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D. MASON.

ART OF CLEANING AND PAINTING OR TREATING SURFACES SUBMERGED IN WATER.

(Application filed Jan. 20, 1900.)

(No Model.)

Fig. 1.

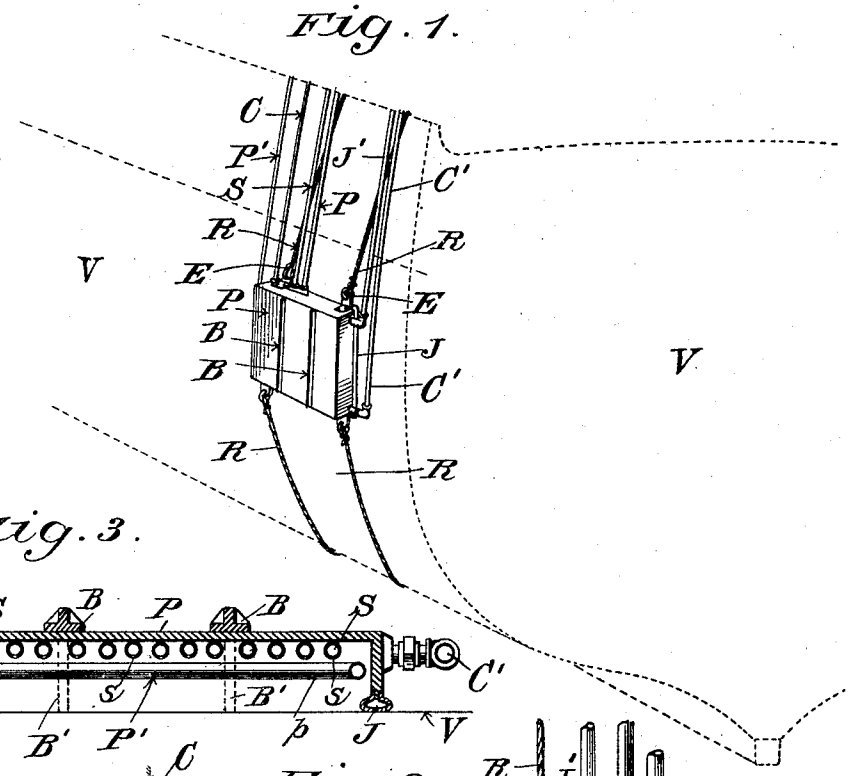
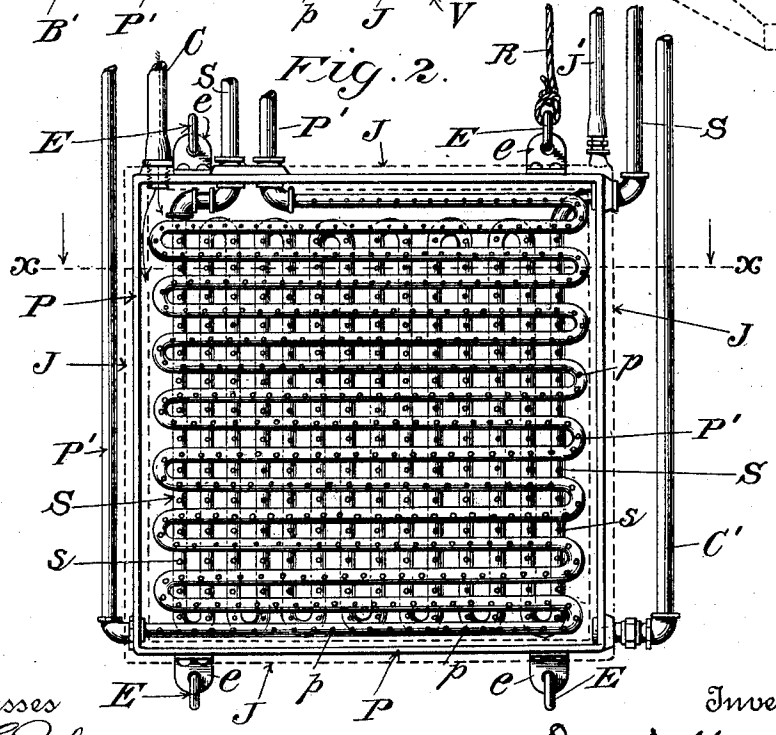


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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ART OF CLEANING AND PAINTING OR TREATING SURFACES SUBMERGED IN WATER.

