

5

### **Plain Bearing with Multipart Carriage**

The invention relates to a plain bearing according to the  
10 preamble of Claim 1 and to a plain bearing assembly with  
such a plain bearing and to use of such a plain bearing.

Generic plain bearings are sufficiently well known in the  
prior art and are used for sliding guidance of working  
devices, in particular as a linear guide. Depending on the  
15 field of application, such working devices may have the most  
varied properties. For example, such working devices may be  
elements fitness apparatus, machine tools, such as for  
example saws, or holding means, for example for displays. In  
every case it comes down to the plain bearing enabling  
20 maximally friction-free and wear-free guidance of the  
working device attached thereto along a rail. A plain  
bearing of the type in question is described for example in  
DE 20 2004 016 094 U1.

A plain bearing of the type in question comprises a  
25 carriage, having a carriage body, in which a passage running  
along a longitudinal axis through the carriage element is  
provided. In the passage, a sliding element is arranged  
resting against the carriage element, which sliding element  
encloses a sliding opening situated within the passage. The  
30 plain bearing is configured to receive a cylindrical guide  
portion of a rail in such a way in the sliding opening that  
the cylinder axis thereof extends along the longitudinal

axis, in particular coincides therewith, and the guide portion received in the sliding opening is enclosed at least in portions by the sliding element, thereby ensuring sliding guidance of the carriage on the rail. The carriage and thus  
5 the plain bearing may accordingly be displaced along the cylinder axis of the guide portion relative to the rail, while the carriage rests against the guide portion of the rail solely via the sliding element or a plurality of sliding elements. The opening and the sliding element  
10 preferably enclose the longitudinal axis and thus also the cylindrical guide portion received in the sliding opening over an angular range of at least  $200^\circ$ , in particular at least  $220^\circ$ , in particular at least  $240^\circ$ , in particular at least  $260^\circ$ . In this way, it is ensured that the carriage  
15 also is held reliably on the guide portion of the rail even on exposure to an external force acting perpendicularly to the longitudinal axis between the rail and the carriage. Through corresponding configuration of the sliding element, it is furthermore preferably ensured that, even under any  
20 external force acting between rail and carriage perpendicular to the longitudinal direction, the carriage always rests against the guide portion of the rail solely via the sliding element.

In the case of a plain bearing assembly of the type in  
25 question, comprising a carriage and a rail, the guide portion of the rail is received in the sliding opening of the carriage. The guide portion is preferably configured as a cylinder extending with its cylinder axis along the longitudinal axis. The guide portion preferably has a  
30 lengthwise extent along the longitudinal axis which is substantially greater than the lengthwise extent of the carriage along the longitudinal axis, in particular amounts

to at least ten times, in particular at least twenty times, this lengthwise extent of the carriage. A plain bearing assembly of the type in question is thus generally preferably configured as a linear guide and serves in  
5 linear, sliding guidance of a working device which is attached to the carriage, while the rail is attached in a fixed position to a component.

In the case of plain bearings of the type in question, sliding elements made from plastics material are  
10 conventionally used, in particular sliding elements made from a tribopolymer. This enables lubricant-free sliding guidance of the plain bearing on a rail. However, such sliding elements are subject to wear. Depending on loading of the working device attached to the carriage and depending  
15 on the distance traveled by the carriage along the rail, a sliding element may experience such wear as to make replacement of the sliding element necessary. To replace such a sliding element, typically the working device has to be detached from the carriage and then the carriage has to  
20 be pulled off the rail along the longitudinal axis, after which the sliding element is accessible and can be removed from the carriage element and replaced by a new sliding element. However, this requires considerable effort. Because of the load exerted on the carriage by the working device  
25 and the enclosed arrangement of the sliding element in the passage of the carriage, simple replacement of the sliding element and thus simple maintenance of the plain bearing is not possible with plain bearings of the type in question.

It is an object of the present invention to provide a plain  
30 bearing and a plain bearing assembly and use of a plain bearing with which at least one disadvantage of the plain

bearing of the type in question can be remedied at least in part.

