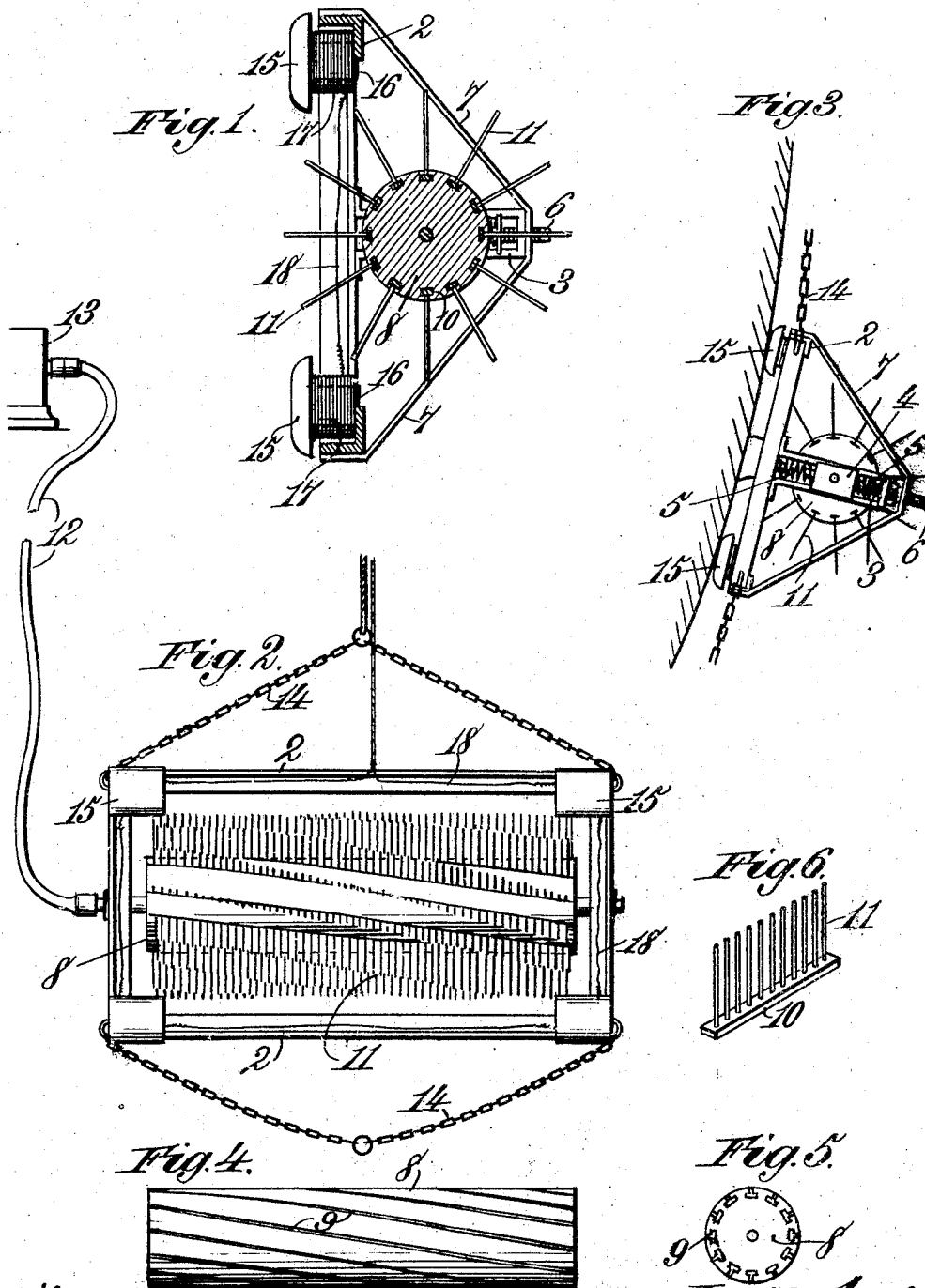


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 APPARATUS FOR CLEANING SHIPS.
 APPLICATION FILED NOV. 17, 1905.