SPECIFICATION forming part of Letters Patent No. 660,646, dated October 30, 1900.

Application filed January 20, 1900. Serial No. 2,225. (No specimens.)

To all whom it may concern:

Be it known that I, DAVID MASON, a citizen of the United States, residing at New York, borough of Manhattan, in the county of New York and State of New York, have made a new and useful Invention in the Art of Cleaning and Painting or Treating Surfaces Submerged in Water, of which the following is a specification.

My invention has for its objects, first, to provide a method of operation for effectually cleaning the bottoms and sides of floating vessels and other submerged surfaces, and, second, to provide a method of operation for applying a paint or other protective agent thereto after the same has been thus cleaned and also for effectually drying said paint or agent after it is thus applied.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 represents in dotted lines a part of the hull of a vessel with apparatus attached to the side thereof at a point below the surface of the water for effecting the results sought. Fig. 2 is an enlarged plan view of the apparatus as seen looking at Fig. 1 of the drawings from the right to the left hand side thereof, and Fig. 3 is a transverse sectional view of Fig. 2 on the line $x\,x$, as seen looking thereat from the top toward the bottom of the drawings in the direction of the arrows.

My invention contemplates in its practice preferably the use of an apparatus adapted to be lowered beneath the surface of the water and securely attached to the side of a vessel or other submerged surface in such manner as to render its union thereto water-tight, after which the inclosed water is pumped out, and the surface thus inclosed within the apparatus is subjected, first, to a spray of superheated steam or a spray of an acid of such a nature as will release the materials attached to the bottom or sides of the vessel or submerged surface, and thus thoroughly cleanse it; second, the subjection of the surface thus cleansed to a circulation of intensely hot or dry air under pressure in such manner as to thoroughly dry it; third, the subjection of such surface to a spray of paint or such other protective liquid agent as will attach itself thereto, and, fourth, the subjection of the surface thus painted to a further circulation of hot or dry air until the same is thoroughly dry.

Referring now to the drawings in detail, in which like letters of reference represent like or equivalent parts wherever used, and first to Fig. 1, V represents the vessel, and P the exterior surface of the preferred form of apparatus for accomplishing the results sought, said apparatus consisting in the present instance of a rectangular-shaped box or pan made, preferably, of strong steel and having the desired area or surface, but of relatively shallow depth. To the under edge of this box or pan is firmly secured a pneumatic tube J, extending entirely around it, the same being adapted to constitute a sealing means for effectually sealing the apparatus to the side of the vessel or surface to be treated. This pneumatic tube is connected to a strong flexible hose-pipe J′, running to a point above the water, which is adapted to be attached to an air-pump.

e e e represent lugs or ears secured to the four corners of the box or pan and provided each with a metallic ring E, to which are secured the operating-ropes R R R R, four in number.

C represents a strong hose-pipe which is secured to a tubular fitting entering the upper edge of the box or pan, running to a force-pump (not shown) on board of the vessel. C′ represents an outlet hose-pipe secured in a similar manner to the bottom of the box or pan, said outlet hose-pipe running also to the pump or to any desired point.

P′ represents a hose-pipe secured by fittings to the opposite ends of a tube coiled back and forth in lines parallel with each other, so as to fill the entire inner surface of the box or pan, said tube being continuously perforated, as shown at $p\,p$.

S represents an additional hose-pipe connected to the opposite ends of a second tube, coiled back and forth at right angles to and behind the first-named tube and perforated at $s\,s$, as shown. Both of said coiled tubes are firmly secured to the inner surface of the box or pan P.

The outer ends of the several hose-pipes C, C′, P′, J′, and S are carried above the surface of the water and are adapted to be connected to a pump, as will be described in connection with the description of the mode of operation.

