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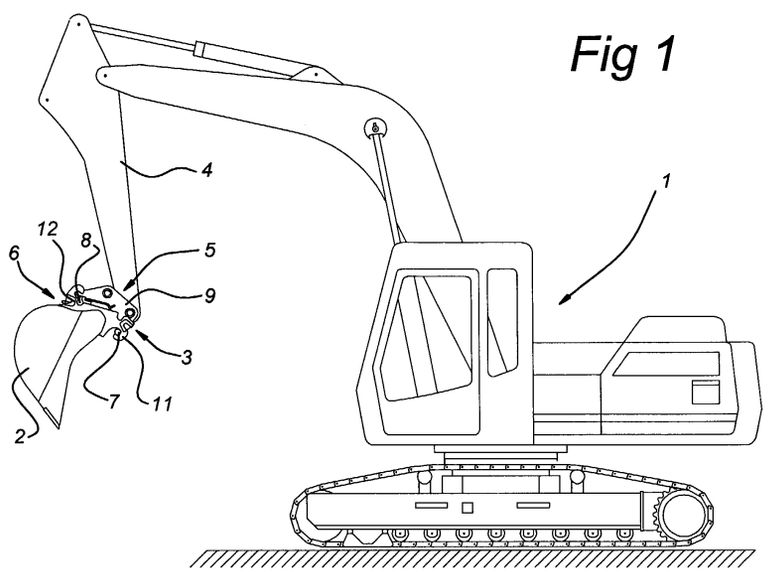
(54) Quick change system and excavator bucket having such a system

(57) A quick change system for coupling an attachment to a machine, for example for coupling an excavator bucket (2) to an excavator (1), comprising a head (5) on the machine (1) and a mounting (6) on the attachment (2), which mounting (6) can be coupled to the head (5), wherein the head (5) has a first pair of supports (7) located in the extension of one another and a second pair of supports (8) located in the extension of one another that are parallel to and opposite the first pair of supports (7), the mounting (6) having a first pair of recesses (11) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a second pair of recesses (12) located in the extension of one another that are parallel to and opposite the first pair of recesses and in which the second pair of supports (8) can be accommodated, as well as locking means (15 - 18) for locking the mounting (6) and the head (5) with respect to one another in the coupled position. The mounting (6) also has a third pair of recesses (13) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a fourth pair of recesses (14) located in the extension of one another that are parallel to and opposite the third pair of recesses (13) and in which the second pair of supports (8) can be accommodated. The excavator bucket can consequently be coupled either as a backhoe or a face shovel.

Fig 1



EP 1 496 163 A1

Description

[0001] The invention relates to a quick change system for coupling an attachment to a machine, for example for coupling an excavator bucket to an excavator, comprising a head on the machine and a mounting on the attachment, which mounting can be coupled to the head, wherein the head has a first pair of supports located in the extension of one another and a second pair of supports located in the extension of one another that are parallel to and opposite the first pair of supports, the mounting having a first pair of recesses located in the extension of one another, in which the first pair of supports can be accommodated, and a second pair of recesses located in the extension of one another that are parallel to and opposite the first pair of recesses and in which the second pair of supports can be accommodated, as well as locking means for locking the mounting and the head with respect to one another in the coupled position.

[0002] A quick change system of this type is known and is used, for example, for coupling the excavator bucket to the arm of an excavator. The advantage that the excavator bucket can be changed quickly and easily is obtained by means of this system. If the locking means are constructed such that they can be operated remotely, the driver of the excavator does not even have to leave his cab when changing excavator buckets.

[0003] There are two types of excavator buckets that are attached to the excavator in different ways, specifically as a so-called backhoe or as a so-called face shovel. In the case of a backhoe the opening of the excavator bucket faces the excavator; in the case of a face shovel the opening of the excavator bucket faces away from the excavator. This latter arrangement is useful, for example, when uprooting trees.

