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(54) Boat mooring device and method of making the same

(57) A method of making a boat mooring device includes: (a) mounting at least two spaced-apart rod members (7) to a base plate (6), each of the rod members (7) penetrating the base plate (6) and having a securing portion (72) protruding from a bottom surface (62) of the base plate (6) and a shank portion (71) protruding from a top surface (61) of the base plate (6); (b) placing the rod members (7) and the base plate (6) in a mold device and molding a molding material over the base plate (6) and the rod members (7) to form a molded part (8) that embeds the shank portions (71) of the rod members (7) and that covers at least the top surface (61) of the base plate (6); and (c) forming a protective coating (9) on the molded part (8). A boat mooring device including a base plate (6), at least two spaced-apart rod members (7), and a molded part (8) is also disclosed.

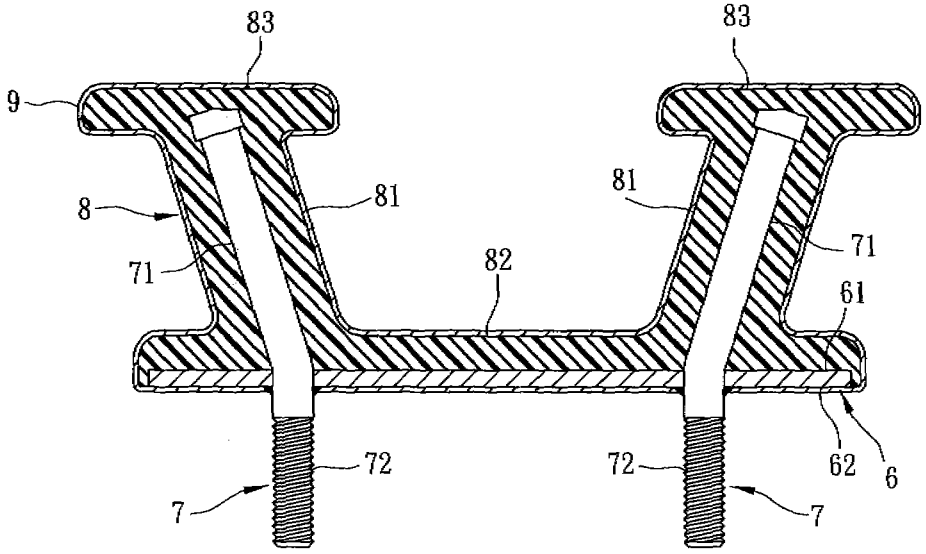

FIG. 5

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Description

[0001] This invention relates to a boat mooring device and a method of making the same, more particularly to a boat mooring device including a molded part and a method of making the same.

[0002] Generally, a boat is moored through a boat mooring device on a boat and a mooring pillar on a pier. A mooring line has one end anchored to the boat mooring device and the other end tied around the mooring pillar. In addition, cargos wrapped by a rope can be secured to the boat mooring device for preventing movement of the same.

[0003] Referring to Fig 1, a conventional boat mooring device is formed by penetrating and fixing two spaced-apart stainless steel screws 23 to a metal plate 21, followed by mounting a stainless steel cleat 22 to the metal plate 21 by an argon arc welding process. Subsequently, the stainless steel cleat 22 is subjected to a polishing process.

[0004] However, during the welding process, since blowholes are formed at the joint of the stainless steel cleat 22 and the metal plate 21, an additional repair welding process is required for removing the blowholes so as to ensure rigid connection between the metal plate 21 and the stainless steel cleat 22, which is time-consuming and cost ineffective. Despite a series of welding processes, some blowholes are still likely to exist. Since the stainless steel cleat 22 and the metal plate 21 are made of a stainless steel (SUS316) containing a high amount of iron (e.g. 85% iron, 12% nickel, and 3% chromium), the two elements are likely to be corroded by the moisture in the blowholes.

