United States Patent

[11] **3,572,000**

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[33] **Sweden**
[31] **9204/68**

[54] **MOUNTING OF EXTERIOR SURFACE CLADDING FOR TANKS OR SIMILAR STRUCTURES**
7 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **52/486,**
52/249, 52/404, 52/508, 52/573, 248/224
[51] **Int. Cl.** **E04b 2/40,**
E04b 1/68
[50] **Field of Search** 52/249,
269, 478, 436, 487, 508, 544, 543, 404, 573;
248/300, 301, 224, 223, 247

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ABSTRACT: A bracket for supporting surface coatings on tanks and similar buildings, this bracket extending perpendicularly out from the wall of the building and carrying at its outer end an essentially horizontal rail. This rail extends in front of and at a distance from the wall of the building to which there are attached a protection surface forming said surface coating. The invention resides in the arrangement of carrying arm arranged on said bracket and being vertically displaceable in relation to the same. The carrying arm is further, at its outer end, provided with at least one hook, this hook carrying a second horizontal rail, a lower row of protection sheets adapted to be arranged at said second horizontal rail.

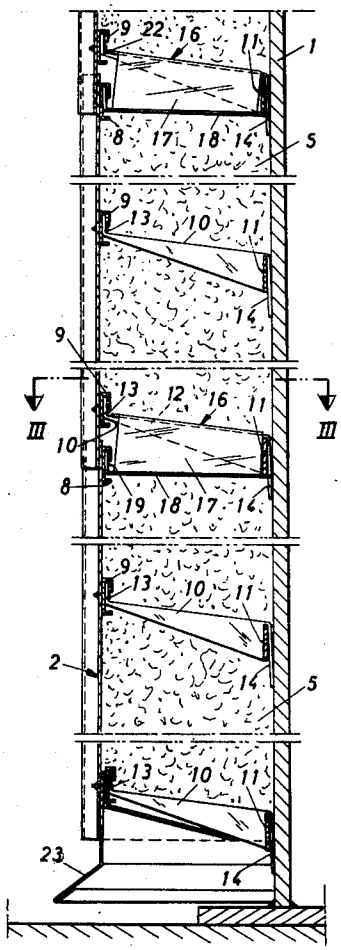
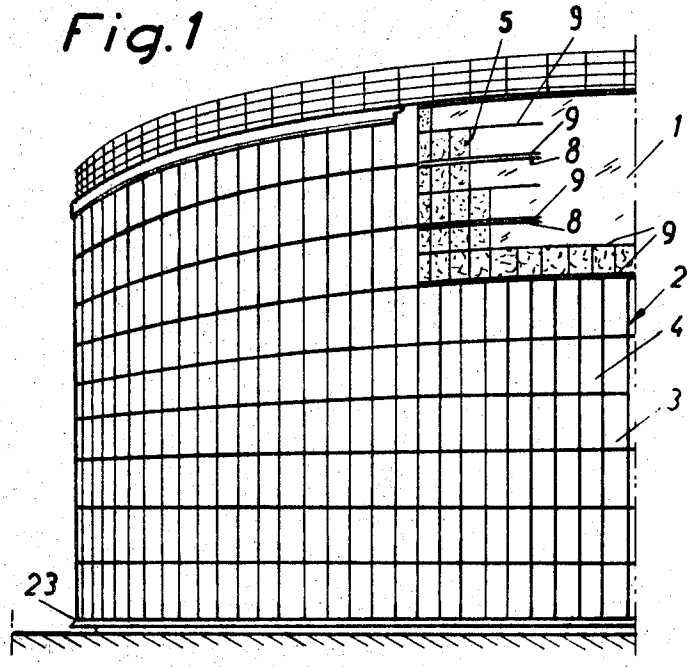