As one way of achieving the stated object underlying the present invention, the invention proposes a plain bearing  
5 having the features according to Claim 1. The plain bearing according to the invention comprises, as in the case of the above-explained plain bearing of the type in question, a carriage, having a carriage body with a passage running along a longitudinal axis, wherein a sliding element resting  
10 against the carriage body is arranged in the passage, which sliding element at least in portions encloses a sliding opening situated within the passage, which opening is suitable for receiving a cylindrical guide portion of a rail extending along the longitudinal axis. The plain bearing  
15 according to the invention may have further features which are explained in connection with plain bearings of the type in question. According to the invention, the carriage body has two carriage elements arranged next to one another along the longitudinal axis and fixed detachably to one another,  
20 each of which forms a longitudinal portion of the passage. A longitudinal portion of the passage is a portion of the passage along the longitudinal axis, wherein the longitudinal axis runs in the longitudinal direction and thus each orientation along the longitudinal axis is an  
25 orientation in the longitudinal direction. Each of the carriage elements forms a respectively different longitudinal portion of the passage. Each of the carriage elements forms a limit stop, acting along the longitudinal axis, for the sliding element, wherein at least one portion  
30 of the sliding element is fixed in position along the longitudinal axis between these limit stops, which are formed by the two carriage elements. The sliding element

may, for example, be arranged wholly between the two limit stops. For example, the sliding element may have a projection which forms the stated portion of the sliding element and is thus arranged along the longitudinal axis between the limit stops and is thus fixed with regard to movement play to the region extending longitudinally between the limit stops. The sliding element is preferably arranged in each of the two longitudinal portions of the passage formed by the two carriage elements. The sliding element may for example have two separate sliding subelements, wherein each of the subelements is arranged in a respectively different one of the two longitudinal portions of the passage formed by the two carriage elements and wherein each of the sliding subelements in each case forms a subportion of the portion of the sliding element which is fixed in position along the longitudinal axis between the limit stops formed by the two carriage elements. The sliding element is particularly preferably of one-piece construction, which particularly simplifies the production and maintenance of the plain bearing, in particular replacement of the sliding element. By fixing the position of the stated portion of the sliding element between the limit stops, the position of the sliding element as a whole, in relation to the longitudinal axis, is at all times fixed relative to the carriage.

The plain bearing according to the invention is associated with significant advantages over generic plain bearings. By forming the carriage body of two carriage elements, which are arranged adjacent one another along the longitudinal axis and fixed detachably to one another such that they can be moved away from one another along the longitudinal axis, access to the sliding element arranged in the passage is ensured when the carriage elements are moved apart from one

another. Furthermore, by providing the two carriage elements, the carriage limit stops can be simply provided, these preventing displacement of the sliding element along the longitudinal axis relative to the carriage when the plain bearing is in the intended state in which the carriage elements are fixed to one another, but no longer entailing any restriction of movement of the sliding element once the carriage elements have been moved apart, such that the sliding element can then be replaced. Furthermore, the configuration according to the invention of the carriage enables a working device fastened to the carriage to remain fastened to one of the carriage elements while the other one of the carriage elements is detached from the working device and displaced along the longitudinal axis relative to the one carriage element and to the working device, in particular while it is guided on the guide portion of a rail. Ongoing guidance of the other carriage element makes assembly of the carriage, i.e. re-joining together of the carriage elements, particularly simple. In general, the sliding element preferably has a slot extending along the entire longitudinal axis, such that the sliding element can be removed radially from said cylindrical guide portion if it is located along the longitudinal axis between the carriage elements. In one embodiment, the carriage elements form longitudinal portions of the passage of identical length. In another embodiment, one of the carriage elements forms with its longitudinal portion more than 80% of the lengthwise extent of the passage along the longitudinal axis, wherein the sliding element is preferably arranged only in the longitudinal portion formed by this carriage element and the other one of the carriage elements is fastened to the one carriage element merely in the manner of a cover, forming a limit stop for the sliding element.

In one embodiment, the sliding element and the carriage are configured in such a manner relative to one another that the only way to remove the sliding element from the passage without radial compression is to perform this after the carriage elements have been detached from one another and the carriage elements have been moved apart from one another along the longitudinal axis and thus in the longitudinal direction. In the intended operating state of the plain bearing, the sliding element can therefore at best - if at all - be removed from the passage after undergoing prior radial compression, by which said portion of the sliding element is moved radially to the outside of the limit stops formed by the carriage. In one embodiment, in the event of such a cylindrical guide portion being arranged in the sliding opening, which guide portion is spaced in each case by less than 0.3 mm from the sliding element at four circumferential portions offset with regard to rotational angle by in each case  $60^\circ$  about the longitudinal axis, the sliding element is removable from the passage solely once the carriage elements have been detached from one another and moved apart from one another along the longitudinal axis. The described preferred embodiments on the one hand enable reliable fixing of the sliding element relative to the carriage, and on the other hand furthermore enable simple removability of the sliding element once the carriage elements have been detached and moved apart from one another. In one embodiment, the carriage elements and the sliding element are configured in such a manner relative to one another that, in the event of such a cylindrical guide portion of the rail being arranged in the sliding opening, which guide portion has such a diameter that it rests in against the sliding element at each of two radially opposing ends, once the carriage elements have been detached from one