[0004] The disadvantage of this backhoe and face shovel is that different excavator buckets have to be used for these. The aim of the invention is therefore to provide a quick change system that offers the possibility of using one and the same excavator bucket either as backhoe or as face shovel. Said aim is achieved in that the mounting has a third pair of recesses located in the extension of one another, in which the first pair of supports can be accommodated, and a fourth pair of recesses located in the extension of one another that are parallel to and opposite the third pair of recesses and in which the second pair of supports can be accommodated.

[0005] With the quick change system, an excavator bucket that has the mounting according to the invention can be coupled to the head of the excavator as a backhoe or as a face shovel, with the four pairs of recesses in two different positions. It is thus not necessary to keep a separate bucket ready when changing between backhoe and face shovel: it is possible simply to use other pairs of recesses for this.

[0006] In a known manner two recesses located opposite one another define a centre line that essentially runs through the centre of said recesses, said recesses being oriented transversely to one another viewed in the direction of the centre line. When coupling up, the one pair of supports of the head can then be hooked first into a pair of recesses, which preferably are in the shape of a hook. By turning the head the second pair of supports can be introduced into the second pair of recesses. After locking, the excavator bucket is then ready for use. The same excavator bucket can now be coupled up in a different position in a corresponding manner by making use of the third and fourth pair of recesses, which likewise can be oriented transversely to one another for this purpose.

[0007] The known mounting has two parallel plates located some distance apart; the recesses of the various pairs are all made in said plates. With this arrangement it is possible to choose an embodiment such that the first or second pair of recesses are on the side of the plates facing away from the attachment and the other pair of recesses are on the side of the plates facing the attachment. The recesses of the third and fourth pair are then on the side of the plates facing away from the attachment.

[0008] The locking means of the quick change system can comprise a locking member movably connected to the head, as well as two pairs of locking recesses provided on the mounting, one of which locking recesses is designed to lock the head and mounting connected to one another by the first and second pair of recesses and the other of which locking recesses is designed to lock the head and mounting connected to one another by the third and the fourth pair of recesses. The locking member and the locking recesses can have surfaces running in a wedge shape with respect to one another.

[0009] The invention furthermore relates to an attachment for a quick change system as described above and also to a mounting and a plate used with such a mounting.

[0010] The invention will be explained in more detail below with reference to an illustrative embodiment shown in the figures.

Figure 1 shows a side view of an excavator with an excavator bucket coupled as a backhoe.

Figures 2a and 2b show a side view and rear view of the excavator bucket.

Figure 3 shows detail III in Figure 2a on an enlarged scale.

Figure 4 shows a perspective view of the head of the quick change system, which is known per se.

Figure 5 shows a side view of the excavator with an excavator bucket coupled as a face shovel.

[0011] An excavator bucket 2 is coupled to the excavator 1 shown in Figure 1 by means of the quick change system indicated in its entirety by 3. The excavator bucket forms a backhoe that can be used when digging

trenches and the like. The quick change system consists of the head 5 attached to the arm 4 of the excavator and the mounting 6 fixed to the excavator bucket 2. The mounting consists of the two parallel plates 9, 10 that are welded to the rest of the excavator bucket 2, as shown in Figures 2a and 2b. The head 5, with the exception of the pairs of supports 7, 8, one of each of which pairs can be seen in Figure 4, fits between these plates 9, 10.

[0012] In the position shown in Figure 1, the supports 7 are accommodated in the first, hook-shaped recesses 11 of the plates 9, 10 and the supports 8 are accommodated in the second recesses 12; see Figure 3. The excavator bucket 2 is then coupled as a backhoe. So as also to be able to couple the excavator bucket 2 to the head 5 as a face shovel, the third and fourth recesses 13, 14 are made according to the invention in the plates 9, 10 thereof. As can be seen in Figures 4 and 5, the supports 7 of the head 5 are then accommodated in the third hook-shaped recesses 13 and the supports 8 are accommodated in the fourth recesses 14.

