

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 036 009 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

16.04.2003 Bulletin 2003/16

(21) Application number: **98923292.1**

(22) Date of filing: **20.05.1998**

(51) Int Cl.7: **B65D 19/38**

(86) International application number:
PCT/SE98/00967

(87) International publication number:
WO 98/052830 (26.11.1998 Gazette 1998/47)

(54) **PALLET**

PALETTE

PALETTE

(84) Designated Contracting States:
BE DE DK ES FR GB IE IT NL

(30) Priority: **21.05.1997 SE 9701882**

(43) Date of publication of application:
20.09.2000 Bulletin 2000/38

(73) Proprietor: **Bas, Allan**
824 40 Hudiksvall (SE)

(72) Inventor: **Bas, Allan**
824 40 Hudiksvall (SE)

(74) Representative: **Wiklund, Erik et al**
AWAPATENT AB,
Box 5117
200 71 Malmö (SE)

(56) References cited:

DE-A- 19 519 969	US-A- 4 019 634
US-A- 4 128 253	US-A- 4 267 781
US-A- 4 604 014	

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 036 009 B1

Description

[0001] The present invention relates to a pallet according to the preamble to claim 1.

State of the Art

[0002] Presently, pallets, which are available in many different designs, are almost exclusively put together by means of nail joints; which provide a strong joint. For certain types of pallets, e.g. the so-called Euro pallet, standards have been established with respect to materials, dimensions, and strength. Accordingly, it is important for the joint to be strong and to be able to withstand loads in order for the pallet to comply with the standard applicable to the respective pallet type. This is one of the reasons why nail joints are common.

[0003] Today, damaged pallets are to some extent repaired, but it is difficult and uneconomical to take apart the nail joints without causing further damage to the different parts of the pallet. Moreover, if the pallet is composed of several materials, e.g. spacers or blocks which are sometimes made of plastic, it is desirable to be able to sort the different materials prior to reusing and/or recycling them. Discarded pallets can be broken up in order later to be used as fuel or as a raw material in, for example, the manufacture of particle board or particle blocks. One of the drawbacks of nail joints is that the nails move when the wood moves as a result of moisture variations. In this connection, the nails may, for example, project from the loading deck of the pallet and damage the load of the pallet. Another drawback of nail joints is that in connection with the breaking up of the pallet, the nails considerably increase the wear on the mechanical equipment, resulting in increased costs. Furthermore, disturbances occur in the ash handling in connection with incineration. However, because of increased demands for producer responsibility, pallets must be dealt with in some way.

[0004] US 4,128,253 discloses a pallet having one upper and one lower platform, the platforms being joined together by the intermediary of several joining devices located between the platforms. Each joining device comprises a spacer which is attached to the platforms by means of a rivet device comprising a male rivet part and a female rivet part. These rivet parts are intended to be introduced from above the upper platform and from below the lower platform respectively through aligned, opposite holes in the platforms, into a through hole in the spacer and engage with each other. The joining device may also comprise a hollow, cylindrical part, a roller, which is freely rotatable about the spacer and intended to "guide" the forks of a truck by rotating upon contacting the forks. In addition, the roller protects the other parts of the joining device by absorbing the blows or other forces which the joining device is subjected to.

[0005] US 4,267,781 discloses a variant of the pallet according to US 4,128,253. In this pallet, the roller and

the outer frame of the spacer have the shape of the frustum of a cone.

[0006] Both these above-mentioned pallets have, inter alia, the limitation and the drawback that one of the platforms must be a sheet to enable the pallet to absorb diagonal forces which, for example, may occur when the pallet is being fitted into tight spaces. Consequently, neither of these pallets would be capable of absorbing diagonal forces if, for example, the pallet was a so-called Euro pallet, i.e. if the platforms comprised several boards rather than an integral sheet. Furthermore, these pallets have the drawback that the joining device has many different components, making the assembly of the pallet more complicated and raising the cost of production and stocking of components. Moreover, the joining device is dependent on the spacer having a special design. This puts demands on, for example, the inventory of spare parts. In addition, the pallets according to the above-mentioned patent specifications do not seem to meet the special requirements with respect to strength which are imposed on certain types of pallets, e.g. a Euro pallet.

[0007] There are also pallets which are assembled by means of gluing, e.g. the pallet according to FR 7,112,656. However, gluing is time-consuming and costly and it may be difficult to break the glued joint in an efficient manner. In addition, glue may be hazardous from the point of view of occupational health as well as from the point of view of the environment.

[0008] Reference is also made to the patent specifications US 4,604,014, US 4,019,634, and DE 19 519 969 for information concerning the background of the invention.