[0005] Referring to Fig. 2, Taiwanese Publication No. M240406 discloses a boat mooring device mounted on a deck of a boat. By virtue of a spring 11 disposed within a vertical hole 10 provided in a mooring seat 14, a cleat 13 is movable between a storing position where the spring 11 is compressed such that the cleat 13 is concealed, and a protruding position where the spring 11 urges the cleat 13 such that the cleat 13 protrudes from the mooring seat 14. However, since the cleat 13 is merely connected to the spring 11, and no structural connection exists between the cleat 13 and the mooring seat 14, when a strong pulling force is applied to a mooring line anchored to the boat mooring device, the cleat 13 may be damaged. Moreover, when air having a high salt content enters a gap between the cleat 13 and the mooring seat 14, corrosion of the cleat 13 and the spring 11 is likely to occur.

[0006] Therefore, an object of the present invention is to provide a method of making a boat mooring device that can overcome the aforesaid drawbacks associated with the prior art.

[0007] Another object of the present invention is to provide a boat mooring device having a molded part.

[0008] According to one aspect of the present invention, a method of making a boat mooring device comprises:

(a) mounting at least two spaced-apart rod members to a base plate, each of the rod members penetrating the base plate and having a securing portion protruding from a bottom surface of the base plate and a shank portion protruding from a top surface of the base plate;

(b) placing the rod members and the base plate in a mold device and molding a molding material over the base plate and the rod members to form a molded part that embeds the shank portions of the rod members and that covers at least the top surface of the base plate; and (c) forming a protective coating on the molded part.

[0009] According to another aspect of the present invention, a boat mooring device comprises: a base plate having a top surface and a bottom surface; at least two spaced-apart rod members penetrating and fixed to the base plate, and a molded part molded over the base plate and shank portions of the rod members. Each of the rod members has a securing portion protruding from the bottom surface, and the shank portion protruding from the top surface. The molded part includes a panel portion covering the top surface, and two posts projecting from the panel portion and respectively embedding the shank portions.

[0010] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of this invention, with reference to the accompanying drawings, in which:

Fig. 1 is a sectional view of a conventional boat mooring device;

Fig. 2 is a sectional view of another conventional boat mooring device;

Fig. 3 is a flowchart to illustrate consecutive steps of a method of making a boat mooring device according to this invention;

Fig. 4 is a sectional view of the method of making the boat mooring device according to this invention, which shows the step of placing two rod members and a base plate in a mold device;

Fig. 5 is a sectional view of the first preferred embodiment of a boat mooring device according to this invention;

Fig. 6 is a perspective view of the first preferred embodiment according to this invention;

Fig. 7 is a perspective view, showing the first preferred embodiment of the boat mooring device according to this invention mounted on a deck of a boat;

Fig. 8 is a sectional view of the second preferred embodiment of the boat mooring device according to this invention; and

Fig. 9 is a sectional view showing the step of placing two rod members and a base plate in a mold device

so as to form a molded part of the second preferred embodiment of the boat mooring device according to this invention.

[0011] Before the present invention is described in greater detail with reference to the accompanying preferred embodiments, it should be noted herein that like elements are denoted by the same reference numerals throughout the disclosure.

[0012] Referring to Figs. 3 to 5, a method of making a boat mooring device of the first preferred embodiment according to this invention includes steps 20 to 60.

[0013] In step 20, two spaced-apart rod members 7 are mounted to a base plate 6. The base plate 6 has a bottom surface 62 and a top surface 61. Each of the rod members 7 penetrates the base plate 6 from the top surface 61 to the bottom surface 62, and has a securing portion 72 protruding from the bottom surface 62 and a shank portion 71 protruding from the top surface 61. It is noted that, in Fig. 4, the base plate 6 is placed upside down in a mold device illustrating using the dotted lines.

[0014] In step 30, the securing portions 72 of the rod members 7 are welded to the bottom surface 62 of the base plate 6 by an argon arc welding process so as to enhance the structural strength therebetween.

[0015] In step 40, the rod members 7 and the base plate 6 are placed in the mold device. In this embodiment, a molding material made from acrylonitrile butadiene styrene (ABS) is injected into the mold device from locations indicated by arrows in Fig. 4 to embed the shank portions 71 of the rod members 7 and to cover the top surface 61 of the base plate 6 such that a molded part 8 (see Fig. 5) molded over the base plate 6 and the shank portions 71 of the rod members 7 is formed. Alternatively, the molding material can be selected from the group consisting of metal, alloy, cement, ceramic, and combinations thereof.

