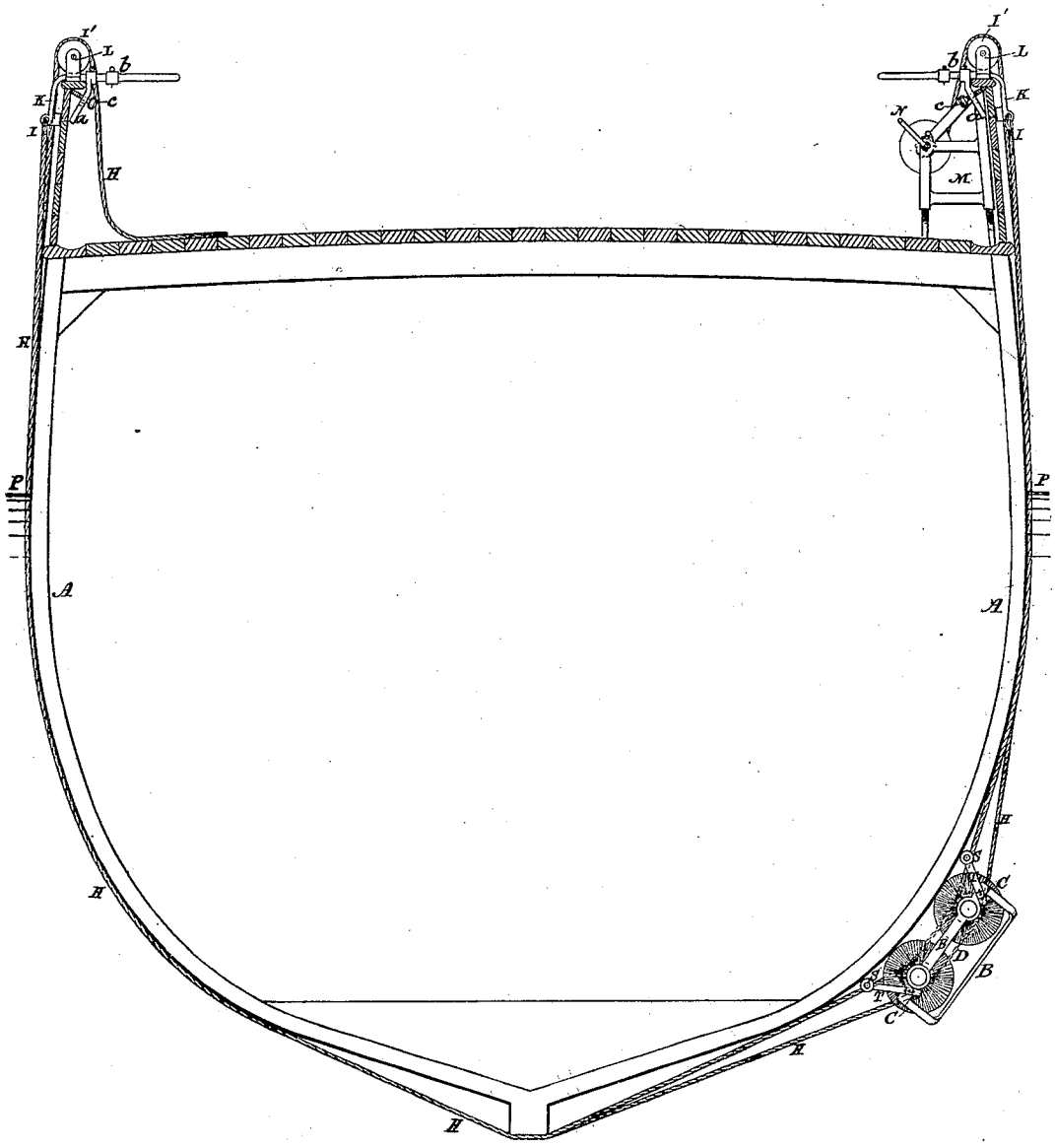
2 Sheets—Sheet 1.

C. FIELDER.

Apparatus for Cleansing the Hulls of Vessels.

No. 205,791. **Patented July 9, 1878.**

Fig. 1



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Inventor
Charles Fielder,
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C. FIELDER.

Apparatus for Cleansing the Hulls of Vessels.