Description of the Invention

[0009] It is an object of the present invention to obviate the above-mentioned drawbacks by providing a pallet which, without deviating from the standards set for the respective pallet model, can be quickly and easily assembled and disassembled and which thus permits efficient reuse of individual parts or recycling of the pallet material by breaking it up without high costs and using it as fuel or as a raw material for new products. Furthermore, it is an object of the present invention to provide a pallet capable of absorbing diagonal forces acting upon the pallet. It is also an object of the invention to provide a pallet which permits reconditioning of damaged pallets by quick and easy replacement of damaged parts. Moreover, it is an object of the invention to provide a throughgoing integrated joint, which is easy and inexpensive to make, which is easy to apply to the pallet, and which is made of a material which, if necessary, can be broken up in conjunction with the wood material without causing problems with, for example, significant wear and tear on machinery and equipment. It must also be possible to incinerate the joint material in conjunction with the disjoined wood material without creating waste

products which are dangerous to the environment. It is a further object of the invention that, after removal, the joint shall be reusable or recyclable. At least these objects are achieved by a pallet according to claim 1.

[0010] The pallet according to the invention is put together at the joints by means of a joining or fastening device, preferably made of plastic, comprising a female part with an inner bore and in its one end a lug-like flanged portion. The joining device also comprises a male part exhibiting a shank and a lug-like flanged portion in its one end. By its shank, the male part is insertable into and engageable with the bore of the female part by the parts being pressed together by a force which is applied to the joining device. The parts are detachable from each other by the application of a force in the opposite direction. The female part is inserted into a through hole in the respective spacer and in the loading deck. The flanged portions of the female and the male part respectively abut against the opposite side faces of the pallet. The flanged portions thus have the task of applying on opposite sides of the pallet the force required to hold together the different parts of the pallet. In comparison with a pallet assembled by means of nail joints, where the nails are driven in from opposite sides of the pallet, the pallet according to the invention has the advantage of being assembled by means of a throughgoing, integrated joint. In the pallet according to the invention, the female part is provided with one or more longitudinal ridges on its outside, intended to prevent the turning of the spacer and enable the absorption of diagonal forces, e.g. if a truck happens to hit the pallet. US 4,128,253 and US 4,267,781 are intended to be used in conjunction with a specially designed spacer defining a bore, and any ridges on the outside of the female part would not have a turning-preventing effect.

[0011] In a preferred embodiment, the flanged portion is designed so that it extends around the entire circumference of the male and the female part respectively. However, in alternative embodiments, the flanged portion may extend around certain parts only of the circumference of the male and the female part respectively, e.g. in the form of two diametrically located catches which hook into the loading deck and the bottom deck respectively.

[0012] In a preferred embodiment, one portion of the shank of the male part is designed with a knurled portion in which each knurl extends around the circumference of the shank and has the shape of the frustum of a cone. Correspondingly, in the preferred embodiment, the female part is designed with a knurled portion in which each knurl extends around the circumference of the bore and is shaped like the enveloping surfaces of the frustum of a cone. The knurls shaped like the frustum of a cone of the male and the female part respectively are adapted to engage with each other to provide a joint of solid strength. In a preferred embodiment, the cross-sectional dimension in the area of the knurls of the male part is somewhat greater than the dimension of the bore

in the area of the knurls of the female part, since the material is preferably somewhat resilient and, in terms of strength, superior joining of the male and the female part is obtained if the wall of the female part is subjected to a certain amount of strain.

[0013] However, it is not necessary for both the male and the female part to have a portion with knurls shaped like the frustum of a cone. One of the parts can be essentially plain and engage with the other part by means of friction. Both parts can also be essentially plain and conical in shape and enter into engagement by means of friction, i.e. the shank of the male part can be conical with its largest diameter adjacent to the flanged portion, and the bore of the female part can be conical with the smallest diameter of the bore adjacent to the flanged portion so that the two parts fit together. However, it is the requirements with respect to the characteristics of the pallet that determine which male and female part combination is suitable.

[0014] In a preferred embodiment, the flanged portion of the male and the female part respectively is located in recesses in the top and bottom face respectively of the pallet to facilitate stacking of the pallet, to ensure that the joining device does not interfere with the loading of the pallet, and to avoid damage to the flanged portion in connection with the handling of the pallet or by the load of the pallet. However, these recesses can be omitted.