[0013] For locking the head 5 and the excavator bucket 2, two pairs of locking recesses 20, 21 have been made on the plates 9, 10.

[0014] The locking recesses 20, 21 can be closed off on the sides facing away from one another by means of welded cover plates 22, which provide supplementary rigidity for the locking recesses 20, 21.

[0015] The head 5 has a locking member 17 that is known per se and can be moved to and fro. In the backhoe embodiment according to Figure 1 the locking member is accommodated in the locking recesses 20; in the face shovel embodiment according to Figure 5 it is accommodated in the locking recesses 21.

[0016] A conventional head 5 that is known per se and is used with the quick change system according to the invention is shown in Figure 4. This head, which can be attached to the arm 4 of the excavator 1 by means of the plates 24, 25 such that it can pivot is first of all provided with supports 7 located in the extension of one another and supports 8 located in the extension of one another, respectively, one of each of which can be seen. In a known manner the head 5 furthermore has a locking bar 17 that runs parallel to the supports 7, 8 located in the extension of one another. The locking bar 17 is supported transversely to its longitudinal direction by means of the guides 26, 27 such that it can slide. A hydraulic operating cylinder 28, which can move the guides 26, 27, and thus the locking bar 17, to and fro in a manner that is known per se and is not described in more detail, is located in the head. Mechanical or electrical drive is also possible.

[0017] At its longitudinal ends the locking bar 17 is provided with locking parts 15, both of which have wedge surfaces 16 running in a wedge shape with respect to one another. In the position in which the locking bar 17 has been moved outwards, these wedge surfaces 16 can be brought opposite the wedge surfaces 18 of the locking recesses 20 or 21 of the mounting 6. The locking bar 17 can then be retracted, such that the locking surfaces 16, 18 interact with one another and the attachment 2 is locked with respect to the excavator 1.

Claims

1. Quick change system for coupling an attachment to a machine, for example for coupling an excavator bucket (2) to an excavator (1), comprising a head (5) on the machine (1) and a mounting (6) on the attachment (2), which mounting (6) can be coupled to the head (5), wherein the head (5) has a first pair of supports (7) located in the extension of one another and a second pair of supports (8) located in the extension of one another that are parallel to and opposite the first pair of supports (7), the mounting (6) having a first pair of recesses (11) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a second pair of recesses (12) located in the extension of one another that are parallel to and opposite the first pair of recesses and in which the second pair of supports (8) can be accommodated, as well as locking means (15 - 18) for locking the mounting (6) and the head (5) with respect to one another in the coupled position, **characterised in that** the mounting (6) has a third pair of recesses (13) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a fourth pair of recesses (14) located in the extension of one another that are parallel to and opposite the third pair of recesses (13) and in which the second pair of supports (8) can be accommodated.

2. Quick change system according to Claim 1, wherein in each case two recesses located opposite one another (11, 12; 13, 14) define a centre line that essentially runs through the centre of said recesses (11, 12; 13, 14) and said recesses (11, 12; 13, 14) are oriented transversely to one another viewed in the direction of the centre line.

3. Quick change system according to Claim 2, wherein in each case two intersecting centre lines enclose an angle that is at most 15 degrees absolute.

4. Quick change system according to Claim 1, 2 or 3, wherein the mounting (6) has two parallel plates (9, 10) located some distance apart, in which the recesses (11 - 14) have been incorporated.

5. Quick change system according to Claim 4, wherein the first pair of recesses (11) is on the side of the plates (9, 10) facing the attachment (2) and the second pair of recesses (12) is on the side of the plates (9, 10) facing away from the attachment (2).

6. Quick change system according to Claim 4 or 5, wherein the third and fourth pair of recesses (13, 14) are on the side of the plates (9, 10) that faces away from the attachment (2).

