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(73) Patenthaver: **OilQuick Deutschland KG, Bürgermeister-Schauer-Straße 1, 82297 Steindorf, Tyskland**

(72) Opfinder: **Kollmann, Michael, Badstraße 12, 86492 Egling an der Paar, Tyskland**

(74) Fuldmægtig i Danmark: **Novagraaf Brevets, Bâtiment O2, 2 rue Sarah Bernhardt CS90017, F-92665 Asnières-sur-Seine cedex, Frankrig**

(54) Benævnelse: **HURTIGSKIFTER TIL EN ENTREPRENØRMASKINE**

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QUICK CHANGE DEVICE FOR A CONSTRUCTION MACHINE

The invention relates to a quick coupler according to the preamble of claim 1.

Such quick couplers are used for easy and convenient changing of different attachments on construction machines. With such a quick coupler, e.g. swing buckets, grabs, shears, compactors, magnets, hydraulic hammers or other attachments can be coupled or uncoupled in a few seconds and with a high safety standard from an operator's cab, e.g. on a boom of an excavator.

A generic quick coupler is known from WO 99/06317 A1. This has a carrier which can be mounted on a boom arm of an excavator and has a base body and parallel lateral flanks. For fastening the carrier to the excavator, opposite passage openings are arranged on the lateral flanks of the carrier for receiving rear and front bearing bushings for mounting pins. The passage openings are designed as slotted holes. The bearing bushings have an external contour adapted to the shape of the elongated holes and are arranged in the passage openings secured against rotation by this external contour. Due to different arrangement of the bores within the bearing bushings and due to different diameters of the bores, the quick coupler can be adapted to different distances between the mounting pins and to mounting pins with different diameters. At least two opposing first bearing bushings are insertable into first opposing passage openings in the lateral flanks in different angular positions by rotation about an axis offset relative to a central axis of a receiving opening of the bearing bushing, and have an external contour for engagement in a corresponding internal contour at the passage openings secured against rotation. Opposing second bearing bushings are arranged in second passage openings in the lateral flanks in the form of elongated holes and are secured against displacement by a positive connection.

The object of the invention is to create a quick coupler of the type mentioned above with an alternative form of positive connection.

This task is solved by a quick coupler with the features of claim 1. Practical embodiments and advantageous further developments of the invention are indicated in the subclaims.

In the quick coupler according to the invention, additional adjustment possibilities can be achieved by securing the opposing second bearing bushings against displacement by means of a positive connection formed by arcuate recesses on the upper and lower sides of the second passage opening and corresponding arcuate elevations on the second bearing bushing. The second bearing bushings can additionally be displaced to different positions for adjustment. The external contour on the first bearing bushings and the internal contour on the first passage openings are formed as a polygonal profile. In the desired positions, the first and second bearing bushings are then secured against rotation. This provides improved adjustability while still ensuring accurate and secure positioning.

Conveniently, the external contour may be located on an engagement portion of the bearing bushing that engages the first passage opening. The first bearing bushing may include a mounting flange provided with tapped bores for attachment to the lateral flank.

The second bearing bushings can be attached to the lateral flanks via a retaining plate. The retaining plate can, for example, be arranged on the outside of the lateral flank and screwed to the second bearing bushing via screws.

Further features and advantages of the invention will be apparent from the following description of a preferred embodiment based on the drawing. It shows:

Figure 1 an exploded view of a quick coupler according to the invention and

Figure 2 a longitudinal section of the quick coupler shown in Figure 1 in the plane of a side web.

Figure 1 shows a quick coupler 1 for easy and convenient changing of different attachments on construction machines, especially excavators. Such a quick coupler 1 can be used, for example, to easily and conveniently couple or uncouple buckets, grabs, shears, magnets, compactors, hydraulic hammers or other mechanical or hydraulic attachments to or from a boom or other attachment of an excavator or other construction vehicle from an operator's cab.

The quick coupler 1 contains a carrier designed as a welded construction or as a cast part, which includes a main body 2 and two lateral flanks 3 parallel to each

other with passage openings 4 and 5 for the receptacle of bearing bushings 6 and 7, respectively, for two connecting bolts 8 parallel to each other. Via the connecting pins 8, the quick coupler 1 can be mounted, for example, on a boom arm of an excavator or other implement.

