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(12) # EUROPEAN PATENT APPLICATION

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(54) **Method for isolating walls, particularly the tank walls from a ship, and panels and fasteners used thereby.**

(57) In a method for isolating tank walls (1), on the tank walls to be isolated are arranged isolating panels (4) from plastic material which are finished on the outer side thereof with a metal sheet (6) and are provided with openings (7) which are pushed over pins (3) soldered to the tank wall, whereby on said pins are screwed elements (3', 3") which press said panels against the tank wall, and in the space between said panels is injected a hardenable isolating foam (13) after having laid an adhesive tape (15) on those edges lying next to one another of said panels, to form said space.

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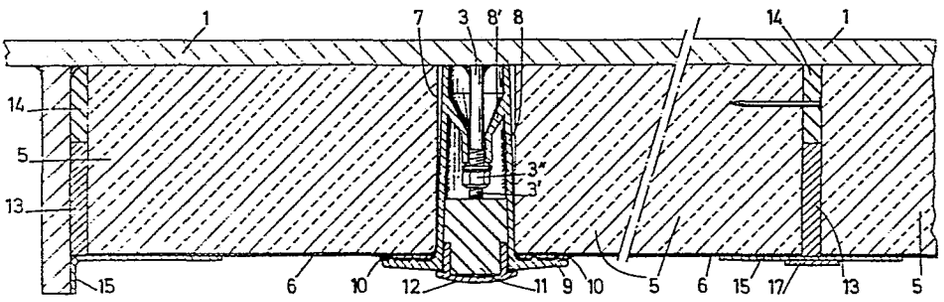

Fig. 2

"Method for isolating walls, particularly the tank walls from a ship, and panels and fasteners used thereby".

This invention relates to a method for isolating the tank walls from a ship whereby said walls are to be coated with a thermally-isolating plastic foam.

Usually said plastic material is glued against the walls to be isolated which due to the narrow spaces usually available, is difficult to perform and also particularly unhealthy due to the emanations and vapours which are released by such work. Moreover difficulties are encountered when arranging large panels because relatively small deviations result in problems when joining said panels.

The invention has not only for object to obviate the above drawbacks but also to provide an original solution to the following problems :

1. Minimizing the heat losses and avoiding cool spots;
2. providing an isolating with sufficient mechanical strength to allow walking on the top surface of said isolating material, whereby further the material should be water-proof at the bottom thereof;
3. said isolating material having to be generally vapour-proof;
4. the isolating layer having to be mounted in very narrow places and

actually by unskilled workers;

5. avoiding the use of dangerous materials or materials which are difficult to use;
6. making possible an easy injecting, and
7. making possible local repairs without difficulty.

It is to be noted that in a ship the holds or tanks of which are to be isolated, said isolating is arranged on the bottom walls before lowering the tank bottom walls on the supports thereof. When said tanks have been positioned, the finishing and touching-up of said tanks is very difficult and laborious.

To obviate the above drawbacks, according to the invention, on the tank walls to be isolated are arranged isolating panels from said plastic material which are finished on the outer side thereof with a metal sheet and are provided with openings which are pushed over pins soldered to the tank wall, whereby on said pins are screwed elements which press said panels against the tank wall, and in the space between said panels is injected a hardenable isolating foam after having laid an adhesive tape on those edges lying next to one another of said panels, to form said space.

A feature of the method according to the invention lies in arranging inside said space between said isolating panels, against the tank wall to be isolated, a resilient strip from foam material which retains the pressure from the foam material

to be injected and prevents the further flowing thereof.

Preferably the hardenable plastic material is injected in the space present between the isolating panels through said adhesive tape.

The invention also relates to the isolating panels and fasteners used with the above-defined method.

Other details and features of the invention will stand out from the following description given by way of non limitative example and with reference to the accompanying drawings, in which :

Figure 1 is a bottom view with parts broken away, of the isolated bottom wall from a tank.

Figure 2 is a cross-section along line II-II in figure 1, drawn on another scale.

In both figures, the same reference numerals pertain to similar elements.

The method illustrated by the figures pertains to the isolating of the bottom wall 1 from a tank 2. It is clear that the vertical walls of a tank may be treated in the same way.

The top side or roof of a tank can be finished in a similar way or according to a more conventional method, depending on the particular conditions.