B B represent angle-irons riveted or other-

wise secured to the outer or bottom surface of the box or pan P for the purpose of giving it sufficient strength to withstand the pressure of the exterior water after the water in the interior thereof has been removed.

B' B' represent in dotted lines vertical standards secured to the bottom of the box or pan and adapted to take the place of the angle-irons B B, if preferred. However, I prefer the angle-irons, for the reason that inasmuch as the inner ends of the standards B' B' rest against the surface to be treated they will therefore prevent the cleaning and painting of that portion thereof immediately under them.

The operation of the apparatus is as follows: The box or pan is first lowered into any desired position below the surface of the water by the ropes R R R R and firmly secured to the side of the vessel by tightening said ropes by winches or any other preferred means, after which an air-pump is applied to the hose-pipe J' and air forced into the pneumatic tube J in such manner as to effectually seal the edges of the box or pan to the side of the vessel or surface to be treated. A pump is then attached to the hose-pipes C C' and all of the water in the box or pan P pumped or forced out, after which the hose-pipe S is attached directly to a source of superheated steam, and the steam is forced therethrough and through the perforations *s s* against the side of the vessel until the surface within the box or pan is effectually cleansed.

In place of steam I may use sulfuric, nitric, or hydrochloric acid under high pressure or any well-known acid or liquid which would thoroughly cleanse the surface. In the event of using such acids, however, it will be understood that the box or pan P, the perforated tubes, and their fittings must all be of such materials as are not readily attacked by such acids, and all of the hose-pipes should be lined with a material not attackable by acids of this nature. The hose-pipe S is then connected to a source of hot air or other drying medium, and the same is forced through the perforations against the side of the vessel or surface to be cleaned until it is thoroughly dry, after which the hose-pipe P' is connected to a source of liquid paint or other liquid material designed to treat the surface thus dried, and the same is forced therethrough and through the perforations *p p* until the surface already treated is thoroughly covered or impregnated with a coating of the liquid paint or preservative, after which the hose-pipes S S and also the hose-pipes P' P' are both connected to a source of intensely hot air or other drying circulating medium and the same forced through all of the perforations *s s p p* until the paint or other agent is thoroughly dry. The air is then released from the pneumatic tube J and the ropes loosened, so that the box or pan can be moved to a new surface, which is treated in like manner, until the entire area of the vessel or other submerged surface to be cleansed has been fully treated.

I do not limit myself to the use of the especial means or apparatus described for effecting the results sought, as I believe I am broadly entitled to claim a method of operation as hereinbefore described. It will be obvious that one of the sets of perforated tubes and its connecting hose-pipe might be done away with and that the treating medium, the drying medium, and the paint or protective agent might be forced through one set of such pipes; but I prefer the arrangement herein-before shown and described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The method of cleaning and treating a submerged surface with a protective agent, consisting in first subjecting the surface to the action of a cleansing medium, then subjecting it to a drying medium, then coating it with a protective agent and finally drying the latter, substantially as described.

2. The method of cleaning and treating a submerged surface with a protective agent, consisting in first subjecting the surface to the action of superheated steam, then subjecting it to a drying medium, as air, then coating the surface with a protective agent, as paint, and finally drying the paint, substantially as described.

3. The method of drying a submerged surface, consisting in subjecting the same to the spraying action of a drying medium under pressure, substantially as described.

4. The method of treating a submerged surface with a liquid protective agent, consisting in subjecting the same to the spraying action of said liquid agent under pressure, substantially as described.

5. The method of treating a submerged surface with a liquid protective agent, consisting in subjecting the same to the spraying action of a liquid protective agent under pressure and then drying the surface thus treated, substantially as described.

6. The method of painting a submerged surface, consisting in subjecting the same to the spraying action of a liquid paint under pressure, substantially as described.

7. The method of painting a submerged surface, consisting in subjecting the same to the spraying action of a liquid paint under pressure, then drying the surface thereof by subjecting it to hot air under pressure, substantially as described.

In testimony whereof I have hereunto subscribed my name this 19th day of January, 1900.

DAVID MASON.

Witnesses:
C. J. KINTNER,
M. F. KEATING.