Dec. 6, 1938. F. G. BRAMMER 2,138,831

MEANS AND METHOD FOR PROTECTION FROM MARINE PARASITES

Filed Jan. 29, 1937

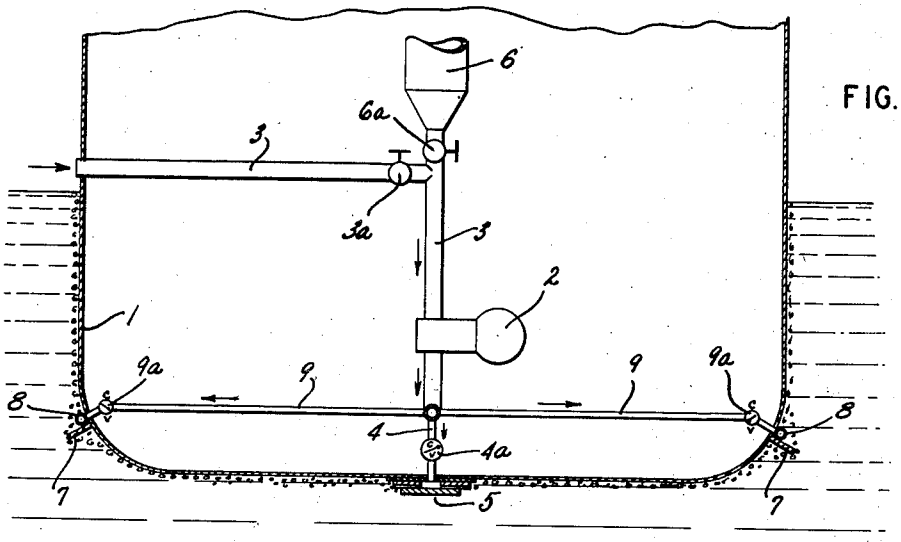


FIG.—1

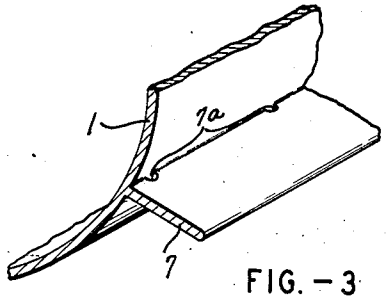


FIG.—3

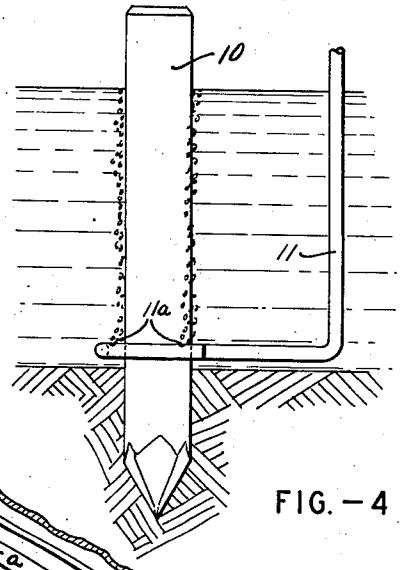


FIG.—4

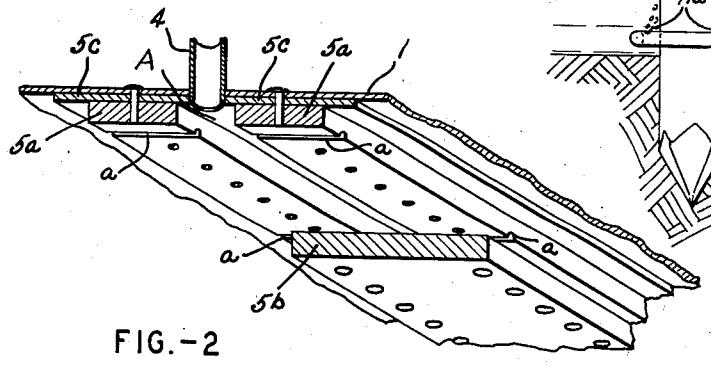


FIG.—2

INVENTOR
FREDERICK G. BRAMMER
BY
Brockett, Hyde, Wigley & Meyer
ATTORNEYS

Patented Dec. 6, 1938

2,138,831

UNITED STATES PATENT OFFICE

2,138,831

MEANS AND METHOD FOR PROTECTION FROM MARINE PARASITES

Frederick G. Brammer, North Olmstead, Ohio

Application January 29, 1937, Serial No. 123,012

7 Claims. (Cl. 114—222)

This invention relates to the protection of immersed body surfaces such as those of ships' hulls, piles, and the like, from marine parasites. The term "marine parasites" is here used to comprehensively include prehensile animal and vegetable matter such as barnacles and tenacious seaweeds, and also to include the class of marine borers which attack piles and shoring in some waterfront locations. As is evident, a ship's speed is greatly impaired by such parasitical growths or accumulations and great expense and loss of revenue is involved in the frequent drydocking which has heretofore been found necessary for their removal; and similarly great property damage has resulted from the inroads of marine borers along waterfronts.