[0015] In a preferred embodiment, the inner bore of the female part is throughgoing. This facilitates, for example, the disassembly of the pallet. In this connection, the male part can easily be pushed out of the female part from the bottom face of the pallet. However, a through-going inner bore of the female part is not essential. For example, it would be possible to grip the male part by the flanged portion and pull it out of the female part.

[0016] In a preferred embodiment, the pallet also comprises a lower bottom deck. In this embodiment, the female part is inserted into a through hole in the bottom deck, the bottom deck being connected to the spacer and the loading deck by means of a male part which is inserted into the female part from the opposite direction.

[0017] Male and the female part can be made in different lengths depending on which parts of the pallet are included in the joint in question. In the corner joints of the pallet, for example, the different parts may consist of the loading deck, the spacer, a lower bottom deck, and a cross piece or stringer, while in other joints perhaps only the loading deck and the cross piece are involved. Some pallet types may be joined together at the corners only and, in that case, no shorter models of the male and the female part are needed. The length of the male and the female part respectively can thus be varied depending upon the type of pallet which is to be assembled.

Brief Description of the Accompanying Drawings

[0018] The following applies to the drawings, in which Figs 1, 3 and 5 are drawn on a larger scale in the horizontal direction than in the vertical direction:

Fig. 1 is a perspective view of a preferred embodiment of an assembled pallet according to the invention, where the concealed parts of the joining device are indicated by dashed lines in six of the joints;
 Fig. 2 is a side view of a preferred embodiment of the male part;
 Fig. 3 is a cross-sectional view of a preferred embodiment of the female part;
 Fig. 4 is a bottom view of a preferred embodiment of the female part;
 Fig. 5 is a cross-sectional view of a preferred embodiment of a joint of a pallet according to the invention; and
 Fig. 6 is a cross-sectional view of an alternative embodiment of the joint.

Detailed Description of Preferred Embodiments of the Invention

[0019] Reference is first made to Fig. 1 which shows a pallet generally designated 1 with a loading deck 2 comprising loading deck boards, spacers 3, a bottom deck 4 comprising bottom deck boards, and cross pieces 5 which are located between the loading deck boards and the spacers and extend parallel to the short side of the pallet. In this embodiment, the pallet has fifteen joints. In the joints 6, the loading deck 2, the cross piece 5, the spacer 3, and the bottom deck 4 are joined together. In the joints 7, the loading deck 2 and the cross piece 5 are joined together.

[0020] Fig. 2 shows a preferred embodiment of the male part 8, which has a lug-like flanged portion 9 and a shank 10. In one portion, the shank 10 is formed with catch means in the form of knurls 11 shaped like the frustum of a cone.

[0021] Fig. 3 shows a preferred embodiment of the female part 12, which has a lug-like flanged portion 13 and an inner through bore 14 into which the shank 8 of the male part 10 in Fig. 2 is intended to be inserted. The female part has a portion with catch means in the form of knurls 15 on the wall of the bore 14 which have the shape of the enveloping surface of the frustum of a cone. The knurls 15 are pointing in the opposite direction to that of the knurls 11 in Fig. 2 to ensure that the male part 8 and the female part 12 are engageable with each other. Accordingly, the knurls are shaped so that the cross-section of the shank 10 of the male part 8 and of the bore 14 of the female part is tapering. In the female part 12, the cross-section tapers in the direction of the flanged portion 13. The cross-section of the male part 8 (Fig. 2) tapers in the direction away from the flanged portion 9. In the areas where the knurls 11, 15 are adjoining in

both the male part 8 and the female part 12, the knurls 11, 15 are formed with horizontal steps, perpendicular to the respective longitudinal axis of the male part 8 and the female part 12, adapted to catch on the corresponding projecting steps of the corresponding part 8, 12. On its outside, the female part 12 exhibits a number of ridges 16 which are intended to prevent the turning of the spacer and the joining device, for example when the pallet is subjected to diagonal side forces.

[0022] In order to provide a clearer illustration of the location of the ridges 16, Fig. 4 shows a bottom view of a preferred embodiment of the female part 12 with the bore 14 in the middle, the flanged portion 13, and the ridges equidistantly located around the circumference of the female part 12.

[0023] Fig. 5 shows a cross-sectional view of a joint of a pallet according to the invention. In the joint shown, the loading deck 2, the cross piece 5, the spacer 3, and the bottom deck 5 are joined together by means of the male part 8 and the female part 12. The knurled portion 11 of the male portion 8 is in engagement with the knurled portion 15 of the female part 12. Ridges 16 are arranged around the circumference of the female part 12 to prevent turning of the component parts of the pallet. The flanged portion 9 of the male part 8 and the flanged portion 13 of the female part 12 are located in recesses 17 on opposite sides of the pallet 1, see also Fig. 1.