another the carriage elements may each be moved apart from one another along the longitudinal axis while being guided by the respective longitudinal portion of the passage, which they respectively form on the guide portion of the rail, and while the sliding element remaining arranged on one of the two carriage elements until the other one of the carriage elements is spaced from the sliding element along the longitudinal axis, and then the sliding element may be removed from the one carriage element along the longitudinal axis. The carriage elements may thus preferably be moved away from one another while being guided by the longitudinal portions of the passage, which they form, respectively, on the cylindrical guide portion along the longitudinal axis, while the sliding element remains arranged on one of the carriage elements. As soon as the carriage elements are sufficiently spaced apart from one another, such that the sliding element now only being arranged on one of the carriage elements is radially accessible, the sliding element may be removed from this carriage element by pulling it along the longitudinal axis out of the longitudinal portion of the passage formed by this carriage element. It is generally preferable for the carriage elements to enclose the longitudinal axis over an angular range of at least  $200^\circ$ , in particular at least  $220^\circ$ , in particular at least  $240^\circ$ , in particular at least  $260^\circ$ , in each case in the longitudinal portion, formed thereby, of the passage. It is generally preferable for the sliding element to enclose the longitudinal axis over an angular range of at least  $200^\circ$ , in particular at least  $220^\circ$ , in particular at least  $240^\circ$ , in particular at least  $260^\circ$ , in particular in each of the longitudinal portions, formed by the two carriage elements, of the passage. This enclosure is preferably uninterrupted enclosure over the stated angular range. Preferably, said

enclosure is over at least 50%, in particular at least 80%, in particular at least 90% of the total length of the passage along the longitudinal axis and/or the length of the sliding element along the longitudinal axis. This enclosure  
5 ensures particularly reliable sliding fixing and mounting of the plain bearing on a cylindrical guide portion.

In one embodiment, the sliding element has a shell part which is configured in the manner of a hollow cylinder, in particular in the manner of a hollow cylinder interrupted by  
10 a slot running along the longitudinal axis. This slot enables radial accessibility of the sliding opening. Through the provision of a slot, the sliding element may preferably be clipped radially onto a cylindrical guide portion. The shell part forms the sliding opening with its radial inner  
15 side. The internal cross-section of the hollow cylinder thus corresponds to the cross-section of the sliding opening. Particularly preferably, a projection assembly running around the longitudinal axis is formed on a radial outer side of the shell part and is arranged along the  
20 longitudinal axis between the limit stops formed by the two carriage elements. The projection assembly may for example be configured to run continuously about the longitudinal axis over a fixed angular range, in particular a preferably large angular range as explained above, or have projection  
25 portions spaced from one another in the circumferential direction, these preferably being distributed over a correspondingly large angular range (preferably at least  $200^\circ$ , preferably at least  $240^\circ$ , preferably at least  $260^\circ$ , as explained above). The projection assembly is arranged at  
30 least in part along the longitudinal axis between the limit stops formed by the two carriage elements. The projection assembly may for example have some projection portions which

are arranged between the limit stops, and at least one further projection portion which is arranged outside the limit stops. This further projection portion may for example fulfill a different function from the other projection portions, for example bring about rotational locking, thereby being configured as an antitwist portion. In general, the projection assembly preferably has a plurality of projection portions arranged distributed about the longitudinal axis, at least one of which is configured as an antitwist portion and is arranged between two further limit stops of the carriage acting perpendicular to the longitudinal direction and spaced from one another in a direction of rotation about the longitudinal axis. By arranging the antitwist portion between the further limit stops of the carriage, a rotational position of the sliding element relative to the carriage is thus fixed in relation to rotation about the longitudinal axis. The carriage elements particularly preferably together form each of the further limit stops, such that each of the carriage elements in each case forms part of each of the further limit stops. Particularly preferably, all the projection portions of the projection assembly are arranged along the longitudinal axis between said limit stops of the carriage.

