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Glazebrook

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[45] **Aug. 19, 1975**

[54] **MARINE PANEL HANGING ASSEMBLY**

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[73] Assignee: **National Building Industries,** National City, Calif.

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[21] Appl. No.: **405,017**

[52] **U.S. Cl.** ..... **114/84;** 52/483; 114/74 A

[51] **Int. Cl.**[2] **B63B 3/68**

[58] **Field of Search** ..... 114/84, 74 A; 52/403, 483, 52/395

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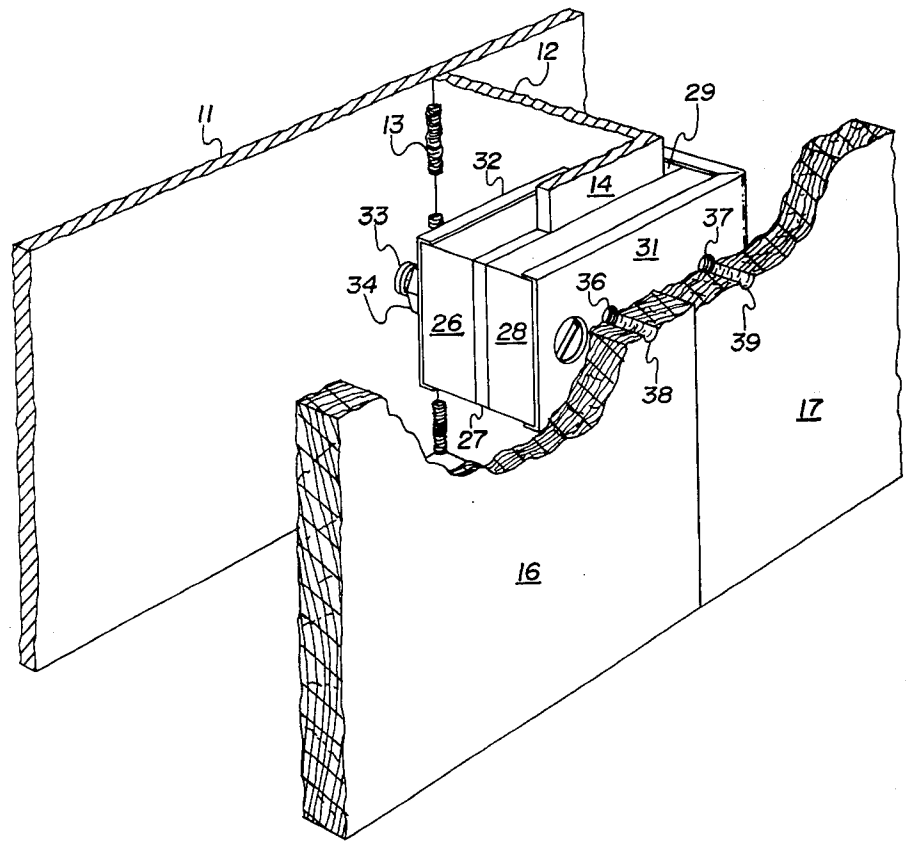
Primary Examiner—Trygve M. Blix

Assistant Examiner—Sherman D. Basinger

[57] **ABSTRACT**

A marine panel hanging assembly for hanging marine panel sections in spaced relationship with the inside surface of a ship's hull, in one embodiment, utilizing a metallic bulkhead stiffener already in place in which first and second insulator plates are clamped around the bulkhead stiffener and held in place by first and second clamp plates to which are attached via screws thereto in a non-metal to metal heat transfer relationship. Another embodiment for utilization with metallic bulkheads consists of a primary contact insulator against the bulkhead to which is attached a metallic saddle having a saddle insulator in contact with a backwall thereof and a metallic nut plate in contact therewith which in turn has an insulative bolt plate ahead of it. The nut plate being displaced from the saddle assembly and the panels being attached directly to the sliding bolt plate resulting in no metal to metal heat transfer. A third embodiment is for utilization with a bulkhead which is accessible from each side and utilizes an insulator on each side of the bulkhead with a bore through the bulkhead to which is attached a tubular clamp screw insulator. A clamp screw is passed through both insulators with a clamp plate on the faces of each insulator to hold the entire assembly together, the clamp plate acting as a nut plate with threaded apertures therein for screwing wall panels thereto.

