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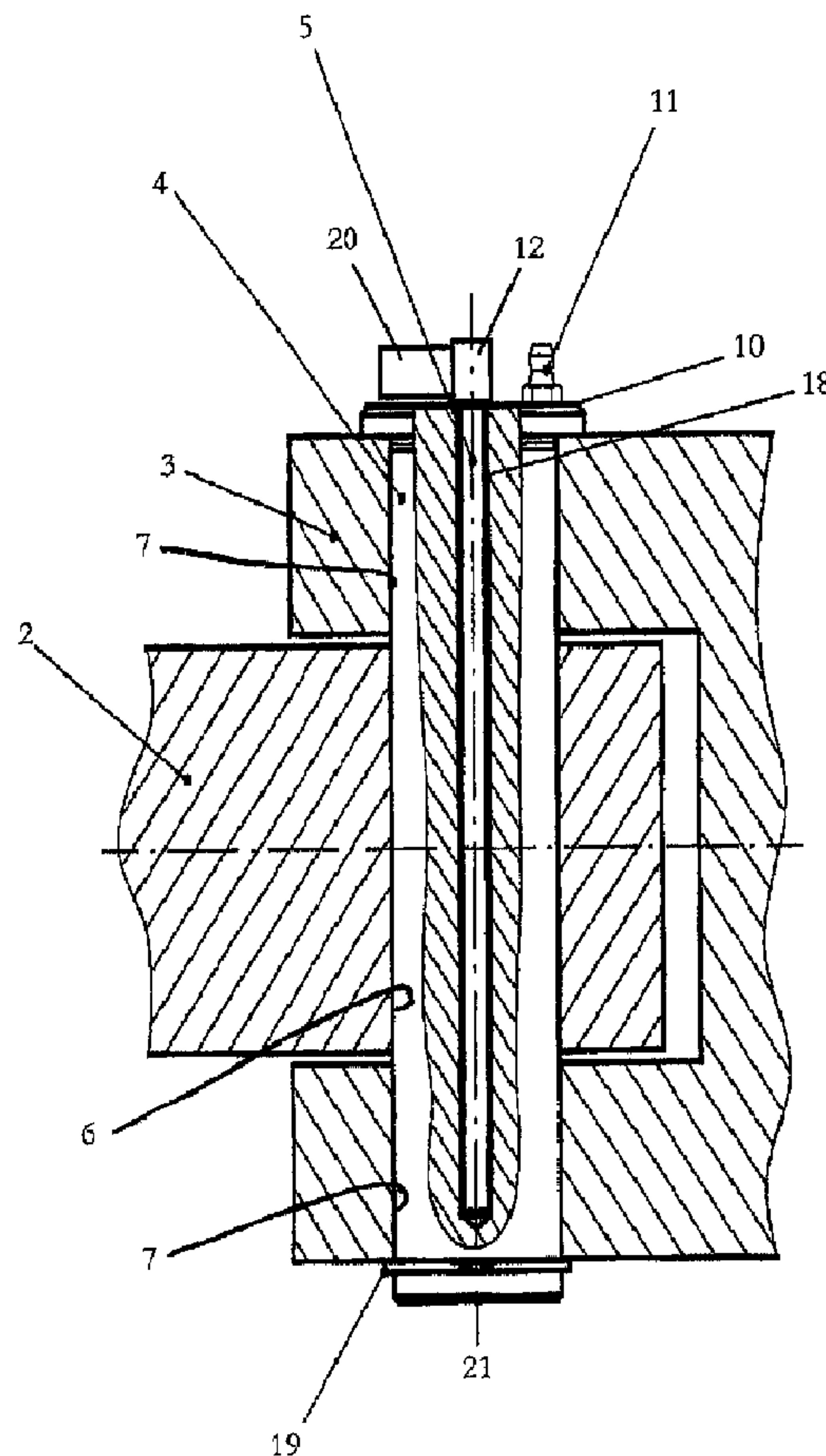
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(54) Title: JOINT ARRANGEMENT WITH HEATABLE JOINT BOLT



(57) Abrégé/Abstract:

This invention relates to a joint arrangement (1) for a coupling, more particularly for an articulated joint coupling or a central buffer coupling, for the purpose of joining in an articulated manner two adjacent wagon boxes (100, 101) of a multi-member vehicle,

(57) **Abrégé(suite)/Abstract(continued):**

particularly a rail vehicle. The joint arrangement has a first pivoting part (2), a second pivoting part (3) and a joint bolt (4). The first and the second pivoting parts (2, 3) interact by means of the vertically running joint bolt (4), about a common swiveling axis (21), as defined by the joint bolt (4). In order to prevent freezing of the joint arrangement at low ambient temperatures and thus limiting operation thereof, the joint bolt is equipped with a heating element (5) for heating the joint arrangement.

“Joint Arrangement With Heatable Joint Bolt”

Abstract

This invention relates to a joint arrangement (1) for a coupling, more particularly for an articulated joint coupling or a central buffer coupling, for the purpose of joining in an articulated manner two adjacent wagon boxes (100, 101) of a multi-member vehicle, particularly a rail vehicle. The joint arrangement has a first pivoting part (2), a second pivoting part (3) and a joint bolt (4). The first and the second pivoting parts (2, 3) interact by means of the vertically running joint bolt (4), about a common swiveling axis (21), as defined by the joint bolt (4). In order to prevent freezing of the joint arrangement at low ambient temperatures and thus limiting operation thereof, the joint bolt is equipped with a heating element (5) for heating the joint arrangement.