Particularly preferably, the carriage elements together form, at their ends facing one another along the longitudinal axis, a groove running around the longitudinal axis and forming the limit stops of the two carriage elements. The groove preferably runs uninterrupted about the longitudinal axis, preferably over an advantageous large angular range as indicated above. Said portion of the sliding element is thus arranged within the groove. The portion is preferably formed by the projection assembly. The

projection assembly is accordingly preferably arranged at least in part in the groove, namely at least with that part with which it forms said portion of the sliding element. Particularly preferably, the antitwist portion, in relation to a direction along the longitudinal axis, is arranged in the groove. The carriage preferably has a recess which opens into the passage, wherein the antitwist portion of the sliding element is arranged in the recess. The recess opens in the radial direction into the passage, such that the antitwist portion extends from the passage radially into the recess. The recess is preferably arranged within said groove in a direction along the longitudinal axis, such that the recess opens into the groove. Alternatively or in addition, the recess preferably forms a continuous connection from an outer side of the carriage to the passage.

It is generally preferred for the carriage elements to be configured in one piece, particularly preferably made in one piece from a metal or a metal alloy. The carriage elements are preferably made using die-casting. It is generally preferred for the sliding element to be made from a tribological polymer, in particular made in one piece from the tribological polymer, in particular using injection molding. Such a tribological polymer is a polymer optimized with respect to wear reduction and friction reduction. Such a tribological polymer conventionally has a base polymer, for example the thermoplastics polyethene, polypropylene, polyacetal, polycarbonate, polyamide, polyvinyl chloride, polytetrafluoroethene and, in the case of thermosets, phenolic resins. To this base polymer are added finely divided solid lubricants, for example molybdenum disulfide or graphite, and/or fillers, for example plastics material or textile fibers or particles. It is generally preferred

for the sliding element to have flutes running along the longitudinal axis on the inner side of its shell part. These flutes may on the one hand prevent elevated friction due to soiling between sliding element and guide portion of a rail, and on the other hand due to the flutes the sliding element may have preferred radially elastic properties and preferably a contact surface of the sliding element against the guide portion may be reduced.

In one embodiment, the plain bearing has at least one peg, which extends along the longitudinal axis. The peg is fixed to a side of one of the carriage elements which faces toward the other carriage elements and thus faces along the longitudinal axis. The peg is arranged in a hole-type, in particular blind hole-type, indent, which is provided on the side of the other element facing toward the one carriage element. The peg accordingly engages in this indent to fix the position of the carriage elements relative to one another perpendicular to the longitudinal axis. A rotational position of the carriage elements relative to one another, in relation to rotation about the longitudinal axis, may for example be clearly fixed when a cylindrical guide portion is located in the passage of the carriage. The plain bearing preferably has two pegs spaced from one another perpendicular to the longitudinal axis, wherein the provision of two pegs makes it possible to fix the rotational position clearly, wherein these pegs, as explained in relation to the one peg, are arranged on the side of one of the carriage elements and in each case engage in an indent which is arranged on the other one of the carriage elements. The peg is preferably fixed to the one carriage element by providing a hole-type, in particular blind hole-type, indent on said side of this one carriage

element into which the peg is inserted. Fixing of the peg relates to fixing perpendicular to the longitudinal axis. The peg preferably has substantially the same cross-section as the hole-type indent, such that the peg is held with as little play as possible in the indent. By providing the one  
5 peg or plurality of pegs, intended joining together of the carriage elements to produce the carriage may be particularly simplified and the robustness of the carriage particularly enhanced.

10 In one embodiment, the plain bearing has a screw extending along the longitudinal axis, which presses with its screw head along the longitudinal axis against an outer side of one of the carriage elements and which extends with its threaded pin through this one carriage element and is  
15 screwed into a threaded hole provided in the other one of the carriage elements. In this way, reliable detachable fixing of the carriage elements to one another can be ensured.

