

# UNITED STATES PATENT OFFICE.

JAMES GAMAGE TARR AND AUGUSTUS HENRY WONSON, OF GLOUCESTER,  
MASSACHUSETTS.

## IMPROVED PAINT FOR SHIPS' BOTTOMS.

Specification forming part of Letters Patent No. 48,221, dated June 13, 1865.

*To all whom it may concern:*

Be it known that we, JAMES GAMAGE TARR and AUGUSTUS HENRY WONSON, of Gloucester, in the county of Essex and State of Massachusetts, have invented an Improved Paint or Composition of Matter for Protecting Iron Surfaces from the Injurious Effects of Sea-Water; and we do hereby declare that the following is a full and exact description thereof, and the method adopted in making the same.

The object of our invention is twofold: We prevent the corrosive effects of sea-water on iron immersed in it by both covering the surface as perfectly as possible, and we then throw the iron into a negative electrical state, in relation to the more positive covering used, so that it shall not corrode. We render the surface of this covering so poisonous as to repel any organic forms from effecting an attachment to it, and thus secure a smooth surface, which is constantly and slowly corroding.

Iron, when brought in contact with zinc in sea-water, takes a negative state, and, while the zinc corrodes, the iron is protected; but such protected surface becomes foul, and this obstacle has hitherto prevented protection by means of zinc. It happens, too, that the action of zinc, at first local, becomes more and more truly so, rendering large surfaces of zinc necessary to effect a full protection.

We have found that zinc, when alloyed with small percentages of more positive metals, dissolves in sea-water more rapidly than pure zinc does, and by bringing this alloy in contact with an iron surface and maintaining it there the relation of the iron to sea-water becomes so changed that it does not corrode. The salts of zinc formed by the action of sea-water are poisonous to a certain degree; but we increase the poisonous effect by choosing a metal or metals for alloying which form very poisonous compounds. We have found, too, that oxide of arsenic may be used with zinc in the metallic state, and then compounds of chloride of zinc and arsenic form, which repel all organized bodies.

As zinc cannot be easily reduced to powder when pure, we form an alloy first which shall be brittle, or we use impure zinc, to which we add tin, copper, antimony, arsenic, quicksilver,

or any metal which is more negative than pure zinc, and thus obtain an alloy which can be reduced to powder, ground in a mill to any degree of fineness, and then be used as any pigment for forming the basis of a paint.

The medium use for suspending and fixing the powder of the alloy may be any of the tarry or oleaginous bodies which will dry in air and remain hard and somewhat elastic under sea-water, and with this medium as part of a paint the alloys representing a pigment can be easily and completely mixed.

Our new paint, which we call "galvanic paint," consists of a tarry or oleaginous medium, suspending an alloy or alloys of zinc with any metal below zinc in positive electrical relation. Some oxide of zinc always forms, and we add oxide of arsenic.

To enable one skilled in the art to make our galvanic paint, we proceed to describe the steps of our method.

Common or impure zinc or spelter being melted in a covered iron kettle, we add five pounds of tin clippings (tinmen's waste) to one hundred pounds of zinc, and wait half an hour for the tin and iron to dissolve, stirring twice through a hole in the cover. We allow the mass to cool or dip it out, then break it up small and grind it in a suitable mill, bolting the fine powder, if we choose to add copper instead of tin and iron. Then, while the zinc is melted, we put in nine pounds of clean yellow metal or brass and wait for it to dissolve, cooling and grinding as before. Other alloys may be formed in the same way, and we find the more compound the alloy the more regularly the zinc dissolves, and residuary metal holds its place after the corrosion has established a galvanic action. Other alloys may be formed on the powder directly. Taking the powder formed from impure zinc and tinnerns' waste alloy, we may mix it with white arsenic and moisten the mass; afterward, by stirring the whole, an alloy forms. Quicksilver may be mixed with the powdered alloy, and a solution of corrosive sublimate being added, an alloy of zinc, tin, iron, and quicksilver rapidly forms. Even very weak acid will cause arsenic and quicksilver to unite with the zinc easily. We prefer the alloy of impure zinc, tin, iron,



and quicksilver for general use, and form it as above described, adding from ten to twenty per cent. of fine powder of white arsenic after the alloy has been ground. We take forty gallons of Stockholm or other good wood-tar and add thirty gallons of naphtha of coal-tar, and allow the mixture to remain twelve hours after a thorough stirring. Some dregs are deposited, and the clean upper fluid can be drained off, leaving about ten gallons of residuum, which can be strained. The fluid free from dregs may be mixed with three-fourths of a pound of calcined ocher or brown iron ore for every gallon of fluid taken, and this mixture forms the medium which we prefer for cementing the alloy of zinc to an iron surface, although the other compounds may be used. Into the medium thus made we stir in slowly and carefully four and a half to five pounds of the alloy powder for every gallon of medium, being governed by the production of the desired consistency given to the paint. When we grind the medium and alloy together more alloy can be introduced; but we prefer to mix the bolted powder of the alloy directly with the medium. This paint can then be laid on iron surfaces with a brush, and such is its adhesive character that it covers rusted spots and all dry metallic compounds perfectly, and seems to reduce the oxides to a

metallic state, while it protects the iron mechanically and chemically. The alloy of zinc in dissolving leaves both oxide and metal behind, occupying its place, while the chlorides formed are poisonous to animal and vegetable life.

We are aware of many trials made to protect iron surfaces by strips of metal and various coverings of an impermeable character. We disclaim these devices, and confine ourselves to the use of a paint the basis of which is an alloy of zinc more rapidly oxidizable than zinc is when pure, and which can be laid on in the form of powder, cemented by an adhesive medium, so as to permit slow solution to take place and a galvanic action to continue, while the products of solution are poisonous to animal and vegetable life.

What we claim, and desire to secure by Letters Patent, is—

The composition or a paint in which metallic zinc forms the basis, and is alloyed or in contact with metals which dissolve less readily in sea-water, substantially as set forth herein.

JAMES GAMAGE TARR.

AUGUSTUS HENRY WONSON.

Witnesses:

CYRUS STORY,  
WM. A. KING.