Joint Arrangement with Heatable Joint Bolt

Description

This invention relates to a joint arrangement for a coupling, more particularly an articulated joint coupling or a central buffer coupling, for the purpose of joining in an articulated manner two adjacent wagon boxes of a multi-member vehicle, particularly a rail vehicle. The joint arrangement has a first pivoting part, a second pivoting part and a joint bolt, wherein the first and the second pivoting parts interact, by means of the joint bolt, about a common swiveling axis, as defined by the joint bolt.

Such a joint arrangement is known from the engineering of rail vehicles, for example, in the form of an articulated joint coupling. The task of such a joint arrangement, as used in an articulated joint coupling, is to link adjacent boxes of a multi-member vehicle unit, and in doing permit defined movements between the wagon boxes on the one hand, and limit, on the other hand, certain degrees of freedom, if necessary. Aside from the coupling of two wagon boxes in the longitudinal direction of the vehicle, the joint arrangement often performs other functions, such as, for example, the support of a portion of the force of the weight or the steering of the wagon box.

Irrespective of varying structural designs, each joint arrangement, constructed as an articulated joint coupling, has a first pivoting part assigned to the first wagon box, as well as a second pivoting part allocated to the second wagon box. By the term “assigned pivoting part” in connection with articulated joint couplings it is meant pivoting parts or articulated arms that are rigidly attached, but also almost rigidly attached, to the respective wagon box. Into this category also fall those pivoting parts or articulated arms that are arranged with

a certain play at the respective wagon box. This is the case, for example, if the pivoting part is being attached to the wagon box via an elastomer body.

However, in rail vehicle engineering, joint arrangements are used not only as joint couplings in which the joint arrangement assume the articulated coupling of two adjacent wagon boxes, but also in coupling arrangements, such as central buffer couplings. A coupling arrangement has usually a coupling rod per wagon box, which is attached at the front end of the respective wagon box by way of an articulation. A coupling head can be provided at the front end of the coupling rod, i.e. at the end facing away from the articulation. In the coupled state the respective coupling rods are rigidly connected to each other, whereas the respective ends of the coupling rods at the wagon cars are attached to the respective wagon cars in an articulated manner by way of the already mentioned articulation. Therefore, an arrangement of a coupling that has been coupled through – contrary to the aforementioned articulated joint coupling – has not one common swiveling axis but two varying swiveling axes. In the respective articulations the respective end of the coupling rod is attached to the pillow block at the front end of the wagon box in a swiveling manner. This is usually achieved with the assistance of a joint arrangement. In such a joint arrangement the first pivoting part forms part of the pillow block, whereas the second pivoting part forms the end of the coupling rod.

Furthermore, joint arrangements are used in so-called foldable coupling arrangements wherein the joint arrangement is integrated in the coupling rod of such a coupling arrangement so that the coupling rod can be folded, if required. In this case the first and the second pivoting part constitute one part of the coupling rod, respectively.

The joint arrangement has also been provided with a joint bolt which joins the respective pivoting parts to each other in such a way that the latter can interact in an articulated manner about a common swiveling axis that has been defined by the joint bolt. In an articulated joint coupling the function of the joint bolt is primarily to transmit the tractive and compressive forces of the articulated joint coupling. In detail, such tractive and compressive forces are transmitted to the joint bolt by one of the two pivoting parts and are then passed on, via the joint bolt, to the counterpart of the joint arrangement. In order to render an articulated interaction of the two pivoting parts possible, it must be possible to have the pivoting parts swivel about the bolt axis towards each other. With respect to joint arrangements that are used in the articulation of a central buffer coupling, the primary function of the joint bolt is to transmit pulling and impact forces – which are transmitted via the coupling rod of the coupling of adjacent wagon cars – from the coupling rod, which serves as one of the two pivoting parts, to the pillow block, which serves as the other pivoting part, via the joint bolt. In coupling arrangements in which the coupling rod can be folded with the assistance of a joint arrangement, and in which, therefore, the first and the second pivoting parts form one part of the coupling rod, respectively, the joint bolt serves the purpose of joining the two partial coupling rods in a swiveling manner.

In order that in an articulated joint coupling the forces, which occur between adjacent wagon boxes while a multi-member rail vehicle is being driven, can be absorbed by the joint arrangement and thus prevent such forces from being passed on to the undercarriage of the vehicle in an undampened manner, bearings are usually provided in the joint arrangement that pick up and absorb such forces. For example, joint arrangements designed as spherical joints

absorb longitudinal, lateral and vertical forces that occur between adjoining wagon cars while a multi-member rail vehicle is being driven.

Furthermore, joint arrangements are known that have, in addition, a roller bearing and an elastomer joint. Joint arrangements constructed in this way make it possible to absorb, via the roller bearing, horizontal deflections that occur on a curved path, whereas the angle of inclination, which occurs when driving through a sinkhole or over the summit of a mountain, is absorbed by the elastomer joint.

However, in joint arrangements, as known in the state of the art, it has proven disadvantageous that bearings freeze at low ambient temperatures. As a result thereof the joint bolt is no longer able to move in its bearing. In particular, the joint arrangement is no longer operable because it has become rigid at least in part.