3 Claims, 13 Drawing Figures



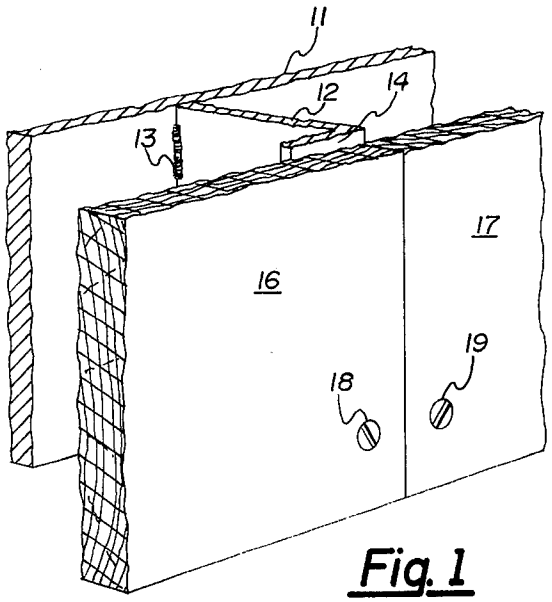


Fig. 1

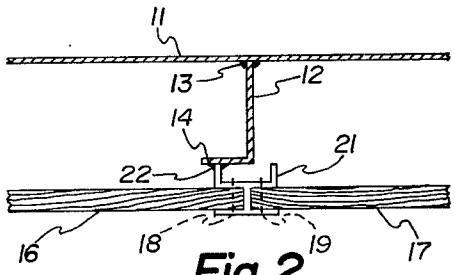


Fig. 2

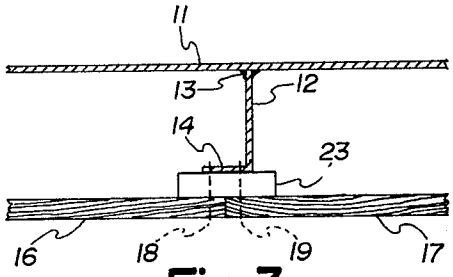


Fig. 3

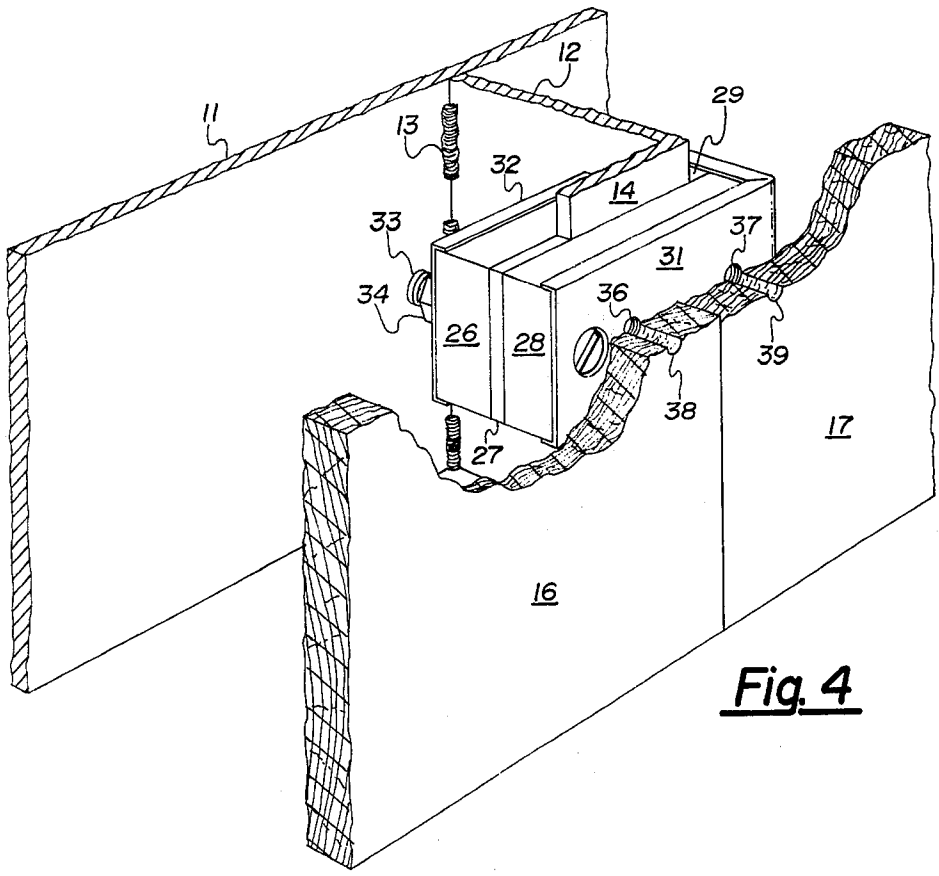


Fig. 4

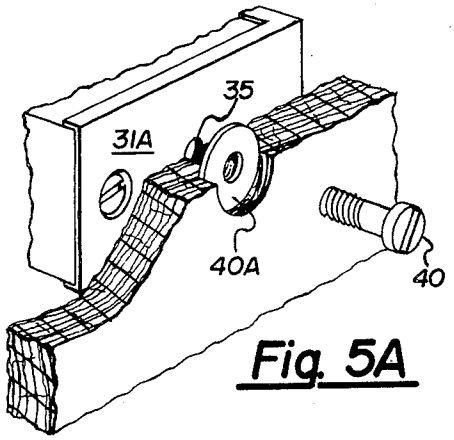


Fig. 5A

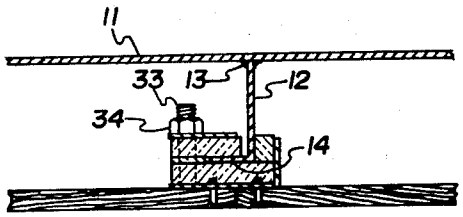


Fig. 5

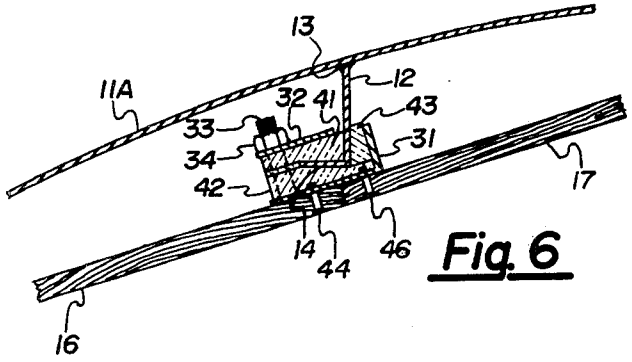


Fig. 6

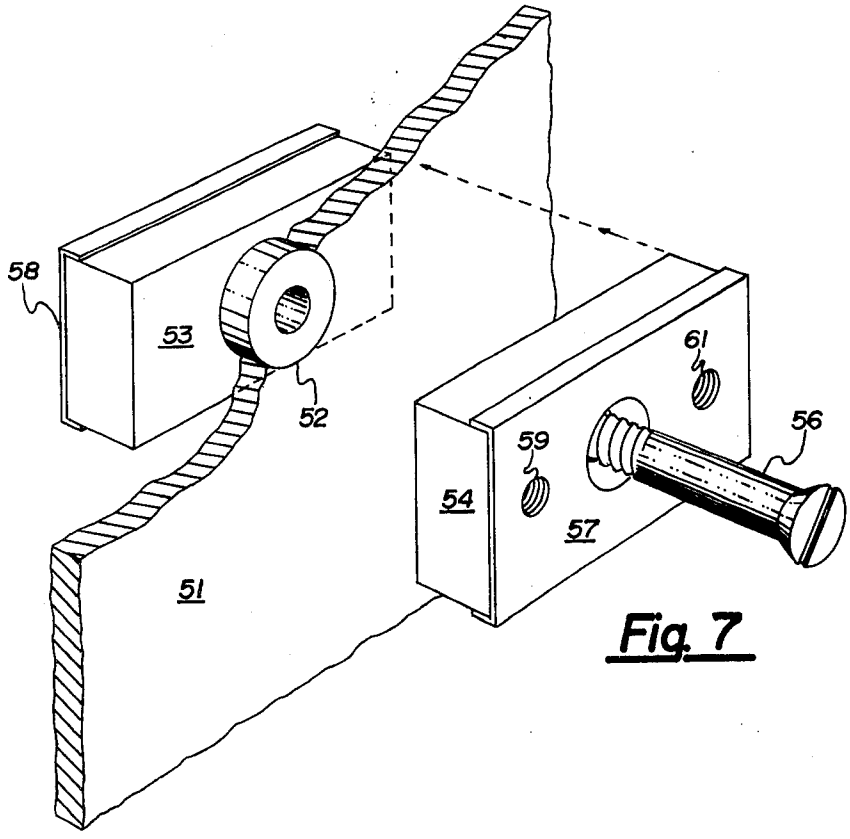


Fig. 7

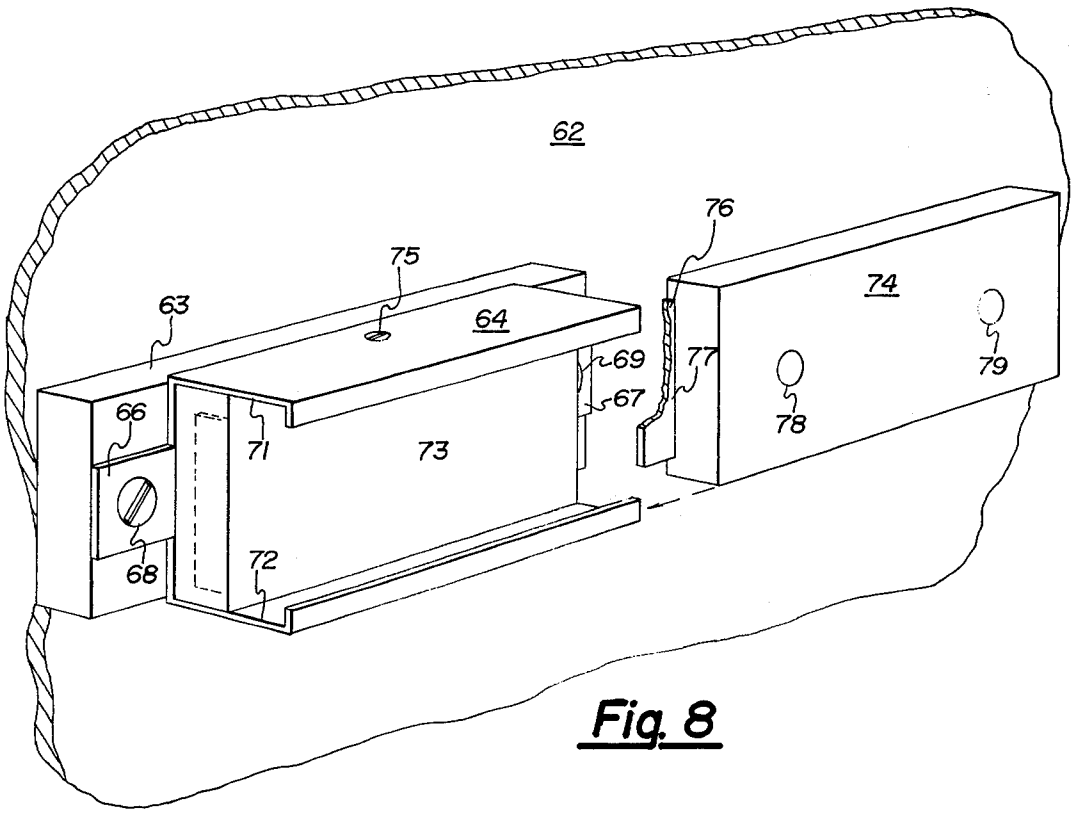

62
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Fig. 8

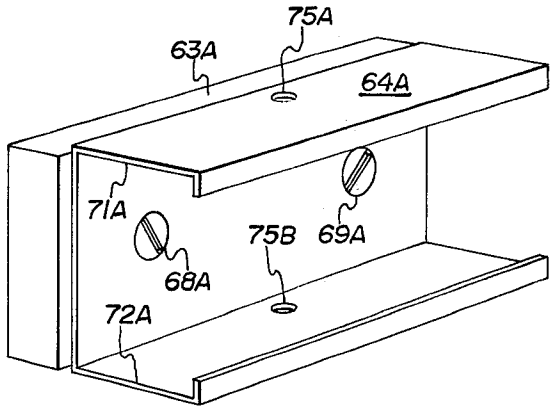

75A
63A
64A
71A
75B
69A
68A
72A

Fig. 9

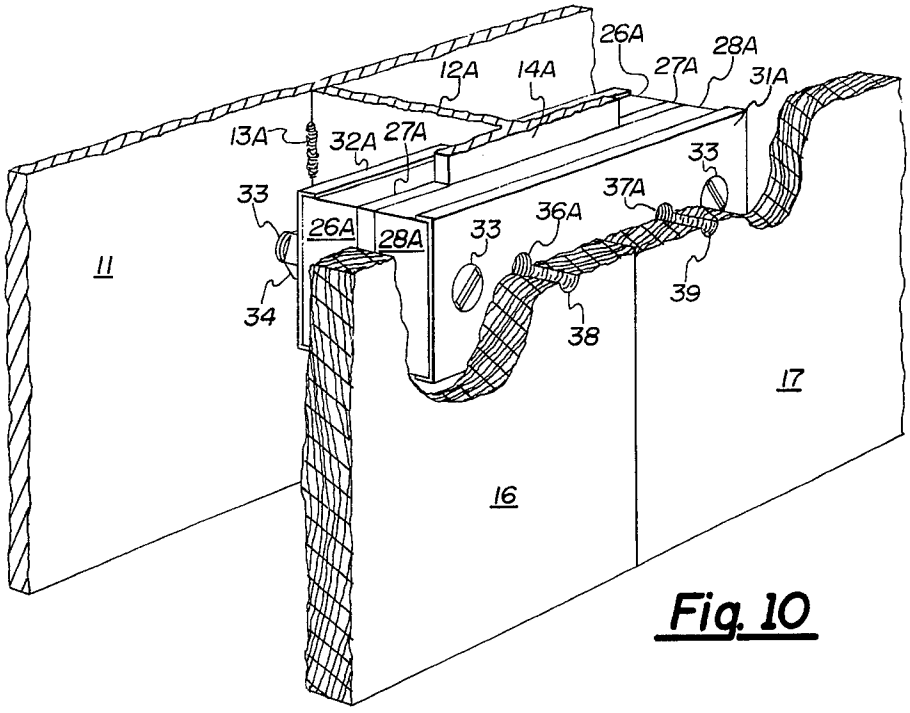


Fig. 10

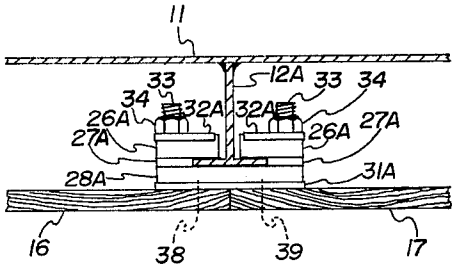


Fig. 11

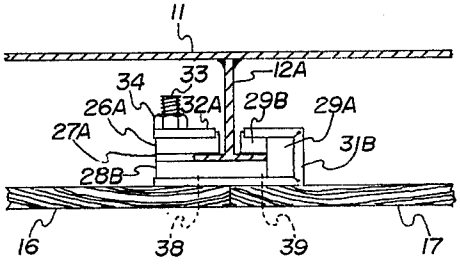


Fig. 12

MARINE PANEL HANGING ASSEMBLY

BRIEF DESCRIPTION OF THE INVENTION

