United States Patent

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[33] **Great Britain**
[31] **10089/68**

[54] **DEFOULING OF SHIP'S HULLS**
4 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **114/222**
[51] **Int. Cl.** **B63b 59/00,** B08b 3/00
[50] **Field of Search** 114/222; 15/322, 96–98, 244

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ABSTRACT: This invention relates to a method of, and apparatus for defouling the hull of a ship while afloat by lowering into the water a pad having a liquid, permeable dispensing face, moving the pad to bring the dispensing face into intimate contact with the hull, and feeding to the pad steam or a poisonous liquid composition which passes through the dispensing face to attack the adjacent marine growth.

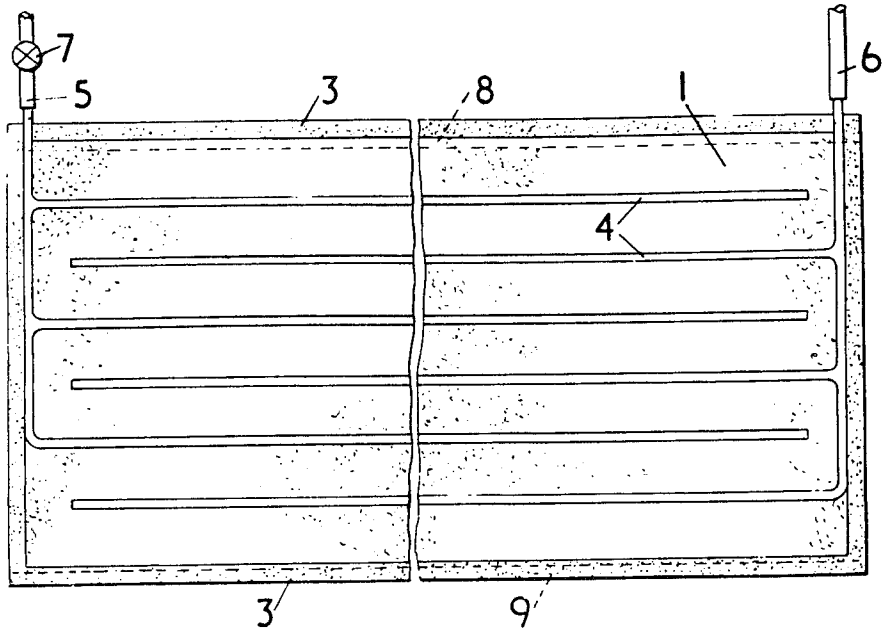
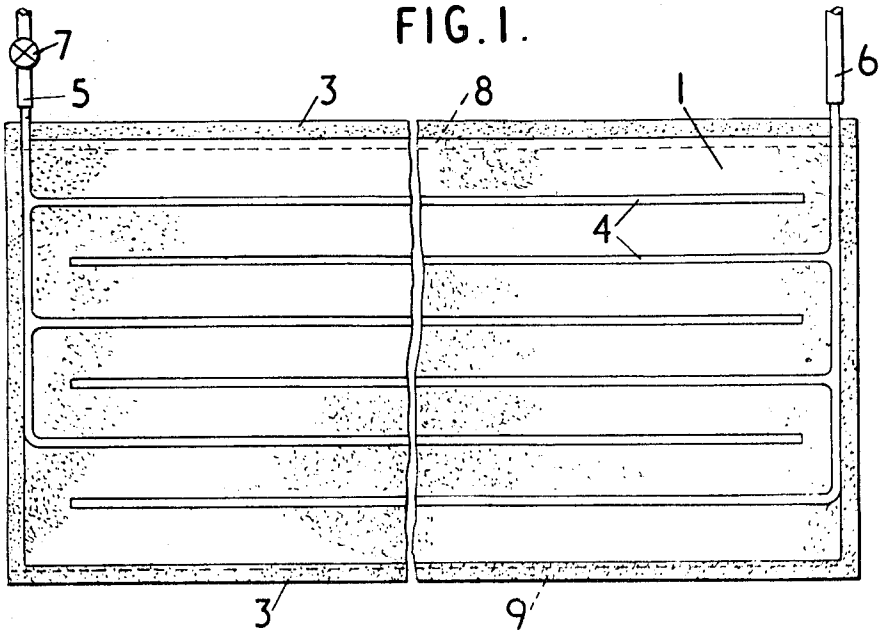


FIG. 1.



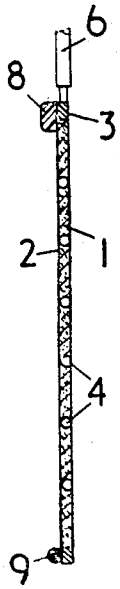


FIG. 2.

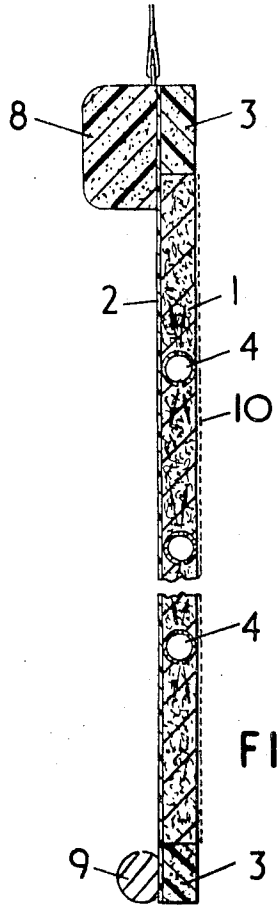


FIG. 3.