Therefore, the aim of the invention is to provide a joint arrangement for a coupling, more particularly for an articulated joint coupling or a central buffer coupling, in order to join in an articulated manner, two adjacent wagon cars, and which also operates at low ambient temperatures.

This problem is solved by a joint arrangement of the kind mentioned at the outset, whereby a joint arrangement also has at least one heating element placed in a recess of the joint bolt and outwardly covered for heating to the joint arrangement. Provision has been made in this connection that when activating the heating element, the heat, created in the joint bolt, is transmitted to the bearings of the joint arrangement via the outer surfaces of the joint bolt. Through this heat input, via the heating element, the icing of the bearings can

be prevented or melted even at low ambient temperatures so that the joint arrangement is always operable. The solution, according to the invention, makes it also possible in winter to reliably keep the joint arrangement free from ice and snow and thus ensure its operation. In one embodiment the heating element is inserted in a recess of the joint bolt and subsequently covered outwardly by welded or soldered covering elements. Furthermore, it is conceivable to glue or solder the heating element into the recess itself. In doing so, it must be ensured that the heating element is being soldered in without cavities in the filling material in order to prevent, on the one hand, local overheating of the heating element in such cavities and, on the other hand, the penetration of moisture during operation, which frequently leads to corrosion. Furthermore, it is conceivable to use as exterior covering of the heating element, a silicone material that forms the exterior covering and which, when filling, for example, is a sealable, single-component material which, under the effect of the humidity of the air, cures and hardens at room temperature. It is also conceivable to use as covering, covering elements that are placed into adapted depressions and connected to the joint bolt preferably by way of hard-soldering. Due to the fact that the joint arrangement, according to the invention, is designed in such a way that the heating element can be inserted into the recess of the joint bolt even after the mechanical completion of the joint arrangement or the joint bolt, the risk of damaging the heating element, including its supply line is substantially reduced when installing the joint arrangement.

Provision has been made in a particularly preferred embodiment to the effect that the recess of the joint bolt is designed true to size of the cross-section of the heating element. With this solution to the problem it is now no longer necessary to glue or solder the heating element into the recess since, on the one

hand, the heating element is kept firmly in position on account of the precise design of the recess and, secondly, because a quick and uniform heat introduction into the joint bolt or joint arrangement is assured. Thus, the heat transfer from the heating element to the joint bolt can be improved, and the expense of mounting and demounting the heating element can be reduced. Furthermore, it is also conceivable that the recess is designed along the longitudinal axis of the joint bolt and that by doing so the depth of the recess and, therefore, the length of the heating element can be adapted accordingly to the demands made on the joint arrangement. Naturally, it is also conceivable to use several heating elements per joint bolt instead of one single heating element whereby either each individual heating element is provided with its own recess, or one single recess is designed to receive several heating elements. Due to the precise design of the recess, as already briefly mentioned, especially the quick and uniform heat input and distribution to the joint arrangement and particularly to the bearings is more advantageous because it leads to the reduction of defrosting times. Furthermore, the precise design of the recess for the reception of the heating element eliminates the necessity of fixing the heating element into position in the recess, for example, by soldering or gluing. This assures fast assembly and disassembly and particularly the swift installation, demounting and replacement of a defective heating unit, thus achieving also shorter downtimes of the vehicles when replacing the heating element.

In another advantageous embodiment in which the recess of the joint bolt is constructed in such a way that once the recess has been finished, the heating element can be inserted into the recess, provision has been made, according to the invention, to fasten the heating element to the joint bolt in a detachable manner. By using detachable fasteners to fix the heating unit into position at

the joint bolt, a quick and easy assembly and disassembly are also assured. Thus, the installation and dismantling of a heating unit, as well as the replacement of a defective heating element can be executed very quickly. Conceivable as detachable fasteners are, for example, head sheets by means of which the heating element is being fixed into position at the joint bolt. Naturally, it is also conceivable in this case that once the heating element has been inserted into the joint bolt, it can be fixed into position at one of the pivoting parts. The recess, which is designed to receive the heating unit in the joint bolt, is preferably constructed as a linear borehole that runs basically parallel to the longitudinal axis or on the longitudinal axis of the joint bolt itself. On the other hand, it is also conceivable to design the recess or recesses as a groove in the joint bolt which is subsequently covered by means of an inserted face plate. Such a solution in the form of a groove is being considered, for example, if drilling out the recess in the joint bolt causes difficulties, for example, on account of the hardness of the steel used for the joint bolt. It is also possible, of course, that the recesses are designed as grooves as well as boreholes in a joint bolt.

In an advantageous embodiment of the invented joint arrangement – even though it is known partially in connection with articulated joint couplings from the sector of rail vehicle engineering – provision has been made to the effect that the first pivoting part has a first through-hole, and the second pivoting part has a second through-hole which axially aligns with the first through-hole formed in the first pivoting part. Provision has been made, according to the invention and in an advantageous manner that the joint bolt, which is equipped with the heating element, passes through the first and the second through-hole. A bearing yoke as well as a bearing eye are conceivable as pivoting parts in this connection. These can be used as a yoke-eye-joint arrangement or also as

an eye-eye-joint arrangement wherein the connection is made via the joint bolt. Naturally, the joint arrangement, according to the invention, is not limited to such cases in which a joint bolt, running vertically, has been provided. Joint arrangements are conceivable, however, in which the joint bolt is aligned other than horizontally.

