SPECIFICATION

TITLE OF THE INVENTION: Resin tightening member

TECHNICAL FIELD

[0001.] The present invention relates to a resin tightening member, and more particularly to a resin tightening member for securely and easily holding multiple pipes while suppressing vibrations of the pipes used for fueling devices and so on.

BACKGROUND ART

[0002.] In a fueling device installed at a fueling station that fuels automobiles and the like with fuel such as gasoline, a fueling nozzle provided at a tip of a fueling hose is removed from a nozzle hook and inserted into a fueling port of a vehicle to fuel a fuel tank. Pipes through which the fuel flow inside the fueling device are provided with a metal tightening member that sandwiches and fixes the pipes with each other, and the metal tightening member prevents pipe vibration due to fuel flow, interference between pipes and flanges, interference between pipes and parts in the fueling device, and deterioration of pipe durability due to vibration.

[0003.] In order to fix the pipes in a conventional fueling device, elastic members such as rubber packings for suppressing vibration are attached to the pipes, the pipes are sandwiched by two metal tightening members, and the pipes are fastened with bolts and nuts.

[0004.] In addition, since the pipes are welded and are highly rigid, and assembly errors occur due to fixed start and end points of the pipes, it is difficult to make fine adjustments to pipe positions. If the metal tightening member is bolted in this state, the metal tightening member may be partially fixed or the other parts may be plastically deformed, making it impossible to properly fix the pipes. As a result, there is a problem that contact surfaces between the metal tightening member and the pipes are reduced, and the function of suppressing the vibrations of the pipes is deteriorated.

[0005.] Then, in Patent Document 1 is proposed a resin clamp for pipes having first and second clamps extending 180 ° in different directions from a common base, and frontages of the first and second clamps open 180 ° in different directions from each other, wherein a slit along axial directions of the pipes on the common base simultaneously achieves a pipe holding performance for protecting coming off and shift in axial directions of the pipes and easy pipe insertion work.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0006.] Patent Document 1: Japanese Patent Publication No. H04-285309 gazette

OUTLINE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[000 7.] However, in the resin clamp for pipes described in Patent Document 1, since the first and second clamp portions are thick, sink marks, voids, excessive shrinkage, warpage, and the like occur, there is a concern that the clamp would be deformed into a shape different from an originally planned size, a gap would be created between the pipes and the resin clamp for pipes, and the pipe holding performance would be deteriorated.

[0008.] The present invention has been made in consideration of the problems in the conventional art, and the object thereof is to provide a resin tightening member that can securely and easily fix pipes and suppress pipe vibration without causing deterioration of pipe holding performance.

MEANS OF SOLVING THE PROBLEMS

[0009.] In order to attain the above object, a resin tightening member of the present invention is characterized by including: a plate-shaped base; a plurality of grooves for accommodating pipes on a one-to-one basis, each of which has two support portions protruding from one surface of the base and facing each other; and a first reinforcing member connecting one support portion of one groove of two adjacent grooves protruding from the base and a support portion that is of the other groove and that faces the one support portion of the one groove.

[0010.] With the present invention, since the resin tightening member is made of resin, an elastic deformation range is widened, and it is possible to suppress plastic deformation, attach a pipe following the pipe, that is, fix the pipe appropriately. Further, since elastic deformation range is wide, a contact area with the pipe is large and frictional resistance is improved, so that the effect of suppressing vibration of the pipe is high. Further with the first reinforcing member, the thickness of the groove can be reduced, which protects sink marks, voids, excessive shrinkage, warpage, and the like, which prevents the clamp from deforming into a shape different from an originally planned size, and a gap from being created between the pipes and the resin clamp for pipes. As a result, pipe holding performance of the tightening member does not deteriorate. Furthermore, with the first reinforcing member, the strength of the entire resin tightening member can be improved, vibration between adjacent grooves can be suppressed, and shape deformation of the entire tightening member can be prevented.

[0011.] In the above resin tightening member, the two support portions of the groove may have an R shape along an outer shape of the pipe to be accommodated, which eliminates the gap between the pipe and the groove and improves the pipe holding function.

[0012.] In addition, extending a tip of each of the two support portions of the groove in a direction away from each other makes it easier to insert the pipe, and it makes it possible to insert the pipe without slipping and

shifting in the direction perpendicular to its axial direction also.

[0013.] Further, providing a frictional force enhancing means at a portion of the groove that comes into contact with the pipe increases frictional resistance and makes it possible to fix the pipe and suppress vibration without adding a friction member such as rubber packing to the pipe.

[0014.] Furthermore, a hole that penetrates the base in a thickness direction can be provided in a vicinity of each of the two support portions of the groove. With this, the pipe can be fixed by passing a fixing member such as a binding band through the hole, and functions of fixing of the pipe and suppressing vibration can be further improved.

[0015.] In a vicinity of the hole, it is possible to provide a guide including a front surface having the same R shape continuous with the R shape portions of the two support portions of the groove and a back surface having an R shape parallel to the R shape of the front surface. With this guide, a fixing member such as a binding band can be properly fastened along the shape of the pipe, and the area for fixing the pipe is increased, so that the pipe can be fixed more firmly and the vibration suppression function is also improved.