In one embodiment, the carriage comprises a fastening device  
20 for fastening a working device to the carriage. The fastening device has a supporting face for the working device lying in a plane and having two subareas, wherein each of the carriage elements forms one of the subareas, respectively. Alternatively or in addition, the carriage may  
25 have at least one channel running perpendicular to the longitudinal axis, in particular at least two channels running perpendicular to the longitudinal axis, for receiving a fastening means for fastening the working device to the carriage. The fastening means may for example be a  
30 screw which is screwed through the channel into a corresponding thread of the working device and which presses with its screw head against the carriage such that the

working device is fixed to the carriage via the fastening means. With each of the carriage elements having a subarea of the supporting surface and/or each of the carriage elements having one of the two channels, the working device  
5 may be fastened to both carriage elements. Accordingly, one of the carriage elements may be detached from the working device and moved away along the longitudinal axis from the working device and the carriage element still fastened thereto in order to replace the sliding element. The  
10 channels particularly preferably run parallel to one another. At least one of the channels is in each case particularly preferably formed from each of the carriage elements. In each case at least one of the channels particularly preferably passes through in each case one of  
15 the subareas, such that at least one of the channels in each case passes through each of the subareas. When the channel passes through the subarea, the channel opens into the subarea. The working device may accordingly be fastened within the subarea by said channel.

20 The invention further relates to a plain bearing assembly comprising a plain bearing according to the invention and a rail, wherein the rail is arranged with its guide portion in the sliding opening and rests against the sliding element. The guide portion preferably lies at two of its ends  
25 configured radially, i.e. perpendicular to the longitudinal axis, against the sliding element, in particular at four radial ends which are offset from one another in each case by an angle of rotation of  $60^\circ$  about the longitudinal axis. The guide portion is preferably longer by a multiple than  
30 the carriage along the longitudinal axis.

The invention further relates to use of a plain bearing assembly according to the invention. In the case of use

according to the invention, to replace the sliding element the carriage elements are detached from one another and moved apart from one another along the longitudinal axis, while they are both guided in uninterrupted manner on the  
5 guide portion of the rail and the longitudinal portion, formed by the respective carriage element, of the passage engages around this guide portion, in particular over the above-stated advantageous angular range. In the case of use according to the invention, the sliding element is removed  
10 completely from the passage of the carriage along the longitudinal axis between the carriage elements, which have been moved apart from one another and remain guided on the guide portion of the rail, and replaced by a new sliding element. Removal from the passage may proceed, for example,  
15 in that the sliding element remains in the longitudinal portion of the passage formed by one of the carriage elements while the other of the carriage elements is moved apart from the one carriage element, after which the sliding element is also removed from this longitudinal portion of  
20 the passage formed by the one of the carriage elements. The sliding element is replaced by a new sliding element, by introducing the new sliding element into the passage of the carriage after removal of the sliding element between the carriage elements, in relation to a direction along the  
25 longitudinal axis, after which the carriage elements are connected together and fixed to one another, thereby fixing the position of the new sliding element relative to the carriage. The new sliding element is thus guided between the carriage elements in relation to a direction along the  
30 longitudinal axis, until is arranged aligned with the longitudinal portions of the passage formed by the carriage elements, after which the carriage elements are moved toward one another along the longitudinal axis and the sliding

element is received into said longitudinal portions of the passage, such that the sliding element is introduced into the passage of the carriage along the longitudinal axis.

Features which have been described with reference to the plain bearing according to the invention or the use according to the invention may *mutatis mutandis* be provided for the use according to the invention or the plain bearing according to the invention. It should further be pointed out that the designations "the one carriage element" and "the other carriage element" are used at all times only in the direct context of distinguishing the two carriage elements from one another. The features described in the respective context with reference to "the one" or "the other" carriage element may alternatively be provided in the case of either one of the two carriage elements, such that the designations "the one" and "the other" are interchangeable.

The invention is explained in more detail below on the basis of an exemplary embodiment with reference to two figures, in which:

Figure 1: is a schematic diagram of one exploded drawing of a plain bearing according to the invention;

Figure 2: shows, in different schematic diagrams, different views of components of the embodiment of a plain bearing according to the invention as shown in Figure 1.

Figure 1 shows, in a schematic diagram, an exploded drawing of an embodiment of a plain bearing 1 according to the invention. The plain bearing 1 comprises a carriage, formed by a first carriage element 2 and a second carriage element 3. The plain bearing 1 furthermore has a sliding element 4.