The main body 2, which is designed in cross-section as an inverted U-profile, has first receptacles 9 open towards the rear on one side for receiving and holding a first bolt-shaped coupling element and second receptacles 10 open towards the bottom on the other side for receiving and holding a second bolt-shaped coupling element. The bolt-shaped coupling elements can be arranged, for example, on an attachment or an adapter that can be attached to the attachment.

In the embodiment shown, the quick coupler 1 contains two spaced-apart first receptacles 9 for the first coupling element at the rear of the main body 4 and two spaced-apart receptacles 10 for the second coupling element at the front. The rearwardly open first receptacles 9 are fork- or claw-shaped. The downwardly open second receptacles 10 have a curved lower abutment face 11 for abutment of the second bolt-shaped coupling element. A locking device is provided on each of the two receptacles 10 on the front side of the main body 4, having a bolt-shaped locking element 13 which is guided displaceably in a guide bore 12 within the main body 2 and can be moved by means of a drive between a retracted release position and an extended locking position. In the extended locking position, the downwardly open second receptacles 10 are closed at the bottom by the bolt-shaped locking elements 13 displaceably arranged in the guide bores 12 in the main body 2, so that the second bolt-shaped coupling element is engaged underneath and held by the bolt-shaped locking elements 13. Instead of the bolt-shaped locking elements 13, hook-shaped or otherwise shaped locking elements can also be arranged on the main body 2 of the carrier.

In order to couple an attachment with the aid of the quick coupler 1, the quick coupler 1, which is generally arranged on a boom of an excavator, is first moved in such a way that the first coupling element arranged on an adapter or directly on the attachment is retracted into the claw- or fork-shaped receptacles 9 on one side of the quick coupler 1. Then, with the locking elements 13 still retracted, the quick coupler 1 is pivoted around the first pin-shaped coupling element in such a way

that the second coupling element on the adapter or attachment comes to rest against the abutment faces 11 of the downwardly open receptacles 10 on the other side of the quick coupler 1. Subsequently, the locking elements 13, which are displaceably arranged in the guide bores 12 in the main body 2 of the carrier, can be extended hydraulically so that the second bolt-shaped coupling element is engaged underneath by the two bolt-shaped locking elements 13 on the quick coupler 1 and the attachment is thus held on the quick coupler 1.

As can be seen from Figures 1 and 2, two opposing rear passage openings 4 are provided in the two lateral flanks 3 of the carrier for receiving of first bearing bushings 6 and two opposing front passage openings 5 are provided for receiving of second bearing bushings 7. The first bearing bushings 6 arranged at the rear have an engagement portion 14 for engaging the rear passage opening 4 and a mounting flange 16 provided with tapped bores 15. The engagement portion 14 of the rear bearing bushing 6 has an external contour 17, formed here as an external hexagonal profile, for positive engagement with a corresponding internal contour 18, formed here as an internal hexagonal profile, of the rear passage opening 5. This allows the first bearing bushing 6 to be rotated about an axis 19 shown in Figure 1 in different angular positions within the passage opening 4 and to be inserted into the passage opening 5 in a certain position secured against rotation.

A receiving bore 20 eccentric to the axis 19 is provided in the first bearing bushing 6. The central axis 21 of the receiving bore 20 is offset relative to the axis 19 so that the position of the receiving bore 20 relative to the lateral flank 3 can be changed by rotating the first bearing bushing 6. A number of through-bores 22 for screws 23 are arranged around the passage opening 5 in the lateral flanks 3, aligned with the tapped bores 15 in the mounting flange 16. The bearing bushing 6, which is inserted at a certain angular position into the passage opening 4 of the lateral flank 3, can be fastened to the lateral flank 3 via the screws 23.

The external contour 17 and the corresponding internal contour 18 can expediently be formed as a polygonal profile. However, the connection between the bearing bushing 6 and the lateral flank 3 can also be made, for example, by external and internal serrations, by a splined shaft and splined hub profile, or by an external and internal polygonal profile.

The second passage openings 5 arranged at the front in the lateral flanks 3 are designed as elongated holes with arcuate recesses 24 on the upper and lower sides. The second bearing bushings 7 arranged at the front have an oval base body with a flange 25 and an engagement region 26 for positive engagement in the front passage opening 5.