[0016] As shown in Fig. 5, the molded part 8 includes a panel portion 82 covering the top surface 61 and two posts 81 projecting from the panel portion 82 and respectively embedding the shank portions 71. Each of the posts 81 has an end provided with an enlarged head 83 distal from the panel portion 82.

[0017] In step 50, a protective coating 9 is formed on the panel portion 82 and the posts 81 of the molded part 8, and on the bottom surface 62 of the base plate 6 by electroplating. In this embodiment, the protective coating 9 is made of a material of nickel alloy and has a thickness larger than 1mm. Since nickel alloy has properties, such as high hardness, wear resistance, and corrosion resistance, the molded part 8 can be protected against corrosion caused by air, water, and salt water. Alternatively, the protective coating 9 can be made of a material selected from the group consisting of nickel, copper, or copper alloy.

[0018] In step 60, the protective coating 9 is polished so as to reduce surface roughness, thereby exhibiting a beautiful metallic luster.

[0019] Referring to Figs. 6 and 7, the securing portion 72 is exposed from the protective coating 9 and may be brought to penetrate through a deck 91 of a boat. Each of a pair of nuts 92 is used to engage threadedly a corresponding securing portion 72 so as to mount the boat mooring device on the deck 91. When a boat is required to be moored, one end of a mooring line (not shown), which is anchored to the posts 81 of the molded part 8 at the other end, is tied around a mooring pillar on a pier.

[0020] Referring to Fig. 8, the second preferred embodiment of the present invention differs from the first embodiment in that the base plate 6 is provided with an end flange 601 formed along a periphery thereof. After a molding material is injected into the mold device, the molded part 8 is molded over the end flange 601 of the base plate 6, the top surface 61 of the base plate 6, and the shank portions 71 of the rod members 7 (see Fig. 9).

[0021] By virtue of a molded part 8 which is molded over the base plate 6 and the shank portions 71 through a molding process so as to embed the shank portions 71, the disadvantages caused by blowholes resulting from the welding process in the prior art can be eliminated.

[0022] Moreover, in this invention, by welding the rod members 7 to the base plate 6, structural strength therebetween can be enhanced. In addition, if a plastic material (e.g., acrylonitrile butadiene styrene (ABS)) is used as the molding material, which is lighter than metal, a weight of the boat mooring device can be reduced. In addition, with the protective coating 9 having a thickness larger than 1mm on the molded part 8, an anti-corrosion property can be attained.

Claims

1. A method of making a boat mooring device comprising:

   (a) mounting at least two spaced-apart rod members (7) to a base plate (6), each of the rod members (7) penetrating the base plate (6) and having a securing portion (72) protruding from a bottom surface (62) of the base plate (6) and a shank portion (71) protruding from a top surface (61) of the base plate (6);
   (b) placing the rod members (7) and the base plate (6) in a mold device and molding a molding material over the base plate (6) and the rod members (7) to form a molded part (8) that embeds the shank portions (71) of the rod members (7) and that covers at least the top surface (61) of the base plate (6); and
   (c) forming a protective coating (9) on the molded part (8).

2. The method of Claim 1, further comprising polishing the protective coating (9).

3. The method of Claim 2, wherein the protective coating (9) is formed by electroplating.

4. The method of Claim 2, wherein the molded part (8) is made from a material selected from the group consisting of plastic, metal, alloy, cement, ceramic, and combinations thereof.

5. The method of Claim 2, wherein the protective coating (9) is made of a material selected from the group consisting of nickel, nickel alloy, copper, copper alloy, and combinations thereof.

6. The method of Claim 2, wherein the protective coating (9) has a thickness larger than 1mm.

7. The method of Claim 1, wherein the rod members (7) are mounted to the base plate (6) by a welding process in step (a).

8. A boat mooring device comprising:

a base plate (6) having a top surface (61) and a bottom surface (62);
at least two spaced-apart rod members (7) penetrating and fixed to said base plate (6), each of said rod members (7) having a securing portion (72) protruding from said bottom surface (62) , and a shank portion (71) protruding from said top surface (61); and
a molded part (8) molded over said base plate (6) and said shank portions (71) of said rod members (7), and including a panel portion (82) covering said top surface (61) and two posts (81) projecting from said panel portion (82) and respectively embedding said shank portions (71).