[0024] Fig. 6 shows an alternative embodiment of the joining device in which the shank 10 of the male part 8 is conical and has knurls 11 shaped like the frustum of a cone 11, while the female part has a plain, conical bore 14. The conical shape of the parts ensures that the male part 8 and the female part 12 are pressed together and a secure joint is obtained. Moreover, in this embodiment, the knurls 11 shaped like the frustum of a cone on the shank 10 of the male part 8 contribute to the engagement of the parts with one another and hold the parts of the pallet together since the knurls 11 shaped like the frustum of a cone of the male part 8 have a larger dimension than the female part 12 and resiliently "stretch" the female part 12.

[0025] When the pallet according to the invention is to be assembled, the different parts of the pallet are first predrilled in the locations of the joints. Subsequently, the parts are moved into position and the male part 8 and the female part 12 are inserted from opposite sides of the pallet into the predrilled holes. Preferably, the male part 8 and the female part 12 are pressed together with the aid of a pressing tool rather than being rammed together. When the pallet is to be disassembled, it is preferred that an external force is applied from below to the male part 8 to push the male part out of the female part 12, and for this reason the bore of the female part is preferably throughgoing, as in the examples shown. Subsequently, the parts of the pallets can be sorted, after which undamaged parts can be reused as pallet parts. Damaged parts are replaced and discarded and

can, for example, be broken up and used in particle boards or as fuel.

Claims

1. A pallet comprising at least one upper loading deck (2) and spacers (3) joined to the loading deck (2), the loading deck (2) and each of the spacers (3) being joined together by means of a joining device comprising a female part (12), which exhibits an inner bore (14) and a flanged portion (13) in its one end, as well as a male part (8), which exhibits a shank (10) and a flanged portion (9) in its one end and which by its shank (10) is insertable into and engageable with the bore (14) of the female part (12) by the application of a force pressing the male part (8) and female part (12) towards each other and disengageable by the application of a force in the opposite direction, the female part (12) being inserted into a through hole in the pallet and the flanged portions (9, 13) abutting against the opposite side faces of the pallet, **characterised in that** the female part (12) on its outside is provided with at least one longitudinal ridge (16).
2. A pallet according to claim 1, characterised in that the shank (10) of the male part (8) has at least one knurled portion in which each knurl (11) has the shape of the frustum of a cone.
3. A pallet according to claim 1 or 2, **characterised in that** the bore of the female part (12) has a knurled portion in which each knurl (15) has the shape of the enveloping surface of the frustum of a cone.
4. A pallet according to any one of the preceding claims, **characterised in that** the inner bore (14) of the female part (12) is throughgoing.
5. A pallet according to any one of the preceding claims, **characterised in that** the shank (10) of the male part (8) is conical in shape, with an increasing diameter towards the flanged portion (9), and that the bore (14) of the female part (12) is oppositely conical, with a decreasing diameter towards the flanged portion (13).
6. A pallet according to any one of the preceding claims, **characterised in that** the pallet further comprises a lower bottom deck (4), and that the female part (12) is inserted into a through hole in the bottom deck (4).

Patentansprüche

1. Palette, die wenigstens eine obere Ladeplatte (2)

und Abstandshalter (3) umfasst, die mit der Ladeplatte (2) verbunden sind, wobei die Ladeplatte (2) und jeder der Abstandshalter (3) mittels einer Verbindungsvorrichtung miteinander verbunden sind, die einen Aufnahmeteil (12), der eine Innenbohrung (14) und einen Flanschabschnitt (13) an seinem einem Ende aufweist, sowie einen Einführteil (8) umfasst, der einen Schaft (10) und einen Flanschabschnitt (9) an seinem einen Ende aufweist und der durch das Ausüben einer Kraft, die den Einführteil (8) und den Aufnahmeteil (12) aufeinander zu drückt, mit seinem Schaft (10) in die Bohrung (14) des Aufnahmeteils (12) eingeführt und mit ihr in Eingriff gebracht werden kann, und durch das Ausüben einer Kraft in der entgegengesetzten Richtung gelöst werden kann, wobei der Aufnahmeteil (12) in ein Durchgangsloch in der Palette eingeführt wird und die Flanschabschnitte (9, 13) an den auf einander gegenüberliegenden Seiten befindlichen Flächen der Palette anliegen, **dadurch gekennzeichnet, dass** der Aufnahmeteil (12) an seiner Außenseite mit wenigstens einem Längssteg (16) versehen ist.