As can be seen from Figure 2, the engagement region 26 contains arcuate elevations 27 corresponding to the recesses 24 on its upper and lower sides. A receiving bore 28 for receiving a mounting pin 8 is also arranged in the front bearing bushing 7. Due to the design of the front passage opening 5 and the engagement region 26, the bearing bushing 7 can be inserted at various points on the lateral flank 3 within the passage opening 5, which is designed as an elongated hole, where it is secured against displacement. Thus, the position of the receiving bore 28 relative to the lateral flank 3 can be easily changed.

The front bearing bushing 7 is fastened to the lateral flank 3 by a retaining plate 29 shown in Figure 1, which is arranged on the outside of the lateral flank 3 and is screwed to the bearing bushing 7 by screws 30. For this purpose, through-bores 31 are provided in the retaining plate 29 and corresponding tapped bores 32 in the bearing bushing 7. The mounting pins 8 can be fixed to the lateral flanks 3 via mounting elements 33 and tapped bores 34 in the lateral flanks 3.

List of reference signs

1	Quick coupler
2	Main body
3	Lateral flank
4	First passage opening
5	Second passage opening
6	First bearing bushing
7	Second bearing bushing
8	Mounting pin
9	First receptacle
10	Second receptacle
11	Abutment face
12	Guide bore
13	Locking element
14	Engagement portion
15	Tapped bores
16	Mounting flange
17	External contour
18	Internal contour
19	Axis
20	Receiving bore

21 Central axis

22 Through-bore

23 Screw

24 Recess

25 Flange

26 Engagement region

27 Elevation

28 Receiving bore

29 Retaining plate

30 Screw

31 Through-bore

32 Tapped bore

33 Mounting element

34 Tapped bore

PATENTKRAV

1. Hurtigskifter (1) til skift af redskaber til en entreprenørmaskine, hvilken hurtigskifter omfatter en basisdel (2) og parallelle sidevanger (3) med modstående første og andre lejebøsninger (6, 7) til modtagelse af fastgørelsesbolte (8), hvor mindst to modstående første lejebøsninger (6) kan indsættes i første modstående gennemgangsåbninger (4) i sidevangerne (3) i forskellige vinkelpositioner ved drejning om en akse (19), der er forskudt i forhold til en midterakse (21) på en modtagelsesåbning (20) på den første lejebøsning (6), og udviser en ydre kontur (17) til et indgreb, som er sikret mod fordrejning, i en tilsvarende indre kontur (18) på gennemgangsåbningerne (4), og hvor de modstående andre lejebøsninger (7) er anbragt i andre gennemgangsåbninger (5) i sidevangerne (3), der er udformet som aflange huller og er sikret mod forskydning ved hjælp af en tætsluttende forbindelse (24, 27), **kendetegnet ved, at** den tætsluttende forbindelse (24, 27) er dannet af buede fordybninger (24) på den anden gennemgangsåbnings (5) over- og underside og tilsvarende buede forhøjninger (27) på den anden lejebøsning (7), og **ved, at** den ydre kontur (17) på de første lejebøsninger (6) og den indre kontur (18) på de første gennemgangsåbninger (4) er udformet som en flerkantet profil.

2. Hurtigskifter (1) ifølge krav 1, **kendetegnet ved, at** den ydre kontur (17) er anbragt på en indgrebsdel (14) på den første lejebøsning (6), hvilken indgrebsdel går i indgreb i den første gennemgangsåbning (4).

3. Hurtigskifter (1) ifølge krav 1 eller 2, **kendetegnet ved, at** den første lejebøsning (6) omfatter en fastgørelsesflange (16) med gevindhuller (15) til fastgørelse på sidevangen (3).

4. Hurtigskifter (1) ifølge et hvilket som helst af krav 1 til 3, **kendetegnet ved, at** de bueformede forhøjninger (27) er anbragt på en indgrebsdel (26) på den anden lejebøsning (7), hvilken indgrebsdel går i indgreb i den anden gennemgangsåbning (5).

5. Hurtigskifter (1) ifølge et hvilket som helst af krav 1 til 4, **kendetegnet ved, at** de andre lejebøsninger (7) er fastgjort på sidevangerne (3) ved hjælp af en holdeskive (29).

