July 13, 1943. F. T. BOYLAN 2,324,131

SECURING REINFORCED COVERINGS TO STEEL SHIP DECKS

Filed April 28, 1942

FIG. 1.

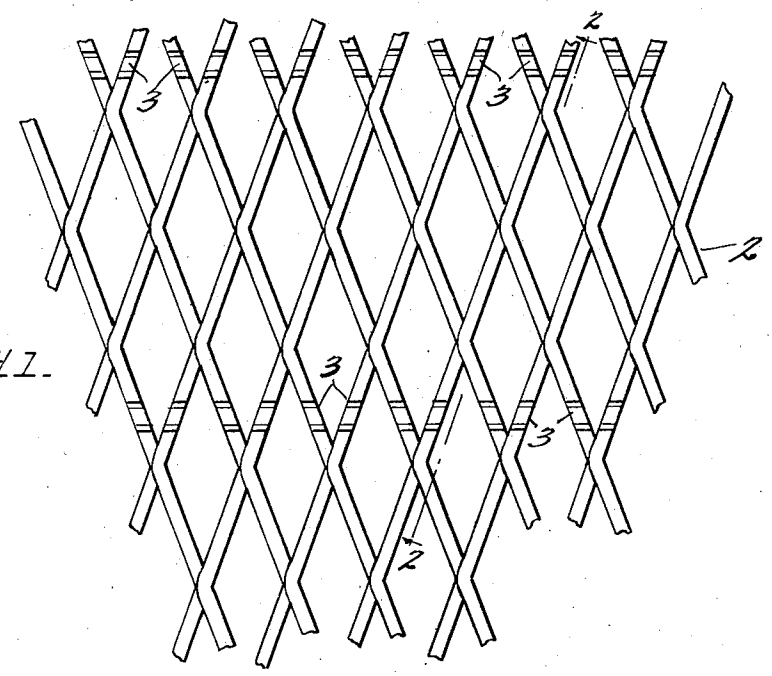


FIG. 2.

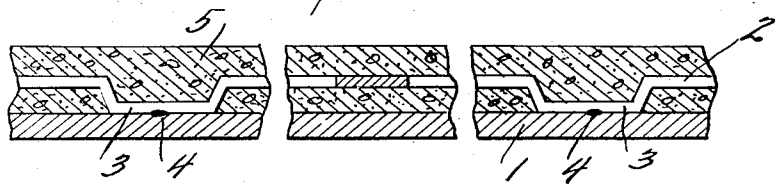
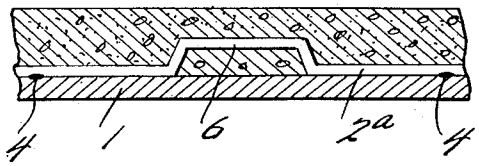


FIG. 3.



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SECURING REINFORCED COVERINGS TO STEEL SHIP DECKS

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2 Claims. (Cl. 114—85)

This invention relates to the reinforcing of the protective covering layer of magnesite, cement or the like, commonly applied to the steel decks of ships, and to the bonding of such reinforced layer. This is a matter of utmost importance, since in marine work, unlike land installations there is a constant weaving of the ship which tends to ultimately crack the magnesite or cement, and as a result, water seeps thru and corrodes the deck. Thus it is essential to get the best possible bond in the cement or magnesite covering in marine work.

Expanded metal of the common diamond, or other form that has heretofore been used for bonding purposes, so far as known to me, has no adequate provision made where the expanded metal, or a substantial component thereof is positioned substantially midway of the thickness of the protective covering so as to best serve its reinforcing function and to prevent cracking or disintegration of the protective covering.

It will be understood that the usual procedure is to first thoroughly clean the deck surface, then spot weld the expanded metal to the deck surface, then apply a bitumastic or like solution to the deck and after it is thoroughly dry, apply one coat of hot enamel, these solutions being swabbed on the deck over the expanded metal. After the enamel is hardened thoroughly the deck covering of cement, magnesite or the like is applied which insures the deck being protected from corrosion in the event the covering cracks or disintegrates and water seeps through. Because of the fact that the usual #13 gauge expanded metal is so thin, it lacks the necessary embedding in the covering to provide a proper key or bond after these various solutions are applied to the deck over the expanded metal, the reason being that the total thickness of the various solutions averages close to or more than the thickness of the expanded metal.