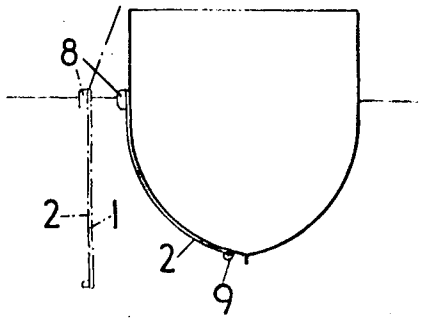


FIG. 4.

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DEFOULING OF SHIP'S HULLS

As ship owners are well aware, periodical cleaning of ship's hulls to remove accumulated submarine weed and shell growth is necessary to maintain operating efficiency. Although antifouling hull coatings inhibit marine growth for short periods, sooner or later dry docking is necessary so that the growth can be physically removed, e.g., by scraping or some other abrasive process. Apart from the cost of dry-docking the abrasive process is liable to destroy the anticorrosive paint layers on the hull and these, which would otherwise last for a substantial time, have to be reapplied.

According to the present invention and with the general object of avoiding such disadvantages there is proposed a method of removing marine growth from a ship's hull while afloat which comprises lowering into the water a pad having a liquid permeable dispensing face, moving the pad to bring the dispensing face into intimate contact with the hull, and feeding to the pad stream, or a poisonous liquid composition, which passes through the dispensing face to attack the adjacent marine growth.

For the performance of such a process, there may be accordingly provided apparatus comprising a dispensing pad which is sealingly engageable with a ship's hull, and has a fluid permeable dispensing face, means for raising and lowering the dispensing pad, means for admitting steam or a poisonous liquid composition into the pad, means for discharging liquid from the pad and means, e.g., a pump or pumps for causing said admission and discharge.

The nature of the invention should be more clearly apparent from the following description of a particular apparatus for performing the method and which is illustrated by way of example in the accompanying diagrammatic drawings, wherein:

FIG. **1** is a side elevation of the apparatus;

FIG. **2** is a vertical cross section through the dispensing pad;

FIG. **3** is an enlarged vertical cross section showing details of the dispensing pad; and

FIG. **4** illustrates the mode of use of the apparatus in the process of the invention.

Referring now to the drawings, the apparatus principally comprises a dispensing pad made of absorbent material **1**, such as, for instance, felt, having on one side a liquid impervious sheet **2** made for instance, of a rubberized fabric. Around the periphery of the pad is a sealing strip **3** of foamed rubber or the like. Embedded within the pad are two sets of flexible synthetic tubes **4** having perforated walls. The tubes are parallel, with the tubes of one set, coupled to an inlet **5**, alternating with the tubes of the other set which are connected to an outlet **6**. The inlet **5** is controlled by a valve **7** and the outlet **6** is connected to a pump (not shown). The absorbent material **1** and the tubes **4** should be as thin (for instance of the order of ¼ inch to ½ inch) as possible in order that the weight of the pad when fully impregnated with water shall not be so excessive as to make recovery from the water an unduly difficult operation.

The pad, which may be for example 30 feet or more in length and of suitable depth to match the submerged depth of hull, when fully impregnated, is caused to have a neutral buoyancy by provision of an elongated float **8** at the top and a sinker **9** at the bottom.

If required there may be provided at the fluid permeable face of the pad abrasive means such as a wire mesh sheet **10** of metal or plastics material for scraping the hull of a ship after the marine growth has been killed so as to dislodge the latter.

When steam is used for killing the marine growth the pad would normally be thermally insulated by a thin layer of insulating material adjacent the liquid impervious sheet **2**.

In operation the pad would be slung over the side of a ship on cables as shown in FIG. **4** so that it unfolds and hangs vertically away from the ship's side as shown by the chain dashed lines and soaks up water. The inlet to the valve **7**, which is closed, is connected to a reservoir (not shown) containing a liquid poisonous composition. The outlet **6** is now connected to a suction pump or ejector, which may be mounted on the ship or on a separate boat or raft, and the water is pumped out of the pad which advances towards the ship's hull and seals itself against the latter, adapting to the hull contour as necessary. A vacuum gauge can be used to judge this condition.

While still maintaining a partial vacuum the valve **7** is now opened to admit the poisonous composition to the pad. The composition disperses into the absorbent material and kills the marine growth by seeping slowly out through the fluid permeable face of the pad. When the poisonous composition appears at the suction side of the pump or ejector the valve **7** should be closed but partial vacuum is maintained for a further period to destroy all growth. If now it is required to scrape the hull a partial vacuum would be maintained and the sheet would be forcibly moved a small distance by ropes attached to the top (as shown), sides or bottom of the pad for that purpose.

A similar procedure to that mentioned above would be used when defouling by use of steam instead of a poisonous composition, the reservoir being replaced by a steam pressure chamber or steam being supplied directly from a pipe coupled to a suitable boiler on the ship itself.

I claim:

1. A method of removing marine growth from a ship's hull while afloat which comprises lowering into the water from the ship a flexible porous pad having a liquid permeable dispensing face and a liquidtight parallel other face, evacuating water from the pad to draw its dispensing face into intimate contact with the hull, and feeding to the interior of the pad steam or a poisonous liquid composition, which passes through the dispensing face to attack the adjacent marine growth.

2. A method as set forth in claim **1** wherein the pad, while said dispensing face is in said intimate contact, is moved along the hull to cause dislodgement of marine growth by scraping means associated with the dispensing face.

3. Apparatus for removing marine growth from a ship's hull while afloat comprising a flexible dispensing pad which is sealingly engageable with the ship's hull and has a fluid permeable dispensing face and a liquidtight other face, means on the ship for raising and lowering the dispensing pad, means for admitting steam or a poisonous liquid composition into the pad, means for discharging liquid from the pad, means for causing said admission and discharge and wherein the pad has abrasive means on its dispensing face.

4. Apparatus as set forth in claim **3** wherein said abrasive means is a wire mesh abrasive sheet.