With the method according to the invention, a number of pins 3 are soldered to wall 1. Said pins which are regularly spaced, are made from stainless steel and the head 3' thereof is provided with a screw thread. Over each set from four pins 3 is pushed an isolating panel 4. The isolating panels 4

(fig. 2) are comprised of an isolating self-extinguishing foam layer 5 and are finished on the outer side with an aluminum sheet 6. Said isolating panels thus have a number of openings 7 which are distributed over the panel surface area according to a module which corresponds to the module according to which said pins 3 are distributed over the tank wall.

To press said isolating panels 4 against tank wall 1, conical components 8 are pushed over pins 3 in said openings 7. Said conical components 8 are retained pressed against tank wall 1 by screwing self-locking nuts 3" on the heads 3' of pins 3.

For this purpose said conical components 8 have a collar 9 which is retained pressed against resilient sealing rings 10. The space above head 3' from pins 3 is sealed with a plug 11 and a cover 12.

Said components 8 provided with an inner centering ring 8', are made from a synthetic or plastic material, preferably polyethylene.

When using panels according to the invention, there is formed between the edges from two adjacent panels, a space which is filled with an injectable foam. The injected foam which fills said space is shown in 13.

To bound that space to be filled with foam, the following operations are performed.

1. On the wall of an isolating panel is arranged, preferably by nailing, a strip 14 from foam material. Said strip connects tightly to said tank wall, is slightly compressed under the action of injected foam 13 and prevents any further flowing

out of said foam between the tank wall and panel.

2. Along the outer side thereof the edges from panels lying next to one another are provided with adhesive tapes 15 and 16. Said adhesive tapes intersect at right angle to one another and thus determine together with the side walls of panels 4 and said strips 14, that space which will be filled by the injected foam 13.

The injection occurs without difficulty through said adhesive tapes 15 and 16, whereby the complete space between the panels can be filled systematically with an hardenable foam which is naturally self-extinguishing. The small holes formed are sealed with small self-adhesive strips 17. By using isolating panels according to the invention, there are formed between the walls thereof spaces which can be filled and isolated integrally. The isolating of said spaces then forms a continuous and homogeneous unit with the isolating panels proper.

The spaces between the isolating panels proper do not have to be regular, they easily compensate for any irregularity in the panel size. There appears from the above description that it is no more to be feared as it was the cas up to now, that discrepancies in the size of the isolating panels or in the arrangement thereof might have an adverse influence on the dimensions of the isolated surfaces areas proper, which caused large problems when isolating tank walls, mostly where lack of space did make it extremely difficult to finish according to the conventional techniques.

The arrangement of adhesive tapes on the

edges of panels lying next to one another occurs under the best circumstances. Use can be made therefor of tapes from elastomer-bitumen with an outer layer from PVC. Such a material adheres remarkably well to aluminum, is water-proof and withstands steam, sea water and vapours.

The expansion of the hardenable foam can occur in those spaces determined by said adhesive tapes and be tested with the hand from the outside. An excess of foaming material will be received by the resilient strips from foam material, as an open-cell material is preferred therefor. Due to the presence of said foam strips, entering of foam between the tank wall and the panels to be isolated is also prevented, which would otherwise bring the danger of the panels being pushed away from the walls.

By selecting a hardenable foam which adheres well to the foam from the isolating panels, the above-mentioned homogeneity of the isolating layer is insured.

Finally it should be stressed that contraction movements of the tank skin are accepted by the material the resilient strips are made of and that said conical components 8 can receive side forces from the panel and transfer same to the pins 3 without endangering the isolating material 5 the panels 4 are made of.

Not only vertical tank walls can be isolated according to the method of the invention and with the material according to the invention, but also radiused corners and curvatures of the tanks to be isolated can be treated in the same way.

It must be understood that the invention is in no way limited to the above embodiments and that many changes can be brought therein without departing from the scope of the invention as defined in the appended claims.

For instance it is clear that the above-described method and the material used therewith can also be used in applications which are not necessarily bound to the isolating of the tank walls in a ship.

CLAIMS.

1. Method for isolating the tank walls from a ship, whereby said walls are to be coated with a thermally-isolating plastic foam, in which on the tank walls to be isolated are arranged isolating panels from said plastic material which are finished on the outer side therof with a metal sheet and are provided with openings which are pushed over pins soldered to the tank wall, whereby on said pins are screwed elements which press said panels against the tank wall, and in the space between said panels is injected a hardenable isolating foam after having laid an adhesive tape on those edges lying next to one another of said panels, to form said space.