The sliding element 4 has a shell part 40, which is formed in the manner of a hollow cylinder interrupted by a slot running along the longitudinal axis X. A projection assembly 41 is provided on the radial outer side of the shell part 40. The projection assembly 41 is provided in the longitudinal center of the shell part 40, which is generally advantageous according to the invention. Figure 1 shows an exploded drawing and thus not the plain bearing 1 in its intended state. It is however apparent from Figure 1 that the carriage elements 2, 3 in each case form a longitudinal portion of a passage of the carriage, into which portion in each case one longitudinal portion of the sliding element 4 may be inserted along the longitudinal axis X, wherein on its radial inner side the sliding element 4 forms a sliding opening for receiving a cylindrical guide portion of a rail. Both the carriage elements 2, 3 and the sliding element 4 enclose the longitudinal axis X over an angular range, in relation to an angle of rotation about the longitudinal axis X, of over  $240^{\circ}$ . It is moreover apparent that the carriage elements 2, 3 in each case form a portion of a groove, in which, in the intended, assembled state of the carriage, the projection assembly 41 is received, whereby the longitudinal position of the shell part 4 is clearly fixed relative to the carriage elements 2, 3. The carriage elements 2, 3 additionally in each case have a channel 24, 34, which extends perpendicular to the longitudinal axis X and passes through a subarea formed by the respective carriage element 2, 3. The subareas formed by the carriage elements 2, 3 are in each case planar and, in the assembled state of the carriage, as apparent from Figure 2a, together form a planar supporting surface for a working device. It is moreover apparent from Figure 1 that, to fix the relative position of the carriage elements 2, 3 perpendicular to the longitudinal

axis X, pegs 22 are provided which are inserted into blind hole-type indents which are provided at the mutually facing longitudinal ends of the two carriage elements 2, 3.

Figure 1 merely shows one of the blind hole-type indents of the first carriage element 2. The plain bearing 1 further comprises a screw 5, which extends through a hole 23 provided in the first carriage element 2 and is screwed, as intended, into the second carriage element 3, such that its screw head presses against the first carriage element 2 and fixes the two carriage elements 2, 3 to one another in relation to their relative positions on the longitudinal axis X.

Figure 2, which comprises Figures 2a, 2b, 2c and 2d, shows various views of the plain bearing 1. The plain bearing 1 is illustrated in its intended state, in which the carriage elements 2, 3 forming the carriage 100 are fixed in position to one another. Figure 2a shows a view from above onto the supporting surface provided to support a working device, said support surface being formed jointly by the carriage elements 2, 3, with the channels 24, 34 provided in the carriage elements 2, 3 passing therethrough. Figure 2a additionally shows the recess formed by the two carriage elements 2, 3 with in each case one recess portion 210, 310, which recess opens into the passage formed by the carriage 100 and is explained in greater detail in connection with Figure 2c. Figure 2b is a view along the longitudinal axis X onto the first carriage element 2 of the plain bearing 1 according to Figure 2a. It is clear from Figure 2b that the screw 5 presses with its screw head against the first carriage element 2 to fix its longitudinal position relative to the second carriage element 3, and that the sliding element 4 is arranged in the passage formed by the carriage

100, which sliding element encloses with its radial inner side a sliding opening 10 lying within the passage, here over an angular range about the longitudinal axis X of more than  $260^{\circ}$ . It is additionally clear from Figure 2b that the  
5 sliding element 4 has flutes 42, which are in each case provided between two portions of the sliding element 4 which are provided to rest against a cylindrical guide portion of a rail.

Figures 2c and 2d show the views B-B and A-A indicated in  
10 Figure 2a. It is apparent from Figure 2c that, perpendicular to the longitudinal direction, the projection assembly 41 of the shell part 40 overlaps with the second carriage element 3, such that the second carriage element 3 forms a limit stop 31 which, together with the limit stop 21 of the first  
15 carriage element 2, shown in Figure 1, fixes the longitudinal position of the projection assembly 41 and thus also of the sliding element 4 as a whole relative to the carriage 100. It is moreover apparent from Figure 2c that the projection assembly 41 comprises a projection portion  
20 formed as an antitwist portion 410 which opens into the partial recess 310 formed by the second carriage element 3 and also, albeit not shown in Figure 2c, into the partial recess 210 formed by the first carriage element 2. The recess formed by the partial recesses 210, 310 thus forms  
25 further limit stops of the carriage 100, between which the antitwist portion 410 is arranged. These further limit stops act with respect to a direction perpendicular to the longitudinal direction. By arranging the antitwist portion 410 in said recess, a rotational position of the sliding  
30 element, in relation to rotation about the longitudinal axis, is fixed relative to the carriage 100. Figure 2c additionally shows the blind hole-type indents 32 on the

side of the second carriage element 3 facing toward the first carriage element 2, into which the pegs 22 shown in Figure 1 engage to fix a relative rotational position of the carriage elements 2, 3 relative to one another, in relation to rotation about the longitudinal axis X. Figure 2b shows a section through the channel 24 of the first carriage element 2. Figure 2d shows the threaded pin of the screw 5 extending through the first carriage element 2. Furthermore, Figure 1 shows the sliding opening 10 formed by the sliding element 4 and the flutes 42, which are provided on the radial inner side of the sliding element 4.