9. The boat mooring device of Claim 8, further comprising a protective coating (9) formed on said molded part (8).

10. The boat mooring device of Claim 9, wherein each of said posts (81) has an end provided with an enlarged head (83) distal from said panel portion (82).

11. The boat mooring device of Claim 9, wherein said molded part (8) is made from a material selected from the group consisting of plastic, metal, alloy, cement, ceramic, and combinations thereof.

12. The boat mooring device of Claim 9, wherein said protective coating (9) is made of a material selected from the group consisting of nickel, nickel alloy, copper, copper alloy, and combinations thereof.

13. The boat mooring device of Claim 9, wherein said protective coating (9) has a thickness larger than 1mm.

14. The boat mooring device of Claim 9, wherein said base plate (6) has an end flange (601) formed along a periphery thereof.

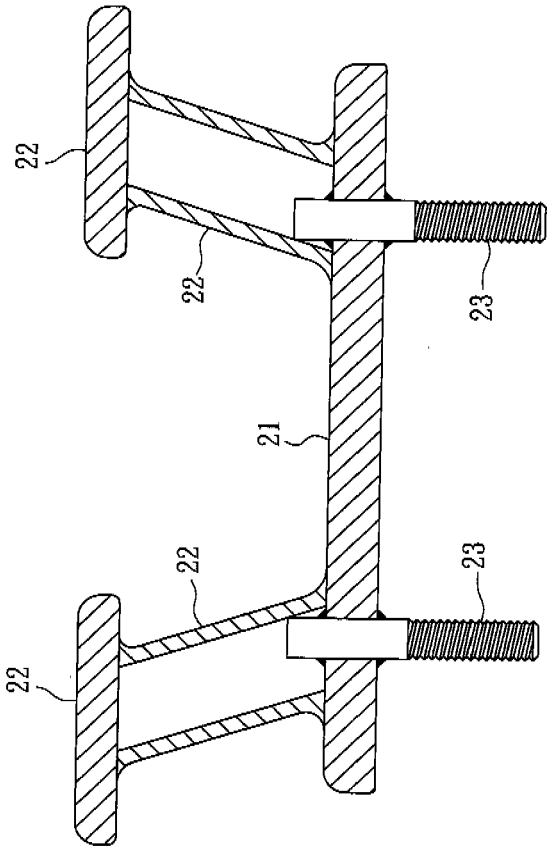

FIG. 1
PRIOR ART

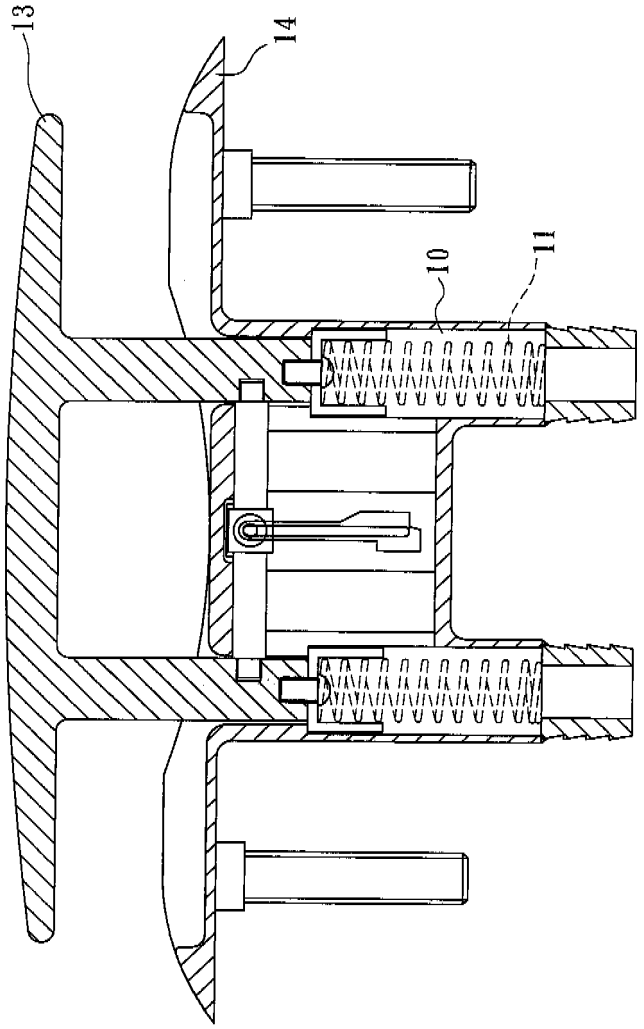

FIG. 2
PRIOR ART

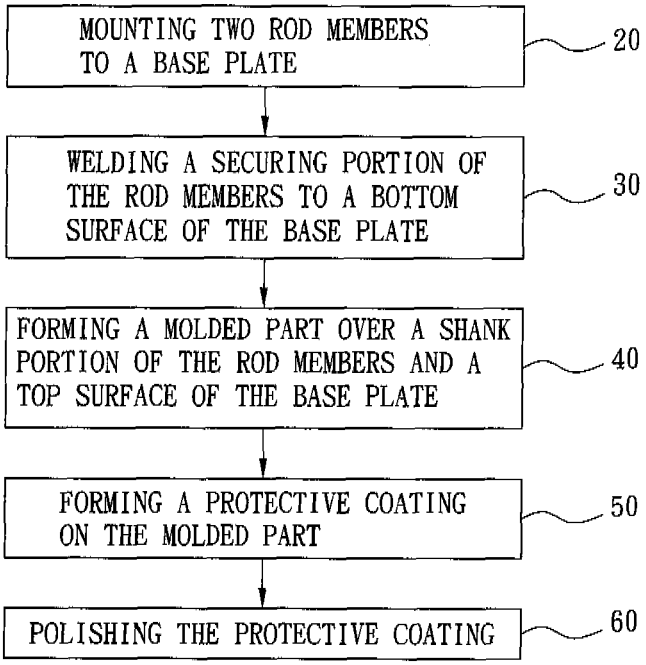
MOUNTING TWO ROD MEMBERS TO A BASE PLATE
20
WELDING A SECURING PORTION OF THE ROD MEMBERS TO A BOTTOM SURFACE OF THE BASE PLATE
30
FORMING A MOLDED PART OVER A SHANK PORTION OF THE ROD MEMBERS AND A TOP SURFACE OF THE BASE PLATE
40
FORMING A PROTECTIVE COATING ON THE MOLDED PART
50
POLISHING THE PROTECTIVE COATING
60