7. Quick change system according to one of the preceding claims, wherein the locking means comprise a locking member (17) movably connected to the head (5), as well as two pairs of locking recesses provided on the mounting (6), one (20) of which locking recesses (20, 21) is designed to lock the head (5) and mounting (6) connected to one another by the first and second pair of recesses (11, 12) and the other (21) of which locking recesses is designed to lock the head (5) and mounting (6) connected to one another by the third and the fourth pair of recesses (13, 14).

8. Quick change system according to Claim 7, wherein the locking recesses (20, 21) are each in a respective plate (9, 10).

9. Quick change system according to Claim 7 or 8, wherein the locking member (17) and the locking recesses (20, 21) have surfaces (18) running in a wedge shape with respect to one another.

10. Quick change system according to Claim 9, wherein the head (5) has a locking bar (17) that is parallel to the supports (7, 8) located in the extension of one another and at its two ends has locking parts (15) with wedge surfaces (16) running in a wedge shape with respect to one another, which locking bar (17) can be moved transversely to its longitudinal direction to and fro between a locking position in which the locking parts (15) are accommodated in one respective pair of locking recesses (20, 21) and a release position.

11. Attachment (2) for a quick change system according to one of the preceding claims, comprising a tool, such as an excavator bucket, to which a mounting (6) intended to be brought into interaction with the head (5) of a machine is fixed, which head (5) has a first pair of supports (7) located in the extension of one another and a second pair of supports (8) located in the extension of one another that are parallel to and opposite the first pair of supports (7), the mounting (6) having a first pair of recesses (11) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a second pair of recesses (12) located in the extension of one another that are parallel to and opposite the first pair of recesses and in which the second pair of supports (8) can be accommodated, as well as locking means (15 - 18) for locking the mounting (6) and the head (5) with respect to one another in the coupled position, which mounting (6) has a third pair of recesses (13) located in the extension of one another, in which the first pair of supports (7) can be accommodated, and a fourth pair of recesses (14) that are parallel to and opposite the third pair of recesses (13) and in which the second pair of supports (8) can be accommodated.

12. Attachment according to Claim 11, wherein in each case two recesses located opposite one another (11, 12; 13, 14) define a centre line that essentially runs through the centre of said recesses (11, 12; 13, 14) and said recesses (11, 12; 13, 14) are oriented transversely to one another viewed in the direction of the centre line.

13. Attachment according to Claim 12, wherein in each case two intersecting centre lines enclose an angle that is at most 15 degrees absolute.

14. Attachment according to Claim 11, 12 or 13, wherein the mounting (6) has two parallel plates (9, 10) located some distance apart, in which the recesses (11 - 14) have been incorporated.

15. Attachment according to Claim 14, wherein the first pair of recesses (11) is on the side of the plates (9, 10) facing the attachment (2) and the second pair of recesses (12) is on the side of the plates (9, 10) facing away from the attachment (2).

16. Attachment according to Claim 14 or 15, wherein the third and fourth pair of recesses (13, 14) are on the side of the plates (9, 10) that faces away from the attachment (2).

17. Attachment according to Claims 11 - 16 for interaction with a head (5) that has a locking member (17) movably connected thereto, wherein the mounting (6) has two pairs of locking recesses (20, 21), one pair (20) of which locking recesses is designed to lock the head (5) and mounting (6) to be connected to one another by the first and second pair of recesses (11, 12) and the other pair (21) of which locking recesses is designed to lock the head (5) and mounting (6) to be connected to one another by the third and the fourth pair of recesses (13, 14).

18. Attachment according to Claim 17, wherein the locking recesses (20, 21) are each in a respective plate (9, 10).

19. Attachment according to Claim 17 or 18, wherein locking recesses (20, 21) have surfaces (18) running in a wedge shape with respect to one another.

20. Mounting for an attachment according to one of Claims 11 - 19, having a first pair of recesses (11)

located in the extension of one another, a second pair of recesses (12) located in the extension of one another that are parallel to and opposite the first pair of recesses, a third pair of recesses (13) located in the extension of one another and a fourth pair of recesses (14) located in the extension of one another that are parallel to and opposite the third pair of recesses (13).