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Fig. 3

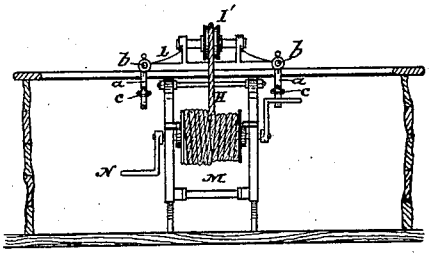


Fig. 2

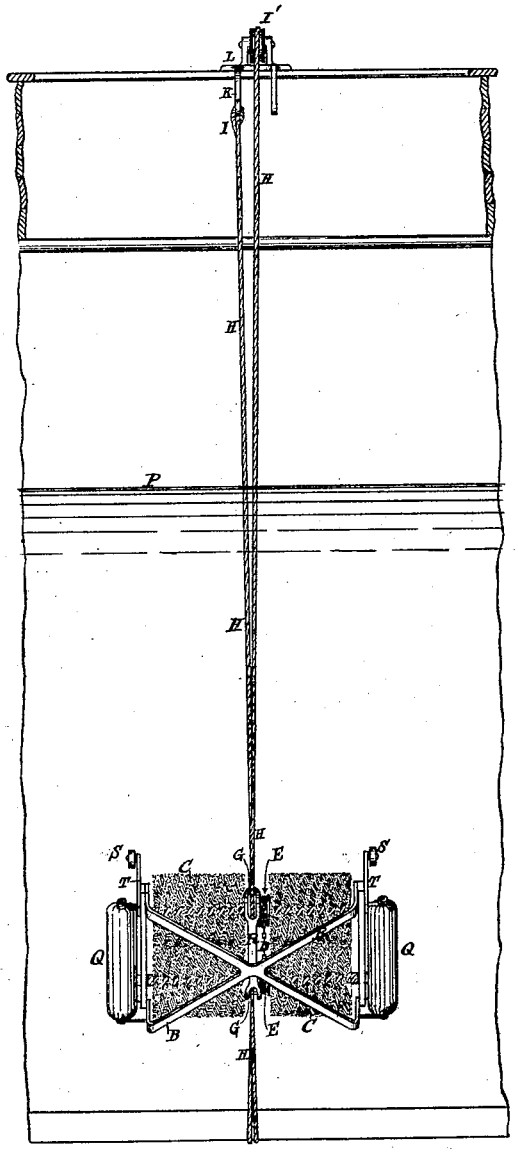
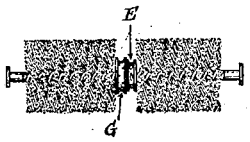


Fig. 4



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Emily Scott
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Charles Fielder,
by Franklin Scott his Atty.

UNITED STATES PATENT OFFICE.

CHARLES FIELDER, OF PLUMSTEAD, ENGLAND.

IMPROVEMENT IN APPARATUS FOR CLEANSING THE HULLS OF VESSELS.

Specification forming part of Letters Patent No. **205,791**, dated July 9, 1878; application filed April 17, 1878.

To all whom it may concern:

Be it known that I, CHARLES FIELDER, of Plumstead, in the county of Kent, England, have invented Improvements in Apparatus for Cleansing the Hulls of Vessels and other Submerged Structures, of which the following is a specification:

This invention relates to improvements in apparatus for cleansing the hulls of vessels and other submerged structures; and consists in fitting two revolving brushes within a suitable frame, the axes of the two brushes being arranged side by side and parallel with each other.

Each brush, in about the center of its length, has a pulley with preferably a V groove, around which the bight of a rope is caused to pass, with the view of not only revolving the brushes when the apparatus is in use, but also to cause the brushes to travel over and so cover the surface to be acted upon. The brushes also carry at their center another sheave or pulley, around which an endlss chain or rope is caused to pass to connect the two brushes and to insure their revolving simultaneously.

When the apparatus is at work on the side of a ship or other submerged structure in the case of cleaning from water-line to keel, the axes of the brushes are preferably horizontal with the water-line. Two double ropes are used, one passing from the upper brush up to the rail of the vessel, where one end is made fast to an adjustable frame, which can travel on the rail, and the other end can be attached to the barrel of a crab or winch for hauling on and rotating the brush. A similar rope to the above is caused to take over the pulley of the lower brush, whence it is carried under the ship's keel, and one end secured to a similar adjustable frame on the opposite rail of the vessel, while the other end of the said rope is attached to a second drum, as before mentioned.

The brushes, which may be formed of bass, cane, or other suitable material, are preferably constructed in the following manner: The core or center of the brush is formed of strands of wire, or of rods, twisted together after the manner of a rope, the bass, cane, or other suitable material of which the brushes are formed having been previously laid at right angles in regular order between them, the result being that a cylindrical brush is formed with the bass or cane in spiral form.

In action, assuming a ship is being cleaned by passing the brushes around the ship's bilge from water-line to keel, the adjustable frames before mentioned having been secured in the required position, and the brush-frame and ropes having been passed under the ship's bottom and secured to the ship's rail at each side and to the barrel of the winches, motion is given to one of the winches, which hauls in one end of the ropes passing around the pulleys of the brushes. This not only causes the brush-frame to travel over the surface being acted upon, but also insures the revolving of the brushes at the same time, and consequently the removal of all accumulations on the ship's side or other submerged structures.

While one end of the ropes encircling the pulley of one brush is being hauled in, the ropes encircling the pulley on the other brush are being paid out, and vice versa, according to the direction of the travel of the brush.

The apparatus can be used in either a vertical or horizontal direction, or as desired, and by hand or other power.

The invention will be clearly understood by reference to the annexed drawings, in which Figure 1 shows a midship section of a vessel with my brush-frame and brushes fitted, and shown as cleaning a ship from the water-line to the keel; and Fig. 2, a side view of the same. Fig. 3 is an inboard view, showing the winch; and Fig. 4 shows one of the brushes.