FIG. 3

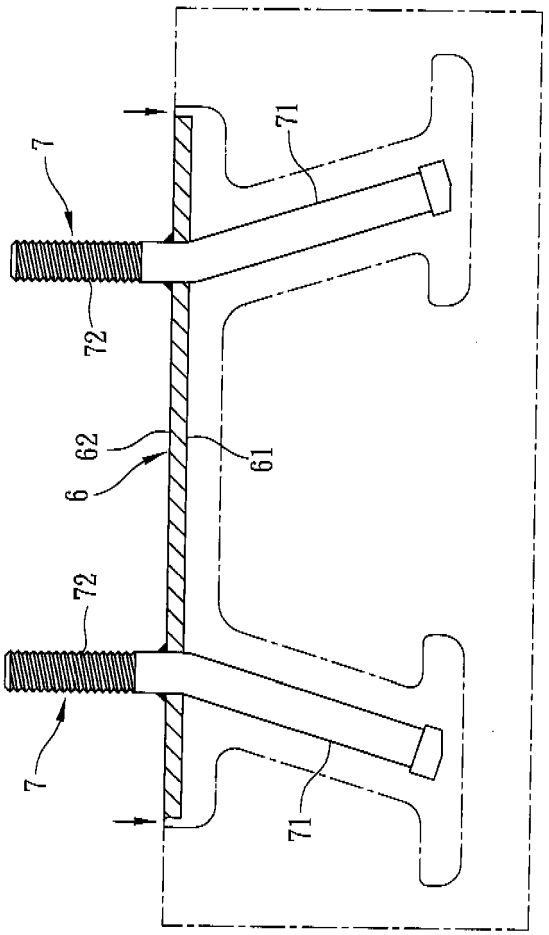

FIG. 4

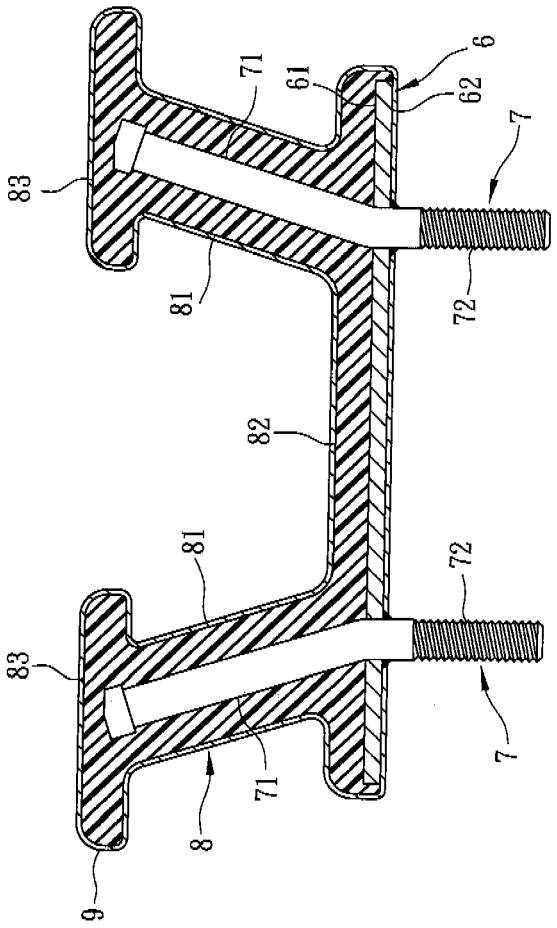

FIG. 5

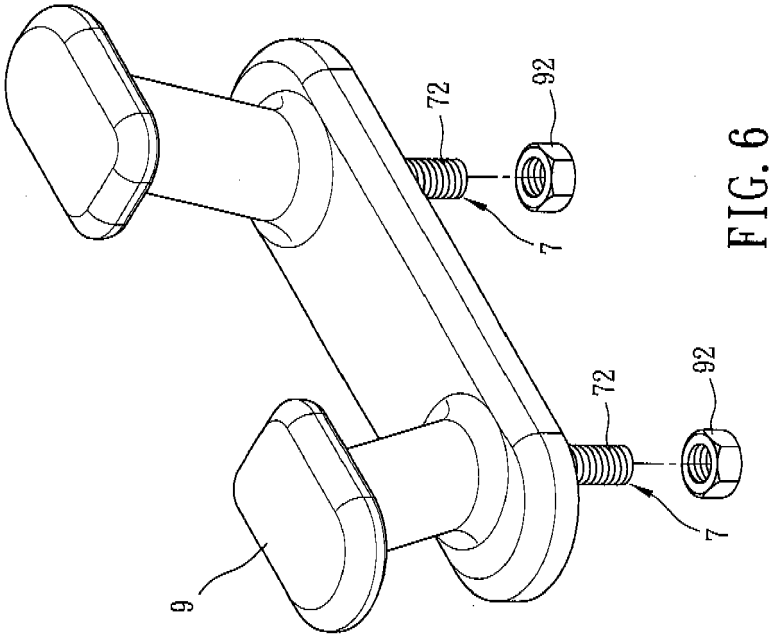

