

PUBLISHED

MAY 25, 1943.

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PIPE JOINT PACKING MEANS

Filed Sept. 2, 1939

Serial No.

293,149

2 Sheets-Sheet 1

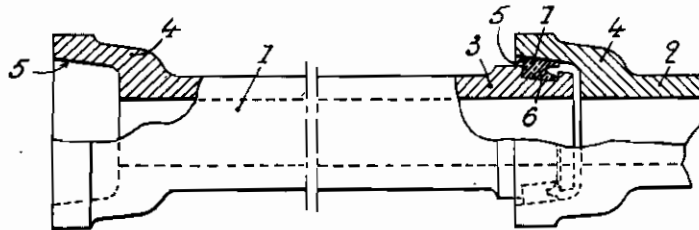


Fig. 1

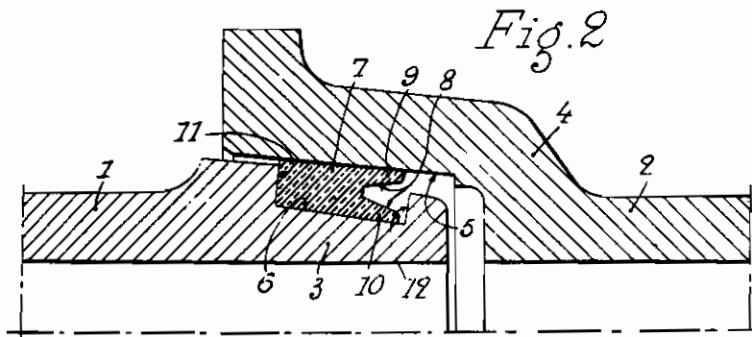


Fig. 2

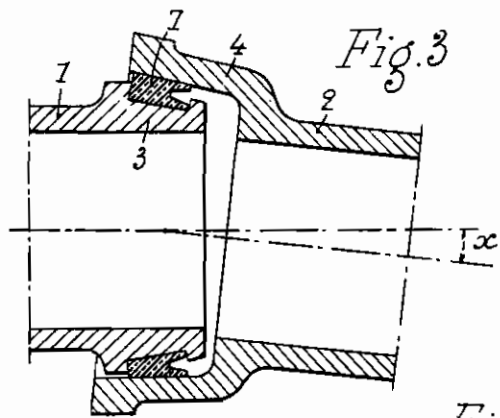


Fig. 3

Fig. 4

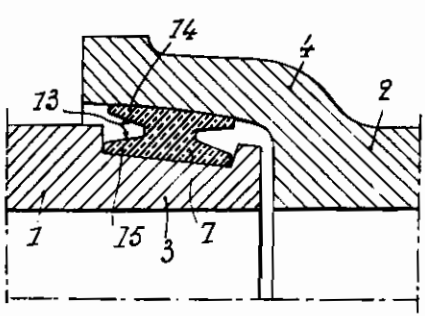
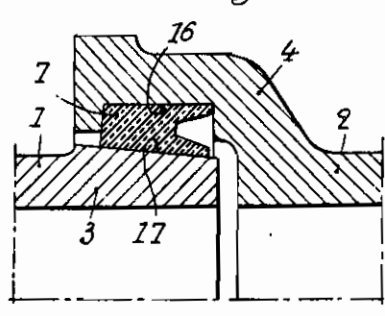


Fig. 5



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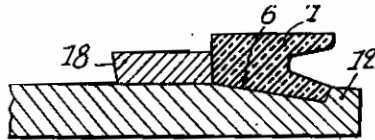