[0016.] In addition, it is possible to mount a second reinforcing member that protrudes from the base and is connected to a support portion outside the groove at both ends of the plurality of grooves. With this second reinforcing member, it becomes possible to suppress spread of the grooves at both ends and further increase the strength of the tightening member.

EFFECTS OF THE INVENTION

[0017.] As described above, with the present invention, it becomes possible to provide a resin tightening member that can securely and easily fix pipes and suppress pipe vibration without causing deterioration of pipe holding performance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018.] [Figure 1] A front view showing a fueling device to which a resin tightening member according to the present invention is applied.

[Figure 2] Figures showing an example of piping structure inside the fueling device shown in Fig. 1, in which (a) is a side view, and (b) is a top view.

[Figure 3] Figures showing a resin tightening member according to an embodiment of the present invention, in which (a) is a front view, (b) is a cross-sectional view taken along the line A-A of (a), (c) is a top view, (d) is a side view and (e) is a perspective view.

[Figure 4] Explanatory drawings of a friction strengthening means used for the resin tightening member shown in Fig. 3, in which (a) is a top view, (b) is a front view, (c) is an enlarged view of the part A of (a), (d) is a side view and (e) is a perspective view.

[Figure 5] A front view showing the use example of the resin tightening member according to the present invention.

[Figure 6] A front view showing another fueling device to which a resin tightening member according to the present invention is applied.

MODE FOR CARRYING OUT THE INVENTION

[0019.] Next, embodiments of the present invention will be explained with referenced to drawings.

[0020.] Figure 1 shows an example of a fueling device to which a resin tightening member according to the present invention is applied, and the fueling device 10 includes: fueling hoses 11 (11A-11C) having fueling nozzles 12 (12A-12C) at one ends; nozzle hooks 13 (13A-13C) on which the fueling nozzles 12 are separately hooked; a display unit 14; an operation unit 15; and the like. In addition, although not shown and described, the fueling device 10 is provided with a general fueling mechanism including a nozzle SW (switch), a flow meter, a fueling motor, and a flow pulse transmitter.

[0021.] As shown in Fig. 2(a), pipes 16 (16A-16C) connected to the fueling hose 11 (see Fig. 1) are arranged in parallel in the vertical direction on the side surface of the fueling device 10, and resin tightening members 1 (1A-1C) according to the present invention are arranged at three places. In this way, it is preferable to arrange a plurality of resin tightening members 1 because the effects of fixing the pipe and suppressing vibration can be improved. It should be noted that the term "parallel" includes not only perfect parallelism but also substantial parallelism within a certain error range.

[0022.] The resin tightening member 1 is entirely made of resin, as shown in Fig. 3, and is composed of a rectangular plate-shaped base 2; three grooves 3 (3A-3C) provided on a surface 2a of the base 2; first reinforcing members 4 (4A, 4B) interposed in the adjacent grooves 3; second reinforcing members 5 (5A, 5B) connected to the grooves 3A and 3C at both ends; and others.

[0023.] The base 2 is formed in a strip-like elongated and thin plate shape. The front surface 2a is provided with three grooves 3 (3A-3C) and others, and a back surface 2b is formed in a planar shape.

[0024.] The grooves 3 (3A-3C) are provided with two support portions 3a and 3b (displayed only in the groove 3A in Fig. 3) protruding from the surface 2a of the base 2 and facing each other. As shown in Fig. 3 (e), the grooves 3 (3A-3C) are located on the paths of the three pipes 16 (16A-16C) arranged in parallel, and each of the pipes 16 is accommodated between the support portions 3a and 3b. The inner surface of the two support portions 3a and 3b and the bottom surface 3c of the groove 3 (inner surface between the two support portions 3a and 3b) have an R shape along the outer shape of the pipe 16 to be accommodated. As a result, the gap between the pipe 16 and the groove 3 is eliminated, and

the pipe holding function is improved. Further, since the tips of the support portions 3a and 3b extend in the directions of being separated from each other, the pipe 16 can be easily inserted without slipping and shifting in a direction perpendicular to the axial direction thereof.

[0025.] In the vicinity of each of the support portions 3a and 3b of the groove 3, two holes 2c and 2d (Fig. 3 shows only the support portions 3a and 3b of the groove 3A) are formed in the vertical direction with respect to one support portion 3a (or 3b). The holes 2c and 2d penetrate the base 2 in the thickness direction of the base 2.

[0026.] The guides 6 (6A-6F) are formed above and below the grooves 3 in the vicinity of the holes 2c and 2d. The guide 6A includes protrusions 6a and 6b protruding from the surface 2a of the base 2 toward the groove 3A, and a front surface 6c has the same R shape continuous with the bottom surface 3c having the R shape of the groove 3, and a back surface 6d has an R shape parallel to the R shape of the front surface 6c. The guides 6B to 6F also have the same configuration as the guide 6A.

