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ART OF PROTECTING CONCRETE SURFACES FROM DAMAGE BY FROST IN TIDAL WATERS.

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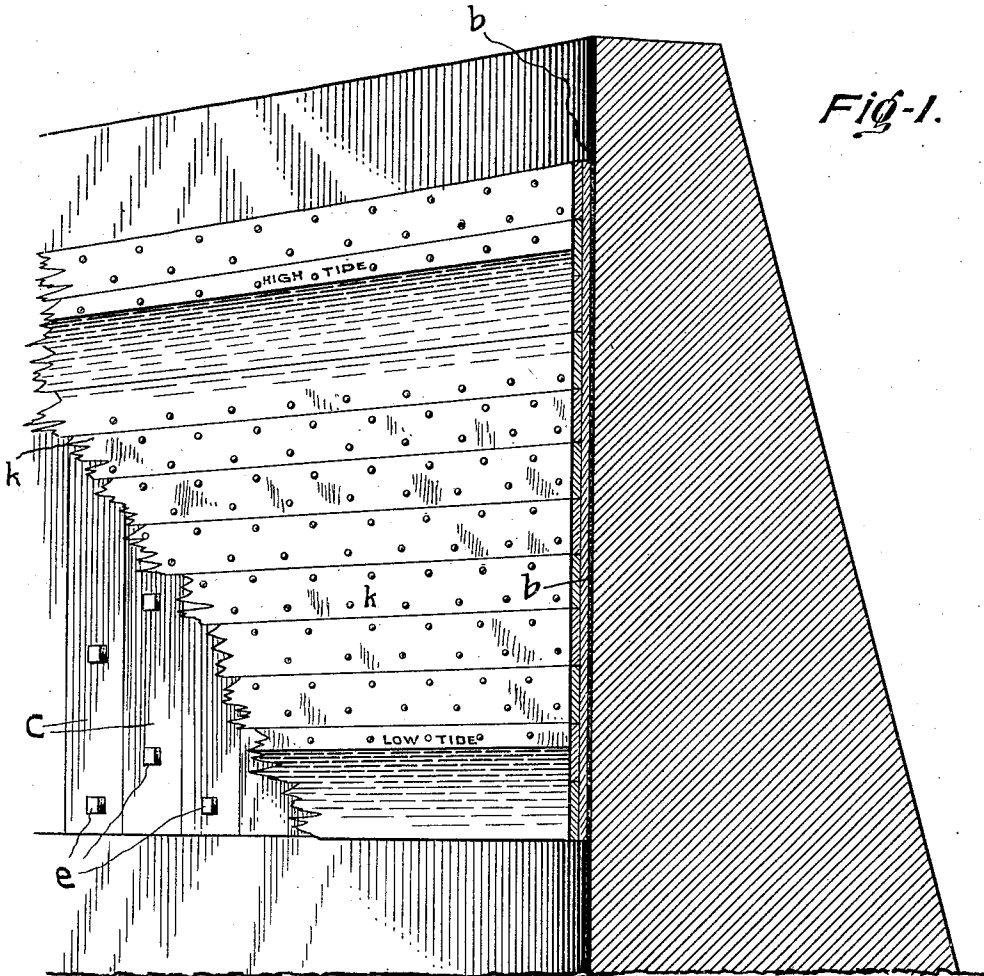


Fig-1.

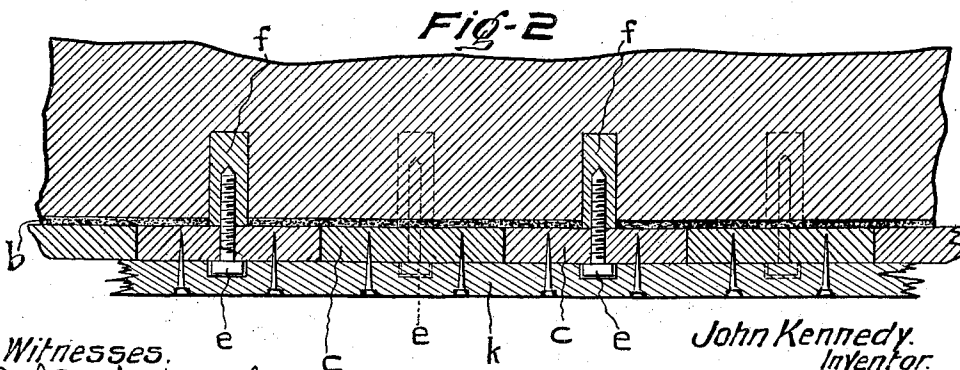


Fig-2

Witnesses.
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ART OF PROTECTING CONCRETE SURFACES FROM DAMAGE BY FROST IN TIDAL WATERS.