The present invention relates to a marine panel hanging assembly, and more particularly to a marine panel hanging assembly having minimal or no metal to metal heat transfer between the hull or bulkhead and the panel.

According to the invention, a marine panel hanging assembly is provided for hanging non-combustible insulative wall panels in a spaced relationship with a metallic hull or bulkhead on a ship. The space requirement is for fireproofing and hence a minimum heat transfer becomes extremely desirable which is the general purpose of the instant invention. In one embodiment for hanging panels in spaced relationship with the metallic hull, the in-place hull stiffener is utilized for attaching the panel hanging assembly. Here a pair of insulative blocks is placed on each side of the hull stiffener member and clamped around the hull stiffener member by a clamp screw passing through metallic clamp plates on each side of the insulative blocks. The clamp plates are spaced from the metallic hull stiffener and the front clamp plate has tapped screw holes for attaching wall panels thereto via panel screws. This arrangement results in no metal to metal heat transfer between the mounting screws of clamp plate to which the wall panels are attached and the metallic hull, thereby maximizing heat insulation.

A second embodiment for attachment to bulkheads accessible from each side lines in placing an insulative block on each side of the bulkhead with a tubular insulator passing through the bulkhead and partially through at least one of the insulative blocks with a clamp. A clamp plate is then placed on the outer exposed faces of the insulative blocks with a clamp screw passed through the clamp plates and the tubular insulator for clamping the entire assembly to the bulkhead. The panels can then be hung on the clamp plates via threadable engagement with a panel screw and the clamp plates themselves, again resulting in no metal to metal path for heat transfer between the panels and bulkhead.

A third embodiment is utilized in hanging panels on a bulkhead having only one accessible side. In this embodiment, an insulative block is placed against the bulkhead with a metallic saddle attached via saddle bolts passing through the saddle and engaging a tapped hole in the bulkhead. The saddle has a channel for receiving a second insulative block after which a bolt plate insulator carrying a nut plate is placed within the channel, the nut plate and bolt plate carrying panel screw holes for threadably engaging a panel with the nut plate.