2. Palette nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schaft (10) des Einführteils (8) wenigstens einen gerändelten Abschnitt aufweist, in dem jede Rändelung (11) die Form des Kegelstumpfes hat.
3. Palette nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Bohrung des Aufnahmeteils (12) einen gerändelten Abschnitt aufweist, in dem jede Rändelung (15) die Form der Hüllfläche des Kegelstumpfes hat.
4. Palette nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Innenbohrung (14) des Aufnahmeteils (12) durchgehend ist.
5. Palette nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Schaft (10) des Einführteils (8) konisch geformt ist und der Durchmesser in Richtung des Flanschabschnitts (9) zunimmt, und dass die Bohrung (14) des Aufnahmeteils (12) entgegengesetzt konisch ist und der Durchmesser in Richtung des Flanschabschnitts (13) abnimmt.
6. Palette nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Palette des Weiteren eine untere Bodenplatte (4) umfasst, und dass der Aufnahmeteil (12) in ein Durchgangsloch in der Bodenplatte (4) eingeführt wird.

Revendications

1. Palette comprenant au moins un plateau supérieur de chargement (2) et des dispositifs d'espacement (3) joints au plateau de chargement (2), le plateau de chargement (2) et chacun des dispositifs d'espacement (3) étant joints ensemble au moyen d'un dispositif de jonction comprenant une partie femelle (12), qui présente un alésage intérieur (14) et une partie en rebord (13) à une des ses extrémités, de même qu'une partie mâle (8), qui présente une tige (10) et une partie en rebord (9) à une de ses extrémités et dont la tige (10) est susceptible d'être insérée et engagée dans l'alésage (14) de la partie femelle (12), par l'application d'une force pressant la partie mâle (8) et la partie femelle (12) l'une vers l'autre, et est susceptible d'être dégagée par l'application d'une force dans la direction opposée, la partie femelle (12) étant insérée dans un trou traversant de la palette et les parties en rebords (9, 13) venant en butée contre les faces latérales opposées de la palette, **caractérisée en ce que** la partie femelle (12), sur sa surface extérieure, est munie d'au moins une nervure longitudinale (16).

5
10
15
20
2. Palette selon la revendication 1, **caractérisée en ce que** la tige (10) de la partie mâle (8) a au moins une partie moletée, dont chaque cannelure (11) a la forme d'un tronc de cône.

25
30
3. Palette selon la revendication 1 ou 2, **caractérisée en ce que** l'alésage de la partie femelle (12) a une partie moletée, dont chaque cannelure (15) a la forme de la surface enveloppante d'un tronc de cône.

35
4. Palette selon une quelconque des revendications précédentes, **caractérisée en ce que** l'alésage intérieur (14) de la partie femelle (12) est traversant.

40
5. Palette selon une quelconque des revendications précédentes, **caractérisée en ce que** la tige (10) de la partie mâle (8) est de forme conique, avec un diamètre qui augmente vers la partie en rebord (9), et **en ce que** l'alésage (14) de la partie femelle (12) a une forme conique opposée, avec un diamètre qui diminue vers la partie en rebord (13).

45
6. Palette selon une quelconque des revendications précédentes, **caractérisée en ce que** la palette, en outre, comprend un plateau inférieur (4) et **en ce que** la partie femelle (12) est insérée dans un trou traversant du plateau inférieur (4).