Fig. 6

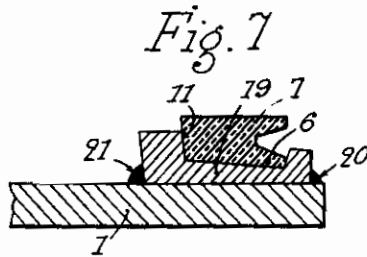


Fig. 7

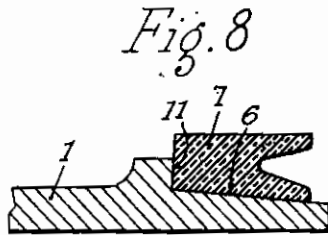


Fig. 8

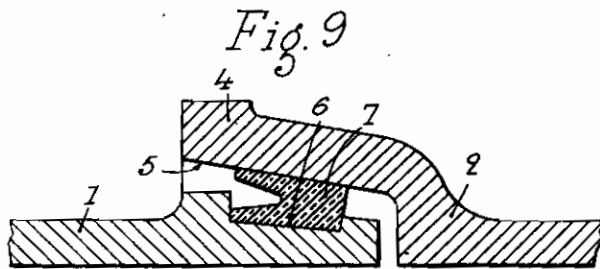


Fig. 9

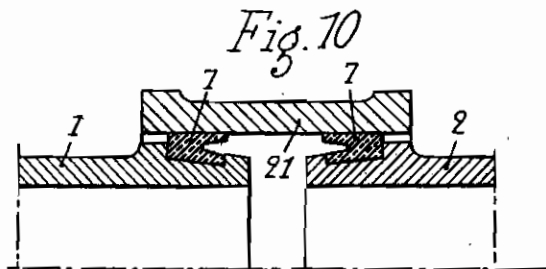


Fig. 10

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PIPE JOINT PACKING MEANS

Pierre Boissou, Pont a Mousson, Meurthe et Moselle, France; vested in the Alien Property Custodian

Application filed September 2, 1939

It is a matter of known practice to utilize, for the assembling of pipes used for conduits and consisting of cast-iron, reinforced concrete or other material and containing a fluid under pressure, automatic packing members having such form that their fluid-tight contact with each of the parts to be assembled will be assured by the pressure of this fluid itself. Such packing members usually comprise a groove (or cavity) which is turned towards the interior of the pipe and in which the pressure is exerted, said groove being situated between two tongues which are thus applied against the walls of each of the pipes to be assembled.

The present invention consists of an improved packing member of this type, which is characterized by the fact that the surfaces of contact between the packing member and the pipes have their generatrices substantially parallel to the longitudinal axis of the piping.

Owing to this arrangement, the position of the contact surfaces is not substantially modified by relative angular and longitudinal displacements of the two pipes, so that the fluid-tightness is not affected by such relative displacements.

According to a further feature, the packing member comprises a solid part which succeeds the said tongues and whose flattening when the pipes are assembled will cooperate with said tongues to ensure a perfect sealing.

The invention further consists of a pipe adapted for the use of the said packing member, said pipe being characterized by the fact that it is provided at one end at least with a groove or recess adapted to accommodate said packing member.

According to a further feature, the end of the pipe which cooperates with the end having the groove adapted to receive the packing member is slightly tapered or spherical, or of like form, in such a way that when the two pipes are fitted together, it will cause a radial flattening of the said packing piece.

Further features will be set forth in the following description.

In the accompanying drawings, which are given solely by way of example:

Fig. 1 shows an assemblage according to the invention, with parts broken away.

Fig. 2 is a partial section of the packing member on a larger scale.

Fig. 3 is a section of a packing member mounted between two pipes whose longitudinal axes are disposed at a certain angle.

Figs. 4 to 9 are longitudinal radial sections of

modified forms of packing members according to the invention.

Fig. 10 shows the assemblage of two pipes by means of a sleeve.

In the embodiment shown in Figs. 1 to 3, the invention is applied to the assemblage of two pipes 1 and 2. The said pipes may be made in one piece, for instance of cast-iron, steel, concrete or any other material; they may also consist, for example, of plain or reinforced concrete, provided or not with a winding for transverse reinforcement and/or with metal end members. Each of these pipes has a spigot end 3 and a bell 4 whose inner surface 5 is slightly tapered and flaring. The spigot end 3 comprises, in a projecting part a recess or groove 6 whose bottom part may be tapered, as illustrated, or cylindrical or of any other shape. In the said groove 6 is located a ring 7 which forms a packing member. It comprises a channel 8 (Fig. 2) facing the inner end of the bell 4, and forming two tongues 9 and 10 adapted to make a fluid-tight contact with the tapered inner surface 5 of the bell 4 and with the bottom of the groove 6, respectively. At the rear of the tongues, the packing member is continued by a solid part of a relatively great length.

The packing member 7, according to the nature and the pressure of the fluid to be conveyed, may consist of solid rubber, or of canvas-backed or reinforced rubber. Its outer surface may be separated from the said fluid by a protecting layer of lead, synthetic resin, or any other suitable material. For certain particular purposes, use can be made of rings of any other plastic material, such as asbestos, graphite-asbestos, copper, lead, etc.