In another advantageous embodiment of the joint arrangement, according to the invention, provision has been made for the joint arrangement to also have a bearing, especially a spherical bearing and/or an angular ball-and-socket joint through which the joint bolt passes. The advantage of this embodiment is that due to the heating element being integrated within the joint bolt, the heat intake can quickly and uniformly penetrate the bearing where it can distribute itself. This leads to a reduction in defrosting times and contributes substantially to the maintenance of the operation of the bearing. It is conceivable in this connection that the bearing is provided or fixed into position in one of the pivoting parts. If, for example, a spherical bearing is used in an articulated joint coupling, Cardanic movements are possible between adjacent wagon cars that are connected to one another by means of the joint arrangement. Alternatively or in addition to this, it is also conceivable to provide an angular ball-and-socket joint in one or in both pivoting parts which advantageously permits Cardanic movements. By doing so, it is possible that horizontal deflections between adjacent wagon cars, when driving around a curve, as well as pitching motions between such wagon cars, when driving through a sinkhole or over a summit, or also an overlapping of both deflections, are absorbed by the joint arrangement, according to the invention.

In order to position the joint bolt, in which the heating is integrated, in the area of the bearing, provision has been made in a preferable embodiment of the joint

arrangement, according to the invention, to rigidly connect the joint bolt to one of the pivoting parts and to interact with the other one of the pivoting parts in such a way that this pivoting part is pivoted on the joint bolt.

In a structural development of the joint arrangement, according to the invention, provision has been made in a preferable manner to the effect that the joint bolt also has a head section and a bolt safeguard which interact in such a way that the bolt is being held within the area of the bearing of the first and second pivoting parts. It is conceivable in this connection to design, for example, the bolt to be cylindrical, and in doing so place at least one groove in the bolt in order to receive a shaft guard ring. In addition or alternatively to this, it is also conceivable that the joint bolt has varying cylindrical diameters in the area of or adjacent the bearing of the first and second pivoting parts and that the varying diameters are arranged in such a way that the bolt is held, within the area of, or to the bearing of the first and second pivoting parts. In all structural embodiments for positioning the joint bolt in the area of the bearing, the primary task of the joint bolt is to transmit to the counterpart of the joint arrangement tractive and compressive forces that are passed on from one of the two pivoting parts to the joint bolt. Due to the joint arrangement, according to the invention, it is possible to swivel both pivoting parts about the axis of the joint bolt towards each other. Such an axis of the joint bolt is usually the common swiveling axis of the joint arrangement.

In a particularly advantageous embodiment of the joint arrangement, according to the invention, provision has been made to the effect that the bearing of the joint arrangement is designed with additional bearings such as, for example, journal-bearing bushings. Furthermore, provision has been made that in the joint arrangement, according to the invention, the joint bolt is equipped not

only with a heating element but also with a subsequent lubricating device for the points of support of the joint bolt. It is conceivable in this connection to design a respective lubricant reservoir in the joint bolt from which – either if necessary or continuously – lubricant is dispensed in the bearing. In a preferred embodiment, provision has been made that this lubricant reservoir, designed in or at the joint bolt, can be refilled with lubricant from the outside. It is conceivable, for example, to provide a respective connection at the front end of the joint bolt. Such a connection can be arranged beside the electrical connections for the heating elements, positioned in or at the joint bolt, or also on the opposite end of the joint bolt.

Preferred embodiments of the joint arrangement, according to the invention, are described in detail, based on the following drawings.

The following drawings show:

- Fig. 1: a longitudinal section of an embodiment of the joint arrangement, according to the invention, in an articulated joint coupling, at aligning, longitudinal axes of the corresponding parts;
- Fig. 2: a longitudinal section of the area of the bearing of an embodiment of the joint arrangement, according to the invention; and
- Fig. 3: a longitudinal section of the area of the bearing of another preferred embodiment of the joint arrangement, according to the invention.

Fig. 1 shows a longitudinal section of the joint arrangement (1), according to the invention, in an articulated joint coupling at aligning longitudinal axes of

the corresponding pivoting parts (2, 3). The joint arrangement (1) shows in this specific embodiment a first pivoting part (2), designed as a bearing eye, which is received by a rigid carrier support (15) that projects beyond the end of the first wagon car (100) (not explicitly shown) and that is firmly connected to the first wagon car (100) in the latter's floor area. The bearing eye itself has a vertical through-hole (6) in which a spherical bearing (8) is fixed into position. as already mentioned, the spherical bearing (8) permits Cardanic movements between adjoining wagon cars.

The bearing eye is received by a second pivoting part (3), designed as a bearing yoke, which is received by a rigid carrier support (16) that projects beyond the end of the second, adjacent wagon car (101) (not explicitly shown) and that is firmly connected to the second wagon car (101) in the latter's floor area. The bearing yoke (3) also has a vertical through-hole (7) that axially aligns with the through hole (6) of the bearing eye (2).