An object of the present invention is the provision of an improved marine panel hanging assembly.

Another object of the invention is the provision of a marine panel hanging assembly which has minimal heat transfer characteristics.

A further object of the invention is the provision of a marine panel hanging assembly utilizing in-place hull stiffeners.

Yet another object of the invention is the provision of a marine panel hanging assembly for utilization with bulkheads accessible from only one side.

A still further object of the invention is the provision of a marine panel hanging assembly for hanging panels in substantially parallel relationship with the curved portion of a ship's hull; and

Yet another object of the invention is the provision of a marine panel hanging assembly which is inexpensive to manufacture and extremely convenient and adaptable in use.

Other objects and many of the attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the Figures thereof and wherein:

FIG. 1 is a perspective view of a typical marine panel installation environment;

FIG. 2 is a top view of a typical prior art panel hanging assembly;

FIG. 3 is a top view of another prior art assembly;

FIG. 4 is a perspective view of a preferred embodiment of the present invention as applied to a ship's metallic hull;

FIG. 5 is a top view partially sectioned of the embodiment of FIG. 4;

FIG. 5A is a perspective view partially broken away of a modification of FIGS. 4 and 5;

FIG. 6 is a sectional view of a modification of FIG. 5 as applied to a curved portion of a metallic hull;

FIG. 7 is a perspective view partially sectioned of another embodiment of the present invention as applied to a bulkhead accessible from both sides;

FIG. 8 is a perspective view partially sectioned of a further embodiment of the present invention as applied to a bulkhead accessible from one side only;

FIG. 9 is a perspective view of a modification of FIG. 8;

FIG. 10 is a perspective view partially broken away of a modification of the embodiment of FIGS. 4 and 5;

FIG. 11 is a top view partially sectioned of the embodiment of FIG. 10; and

FIG. 12 is a top view partially sectioned of a modification of the embodiment of FIGS. 10 and 11.

DETAILED DESCRIPTION OF THE DRAWING

Referring to FIG. 1, a section of a metallic hull is shown at 11 having a metallic hull stiffener 12 welded thereto at 13. Stiffener 12 has a face section 14 to which is attached wall panels 16 and 17 via panel screws 18 and 19.

Referring to FIG. 2, a typical prior art panel hanging technique is shown having a hull 11 with a hull stiffener 12 welded thereto at 13. A hanging bracket 21 is welded to the face section 14 of stiffener 12 at 22. Panels 16 and 17 are attached to hanging bracket 21 via threaded screws 18 and 19.

Referring to FIG. 3, another prior art technique is shown where a steel hull shown at 11 has hull stiffener 12 welded thereto at 13. Insulative block 23 is held against face portion 14 of stiffener 12 via panel screws 18 and 19 passing through panel sections 16 and 17 and insulative block 23 and held in threadable engagement with face portion 14.

Referring to FIGS. 4 and 5, steel hull 11 has hull stiffener 12 welded thereto at 13 with face portion 14 sandwiched between insulative blocks 26, 27, 28 and 29. Insulative blocks 26, 27, 28 and 29 are held in abutting relationship with face portion 14 of hull stiffener 12 via clamp plates 31 and 32. Clamp plates 31 and 32 are

held in a clamping relationship with the insulative blocks **26, 27, 28** and **29** and face portion **14** of reinforcer **12** via clamp screw **33** and clamp nut **34.** Clamp plate **31** has a pair of panel screw holes **36** and **37** in abutting relationship with panel screw holes **38** and **39,** respectively, of wall panels **16** and **17.**

Referring to FIG. **5A,** panels **16A** and **17A** are shown coupled to clamp plate **31A** via clamp plate screw **40** being in threadable engagement with threaded aperture **35** of clamp plate **31A.** Clamp washer **40A** is carried within mating circular recesses in panels **16A** and **17A.**

Referring to FIG. **6,** a curved metallic hull portion **11A** is shown with a metallic reinforcer **12** welded thereto at **13.** Metallic reinforcer **12** has a face portion **14** in parallel relationship with the centerline (not shown) of the hull. Here, bevelled insulative blocks **41,** 42 and **43** are clamped around face portion **14** of metallic hull reinforcer **12** in the same manner via clamp plates **31** and **32,** clamp plate screw **33,** and clamp plate nut **34.** Wall panels **16** and **17** are held via panel screws **44** and **46** in threadable engagement with clamp plate **31.** Panels **16** and **17** are held via the bevelling of insulative blocks **41** and **42** and **43** in a general parallel relationship with metallic hull section **11A.**