5

**List of reference signs**

10

- 1 Plain bearing
- 2 First carriage element
- 3 Second carriage element
- 4 Sliding element

15

- 5 Screw
- 10 Sliding opening
- 21 Limit stop
- 22 Peg
- 23 Hole

20

- 24 Channel
- 31 Limit stop
- 32 Blind hole-type indent
- 34 Channel
- 40 Shell part

25

- 41 Projection assembly
- 42 Flute

100

Carriage

210

Partial recess

310

Partial recess

30

410

Antitwist portion

X

Longitudinal axis

5

**Claims**

10 1. A plain bearing (1) comprising a carriage (100), having  
a carriage body with a passage running along a longitudinal  
axis (X), wherein a sliding element (4) resting against the  
carriage body is arranged in the passage, which sliding  
element at least in portions encloses a sliding opening (10)  
15 situated within the passage, which opening is configured to  
receive a cylindrical guide portion of a rail extending  
along the longitudinal axis (X),

characterized in that

the carriage body has two carriage elements (2, 3) arranged  
20 next to one another along the longitudinal axis (X) and  
fixed detachably to one another, each of which forms a  
longitudinal portion of the passage, wherein each of the  
carriage elements (2, 3) forms a limit stop, acting along  
the longitudinal axis, for the sliding element (4), and at  
25 least one portion of the sliding element (4) is fixed in  
position along the longitudinal axis (X) between these limit  
stops.

2. The plain bearing (1) according to Claim 1,

characterized in that

the only way to remove the sliding element (4) from the passage without radial compression is to perform this after  
5 the carriage elements (2, 3) have been detached from one another and the carriage elements (2, 3) have been moved apart from one another along the longitudinal axis.

3. The plain bearing (1) according to Claim 2,

characterized in that

10 the carriage elements (2, 3) and the sliding element (4) are configured in such a manner relative to one another that, in the event of such a cylindrical guide portion of the rail being arranged in the sliding opening (10), which guide portion has such a diameter that it rests against the  
15 sliding element (4) at each of two radially opposing ends, once the carriage elements (2, 3) have been detached from one another the carriage elements (2, 3) can be moved apart from one another along the longitudinal axis (X) while being guided on the guide portion of the rail by the respective  
20 longitudinal portion of the passage which they respectively form, and while the sliding element (4) remaining arranged at one of the two carriage elements (2, 3) until the other one of the carriage elements (2, 3) is spaced from the sliding element (4) along the longitudinal axis (X), wherein  
25 thereafter the sliding element (4) is removable from the one carriage element (2, 3) along the longitudinal axis (X).

4. The plain bearing (1) according to one of the preceding claims,

characterized in that

the carriage elements (2, 3) each enclose the longitudinal  
5 axis (X) over an angular range of at least  $200^{\circ}$ , in  
particular at least  $240^{\circ}$ , in the longitudinal portion of the  
passage which they form, respectively, wherein in particular  
the sliding element (4) encloses the longitudinal axis (X)  
over an angular range of at least  $200^{\circ}$ , in particular at  
10 least  $240^{\circ}$ , in each of the longitudinal portions, formed by  
the two carriage elements (2, 3), of the passage.

5. A plain bearing (1) according to one of the preceding claims,

characterized in that

15 the sliding element (4) has a shell part (40) which is  
configured in the manner of a hollow cylinder, in particular  
interrupted by a slot running along the longitudinal axis  
(X) and which forms the sliding opening (10) with its radial  
inner side, wherein in particular a projection assembly (41)  
20 running around the longitudinal axis (X) is formed on a  
radial outer side of the shell part (40) and is arranged at  
least in part along the longitudinal axis (X) between the  
limit stops (21, 31) formed by the two carriage elements (2,  
3).

6. A plain bearing (1) according to one of the preceding claims,

characterized in that

the projection assembly (41) has a plurality of projection  
5 portions arranged distributed about the longitudinal axis  
(X), at least one of which is configured as an antitwist  
portion (410) and is arranged between two further limit  
stops of the carriage (100) acting perpendicular to the  
longitudinal direction and being spaced from one another in  
10 a direction of rotation about the longitudinal axis (X) in  
order to fix a rotational position of the sliding element  
(4) relative to the carriage (100) in relation to rotation  
about the longitudinal axis (X), wherein in particular each  
of the further limit stops is formed by a respective one of  
15 the carriage elements (2, 3).