As shown, the bearing yoke (3) is designed in two parts in which the upper part (13) is firmly connected to the lower part (14) of the bearing yoke (3) by means of detachable fasteners (17), particularly by means of screws. Arranged in the upper part (13) and in the lower part (14) of the bearing yoke (3) is an angular ball-and-socket joint (not explicitly shown) that permits Cardanic movements. The bearing eye (2) is connected to the bearing yoke (3) by a vertically inserted joint bolt (4), which is being put through the spherical bearing (8) and through the angular ball-and-socket joint and is fixed into position there by customary means. The spherical bearing (8), which is fixed into position in the bearing eye (2) permits, due to design, Cardanic or spherical movements between adjacent wagon cars (100, 101) and absorbs fluctuations in tensile stress and pressure that occur in the longitudinal direction of the vehicle.

Furthermore, it would be conceivable to provide also a (not explicitly shown) tension and/or compression element between both or one of the carrier supports (15, 16) and the area of the bearing (8) (pillow block). It would be conceivable in this connection to provide a pressure spring on one side and on the other side a tension and/or compression element, arranged between carrier supports (15, 16) and pillow block (8), in particular a pressure spring in order to effect a setting of the joint arrangement (1).

Fig. 2 shows a longitudinal section of the area of the bearing (8) of a preferred embodiment of the joint arrangement (1), according to the invention, which, for example, can also be integrated in the articulated joint coupling, as shown in Fig. 1. As illustrated, it concerns in this embodiment a yoke-eye-joint arrangement, i.e. a joint arrangement in which one pivoting part (3) is designed as a bearing yoke and the other corresponding pivoting part (2) as bearing eye (2). It can be clearly ascertained from Fig. 2 that both pivoting parts (2, 3) have through-holes (6, 7), which align axially with each other. The joint bolt (4) is inserted into this through-hole (6, 7) in order to join the pivoting parts (2, 3) to each other on the one hand and, on the other hand, to define the common swiveling axis (21) for the joint arrangement (1).

In the embodiment, shown in Fig. 2, the joint bolt (4) is shown partly in section. Provided in the joint bolt (4) is a recess (18), which runs axially and is designed as a borehole, in which a heating element (5) is inserted true to size. In order to hold the heating element (5) in the recess (18), designed in the joint bolt (4), a respective holding element (12) has been provided at the upper top section (10) of the joint bolt (4).

In the preferred embodiment, as shown in Fig. 2, the cross-section of the recess (18), as designed in the joint bolt (4), is constructed true to size of the cross-section of the heating element (5) in order to assure, on the one hand, a uniform and quick heat input from the heating element (5) into the joint arrangement (1) and/or the area of the bearing (8) via the joint bolt (4) and, on the other hand, to securely fix the heating element (5) into position in the recess (18) of the joint bolt (4), thus making an additional gluing or soldering of the heating element (5) in the recess (18) unnecessary. Due to the precise design of the recess (18) for receiving the heating element (5), it is, in particular, also possible to prevent the formation of hollow bodies between the heating element (5) and the wall of the recess (18) in which, for example, water can penetrate and thus lead to corrosion. Furthermore, local overheating of the heating element (5), due to such hollow bodies, is prevented which may otherwise result in the destruction of the heating element (5).

As shown, the heating element (5) is fastened from the outside at the front end of the joint bolt (4). Such a fastening is preferably done with a detachable fastener (20) in order to make a fast installation and dismantling of the heating element (5) possible. Although it is not explicitly shown, the respective connecting lines are also preferably led over the front end of the joint bolt (4). Preferably rod-shaped high-performance cartridges are used as (partial) heating elements.

Fig. 3 shows a longitudinal section of another preferred embodiment of the joint arrangement (1), according to the invention. In this embodiment both pivoting parts (2, 3) are designed as bearing eyes, so that the joint arrangement (1) constitutes a so-called eye-eye-joint arrangement. Through-holes (6, 7) have been provided in both pivoting parts (2, 3) that axially align with each

other, and into which the joint bolt (4) with the integrated heating (5) is inserted. The joint bolt (4) preferably has a top section (10) at the upper part of the joint bolt (4), as well as a bolt safeguard (19) at the lower part of the joint bolt with the assistance of which the joint bolt (4) is held in the through-holes (6, 7) of the pivoting parts (2, 3) in such a way that both pivoting parts (2, 3) can perform a swivel motion towards each other. As also shown in the embodiment in Fig. 2, the bolt safeguard (19) is designed as a groove with a shaft security ring. Naturally, also other embodiments are conceivable in this respect.

As shown in fig. 2 and 3, the invented joint arrangement (1), according to the two embodiments, is also equipped with a subsequent lubricating device (11). This subsequent lubricating device (11) is, aside from the heating element (5), likewise integrated in the joint bolt (4). It is conceivable in this connection that the subsequent lubricating device (11) has a lubricant reservoir which is designed inside the joint bolt (4). From this lubricant reservoir, in which the lubricant rests, the lubricant is dispensed to the area of the bearing (8), if required or continuously. The figures also show that a connecting piece has been provided at the front end of the joint bolt (4) in order to fill the lubricant reservoir (not explicitly shown) with lubricant.

By applying heat to the area of the bearing of the joint arrangement, via the heating element, it is being prevented in an advantageous manner that icing of the components of the joint arrangement, which move relatively towards each other, can occur or occurs. Thus, the joint arrangement, according to the invention, is operable even at low ambient temperatures. Naturally, it is also conceivable that instead of one single heating element, which is inserted into the joint bolt, several heating elements can be used.