Referring to FIG. **7,** a bulkhead section **51** is shown having an aperture (not shown) therein which receives tubular clamp screw insulator **52.** Tubular clamp screw insulator **52** is recessed within insulative blocks **53** and **54** which are held against bulkhead **51** via a clamp screw **56** on the face of a front clamp plate and panel nut plate **57** via a clamp screw **58** passing through front clamp plate **57,** insulative block **54,** tubular clamp screw insulator **52,** insulative block **53** and back clamp plate **58.** Front clamp plate **57** has panel screw holes (not shown) substantially identical with panel screw holes **59** and **61** and front clamp plate **57.**

Referring to FIG. **8,** a bulkhead **62** is shown having a insulator block **63** in abutting relationship therewith. A saddle plate **64** has a pair of saddle tabs **66** and **67** with saddle bolts **68** and **69** therein passing through insulative block **63** and in threadable engagement with bulkhead **62.** Saddle bracket **64** has an upper saddle skirt **71** and a lower saddle skirt **72** dimensioned for receiving insulative block **73.** Upper saddle skirt **71** and lower saddle skirt **72** are also dimensioned for slidably receiving insulative block **74** and nut plate **76** carried within a recess **77** in the back surface of insulative block **74.** Insulative block **74** has panel screw holes **78** and **79** therein and a raised face area for direct contact with panels.

Referring to FIG. **9,** insulative block **63** is clamped to a bulkhead (not shown) via bolts **68A** and **69A** in saddle **64A.** The upper saddle skirt **71A** has an insulator holding screw hole **75A** and a lower saddle skirt **72A** has an insulator holding screw hole **75B.**

Referring to FIGS. **10** and **11,** a modification of the embodiment in FIGS. **4** and **5** is illustrated. Here the hull stiffener **12A** is T-shaped instead of L-shaped. The marine panel hanging assembly itself is symmetrical with insulative blocks **26A, 27A** and **28A,** symmetrically disposed around face **14A** of hull stiffener **12A** and between front clamp plate and nut plate **31A** and back clamp plates **32A.** Here two clamp screws **33** and nuts **34** are utilized.

Referring to FIG. **12,** a modification of the embodiment of FIGS. **10** and **11** is shown utilizing a J-shaped front clamp plate **31B** necessitating a variation of insulative blocks **28B, 29A** and **29B.**

OPERATION

Referring back to FIG. **1,** it can be seen that wall panels **16** and **17** are spatially disposed from metallic hull section **11** which is required for fireproofing. In this typical embodiment, the wall panels **16** and **17** are attached by panel screws **18** and **19** and the general appearance will be the same whether the prior art is utilized or the instant invention.

FIG. **2** illustrates a typical prior art method of hanging the panels where a panel hanging bracket **21** is welded at **22** to face portion **14** of an in-place hull stiffener **12** which is welded at **13** to hull **11.** The disadvantage here, of course, is that there is a direct metal to metal transfer between hull **11** and the backs of panels **16** and **17.**

Referring to FIG. **3,** bracket **21** has been replaced with an insulative block **23** with hanging screws **18** and **19** in threadable engagement with apertures in face portion **14** in stiffener **12.** The main disadvantage here lies in the direct heat transfer from panels **16** and **17** to hull **11** through stiffener **12** and panel screws **18** and **19.**

Referring to FIGS. **4** and **5,** one embodiment of the present invention is utilized whereby the face portion **14** of hull stiffener **12** is sandwiched in between a plurality of blocks **26, 27, 28** and **29** and held in place by clamp screws **33** and clamp nut **34** passing through clamp **31** and **32.** Clamp plate **31** is bent around one side of the assembly. Clamp plate **31** actually forms a panel nut plate and is threadably engaged with panel screws passing through panel screw holes **38** and **39** in panels **16** and **17** and is in threadable engagement with holes **36** and **37** in front clamp plate **31.** Here it can be seen that there is no metal to metal heat transfer between hull and wall panels **16** and **17.**

Referring back to FIG. **5A,** separate clamp plate screws have been replaced by one clamp plate screw **40.** The clamping surface now becomes the inside surface of clamp washer **40A** which allows for relative movement (such as by material contraction) of panels **16A** and **17A** without destroying coupling integrity.