In accordance with my invention, I position the expanded metal a distance above the deck surface so that it will be located about midway of the thickness of the protective cement or like covering after the several solutions described have been applied to the deck surface. I accomplish this by producing in the expanded metal, offsets spaced apart a proper distance, e. g. about a foot apart, the extent of these offsets being such that as the sheet of expanded metal is laid upon the deck, it is held spaced therefrom about half the thickness of the protective covering, such covering when of cement, being usually about one inch in thickness, and when magnesite or the like is used being somewhat less. These offset portions are spot welded approximately 12'' apart to the deck surface and are preferably about an inch in lengthwise extent. The entire deck is painted with a bitumastic solution, and on top of that hot enamel applied, but with the body of the expanded metal held raised from the deck surface as described, there is room for the cement to flow underneath the expanded metal to provide an adequate bond or key to hold the deck covering layer securely to the steel deck.

An exemplification of the invention is shown in the accompanying drawing wherein;

Fig. 1 is a plan view showing a fragmentary portion of expanded metal with the offset or spacing formations of my invention;

Fig. 2 is a fragmentary vertical section on line 2—2 of Fig. 1 but enlarged showing a protective covering with the reinforcing and bonding means of my invention assembled to hold it secure to a steel ship deck, and

Fig. 3 is a similar fragmentary vertical section showing another possible way of employing the improved expanded metal formation of my invention.

1 denotes a portion of a steel deck plate and 2 indicates a portion of the expanded metal sheet preferably utilized with my invention. The usual #13 gage 3'' x 8'' expanded metal is well adapted for the required use.

In accordance with my invention lateral offsets 3 are produced in the expanded metal with suitable spacings, preferably about one foot apart in the lengthwise direction of the diamond forms, and closer in the direction transverse thereto, as shown. In order to afford the greatest possible rigidity and assurance that there shall be no minute vibration between the deck surface and the plastic covering, these off-set areas are continuous with the body of the expanded metal sheet at both ends of such areas so that the greatest possible degree of stiffness is transmitted to the plastic layer. These offsets may be of any desired length and may suitably be about one inch long and of a depth about half that of the covering layer to be applied. These offset portions are spot welded to the deck surface approximately 12'' apart as indicated at 4 after which the deck and expanded metal are painted with bitumastic solution or the like and hot enamel applied thereto; These applications, however, not materially reducing the spacing of the major portion of the expanded metal from the deck. It will be noted that when the protective covering 5 of cement, magnesite, or the

like is then applied and flowed through the interstices of the expanded metal, it is possible to cover the deck surface itself completely, and since the expanded metal is keyed halfway up through the covering, it may be practicable to use a lighter thickness of such covering, e. g. ¾'' instead of 1''; 1'' instead of 1¼'' or 1½'', thereby saving the expense of material and weight to the ship, and thereby allowing the vessel to carry a larger cargo.

It is to be noted that with my invention the corrosion resisting solutions are applied to substantially the entire deck surface, whereas when the expanded metal ordinarily used lies flat upon the deck surface, this portion of the deck surface does not get any adequate application of such solutions; also that the protective covering of cement, or magnesite employed is most effectively bonded to the steel deck, the expanded metal serving both as a bond or key by the spot welding at the offset areas **3**, and also serving to reinforce and preserve from cracking or disintegration the body of the protective covering itself.

It is also practicable if desired, to apply the expanded metal with the offset portions extending upward, and with the body of the metal lying flat upon the steel deck. Such an arrangement is shown in Figure 3, wherein the main body of the expanded metal **2***a* lies flat upon the steel deck **1**, spot welded thereto at intervals as seen at **4**, and with the offset areas **6** extending upward therefrom, and affording the necessary bond and key with the cement covering.

The protective covering **5** is thus at the same time reinforced throughout its extent, and most effectively bonded to the surface of the steel deck so that cracking is prevented, and the period of useful service greatly extended, with the steel deck adequately protected from corrosion.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, and refer to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent is as follows:

1. The combination with a steel ship's deck, of a protective covering of plastic material applied to the surface thereof, and a formation of expanded metal sheet embedded in such plastic material, such expanded metal having spaced apart laterally offset areas whereby a substantial portion of the expanded metal is held substantially spaced from the deck surface, and the portion lying against the steel deck surface spot welded thereto, said off-set areas being continuous at both ends thereof with the body of the expanded metal sheet, whereby a maximum of relative rigidity and assurance against a relative vibration is attained.

2. The combination with a steel ship's deck, of a protective covering of plastic material applied to the surface thereof, and expanded sheet metal embedded in such plastic material, such expanded metal having spaced apart laterally offset areas spot welded to the steel deck surface and holding the main body of the expanded metal spaced from the deck and substantially midway of the thickness of the protective covering, said off-set areas being continuous at both ends thereof with the body of the expanded metal sheet, whereby a maximum of relative rigidity and assurance against a relative vibration is attained.

FELIX T. BOYLAN.