FIG. 6

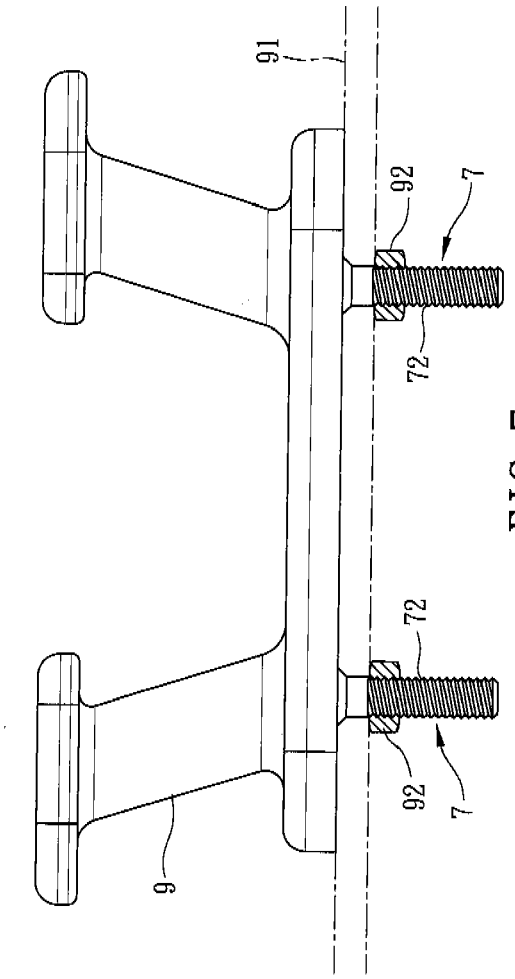

FIG. 7

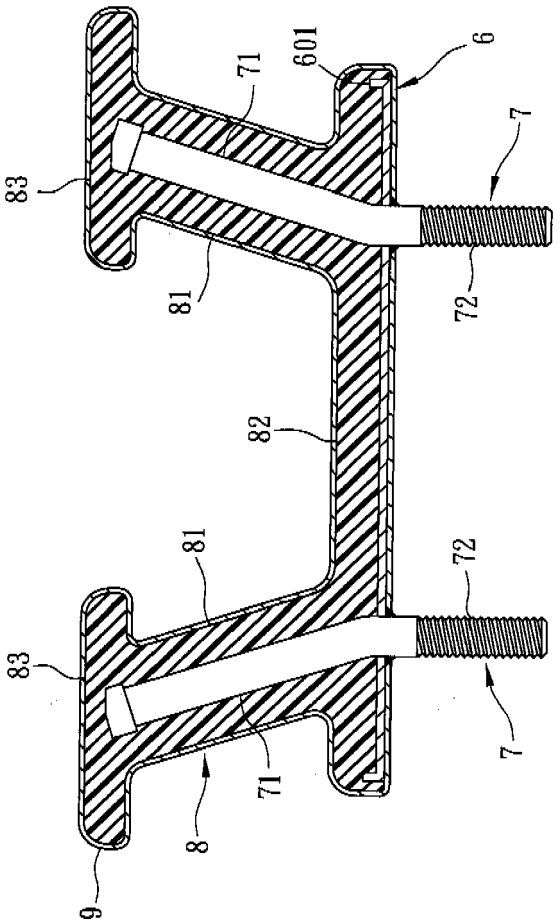

FIG. 8

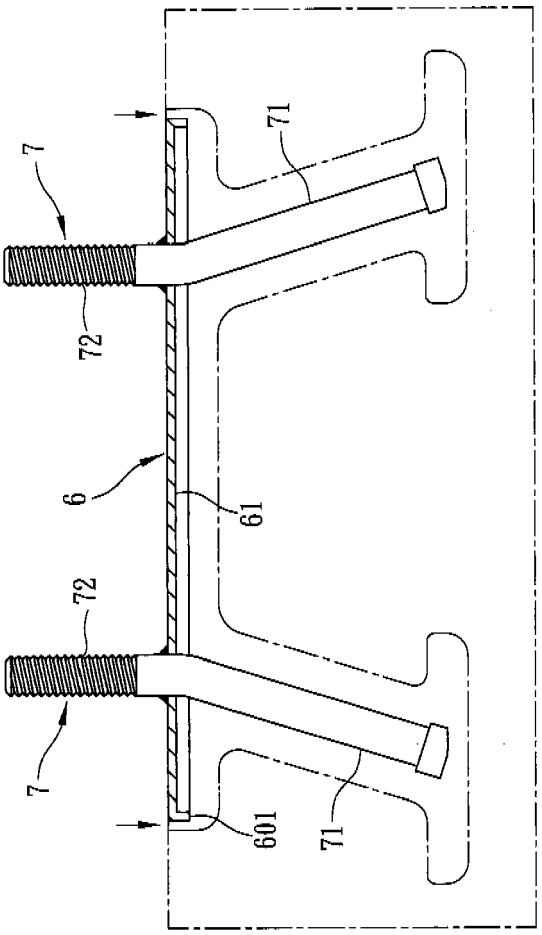

FIG. 9