The general object of this invention is to eliminate such evils, and the invention is based upon the novel expedient of maintaining a thin layer of the water adjacent the surface to be protected, in a turbulent condition so long as the surface is subject to the parasitical attack. In the case of a ship it has been found that accumulation ceases during substantial motion relative to the water in which it floats, as when under way or when anchored in a shift stream. Therefore, the invention contemplates means for agitating the water only as the need arises, such as when the ship is in still waters, to full protect it from accumulations.

Briefly, the invention comprises, as the means for practicing the method, apparatus for liberating a fluid of less density than water, which fluid may be a liquid such as an oil or emulsion of chemically parasiticidal properties, a gas of similar properties or, and preferably, in the interests of economy, simply air.

No chemical preparations have yet been discovered of sufficient parasiticidal properties to serve in the elimination of barnacles, but my invention provides means for periodic treatment with such preparations should they be discovered.

In any event, the invention includes liberation of the treating fluid at such a submerged location and with such distribution that the surface to be protected will be wiped by the treating fluid because of the buoyancy of the latter in its generally upward path to the top of the water. If the treating fluid be gaseous, air being particularly contemplated, streams of bubbles will be formed at the points of liberation and such bubbles will substantially agitate the water immediately adjacent the surface to be protected, maintaining such water in sufficient state of turbulence for the principal purpose of the invention.

More detailed objects of the invention are to provide novel means adapted for liberating the treating fluid, and at the most advantageous locations and yet without impairing the functions of any parts of the structure to be protected.

The exact nature of the invention together with further objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawing which is illustrative in conventionalized and elementary manner only, and in which Fig. 1 is an elevation in transverse section of a floating ship equipped according to the invention; Fig. 2 is a perspective detail of the keel part of the same, parts being broken away to show details of construction; Fig. 3 is a perspective view partly in section and showing details of a modified construction at the bilge keel of a ship; and Fig. 4 is a sectional elevation showing the manner of the application of the invention to a pile.

With reference now to the drawing and first to Fig. 1 thereof, 1 represents the hull of a floating ship of steel construction, within which is provided a pump or compressor 2 having an inlet line 3 to the atmosphere above the water, and an outlet line 4 leading adjacent the keel of the ship generally indicated at 5 in Fig. 1. As is usual in ships of such construction, the keel is generally flat, built up of heavy plates running longitudinally of the ship. According to this invention and as shown in Fig. 2, the keel includes a pair of thick plates 5*a* spaced from each other and a cover or bottom plate 5*b* therebeneath, these plates being maintained in position and assembly as by welding and/or the rivets indicated passing through the hull and such structural members not here illustrated as may therein be provided. A base plate 5*c* is preferably provided between bottom face of the hull 1 proper and the plates 5*a*.

By this arrangement of plates a cavity A is provided running with the keel between the plates 5*a*. The latter are transversely grooved at intervals therealong as at *a* to provide small passages leading laterally in opposite directions into the water from the cavity A within the keel. It is into this cavity A that the outlet pump 2 is arranged to deliver by way of its outlet pipe 4, it being understood that dependent upon the length of the ship the pipe 4 may have branches leading to the cavity A at longitudinally spaced locations for better distribution. Preferably a check valve 4*a* is provided in the pipe 4 and

each of such branches, as closely adjacent the cavity A as convenient for the purpose of preventing inlet of water to the hull. A container 6 may be associated with the pump inlet line 3 for feeding to the pump of fluids subject to the control valves 6a and 3a.

The capacity of the pump 2 and its inlet and outlet piping is sufficient both as to pressure and volume to cause outflow of the fluid which it handles, past the check valve or valves 4a into the cavity A, thence out through all of the outlets a and into the water against the pressure of the latter.