50

55

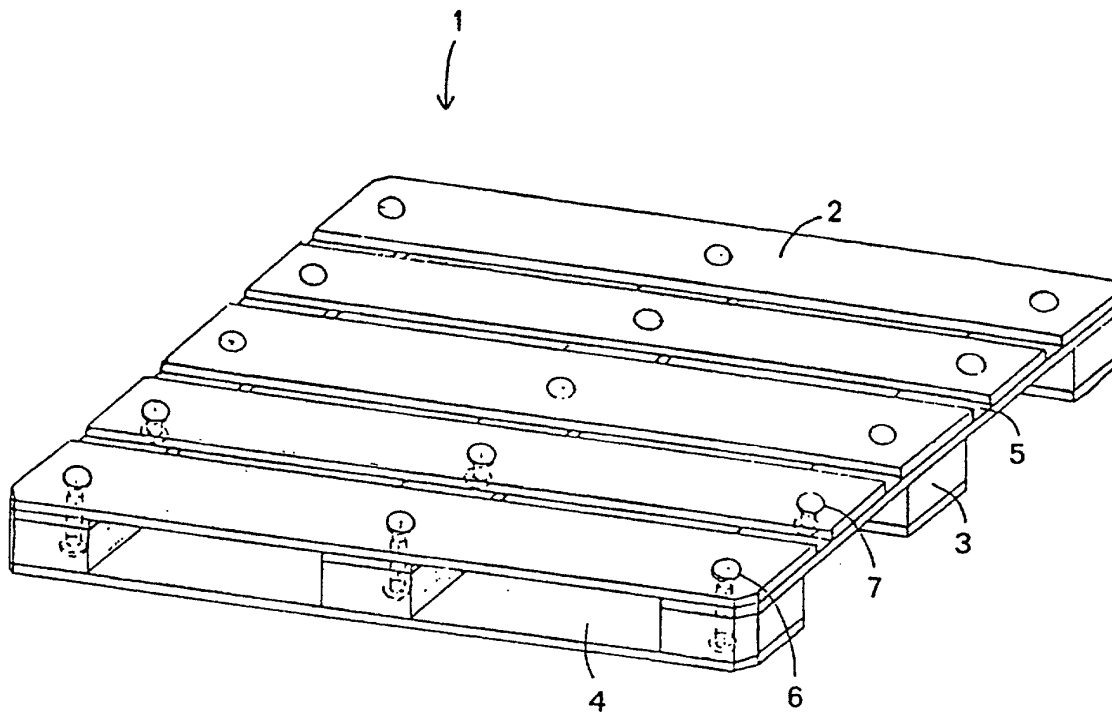


Fig 1

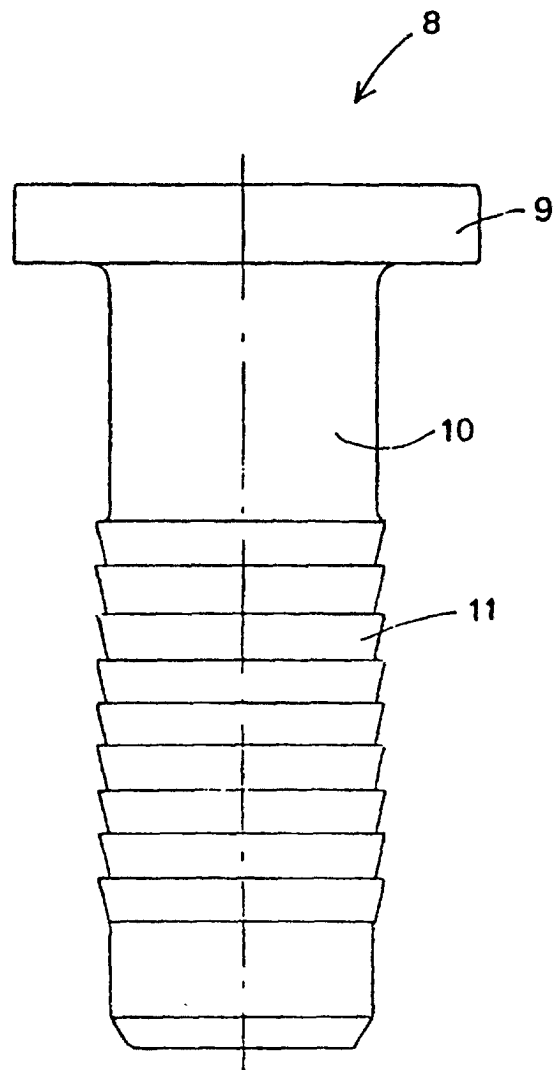


