screw-blades. It will be understood that the apparatus is adjusted to clean one side of the ship's hull and then it is shifted or reversed to operate on the other side thereof. The apparatus may also be used for cleaning a ship lying in a dock, in which event suitable mechanisms should be employed for mechanically rotating the cleaning-cylinder.

Having thus described my invention, what I claim as new is—

1. In a mechanism for cleaning a ship's hull, the combination of a curved carrier-rod, a revoluble cleaning-cylinder mounted on the foot of said carrier-rod and provided with external cleaning elements, and means substantially as set forth for adjusting said cleaner-cylinder lengthwise of, and vertically with respect to, a ship's hull.

2. In a mechanism for cleaning a ship's hull, the combination of a carrier-rod provided with a rack, a carriage in which the carrier-rod is slidably fitted, an operating-shaft journaled in the carriage and having a gear element meshing with said rack, and a cleaner-cylinder revolubly mounted on the carrier-rod and provided with external cleaner elements, as and for the purposes set forth.

3. In a mechanism for cleaning a ship's hull, the combination of a vertical longitudinally-curved carrier-rod, an open-ended cleaner-cylinder revolubly mounted on said carrier-rod and provided with an internal propeller and with external brushes, a carriage having means for slidably supporting the same on the outside of a ship's hull, and operative connections between said carriage and the carrier-rod whereby the latter may be raised or lowered and may be adjusted laterally with respect to the hull, substantially as and for the purposes described.

4. In a machine for cleaning a ship's hull, the combination of a cleaner-cylinder open at both ends and provided with an internal propeller and with external spiral brushes, the

pitch of said brushes corresponding to the pitch of the propeller, a carrier-rod on which said cleaner-cylinder is revolubly mounted, a carriage, and means for pivotally and adjustably connecting the carriage and the carrier-rod together and permitting said carrier-rod to swing on a horizontal axis and to partake of the lateral movement with relation to the hull, substantially as and for the purposes set forth.

5. In a mechanism for cleaning a ship's hull, the combination of a slide-rod, a carriage mounted on said rod and adapted to be moved thereon, a carrier-rod fitted in said carriage and adjustable vertically therein, and a cleaner-cylinder supported by the carrier-rod, substantially as and for the purposes set forth.

6. In a mechanism for cleaning a ship's hull, the combination of bearing-bars supporting a slide-rod, means for shiftably supporting said bearing-bars on the side of a ship's hull, a carriage slidably mounted on said rod, a carrier-rod adjustable in said carriage, and a cleaner-cylinder supported on the carrier-rod, as and for the purposes set forth.

7. In a mechanism for cleaning a ship's hull, the combination of a slide-rod, a carriage, a post having swiveled connection with the carriage and slidably fitted to the slide-rod, a carrier-rod adjustable in said carriage, and a cleaner-cylinder supported on the carrier-rod, substantially as and for the purposes set forth.

8. In a mechanism for cleaning a ship's hull, the combination of a cleaner-cylinder, means for adjustably and loosely presenting said cleaner-cylinder in a submerged condition and in operative relation to a ship's hull, a screw-spindle, a bow-plate connected to the spindle and adapted to fit a ship's bow, an operative connection between the bow-plate and the submerged cylinder, and means for adjusting said spindle and the bow-plate, as and for the purposes described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

WALTER SIDNEY BURT.

Witnesses:

H. J. McMAHON,
A. N. STACY.