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APPARATUS FOR CLEANING SHIPS.

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To all whom it may concern:

Be it known that I, CHARLES E. ARNOLD, a citizen of the United States, residing at Brunswick, in the county of Glynn and State of Georgia, have invented certain new and useful Improvements in Apparatus for Cleaning Ships, of which the following is a specification.

The present invention relates to hull cleaning devices for ships of that type which are designed to perform the cleaning operation without the necessity of dry-docking the vessel, but which are adapted to clean the hull in a thorough and easy manner while riding at anchor.

One of the objects of the invention is to provide a hull-cleaning device which may be moved over the hull surface to be cleaned with little exertion on the draft-tackle for shifting it, and without danger of catching and being stopped by any structural protuberances, such as plate rivets, seams, and the like, or foreign excrescences adhering to the hull surface; this result being attained by providing the frame of the cleaning device with supporting runners having rounded edges, so that these runners will slide freely over the surface of the hull without engaging any structural protuberances or excrescences thereon, thus relieving the shifting tackle by means of which the device is moved to and fro from undue strain.

A further object of the invention is to provide means for maintaining the cleaning device always in close relation to the hull surface, so that the active cleaning element (a rotary brush in the present case) will be held in operative position relative to the hull, and this result is attained by providing magnetic holdfasts which, in the form herein shown, are the supporting shoes above referred to; said shoes forming the pole pieces of electro-magnets which may be energized from any suitable source with which they are properly connected, and which magnetic supporting runners will stick to the iron or steel hull of the vessel to be cleaned and hold the cleaning tool or brush in close proximity always with the side of the vessel.

In order that the invention may be clear to those skilled in the art, I have illustrated in the accompanying drawing one embodiment of my invention, and in said drawings—

Figure 1 is a transverse sectional view of the cleaning tool or device to show the position of the electro-magnets, the mounting for the brush, and the cross-sectional construc-

tion of the supporting frame. Fig. 2 is a plan view looking from the left in Fig. 1; Fig. 3 is a diagrammatic view to show the position of the cleaning device relative to the hull of the ship; Fig. 4 is a side elevation of the brush cylinder; Fig. 5 is a transverse section of the cylinder shown in Fig. 4; and Fig. 6 is a detail perspective view of a part of one of the cleaning brushes with which the cylinder is provided.

Referring to the drawings by numerals, like numbers indicating like parts in the several views, 2 designates the main frame of the cleaning device, which, as shown, is rectangular, and is made of channel iron, as clearly shown in Fig. 1. At each end of the said frame 2 are supporting standards 3, secured in a proper manner to the end rails of the rectangular frame 2, and in said standards are mounted sliding bearing-blocks 4, said blocks 4 being supported on either side by yielding springs 5, which will permit the bearing blocks 4 and the cleaning tool, presently to be described, and which is supported by said blocks 4, to yield and move in their slotted standards 3, an adjusting follower and set-screw 6 being fixed in the upper end of each of said standards 3, so that the bearing blocks 4 may be adjusted in the standards 3. The said standards 3 are preferably side-braced by means of triangular struts 7 (see Fig. 1) which pass over the top of the standards and are secured at their ends to the rectangular frame 2.

Mounted in the sliding bearing blocks 4 is the cleaning tool proper, which in this instance, is shown as a rotary brush made up of a cylinder 8 having spirally arranged undercut slots 9, adapted to receive brush strips 10 carrying steel bristles 11; this construction being a valuable one for the reason that the brush strips 10 may be readily inserted or withdrawn from the T-headed slots 9 in the cylinder 8. The said brush projects through the open frame 2 so that as the frame is drawn up along the side of the vessel the brush, if rapidly revolved, will engage the fouled surface of the hull and the steel bristles will sweep the same clean of all adhering particles or growths. The said cleaning brush may be revolved in any suitable manner; for example, as herein shown, through the medium of a flexible shaft 12 secured to one end of the brush shaft as shown in Fig. 2, and connected at its other end with any suitable motor 13.