2. Method as defined in claim 1, which further comprises arranging inside said space between said isolating panels, against the tank wall to be isolated, a resilient strip from foam material which retains the pressure from the foam material to be injected and prevents the futrher flowing thereof.

3. Method as defined in either one of claims 1 and 2, which comprises injecting said hardenable plastic foam into those spaces present between the isolating panels through said adhesive tapes.

4. Panels for isolating a tank wall by a method as defined in any one of claims 1 to 3, which are comprised of a layer from isolating material with substantially cylindrical openings wherein can be pushed fasteners which are screwed on pins welded therefor on said tank wall.

5. Panels as defined in claim 4, in which

the panels size is so selected that between two panels lying next to one another is formed a space determined by the spacing between said pins, the width of which lies between 7 and 13 mm.

6. Fasteners for retaining isolating panels pressed against a wall to be isolated, which have a slightly conical cross-section with a centering ring canted towards the center line of said fasteners which are pushed over pins fastened to said wall and against which are pressed self-locking nuts which are screwed on the heads of said pins.

7. Fasteners as defined in claim 6, which are provided with a collar through which said fasteners press said isolating panels.

8. Fasteners as defined in either one of claims 6 and 7, which are provided with an isolating plug with cover.

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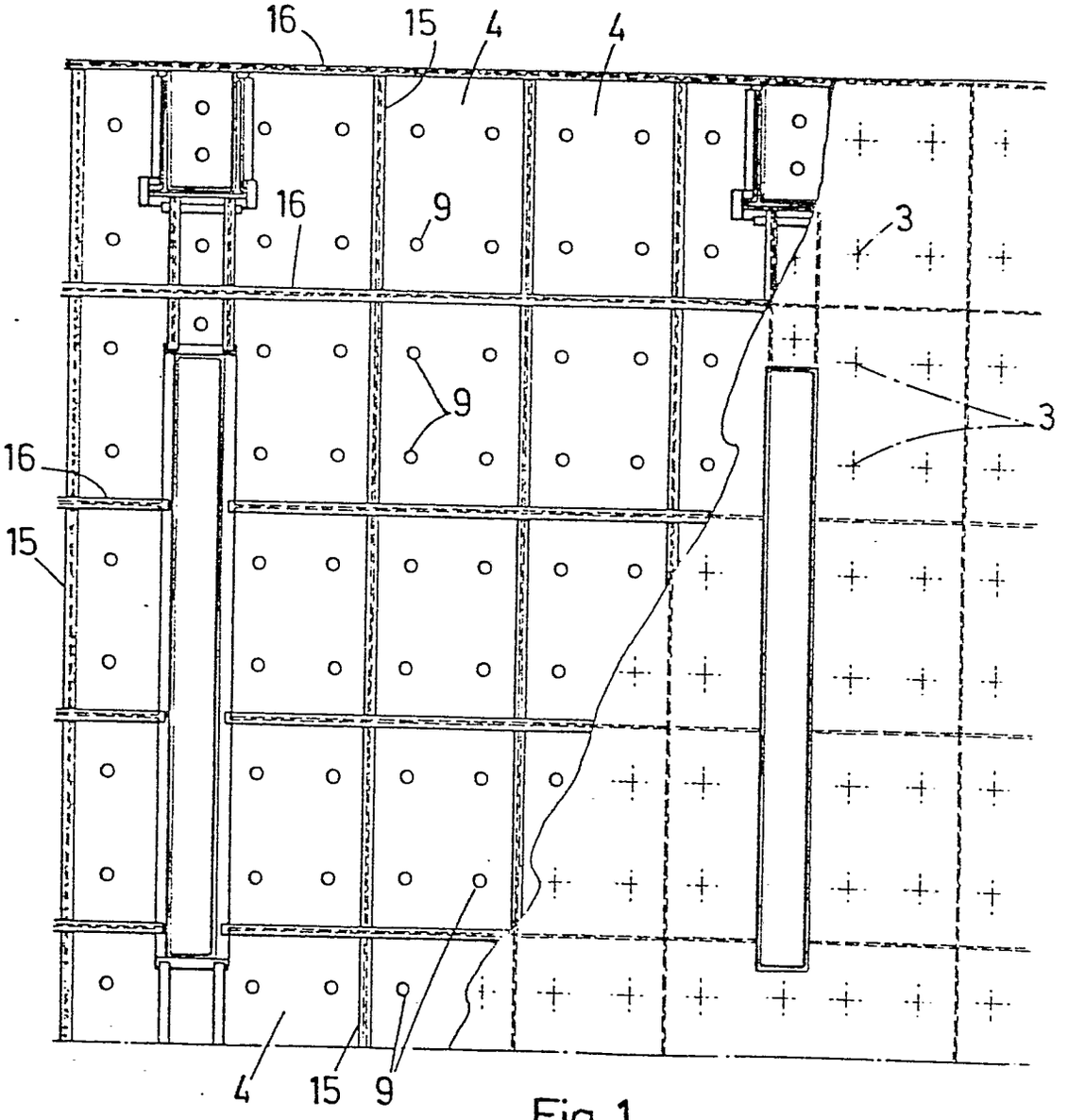