A is the vessel; B, the brush-frame. C C are the brushes. D is the endless-chain connection of the two brushes, passing around wheels or pulleys E E on the respective axles of the two brushes. G G are the pulleys or drums, around which pass the rotating and hauling ropes H H, the bight of the outer ends of these ropes passing around, and, if need be, making a complete turn around, the pulleys G, for griping purposes, while the other ends of the ropes are carried up to the ship's rail on each side, as shown, where one of them, I, is made fast to the eye K of the adjustable frame L, and the other carried over the pulley I and secured to the barrel of the winch M, the turning of which by the handle N rotates the brushes, and also causes them to traverse a

portion of the vessel's outer skin, by which process the part they pass over is effectually cleaned.

It will be observed that the vessel to be cleaned may be provided with a winch, as shown on the right of Fig. 1, on each side, which is temporarily secured at the spot opposite to where the ship's side is to be acted upon; or the ropes H H may be hauled upon or paid out by hand, as arranged on the left of Fig. 1; and supposing the apparatus, as a whole, to be in position for being put in operation and the brush-frame about the level of the water at P, the winch-barrel on the opposite side of the ship, when winches are used, is turned by the handles N N, which hauls in its rope and draws the brush-frame from the water-line, at P, down to the keel, cleaning the ship's side as it progresses. During the downward travel of the brush-frame it is evident that the winch on that side—that is, the brush side—is turned in the reverse direction to the winch on the opposite side, so as to allow the rope to pay out and the brush-frame to descend.

In my invention I secure the performance of the two co-ordinate functions of rotating the brushes and advancing them in the path of their work by the use of the same appliances—to wit, the ropes H H, operating in conjunction with the rotating brushes C C, connected by endless chain or rope D—thus avoiding the use of two independent sets of chains or ropes, one to govern the travel of the brush-frame, and another and independent mechanism to actuate the rotary brush.

When the brushes have arrived at the ship's keel the motion of each winch is reversed, so that the winch which paid its rope out while the brushes are descending becomes the hauling-in one, and at the same time the revolver of the brushes, and the winch which hauled the brushes down to the keel becomes the paying-out one, by which the brushes are again brought to the surface of the water, the process of reversing the motion of the winches, as described, being repeated as many times as found necessary to pass the brushes over the surface being cleaned.

The winch-frames can be readily secured in the required position by means of the screw-legs, serving to jam them against the under side of the ship's rail, while the adjustable frame L, which carries the eye K and top guide-roller, is readily fixed and held where required by the legs *a* sliding on the bars *h*, on which the lugs can be held by pins passing through eyes in their upper ends and through holes formed in the bars *b* for that purpose. The lugs have a screw-pin, *c*, passing through them and taking under the ship's rail, as clearly shown in Fig. 1, by which the whole top frame becomes securely fixed.

The brush-frames are provided with air-bags Q Q, which, so to speak, float them, and thereby render them very easy to handle and manipulate when overboard, and at the same time greatly assist the brushes to keep in contact with the surface being operated upon, by which their action is rendered much more effective.

On reference to Fig. 2, it will be seen that the endless-chain connection driving the two brushes C C is arranged about the center of their lengths; but I do not confine myself to this arrangement, as an endless chain or rope can be used, one at each end of the brushes, and inside or outside the brush-frame, as found convenient.

The brush-frame is provided with a sort of guide, R, through which the ropes H H from the winches pass, and by which they are prevented from slipping off their respective pulleys G G. The frames are also provided with rollers S S on adjustable legs T T, to regulate the touch of the brushes on the ship's side.

I claim as my invention—

1. The described mechanism for co-ordinately producing the advancing and receding movements of the brush-frame and the rotary movements of the brushes by means of the same ropes or chains, consisting of ropes H H, passing around pulleys G G upon the axles of the brushes, having their several extremities attached, as described, the whole being operated by a winch or other suitable power, substantially as specified.

2. The described apparatus for cleaning the hulls of vessels and other submerged structures, consisting of two or more rotary brushes, connected, as shown, by endless belts or chains, adjusted in a frame adapted to travel over the surface of the structure to be cleaned, which frame is confined in the path or line of action, and, together with the rotary brushes which it carries, have imparted to them their respective appropriate motions from the same ropes or chains by which the said mechanism is confined in its path of duty.

3. The guide R, in combination with frame B and ropes H H, substantially as shown and described.

4. The combination of ropes H H, brush-frame B, pulleys G G, brushes C C, endless belt or chain D, and guide R, operated by a winch or other suitable mechanism, substantially as described and set forth.

5. The combination of frame B, equipped with two or more rotary brushes, connected by endless belts or chains, as hereinbefore described and claimed, with air-bags or floats Q Q, the whole being attached to the vessel or other structure, and the several movements thereof controlled by the ropes H H, having their ends attached, substantially as described, of which the hauling in and paying out are regulated by any suitable motor located on the deck of the vessel, substantially as described and set forth.

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