Preferably, the said packing member bears against the lateral walls 11 and 12 of the groove 8, and will thus be held in the longitudinal direction.

In the free state, that is, before the assembling, the packing member 7 has an inner diameter which is slightly less than the diameter of the bottom of the groove 8, so that the packing member will be applied upon this bottom when mounted thereon. Moreover, the radial thickness of the packing member is somewhat greater than that of the annular space between the two pipes which is adapted to accommodate the packing member. Therefore, when the two pipes are assembled by bell and spigot fitting owing on the one hand to the tapered surface 5 of the bell 4, and on the other hand to the provision of the lateral abutments 11 and 12, the solid part of the packing member 7 will be radially flattened,

This solid part thus aids in the fluid-tightness before the piping is filled and is subjected to pressure, which pressure has the effect of applying, in the known manner, the tongues or lips 9 and 10 against the corresponding walls of the two pipes, with a force which is greater according as this pressure is greater. This affords an immediate fluid-tightness which is more complete than with known automatic joints, particularly at the time of the filling of the piping, which is thus facilitated, and at the time of emptying the piping there will be no danger of infiltration from the exterior.

The packing member according to the invention is readily adapted, without prejudice to the fluid-tightness, to considerable relative longitudinal and/or angular displacements of the pipes, as shown in Fig. 3, in which the axes of the pipes form an angle x . In fact, on the one hand, the relatively considerable longitudinal displacements will cause but a slight variation of the radial thickness of the operative part of the recess 5, owing to its small taper, and on the other hand, the angular displacements will not cause any substantial variation of this thickness. This advantage is particularly important for piping buried in the ground, which is subject to settlements or displacements of the ground, and further, for piping which is subject to considerable variations of temperature as the expansions and contractions have no effect upon the fluid-tightness of the joint.

In addition to the aforesaid advantages for the filling and bleeding of the piping, the packing member according to the invention is quite superior to the automatic joints hitherto employed which only preserve their fluid-tightness provided that the adjacent pipes are not subject to any substantial relative movement.

Moreover, the packing member according to the invention is much simpler and more economical than the known non-automatic joints which require the use of special members for the compression of a packing ring.

Furthermore, the form of the groove 6 which is closed on three sides, greatly facilitates the exact mounting of the packing member, the assembling of the pipes at the working ground, and thus a good preservation of the joint.

Fig. 4 shows a modification in which the pack-

ing member 7 comprises a groove or channel 13 on the outer side. The said groove forms two tongues 14 and 15 which still further increase the tightness of the joint, where the piping may be subjected in the interior to an important vacuum. Moreover, in this modification, the groove 6 containing the packing member is formed in the wall of the pipe, which does not comprise a projecting part as shown in Figs. 1 to 3. Furthermore, the inner surface 5 of the bell 4 has a spherical surface, whereby still greater relative deflections of the pipes are permitted.

In the modification shown in Fig. 5, the packing member is located in a groove 16 formed in the inner surface of the bell 4. The spigot end 3 comprises a part 17 of tapered, spherical or like form, whose diameter decreases towards the end, which is not grooved, and serves to ensure the radial compression of the packing member 7 upon assembling the pipes.

The groove 6, instead of being formed in a projecting part at the exterior of the pipe as shown in Figs. 1, 2 and 3, or of being formed in the wall of the pipe as shown in Figs. 4 and 5, may be formed between an abutment 12 carried by the pipe 1, and an abutment 18 which is secured by hooping, as shown in Fig. 6, or by welding, screwing, etc.

In the modification shown in Fig. 7, the groove 6 is formed in a ring 19 which is secured, for instance by welding at 20 and 21, to the pipe 1.

Fig. 8 shows another modification in which the abutment at the end is eliminated.

If desired, the packing member need only be provided with tongues on the outer side, particularly in the case of piping which is subjected to a permanent vacuum, as shown in Fig. 9.

The packing member can be used not only for straight pipes, but also for couplings and parts of cocks and valves. It can even be used for rings or sleeves 21 (Fig. 10) employed for the assembling of two pipes 1 and 2.

It is obvious that in all cases, each pipe element may have at each end either a male or a female part.

Obviously, the invention is not limited to the embodiments herein described and shown, which are given solely by way of example.

PIERRE BOISSOU.