Operation of what has thus far been described will be as follows: The valve 6a being closed and the valve 3a opened and the pump 2 running, air will be discharged through the passages a and bubbles thus generated along either side of the keel 5. These bubbles by their buoyancy will find their way outwardly and upwardly to the top of the water, clinging to the surface of the hull as they move and thus wiping the latter. Each bubble will travel with irregular deviations from a straight path and the deviations of successive bubbles in their streams will differ, so that with proper locations for the openings a, the bubbles will not only themselves wipe substantially the entire hull surface but will by their presence and motion maintain a relatively thin film of the water immediately adjacent the hull in continuous turbulence. Locations and size of the openings for proper bubble distribution will of course vary with the form, size and particularly draft of the hull.

A chemical fluid from the container 6 may be employed if that be found desirable, either in small amounts of concentrated form, or in occasional shots, by proper and obvious manipulation of the valves 3a and 6a. The keel plates being of ferrous metals, to prevent rust accumulations in the outlet passages, an occasional shot of rust preventive may be thus fed to all of the keel passageways.

If the hull be provided with a bilge keel as conventionally indicated at 7, either of two expedients may be employed for avoiding the masking effect of such keel on the hull parts immediately thereabove.

One of these expedients is illustrated conventionally in Fig. 1 and comprises a pipe 8 secured in the crotch between hull and bilge keel and above the latter, this pipe 8 being perforated at intervals and fed from the pump 2 with the same fluid fed to the keel 5, as through branch pipes 9 each preferably equipped with a check valve 9a. By this arrangement a second set of bubbles may be generated along the bilge keel, which bubbles will serve the hull surface immediately thereabove and masked by the bilge keel from the bubbles released at the keel 5.

Another arrangement suitable where the bilge keel has substantial downward slope, is illustrated in Fig. 3 which comprises the simple expedient of providing perforations 7a through the bilge keel adjacent the hull at spaced intervals therealong. By this arrangement the bubbles released from the keel 5 find their way upwardly through the openings 7a in the bilge keel which in fact can thus serve, by suitable location of these openings, in perfecting distribution of the bubbles over the sides of the hull.

In any event it is understood that the described systems are maintained in operation only when the ship lies in still waters, operation being unnecessary when the ship is under substantial way or lies in rapidly flowing water.

The invention is equally applicable to stationary immersed structures such as conventionally illustrated by the pile 10 in Fig. 4, for the protection of which a tube 11, having a part perforated as at 11a adjacent the pile at the bottom of the water, and served from a pump at a convenient removed location, will maintain the water adjacent the pile in sufficient turbulence to protect the latter from the inroads of marine borers. Where tides sweeping the pile are sufficiently swift, pump operation will be unnecessary during ebb and flow periods of the day. Where piles are grouped as is usual, a single pipe 11 may be laid to serve the group instead of the single pile 10 illustrated, as with a perforated length about the group or a few larger openings adjacent the center of the group.

What I claim is:

1. The method of protecting an immersed body surface from marine parasites, comprising releasing a gas from such distributed locations along the lower extremity of said surface whereby to produce bubbles caused to wipe substantially the entirety of said surface in ascending, while said body and water are generally without substantial relative motion.

2. The method of protecting an immersed body surface from marine parasites, comprising producing air bubbles with such distribution at a submerged location that said bubbles will wipe said surface in ascending, while said body and water are generally without substantial relative motion.

3. The method of protecting a ship's hull from marine parasites, comprising producing bubbles at low submerged parts of said hull, at such rate and of such size and at locations so distributed along said hull, as to effectively maintain a thin layer of the water immediately about said hull in a state of turbulence due to the motion of said bubbles in ascending, while there is no substantial general motion between said hull and the water in which it floats.

4. Keel construction for the purpose described and comprising a pair of plates laterally spaced to provide a cavity therebetween running longitudinally with the keel, and a cover plate arranged to provide a bottom for said cavity, means for supplying a fluid under pressure to said cavity, and means providing discharge of said fluid from said cavity, at the sides of said cover plate with distribution therealong.

5. Keel construction for the purpose described and comprising a pair of plates laterally spaced to provide a cavity therebetween running longitudinally with the keel, and a cover plate underlying said spaced plates and extending therebetween to provide a bottom for said cavity, said construction including spaced grooves in the plate faces providing lateral discharge from said cavity with distribution therealong.

6. In a ship having means for releasing a buoyant fluid at the bottom of its hull, a bilge keel having openings arranged to permit said fluid to wipe adjacent hull portions in ascending.

7. In a ship having means for releasing a buoyant fluid at the bottom of its hull, a perforate bilge keel arranged to provide wiping of adjacent hull portions by said fluid in ascending and distribution of said wiping effect along said hull.

FREDERICK G. BRAMMER.