[0027.] As shown in relation to the pipe 16A in Fig. 3 (e), fixing the pipe 16A through binding bands 7 (7A, 7B) through the holes 2c and 2d further improves functions of fixing the pipe 16A and of suppressing the vibration. At this time, since the back surfaces 6d of the guides 6A and 6B have the R shape, the binding band 7 can be properly fastened along the pipe shape. Although not shown, the pipes 16B and 16C can also be fixed through the binding band 7 in the same manner. Further, since the back surface 2b of the base 2 is formed in a flat shape, it is easy to apply a force when attaching the resin tightening member 1 to the pipe 16, and the pipe 16 can be easily inserted into the groove 3.

[0028.] The first reinforcing members 4 (4A, 4B) protrude from the surface 2a of the base 2, and connects one support (3a or 3b) of one of the adjacent grooves 3 with the support (3b or 3a) of the other groove 3. In addition, providing a plurality of first reinforcing members 4 in the vertical direction of Fig. 3(a) increases the strength of the resin tightening member 1 as a whole.

[0029.] The second reinforcing members 5 (5A, 5B) protrude from the surface 2a of the base 2 and are connected to the outer support (3a or 3b) of the grooves 3A and 3C at both ends to reinforce the outer support (3a or 3b) of the grooves 3A and 3C at both ends and suppress the spread of the support (3a or 3b).

[0030.] In addition to the above configuration, as shown in Fig. 4, the resin tightening member 1 is provided with frictional force enhancing means 8 (8A-8C) at portions (hatched portions) of the groove 3 in contact with the pipe 16. The frictional force enhancing means 8 may be a member having a shape capable of enhancing the frictional force such as a protrusion, or a sheet-shaped member having a high friction coefficient, and providing the frictional force enhancing means 8 makes

it possible to fix the pipe 16 and suppress vibration without adding a friction member such as a rubber packing to the pipe 16 as in a conventional case.

[0031.] Figure 5 shows an arrangement example of the resin tightening member 1 (1A, 1B) when five pipes 17 (17A-17E) are arranged in parallel in the vertical direction. In this way, when there are many pipes, a plurality of resin tightening members 1 are used to fix the pipes 17. Although it is possible to increase the number of grooves 3 of the resin tightening member 1 according to the number of pipes 17, using resin tightening members 1 with the same number of grooves 3 enables to unify the members and reduce the cost. Further, the groove 3A at the right end of the resin tightening member 1A and the groove 3C at the left end of the resin tightening member 1B are interposed in the central pipe 17C to increase the number of holdings of the central pipe 17C, which stably holds the pipes 17 (17A-17E).

[0032.] Figure 6 shows another example of a fueling device to which a resin tightening member according to the present invention is applied. The fueling device 20 is a self-type fueling device, and is provided with: fueling hoses 21 (21A-21C) having fueling nozzles 22 (22A-22C) at one ends; nozzle hooks 23 (23A-23C) on which the fueling nozzles 22 are separately hooked; a display unit 24; an operation panel 25; and a general fueling mechanism. For such the fueling device 20 also, as in the case of the fueling device 10 described above, the resin tightening member 1 can be applied to the pipes (not shown) connected to the fueling hoses 21 and arranged in parallel in the vertical direction.

[0033.] Further, the resin tightening member 1 can be used not only for the fueling devices 10 and 20 but also for a plurality of pipes in other devices and the like.

[0034.] The illustrated embodiment is merely an example, and is not a description to the effect of limiting the technical scope of the present invention.

DESCRIPTION OF THE REFERENCE NUMERALS

[0035.]

1 resin tightening member
2 base
3 groove
4 first reinforcing member
5 second reinforcing member
6 guide
7 binding band
8 friction strengthening means
10, 20 fueling devices
11, 21 fueling hoses
12, 22 fueling nozzles

13, 23 nozzle hooks
14, 24 display units
15, 25 operation units
16, 17 pipes

CLAIMS

[Claim 1] A resin tightening member comprising:

a plate-shaped base;

a plurality of grooves for accommodating pipes on a one-to-one basis, each of which has two support portions protruding from one surface of the base and facing each other; and

a first reinforcing member connecting one support portion of one groove of two adjacent grooves protruding from the base and a support portion that is of the other groove and that faces the one support portion of the one groove.

[Claim 2] The resin tightening member as claimed in claim 1, wherein said two support portions of the groove have an R shape along an outer shape of the pipe to be accommodated.

[Claim 3] The resin tightening member as claimed in claim 1 or 2, wherein a tip of each of the two support portions of the groove extends in a direction away from each other.

[Claim 4] The resin tightening member as claimed in claim 1, 2 or 3, further comprising a frictional force enhancing means at a portion of the groove that comes into contact with the pipe.

[Claim 5] The resin tightening member as claimed in one of claims 1 to 4, further comprising a hole that penetrates the base in a thickness direction is provided in a vicinity of each of the two support portions of the groove.

[Claim 6] The resin tightening member as claimed in claim 5, further comprising, in a vicinity of the hole, a guide including a front surface having the same R shape continuous with the R shape portions of the two support portions of the groove and a back surface having an R shape parallel to the R shape of the front surface.

[Claim 7] The resin tightening member as claimed in one of claims 1 to 6, further comprising a second reinforcing member that protrudes from the base and is connected to a support portion outside the groove at both ends of the plurality of grooves.