It should be pointed out that the design, according to the invention, is not limited to the embodiments described in the figures, but is also possible to be executed in many variants. In particular, it is conceivable to use the joint arrangement, according to the invention, as a folding joint in a foldable coupling arrangement in which the coupling rod is foldable in a decoupled state with the assistance of this joint arrangement. It is also conceivable to use the joint arrangement, according to the invention, in the articulation of a coupling arrangement, particularly a central buffer coupling.

WHAT IS CLAIMED IS:

1. A joint arrangement for a coupling for joining in an articulated manner two adjoining wagon boxes (100, 101) of a multi-member vehicle, the joint arrangement comprising a first pivoting part (2), a second pivoting part (3) and a joint bolt (4), whereby the first and the second pivoting parts (2, 3) flexibly interact, by means of the joint bolt (4) about a common swiveling axis (21), as defined by the joint bolt (4), wherein the first pivoting part (2) has a first through-hole (6), and the second pivoting part (3) has a second through-hole (7), which axially aligns with the first through-hole (6), wherein the joint bolt (4) passes through the first and the second through-holes (6, 7), and the joint arrangement has a bearing (8) comprising a spherical bearing whereby the bearing (8) is fixed into position in at least one of the through-holes (6, 7) of the pivoting parts (2, 3), and whereby the joint bolt (4) passes through the bearing (8), the joint arrangement being characterized by the joint bolt (4) having a recess (18) and at least one heating element (5) inserted in the recess (18) and being outwardly covered, the heating element being adapted to heat the joint arrangement.

2. A joint arrangement, according to claim 1, wherein the recess (18) of the joint bolt (4) is designed true to size of the cross-section of the heating element (5).

3. A joint arrangement, according to claims 1 or 2, wherein the heating element (5) is insertable into the recess (18) and is fastened at the joint bolt (4) in a detachable manner.

4. A joint arrangement, according to one of claims 1 to 3, wherein the joint bolt (4) is rigidly connected to one of the pivoting parts (2, 3) and interacts with the other of the pivoting parts (3, 2) whereby the other pivoting part (3, 2) is pivoted on the joint bolt (4).

5. A joint arrangement, according to one of claims 1 to 3, wherein the joint bolt (4) also has a top section (10) and a bolt safeguard (19) which interact to hold the joint bolt (4) relative to the bearing (8) of the first and the second pivoting parts (2, 3).

6. A joint arrangement, according to claim 5, wherein the bolt safeguard (19) has a groove for a shaft security ring.

7. A joint arrangement, according to one of claims 1 to 6, wherein the joint bolt (4) comprises a cylindrical joint bolt and is characterized in that the joint bolt (4) has varying cylindrical diameters adjacent the bearing (8) of the first and second pivoting parts (2, 3), and wherein the varying diameters of the joint bolt (4) are chosen to hold the joint bolt (4) to the bearing (8) of the first and second pivoting parts (2, 3).

8. A joint arrangement, according to one of claims 1 to 7 wherein the joint bolt (4) has a subsequent lubrication device (11) adjacent the bearing (8) of the first and the second pivoting parts (2, 3).

9. A joint arrangement, according to claim 8, wherein the subsequent lubrication device (11) has a lubricant reservoir in which the lubricant is contained and from which the lubricant is dispensed to the bearing (8) of the first and the second pivoting parts (2, 3).

10. A joint arrangement, according to claim 9, wherein the lubricant reservoir is inside the joint bolt (4) and is refillable from outside.

11. The joint arrangement, according to one of claims 1 to 10, wherein the joint arrangement comprises a yoke-eye-joint arrangement wherein one pivoting part (2, 3) has a bearing eye and the other pivoting part (3, 2) has a bearing yoke and where the connection between the bearing eye and the bearing yoke is made by means of the joint bolt (4).

12. The joint arrangement, according to one of claims 1 to 10, wherein the joint arrangement comprises an eye-eye-joint arrangement wherein the first and the second pivoting part (2, 3) has one bearing eye, respectively, and where the connection between the respective bearing eyes is made by means of the joint bolt (4).

13. The joint arrangement, according one of claims 1 to 11, wherein the joint arrangement comprises a folding joint in a foldable coupling.

14. The joint arrangement, according to one of claims 1 to 11, wherein the joint arrangement comprises an articulation of a central buffer coupling wherein one of the two pivoting parts (2, 3), forms part of a pillow block of the articulation and the other pivoting part (3, 2) forms part of the coupling shaft of the central buffer coupling.