Fig.1



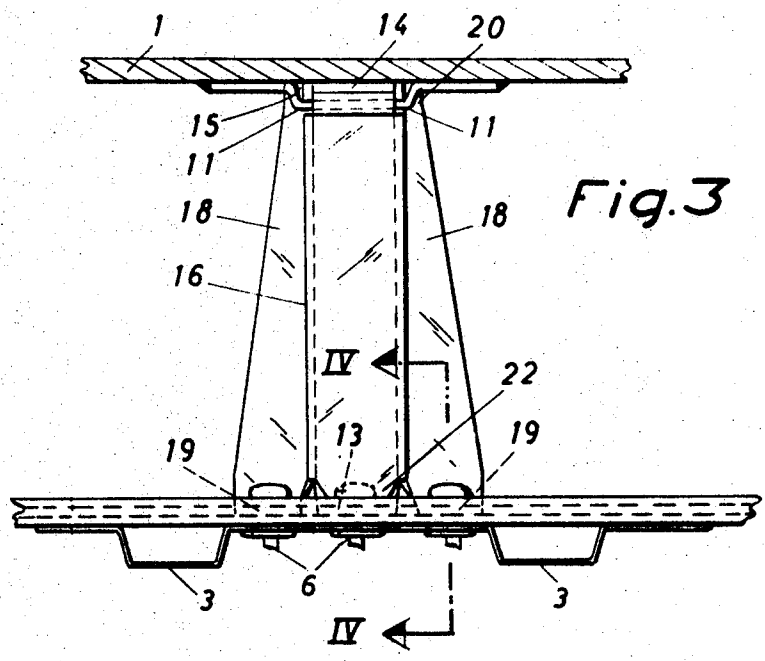


Fig.3

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Fig.2

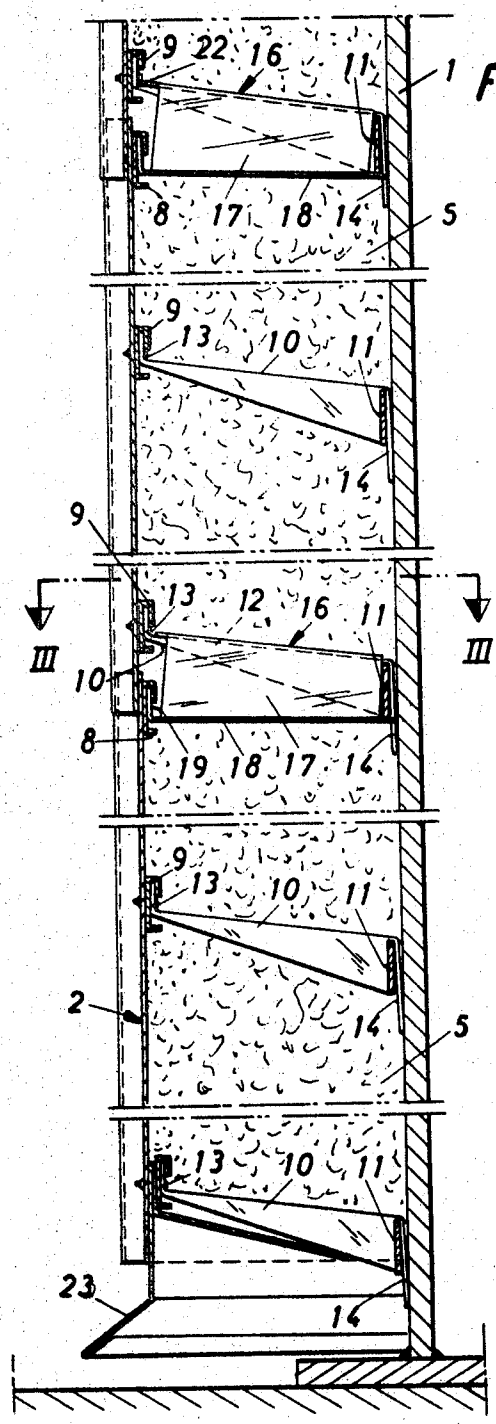

Fig.4

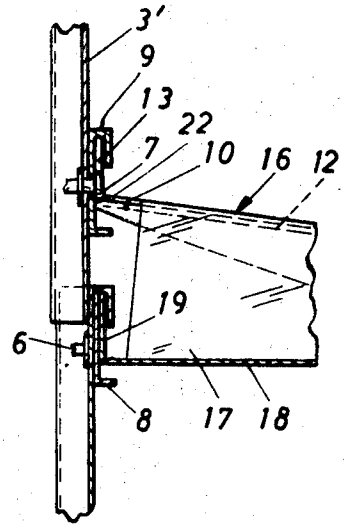

Fig.5

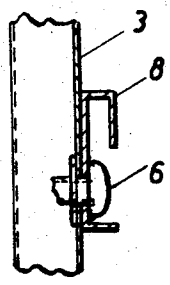

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Fig.8

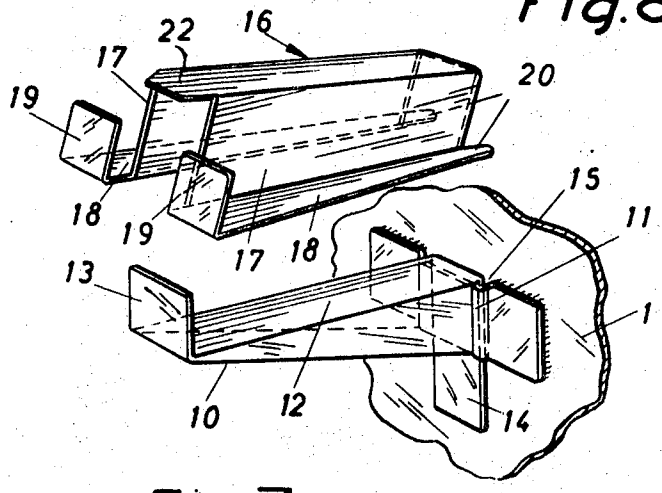


Fig.7

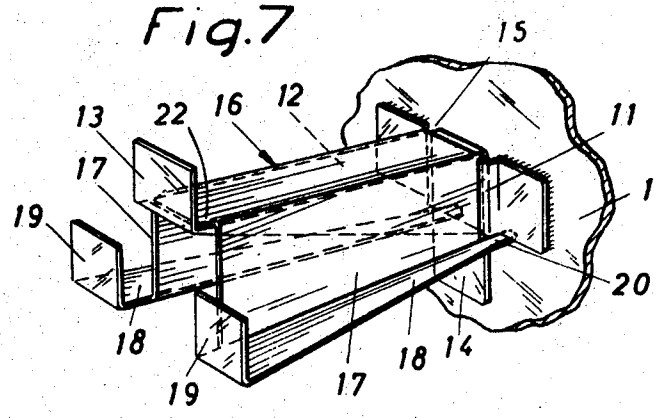
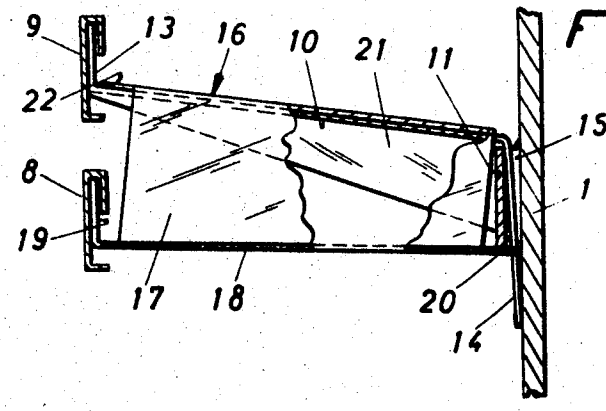


Fig.6



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MOUNTING OF EXTERIOR SURFACE CLADDING FOR TANKS OR SIMILAR STRUCTURES

BACKGROUND OF THE INVENTION

Storage tanks for oil and liquid fuels are mostly provided with an external coating which externally is enclosed in a protection mantle of sheets. Such insulation coatings are exposed to considerably stresses at high wind forces. Hitherto, the protection sheets have been mutually connected by means of rivets, usually so-called pop rivets. Normally used for this purpose are rather thin aluminum sheets, e.g. of a thickness of 0.7 millimeters The heads of the pop rivets and the sheet around the rivet hole have a tendency to be torn due to the vibrations in the protection sheets caused by sudden changes of wind.