The said cleaning device is provided with chain bridles 14 or other suitable hauling means secured to the frame 2, to which the draft ropes, by means of which the device is hauled from watersedge to watersedge over the surface of the hull, are attached, and it will be understood that any suitable winch or rope-hauling device may be used to pull the device back and forth over the surface of the hull.

Obviously, the rectangular frame which supports the brush would be apt to engage and be caught by any protuberance or growths on the hull of the vessel as it is drawn over the hull surface, and this would result in increasing the draft on the hauling mechanism, and would also tend to make the brush work in an uneven and unsatisfactory fashion. To overcome these difficulties and provide the cleaning device with friction-reducing supports, which will ride over an uneven hull-surface with a smooth, even action and without imposing undue strain on the haul rope, I provide the frame 2 with supporting runners 15, which runners are preferably placed at each corner of the rectangular frame, as shown in Fig. 2, the edges of the runners 15 being rounded so that the said runners will ride readily over structural or other protuberances on the vessel; and all danger of stoppage or catching of the device or uneven working of the brush is eliminated.

In order that the cleaning brush may be held to its work, it is necessary that a close relation between the frame and hull be at all times maintained, and this result I secure by making the runners 15 magnetic, as clearly shown in Fig. 1, in which figure it will be seen that the runners 15 are the pole-pieces of electro-magnets 16, so that the said runners 15 in reality form magnetic supporting feet or runners for the device, which, when energized by the current passing through the windings 17 of the magnets from suitable leading-in wires 18, (see Fig. 2), will adhere to the side of the iron or steel hull, and hold the utensil always in proper working position.

It will be seen that I have provided a hull cleaning mechanism which is extremely simple in its construction, and which has the advantage by reason of its supporting runners, of being readily manipulated during its work without danger of vexatious catching or stopping because of the frame engaging structural protuberances or foreign excrescences on the hull surface. Furthermore, the supporting runners, because of the magnetic qualities given them, have the additional function of keeping the device at all times in close relation to the hull.

While I have shown and described a particular construction, and that the best now known to me, it will be understood that this is for illustrative purposes only, and since it

is obvious that the construction may be varied within the skill of the mechanic, and not depart from the spirit of my invention, I deem all such mechanical changes and expedients to be within the purview of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a hull-cleaning device for ships and in combination, a rectangular frame, magnetic supporting runners at the corners of said frame, spring-held bearing blocks mounted in suitable standards on said frame, means for adjusting said bearing blocks, a rotary cleaning tool mounted in said bearing-blocks, and means for driving said tool.

2. In a hull cleaning device for ships and in combination, a rectangular frame, magnetic supporting runners at the corners of said frame, standards extending from each end of the frame, struts for bracing the standards, spring held bearing blocks therein, adjustable means for the blocks, a rotary cleaning tool having its shaft journaled in said blocks, leading in wires for said magnetic runners, and means for driving said tool.

3. In a hull cleaning device for ships and in combination, a rectangular frame, magnetic supporting runners at the corners of said frame, standards extending from each end of the frame, struts for bracing the standards, spring held bearing blocks therein, adjustable means for the blocks, a rotary cleaning tool having its shaft journaled in said blocks, leading in wires for said magnetic runners, and a flexible shafting connected to the shaft of the tool for driving it.

4. In a hull cleaning device for ships, a tool carrying frame, a rotary cleaning tool mounted within the frame, means for driving said tool, an electro magnet secured to each corner of the frame and having one end of the pole piece thereof projecting therefrom and enlarged and rounded, said enlarged and rounded projecting ends of the pole pieces constituting supporting runners for the device, and leading-in-wires for said magnets.

5. In a hull cleaning device for ships, a rectangular tool carrying frame, a rotary cleaning tool mounted therein, means for driving said tool, an electro-magnetic element secured to each corner of the frame and having the pole pieces provided with enlarged rounded ends constituting runners for the device, and leading-in-wires for said magnetic elements.

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

CHARLES E. ARNOLD.

Witnesses:

J. M. ARMSTRONG
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