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Specification of Letters Patent.

Patented Dec. 17, 1912.

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To all whom it may concern:

Be it known that I, JOHN KENNEDY, a resident of the city of Montreal, in the Province of Quebec, Dominion of Canada, consulting engineer, have invented certain new and useful Improvements in the Art of Protecting Concrete Surfaces from Damage by Frost in Tidal Waters; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates particularly to the protection of the surfaces of concrete sea-walls, concrete piers, concrete-piles and the surfaces of other concrete structures from the disintegrating action of frost between high and low tides.

Heretofore great damage has been suffered from the frost eating into such surfaces, the effect being due to the wet surface left by the ebbing tide alternately freezing and thawing when the tide falls and rises, this alternate freezing and thawing causing the frost-line within the concrete mass to advance and retire relatively to the surface exposed. This action is very injurious to the concrete, the surface of which it disintegrates, and attempts have been made to prevent radiation of heat from the surface exposed alternately covered by the tide and exposed by the atmosphere, and, consequently, the entry of frost by stopping the porosity of the concrete surface, but without satisfactory results.

The object of the present invention is to keep the frost out of the concrete; and to this end I apply to the surface to be protected which extends from a point slightly above high water level to a point below low tide level, a coating of cementitious substance and embed therein a covering of wood equal in thickness to the penetration of frost between tides, thus forming an insulating shell which has proved effective.

For full comprehension, however, of my invention reference must be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate the same parts, and wherein:

Figure 1 is a perspective view of a concrete sea-wall protected according to my invention; and Fig. 2 is a horizontal sectional view thereof.

The cementitious layer is indicated at *b* and it is spread over the surface of the con-

crete between high and low water levels, and the wooden covering consists preferably of a series of vertically disposed planks *c* covered by a second series of planks *k* horizontally disposed, each series of planks being about two inches thick, more or less according to the climatic conditions to be taken care of, the vertical planks being greater in length than the distance between high and low tide levels. I consider the best results are obtained by a thickness of cement mortar sufficient to afford an even bed for the planks, and, at the same time, completely fill all spaces between the concrete and planks which latter should be placed as close as possible together; and the planks are pressed into the cement mortar before it sets.

The peculiar nature of the wood makes it particularly adaptable as an insulator for the application of my invention, and, consequently, the closer the planks are placed side by side the more perfect is the insulation of the surface to be protected.

The first layer of planks are fastened in place by bolts or spikes *e* driven or screwed into wooden plugs *f* previously inserted in the concrete which plugs also serve as heat insulators for the bolts or spikes. The second layer *k* of planks are spiked or otherwise independently fastened to the first layer in order that when this outer layer becomes thinned down by sea worms, for instance, or is otherwise rendered ineffective they may be removed without disturbing the first layer.

What I claim is as follows:—

1. In marine construction an insulating shell for protecting from disintegration by alternate thawing and freezing a concrete surface alternately exposed to the atmosphere and submerged consisting of an insulating material applied to the said surface between low and high water levels, the said insulating material comprising planks of sufficient thickness to inclose the fluctuating frost line.

2. The method of protecting a concrete surface exposed alternately to tide-water and the atmosphere, consisting in first applying to the said surface a layer of cementitious substance and then bedding a wooden covering on the cementitious substance before the said substance sets.

3. An insulator for a concrete surface exposed alternately to tide-water and the atmosphere, consisting of the combination

with a structure having a concrete surface
so exposed, of a heat insulating shell con-
sisting of a layer of cementitious substance
and layers of planking covering the cemen-
titious substance and independently secured
5 to the said concrete surface for the purpose
set forth.

In testimony whereof I have signed my
name to this specification in the presence of
two witnesses.

JOHN KENNEDY.

Witnesses:

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**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
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