SUMMARY OF THE INVENTION

The object of the invention is primarily to eliminate said drawbacks. The invention relates more particularly to brackets for carrying a coating on tanks and similar constructions, said brackets being of the kind extending perpendicularly out from the wall of the building and carrying at the outer end a rail at a distance from the wall, said rail extending essentially horizontally, the insulation sheets of the insulation coating being attached to said rail. The main feature of the invention is to be seen therein that the bracket also carries a supporting arm, the latter being vertically displaceable in relation to said bracket and having at its outer end at least one hook, said hook carrying a second horizontal rail, a row of protection sheets on a lower level adapted to be arranged on said second rail. Due to this arrangement it is possible to attach, by means of rivets, rows of protection sheets along the upper border of the lower rail of the brackets in question and to attach by means of rivets a row of protection sheets at the upper rail belonging to the same horizontal row of brackets in a somewhat overlapping relationship to the lower row of sheets. At changes of temperature these two rows of protection sheets can be displaced relatively to each other in vertical direction without influencing the rivet junction. As there is chosen a greater thickness for the rails, e.g. of 2 millimetres, than for the protection sheets, the rivet junction will consequently be more resistant than when the riveting is performed through two thin sheets.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be elucidated with reference to the accompanying drawings. In the drawings:

FIG. 1 shows diagrammatically a part of a tank at the attaching of an insulation coating carried by brackets according to the invention,

FIG. 2 shows on an enlarged scale a broken partial section through the tank wall with brackets and insulation coating,

FIG. 3 shows on an even more enlarged scale a horizontal section on the line III–III in FIG. 2,

FIG. 4 shows a vertical section on the line IV–IV in FIG. 3.

FIG. 5 shows on an enlarged scale a section through the rivet zone between the protection sheet and the rail,

FIG. 6 is a side elevation shown in a partial vertical section of a bracket according to the invention,

FIG. 7 shows diagrammatically the bracket and the carrying arm belonging to the same, and

FIG. 8 is a similar diagrammatical view of the bracket with the carrying arm in lifted position.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to FIG. 1, numeral 1 denotes the tank wall of a tank and numeral 2 a protection mantle comprising a number of sheets, preferably corrugated aluminum sheets 3, 4, the protection mantle intended to protect an insulation layer 5, e.g. of mineral wool. The sheets 3, 4 of the protection mantle 2 are arranged in horizontal rows. The sheets 3, 4 are by means of pop rivets 6, 7 attached to rails 8, 9 of U-shaped

cross section and extending annularly around the tank wall 1. The rail 9 is carried on the outer end of brackets 10 arranged in horizontal rows and extending perpendicularly out from the wall 1, said brackets 10 carried, at their inner ends, by U-shaped washers 11 welded to the wall 1. The brackets 10 are manufactured from sheet material in such a way that their cross sections get the shape of an inverted U. The cross branch 12 of the U (cf. in particular FIG. 8) is at the outer end bent upwards so as to form a hook 13, the rail 9 adapted to be put over this hook 13 (cf. FIG. 4), and its inner end is bent downwards to form a hook 14 to be put into a slot 15 between the washer 11 and the wall 1. By shaping and arranging the bracket 10 in this way, the bracket may at need be displaced to some extend in vertical direction.