Fig 2

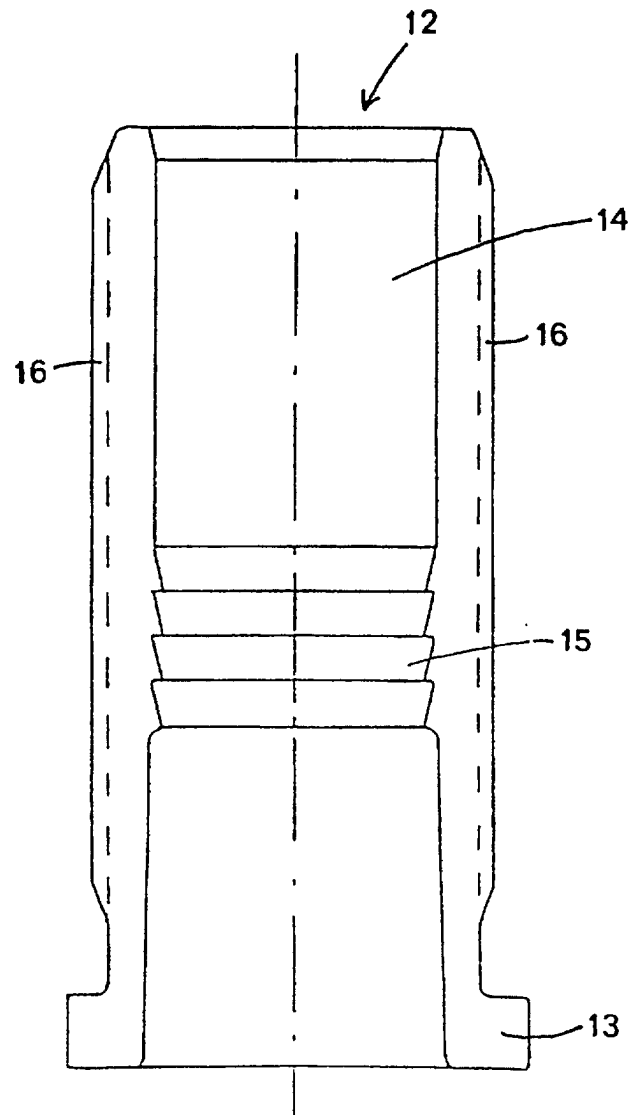
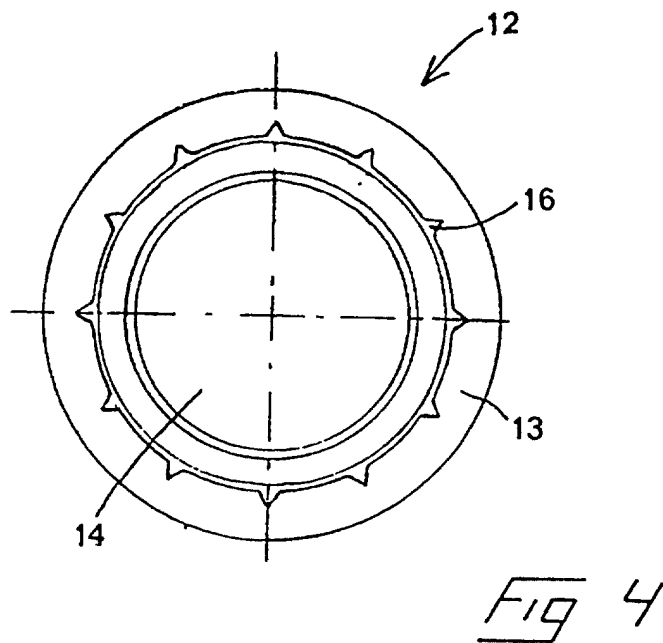