Fig. 1

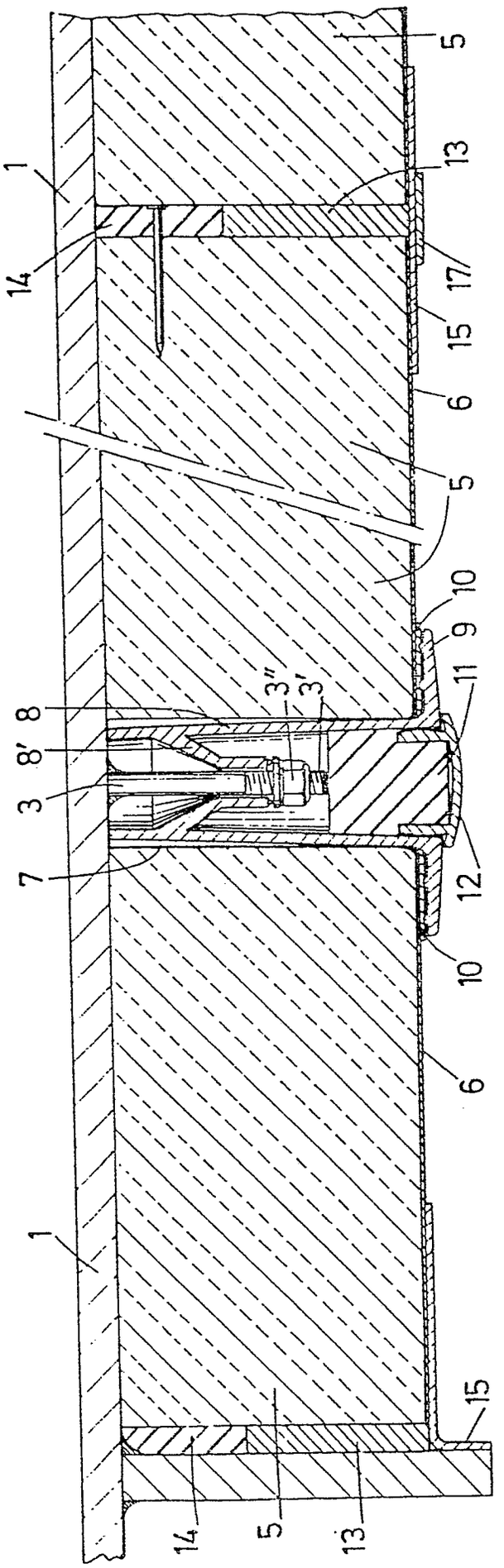

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 80 20 0281

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	DE - B - 1 242 467 (HOWALDTS WERKE) * The whole document *	1,4,6, 7,8
	FR - A - 1 331 801 (CONCH INT.) * Figure 3; pages 2,3 *	1,4,5, 6,7,8
	US - A - 3 498 249 (JONES) * Figure 4; columns 3,4 *	1,2,4, 7,8
	US - A - 3 082 726 (DOSKER) * Figure 3 *	1,4
	US - A - 4 106 424 (SCHULER) * Figure 7; column 3, lines 41-46 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 63 B 25/16

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 63 B

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	07-07-1980	LUKAS