6. Hurtigskifter (1) ifølge krav 5, **kendetegnet ved, at** holdeskiven (29) er anbragt på sidevangens (3) yderside og er skruet fast på den anden lejebøsning (7) med skruer (30).

7. Hurtigskifter (1) ifølge et hvilket som helst af krav 1 til 6, **kendetegnet ved, at** fastgørelsesboltene (8) er fastgjort på sidevangerne (3) ved hjælp af fastgørelseselementer (33).

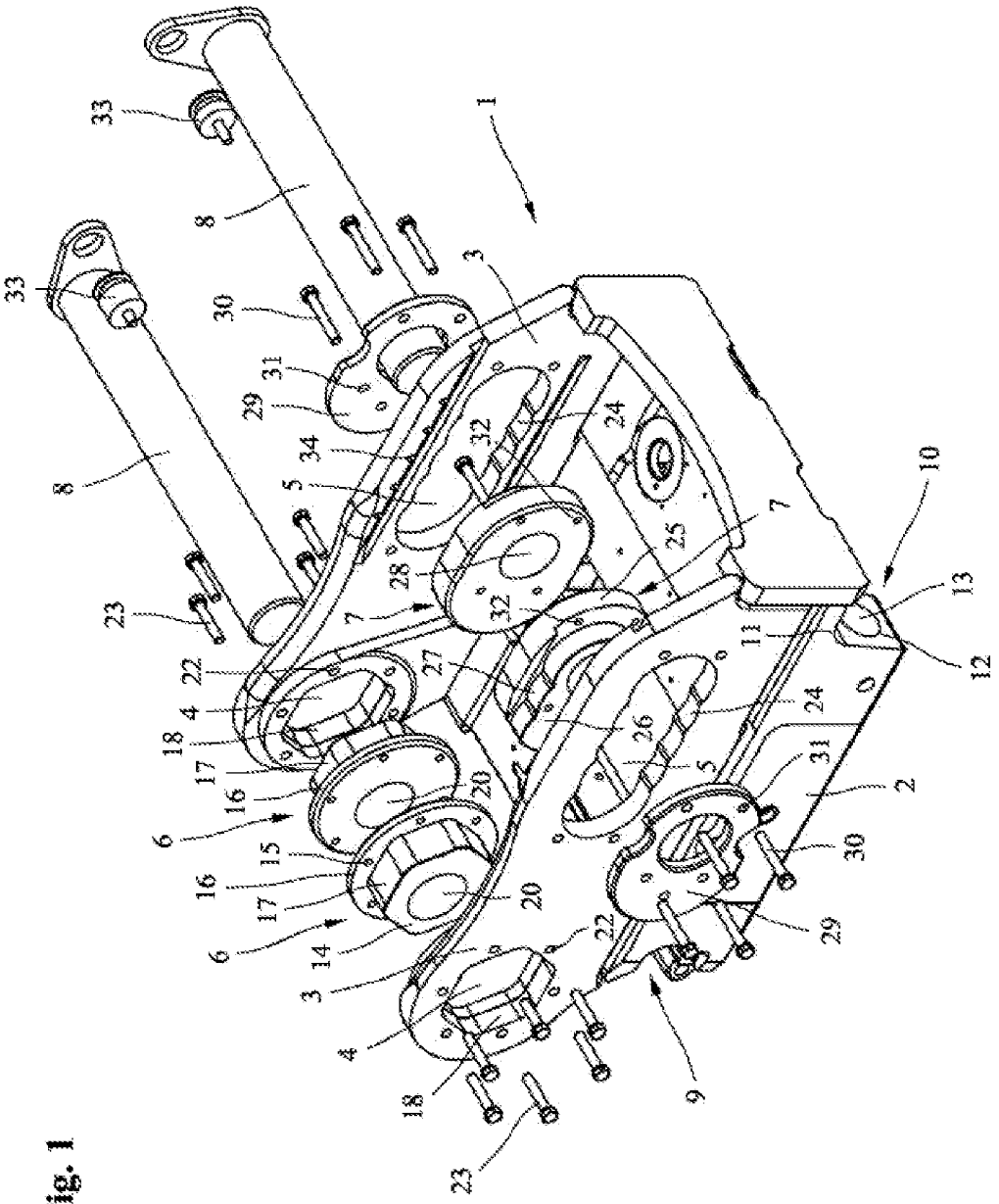

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Fig. 1

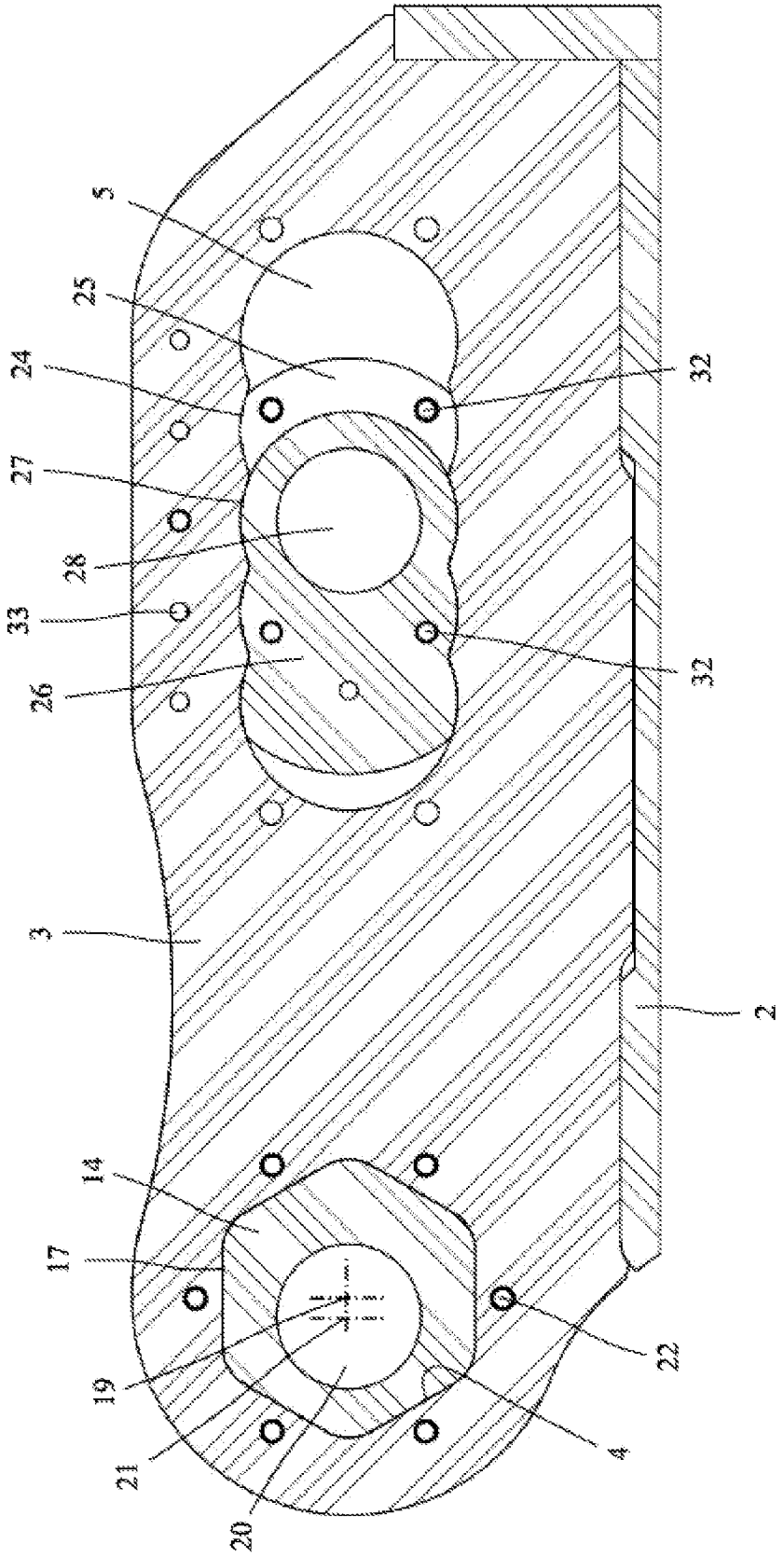


Fig. 2