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(54) **TOOL ATTACHMENT**

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(57) **ABSTRACT**

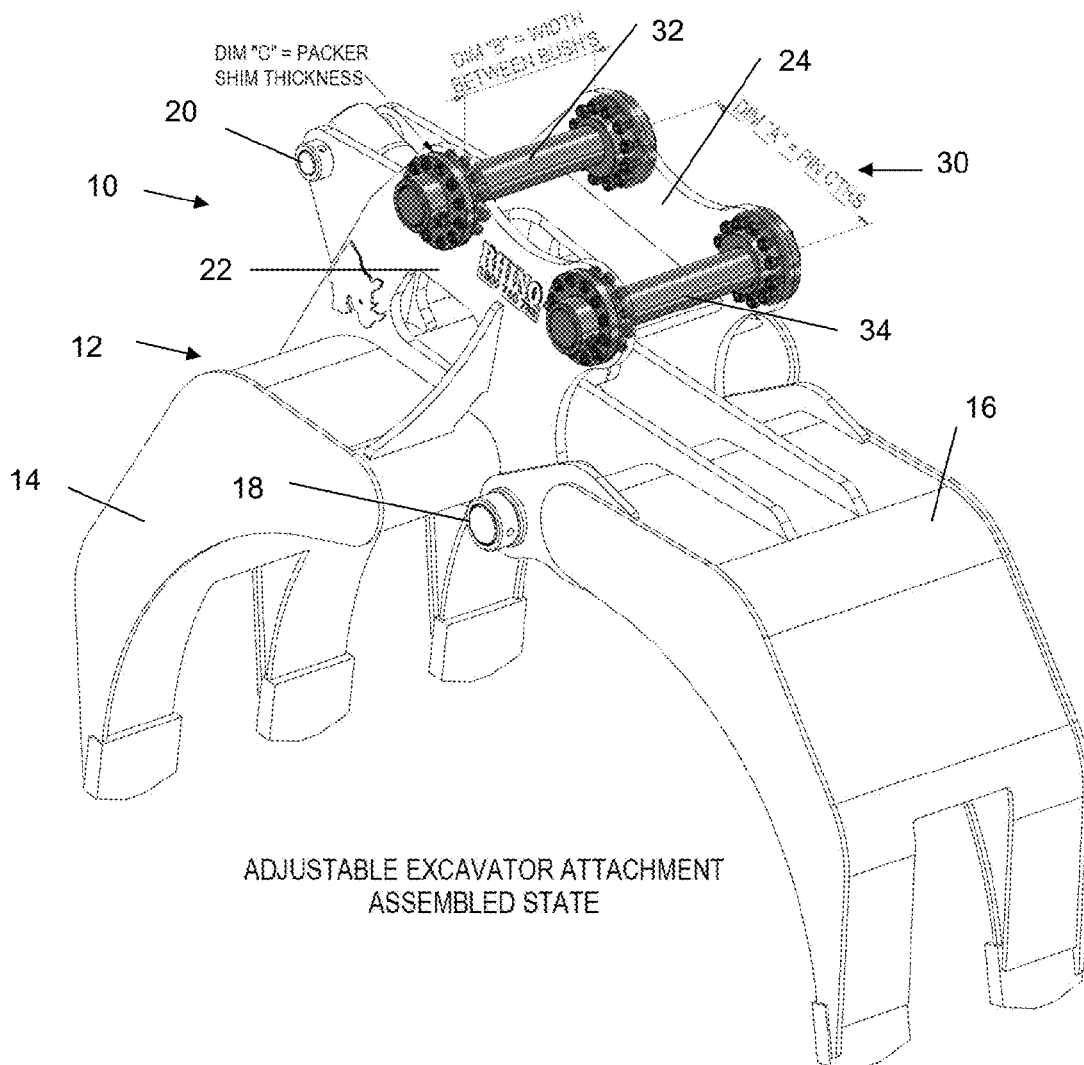
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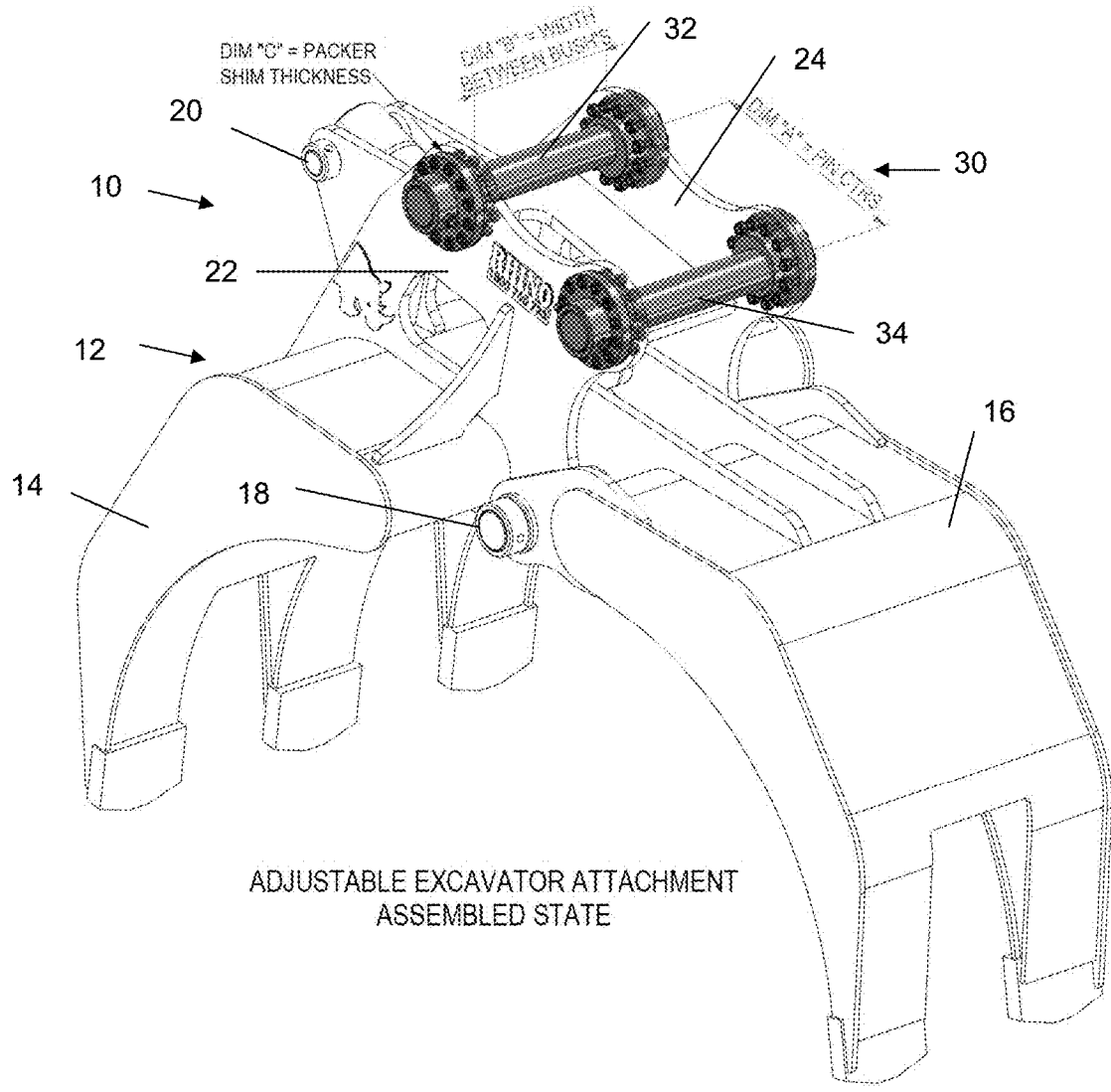
A tool attachment 10 comprising a plurality of pick-up pins 32, 34 or excavator bucket pins, each for threading through a pair of spaced apart holes 26 in a mounting part 22 of the tool, a bush 40 for each hole 26, fasteners 44 for fastening each bush to a surround of the respective hole and retainers 46 for each end of each pick-up pin 32, 34, wherein each of the bushes 40 has an eccentric hole 58 there through for receiving a portion of one of the pick-up pins 32, 34 so that the spacing between the pick-up pins 32, 34 can be selected according to the axial orientation of the bushes 40 in relation to the surround 22.