21. Mounting according to Claim 20, wherein two parallel plates (9, 10) are provided located some distance apart, in which the recesses (11 - 14) have been incorporated.

22. Mounting according to Claim 20 or 21, wherein in each case two recesses located opposite one another (11, 12; 13, 14) define a centre line that essentially runs through the centre of said recesses (11, 12; 13, 14) and said recesses (11, 12; 13, 14) are oriented transversely to one another viewed in the direction of the centre line.

23. Mounting according to Claim 22, wherein in each case two intersecting centre lines enclose an angle that is at most 15 degrees absolute.

24. Plate (9, 10) for a mounting according to one of Claims 20 - 23, having first and second recesses (11, 12) located opposite one another as well as third and fourth recesses (13, 14) located opposite one another that are the same distance apart as the first and second recesses (11, 12).

25. Plate according to Claim 24, wherein in each case two recesses located opposite one another (11, 12; 13, 14) define a centre line that essentially runs through the centre of said recesses (11, 12; 13, 14) and said recesses (11, 12; 13, 14) are oriented transversely to one another viewed in the direction of the centre line.

26. Plate according to Claim 25, wherein in each case two intersecting centre lines enclose an angle that is at most 15 degrees absolute.

Fig 1

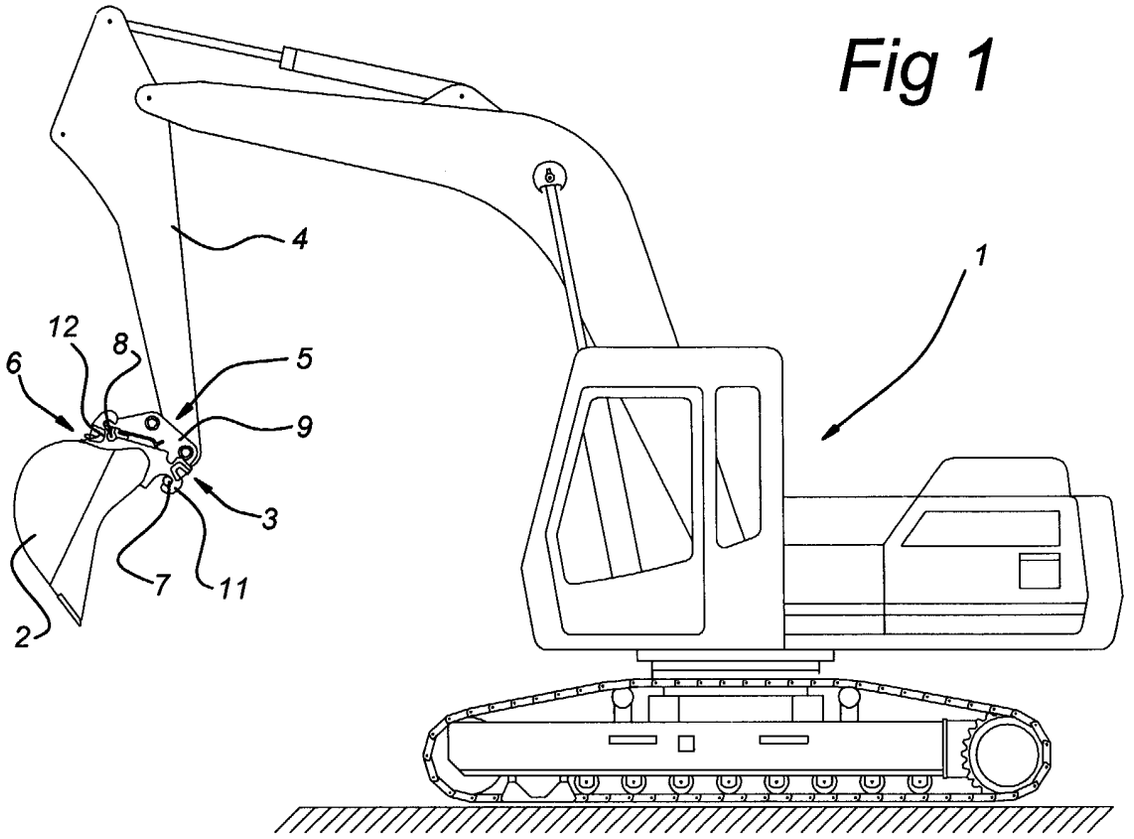


Fig 2a

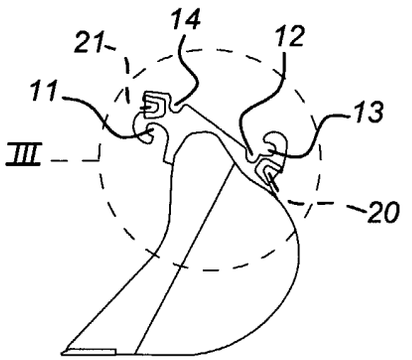


Fig 2b

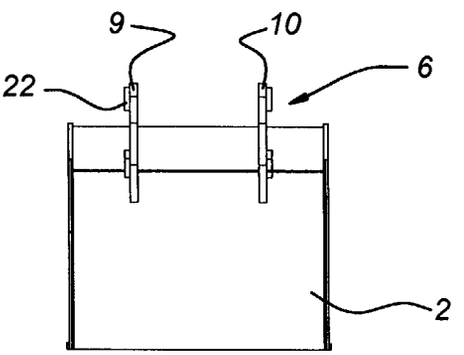


Fig 3

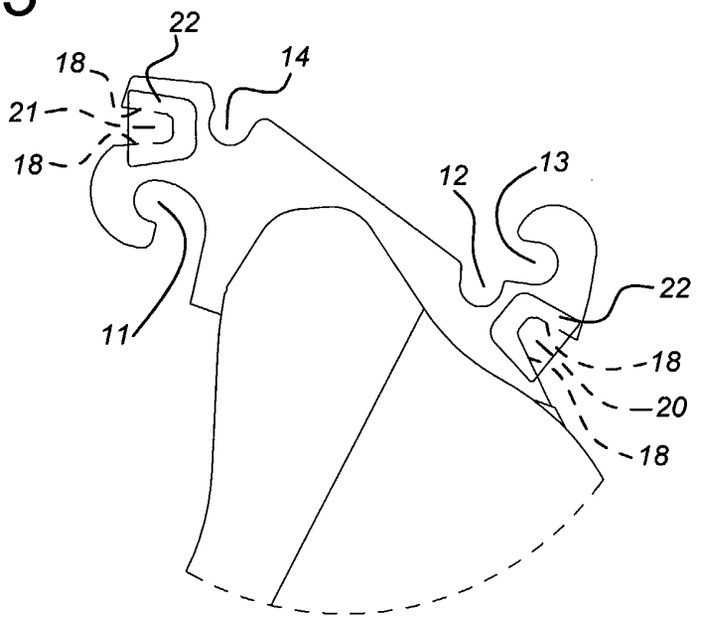


Fig 4

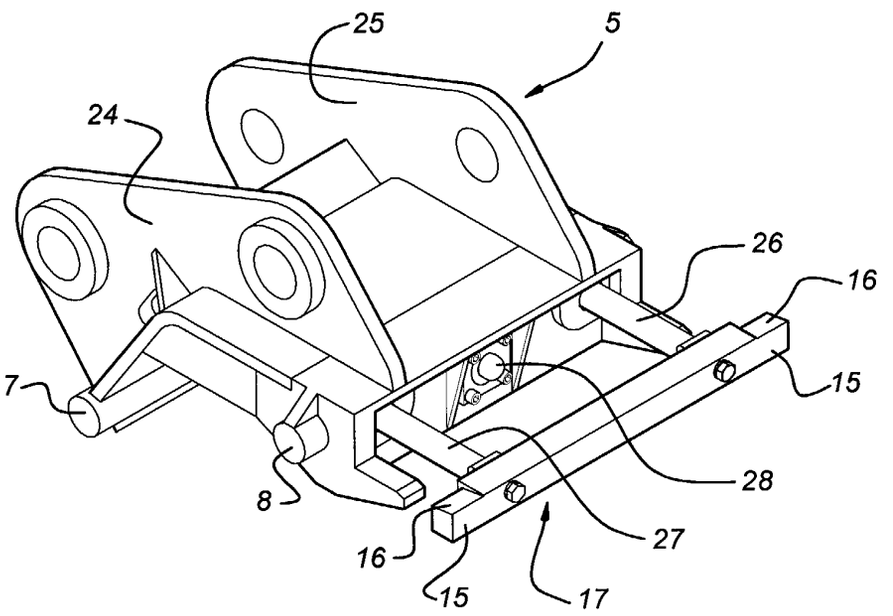
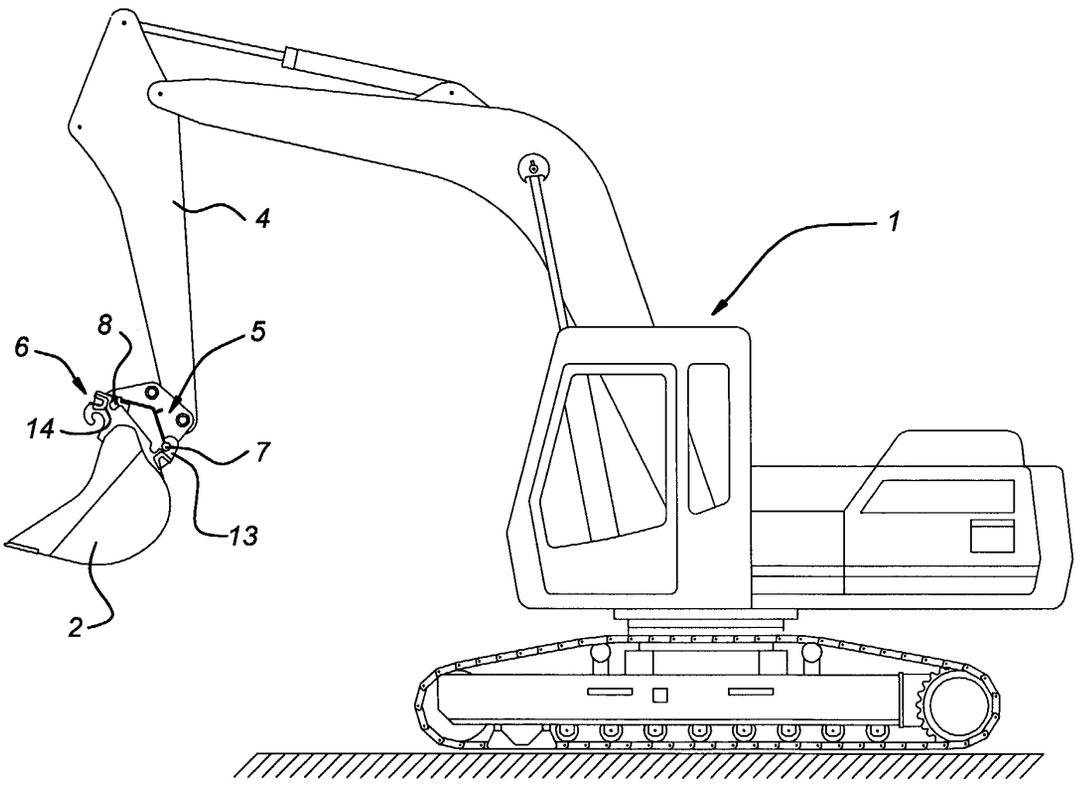


Fig 5



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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 6927

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 September 2004	Guthmuller, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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