7. The plain bearing (1) according to one of Claims 5  
or 6,

characterized in that

the sliding element (4) has flutes running along the  
20 longitudinal axis (X) on the inner side of its shell part  
(40).

8. The plain bearing (1) according to one of Claims 5  
to 7,

characterized in that

25 the carriage elements (2, 3) together form, at their ends  
facing one another along the longitudinal axis (X), a groove  
running around the longitudinal axis (X) and forming the  
limit stops (21, 31) of the two carriage elements (2, 3),

wherein the projection assembly (41) is arranged at least in part in the groove.

9. The plain bearing (1) according to one of Claims 6 to 8,

5 characterized in that

the carriage (100) has a recess which opens into the passage, wherein the antitwist portion (410) of the sliding element (4) is arranged in the recess, wherein in particular the recess opens into the groove and/or the recess forms a  
10 continuous connection from an outer side of the carriage (100) to the passage.

10. A plain bearing (1) according to one of the preceding claims,

characterized in that

15 the carriage elements (2, 3) are formed in one piece, in particular are made in one piece from a metal or a metal alloy, in particular using die-casting.

11. A plain bearing (1) according to one of the preceding claims,

20 characterized in that

the sliding element (4) is made from a tribopolymer, in particular is made in one piece.

12. A plain bearing (1) according to one of the preceding claims,

characterized in that

at least one peg (22), which extends along the longitudinal  
5 axis (X), is fixed on a side of the one of the carriage  
elements (2, 3) facing the other of the carriage elements  
(2, 3), wherein the peg (22) engages in a hole-type, in  
particular blind hole-type, indent (32), which is provided  
10 on the side of the other carriage element (2, 3) facing  
toward the one carriage element (2, 3), to fix a rotational  
position of the carriage elements (2, 3) relative to one  
another in relation to rotation about the longitudinal  
axis (X).

13. A plain bearing (1) according to one of the preceding  
15 claims,

characterized in that

the plain bearing (1) has a screw (5) extending along the  
longitudinal axis (X), which presses with its screw head  
along the longitudinal axis (X) against an outer side of one  
20 of the carriage elements (2, 3) and which extends with its  
threaded pin through this one carriage element (2, 3) and is  
screwed into a threaded hole provided in the other one of  
the carriage elements (2, 3).

14. A plain bearing (1) according to one of the preceding  
25 claims,

characterized in that

the carriage (100) comprises a fastening device for  
fastening a working device to the carriage (100), wherein

the fastening device has a supporting face for the working device lying in a plane and having two subareas, wherein each of the carriage elements (2, 3) forms a respective one of the subareas, and/or wherein the carriage (100) has at least one channel (24, 34) running perpendicular to the longitudinal axis (X), in particular at least two channels (24, 34) running perpendicular to the longitudinal axis, for receiving a fastening means for fastening the working device to the carriage (100), wherein in particular the channels (24, 34) run parallel to one another and in each one of the channels (24, 34) is formed from a respective one of the carriage elements (2, 3) and wherein in particular at least one of the channels (24, 34) passes through each of the subareas.

15 15. A plain bearing assembly comprising a plain bearing (1) according to one of the preceding claims, and a rail, wherein the rail is arranged with its guide portion in the sliding opening (10) and rests against the sliding element (4), wherein in particular the guide portion is longer by a multiple than the carriage (100) along the longitudinal axis (X).

16. Use of a plain bearing assembly according to Claim 15, characterized in that,

to replace the sliding element (4), the carriage elements (2, 3) are detached from one another and moved apart from one another along the longitudinal axis (X), while they are both guided in uninterrupted manner on the guide portion of the rail and the longitudinal portion, formed by the respective carriage element (2, 3), of the passage engages around this guide portion, wherein the sliding element (4)

is removed completely from the passage of the carriage (100) along the longitudinal axis (X) between the carriage elements (2, 3), which have been moved apart from one another and are still guided on the guide portion of the rail, and replaced by a new sliding element (4), by introducing the new sliding element (4) into the passage of the carriage (100) after removal of the sliding element (4) between the carriage elements (2, 3) along the longitudinal axis (X), after which the carriage elements (2, 3) are connected together and fixed to one another, thereby fixing the position of the new sliding element (4) relative to the carriage (100).