Referring back to FIG. **6,** the structure is identical to the embodiments of FIGS. **4** and **5** with the exception of the angle or bevelled insulative blocks **41, 42** and **43** to angle front clamp plate **31** with respect to face portion **14** of hull reinforcer **12** for the purpose of bringing wall panels **16** and **17** in a more parallel relationship with a curved section of hull **11A.** Here it is pointed out that the existing or in-place hull stiffeners **12** are normally mounted in this manner with face portion **14** in parallel relationship to the centerline of the ship and not to the hull portion at which it is attached.

Referring to FIG. **7,** a bulkhead **51** is shown which is accessible from both sides allowing insulative blocks **53** and **54** to abut bulkhead **51** on each side thereof. Here the front clamp plate **57** covers insulative block **54** and is held in place via clamp screw **56** passing through clamp plate **57,** insulative block **54,** tubular clamp screw insulator **52,** which passes through bulkhead **51** and the insulative block **53** on the other side of bulkhead **51** and its clamp plate **58.** In this embodiment, each clamp plate forms a panel nut plate to which panels are mounted via panel mounting screws in threadable engagement with panel mounting screw holes **59**

and 61 in clamp plate 57 for example. The same arrangement is on clamp plate 58 for hanging panels on the other side of bulkhead 51. Here it is pointed out that there is no metallic heat transfer path between bulkhead 51 and panels to be hung therefrom due to the tubular clamp screw insulator 52.

Referring to FIG. 8, a marine panel hanging assembly for utilization with a bulkhead accessible from one side only is shown, the bulkhead being the section shown as 62. In this embodiment a primary insulative block 63 is in abutting contact with bulkhead 62 and is held thereto via a saddle bolt 68 passing through saddle tab 66 of saddle 67 and insulative block 63. Bolt 68 is in threadable engagement with a tapped hole in bulkhead 62. A second insulative block is received by saddle 64 between upper and lower skirts 71 and 72, respectively, and a third insulative block 74, which is actually a bolt plate, carries a nut plate 76 in recess 77 which is then slidably received by saddle 64 with the nut plate 76 in abutting relationship with the second insulative block 73. Nut plate 76 has projections to bend over insulative block 73 to capture the entire assembly. The panel is then hung on bolt plate 74 via panel screws in panel screw holes 78 and 79 and in threadable engagement with apertures in nut bolt plate 76 (not shown). Here a heat transfer path is broken by raised face area on plate 74 spatially displacing panels from a prospective contact area of the wall panel with saddle 64.

Referring to FIG. 9, the operation is exactly the same as FIG. 8 except the saddle tabs 66 and 67 have been eliminated and saddle bolts 68A and 69A pass through apertures in the backwall of saddle 64A.

Referring back to FIGS. 10, 11 and 12, it can be seen that metal to metal heat paths between hull 11 and panels 16 and 17 have been eliminated as in the embodiment of FIGS. 4 and 5.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the present invention, and that it is intended to cover all changes and modifications of the example of the invention herein chosen, for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

I claim:

1. A panel hanging assembly for coupling insulative panels to a vertically disposed metallic member comprising:

an insulative block having one surface abutting a vertical metallic member, said vertical metallic member being fixedly attached to a structure and has one section thereof substantially at right angles to said structure and another section thereof substantially parallel to said structure, said insulative block having one surface abutting an outside surface of said another section of said metallic member;

a metallic bracket;

first coupling means coupling said metallic bracket to said insulative block to a surface opposite said abutting surface;

a second insulative block abutting a back surface of said another section;

said first coupling means comprises a clamp screw and nut, said clamp screw passing through said metallic bracket, said insulative block, and said second insulative block, spatially disposed from said metallic member and in threadable engagement with said clamp nut; and

second coupling means for coupling a panel to said metallic bracket.

2. The panel hanging assembly of claim 1 wherein:

said metallic member is a hull stiffener attached to a ship hull at an angle placing said another section substantially parallel with a centerline of the hull and said insulative block and said second insulative block and bevelled at an angle for placing said metallic bracket substantially parallel to said hull.

3. The panel hanging assembly of claim 1 wherein:

said second coupling means comprises at least one screw in threadable engagement with said metallic bracket;

a clamp washer carried by said screw;

first and second cooperating recesses in abutting non-overlapping adjacent panels, said cooperating recesses being dimensioned for receiving and limiting relative movement of said clamp washer, said screw being dimensioned for passing through said clamp washer and panels and being threadably coupled with said metallic bracket.

* * * * *