A carrying arm 16 can be hung on the bracket 10. This arm 16 is assumed to be manufactured by means of a bending of a sheet such that it in vertical cross section will be shaped as an inverted U. The downwards directed branches 17 of the U are at the outer end of the carrying arm 16 higher than at the inner end and are at the lower border bent sidewards to form flanges 18. These flanges 18 are at the outer ends bent upwards to form hooks 19 over which the lower rail 8 may be arranged. The inner ends of the flanges 18 are shaped as tongues 20 which at the arranging of the carrying arm over the brackets 10 is brought to engage below the holding washer 11 of the bracket 10. The carrying arm 16 is thereby prevented from leaving the bracket 10 with its inner end but it is free, at increase in the temperature and a lengthening caused thereby of the protection mantle 2 with its outer end to swing vertically somewhat upwards, the branches 17 then forming a side guide against the outer side of the downwards directed branches 21 of the bracket 10.

The carrying arm 16 is also at its front end provided with a tongue 22. The latter reaches to the hook 13. If the insulating material is inserted from below into the space between the brackets 10 and presses against the carrying arm 16, the latter is prevented from being lifted up from its brackets thereby that the tongues 20 hit against the holding washer 11 and thereby that the tongue 22 hits the upper rail 9.

As shown in FIGS. 2 and 4 the lower row of sheets 3 are riveted at the upper ends to the rail 8 and an upper row of sheets 3' (FIG. 4) at the lower border to the upper rail 9, attention being thereat paid that the upper sheet 3' will somewhat overlap the upper border portion of the lower sheet.

The brackets 10 and the carrying arms 16 at the same time serve as supports for the insulation layer 5.

As obvious from FIGS. 1 and 2, the lower end of the insulation coating 2 is provided with a drip moulding 23.

The insulation coating thus obtained will be very strong and also rather dense. It is easily applied. Due to the fact that the brackets 10 are vertically displaceable in relation to the holding washers 11 and the carrying arms 16 are displaceable vertically in relation to the brackets 11, the sheets 3, 4, will at the thermal expansion be free to move in relation to each other without influencing the rivet junctions. The insulation coating will for this reason be very resistant and have a long life.

The invention has been described in the aforegoing for purposes of illustration only and is not intended to be restricted by this description or otherwise except as defined in the appended claims. Many a modification is possible within the invention and thus, the shape of the brackets as well as of the carrying arm may be modified. Thus, it is possible, if desired, to manufacture the brackets 10 as well as the carrying arms 16 and the holding washers 11 by moulding of a suitable material. The invention may be carried into effect at front and face coatings on building other than tanks.

I claim:

1. A protective surface for a tank having a tank wall including in combination a bracket supported at one end by said tank wall and extending outwardly therefrom, a first hook formed at the outer end of said bracket, an upwardly facing support surface of said bracket, a carrying arm suspended

from said bracket by a surface thereof overlying and embracing said support surface, a second hook formed on said carrying arm, upper an lower rails respectively supported by said first and second hooks and upper and lower protection sheets respectively rigidly fastened to said upper and lower rails in spaced relation with said tank wall whereby said lower protection sheet and said carrying arm are relatively movable vertically with respect to said upper protection sheet and said bracket in response to alterations in stress

2. A protective surface as in claim 1, wherein the carrying arm is formed from a sheet bent to form a U, said sheet adapted to be hung over said bracket in the longitudinal direction of the same.

3. A protective surface as in claim 2, wherein said carrying arm is provided at an end with a tongue and abutment means are provided on said tank wall beneath which said tongue extends.

4. A protective surface as in claim 2, wherein the carrying arm includes first and second downwardly directed branches of the U-shaped sheet, said branches having, at their outer ends, each a respective hook.

5. A protective surface as in claim 4, wherein the downwardly directed branches of the U-shaped carrying arm are higher at the outer ends than at the inner ends.

6. A protective surface as in claim 1, wherein the bracket is formed from one piece of sheet such that it has a cross section shaped as an inverted U, the cross branch of said U at its outer end being bent upwards to form a first hook and at its inner end bent downwards also to form a second hook.

7. A protective surface as in claim 6, wherein the carrying arm has at its front end a tongue which in applied position reaches to the first hook of said bracket.