Fig 3



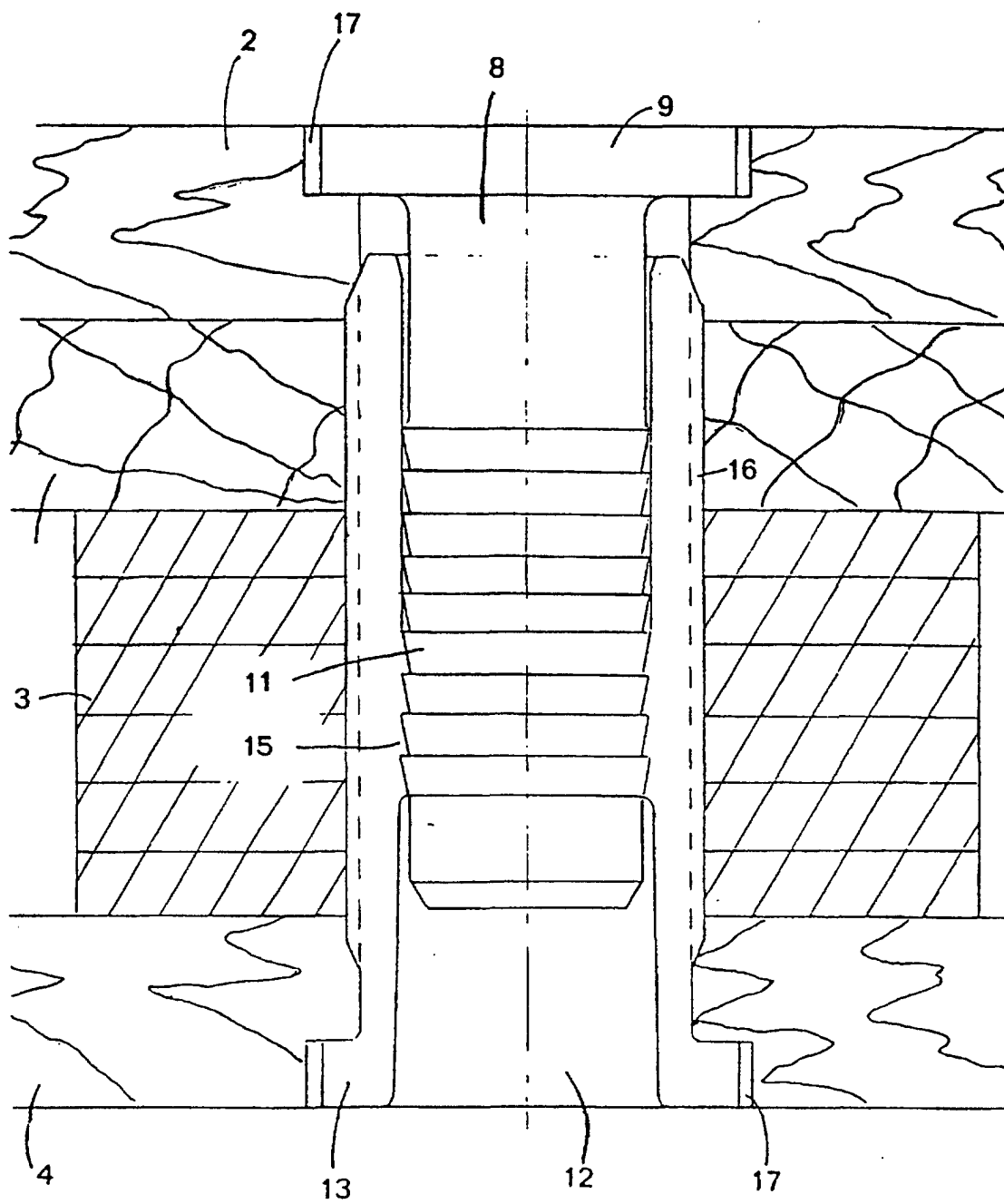


Fig 5

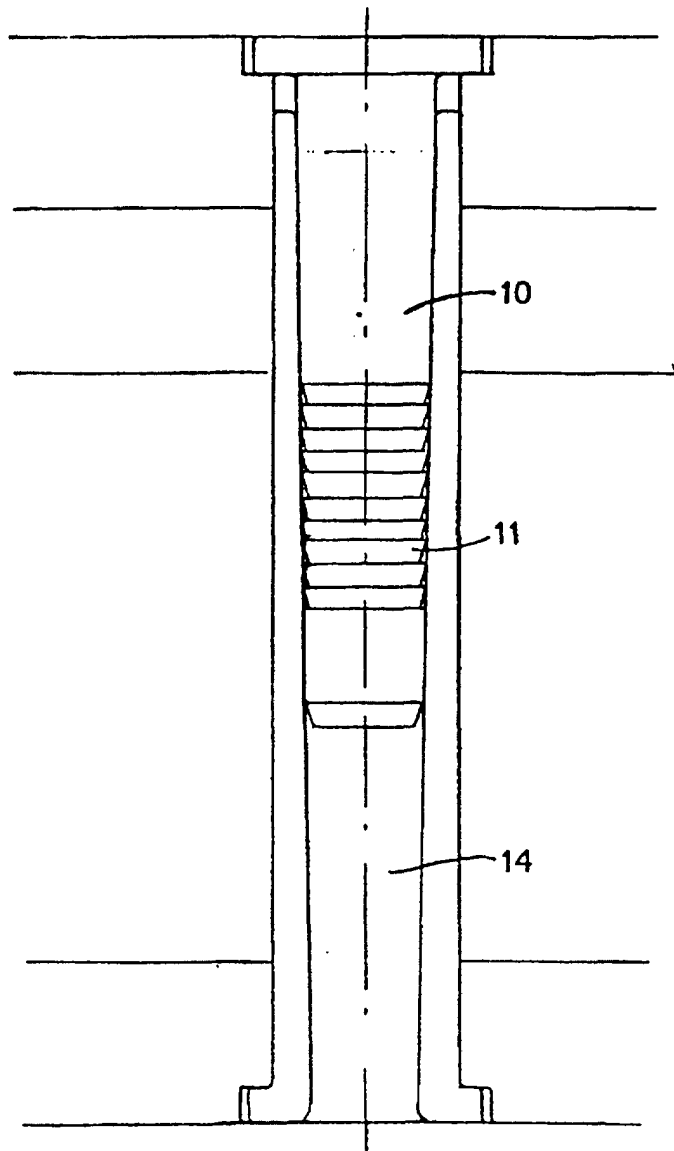


Fig 6