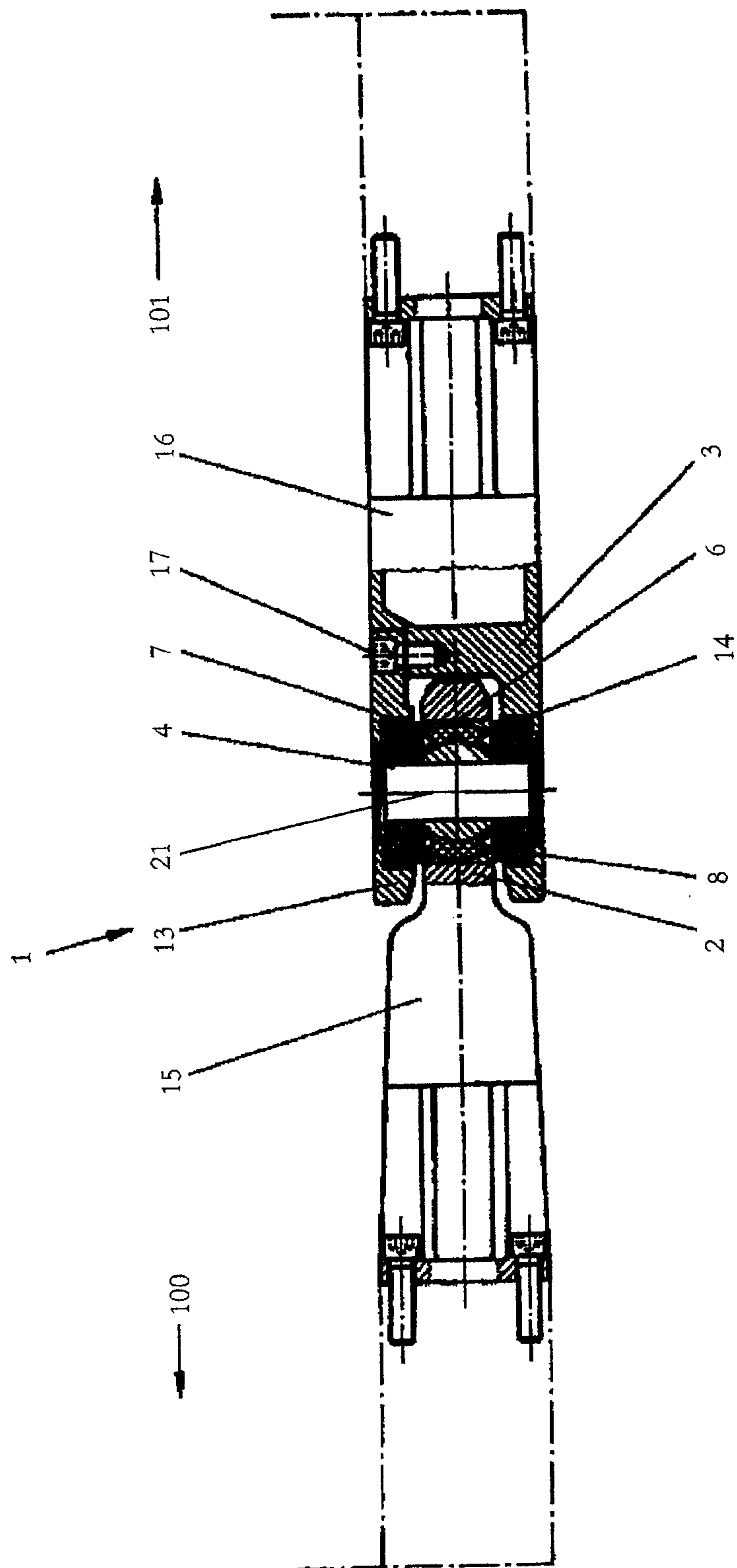


Fig. 1

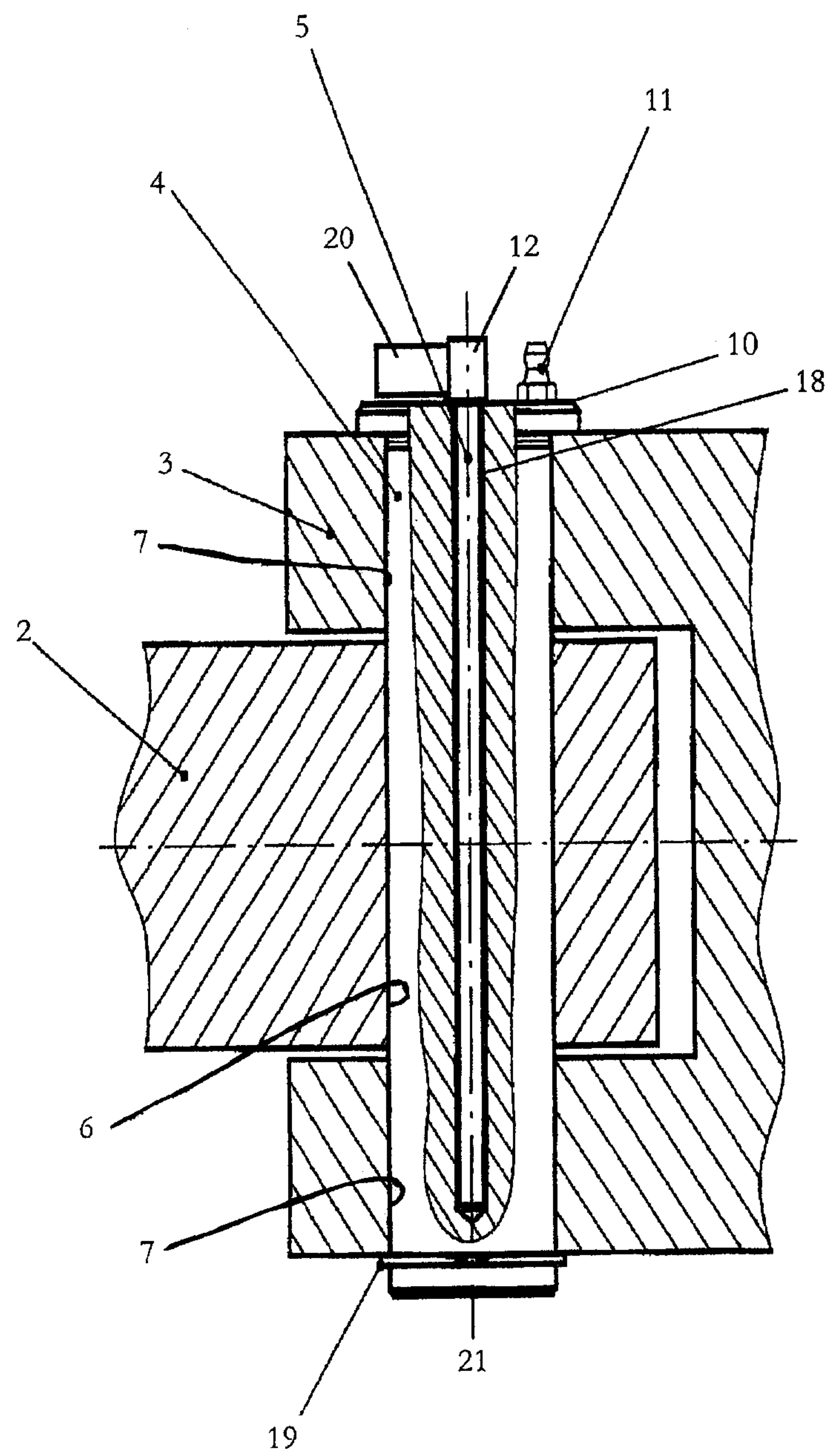


Fig. 2

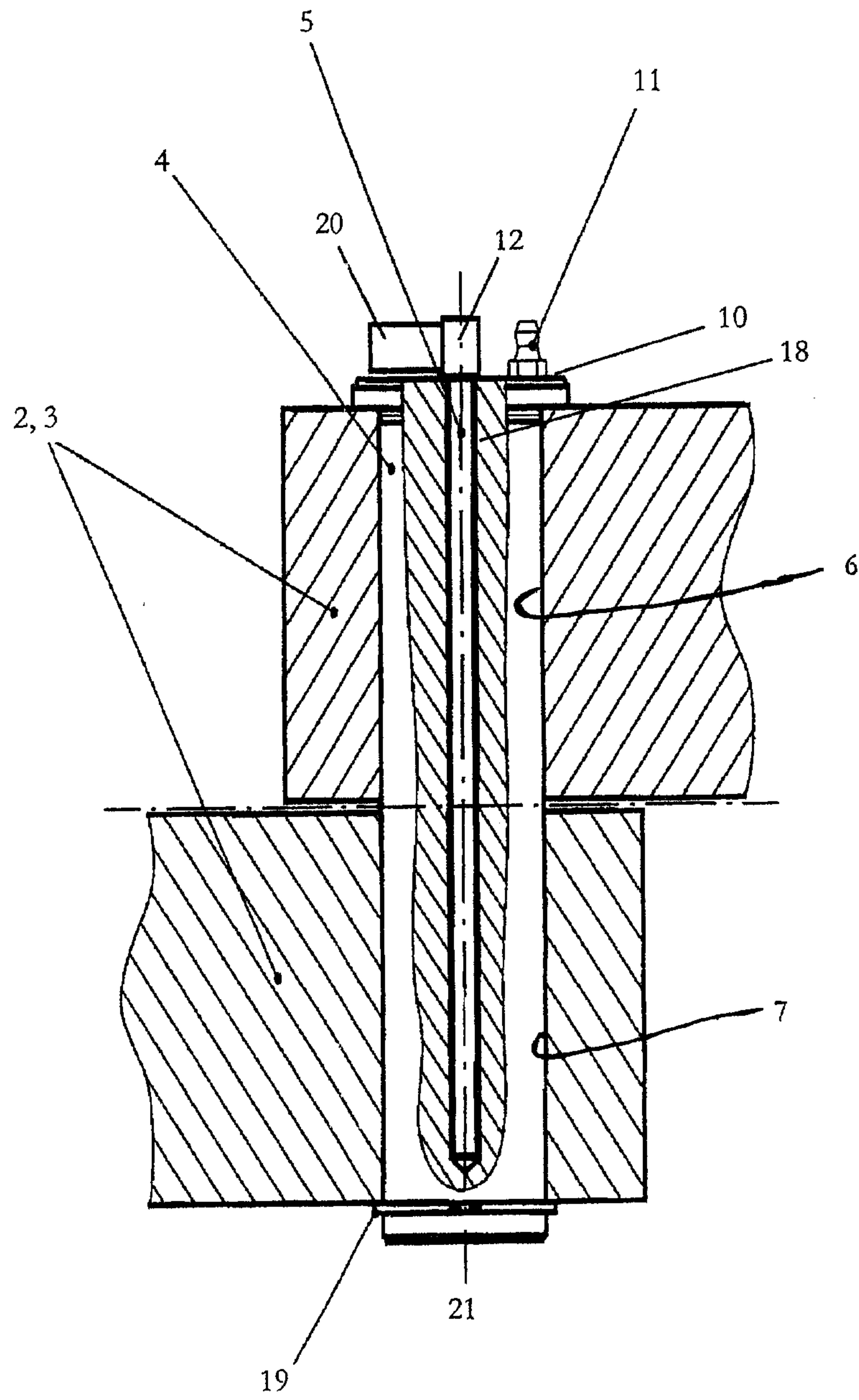


Fig. 3