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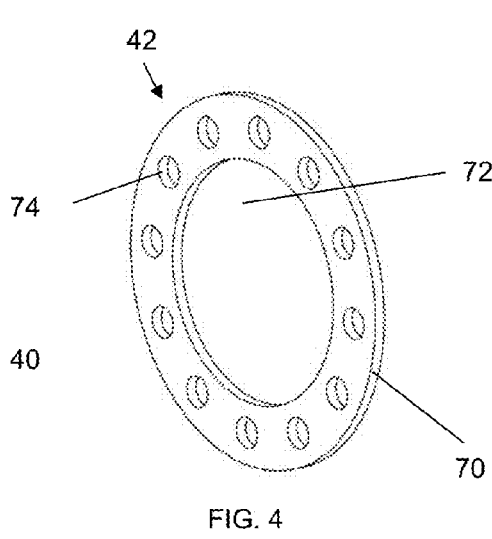
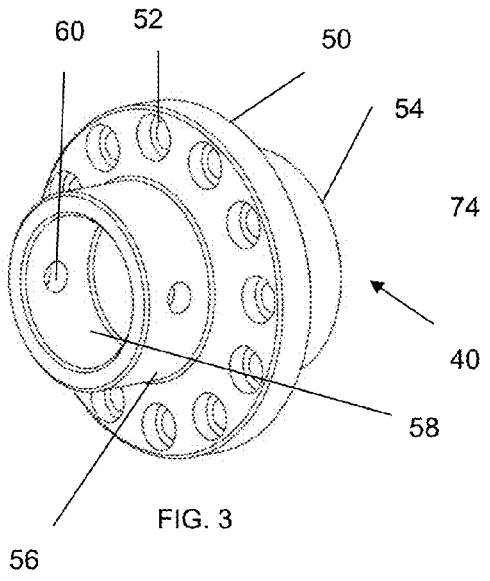
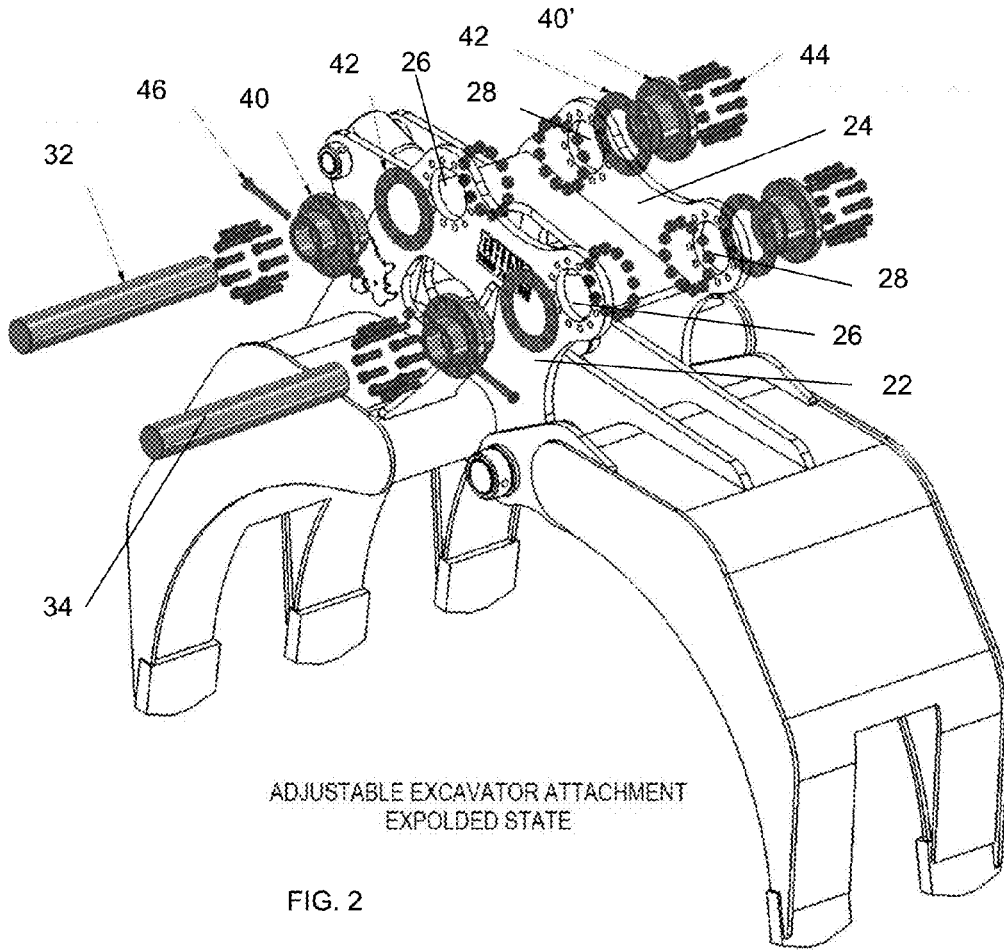
May 18, 2016 (AU) 2016901849





ADJUSTABLE EXCAVATOR ATTACHMENT
ASSEMBLED STATE

FIG. 1



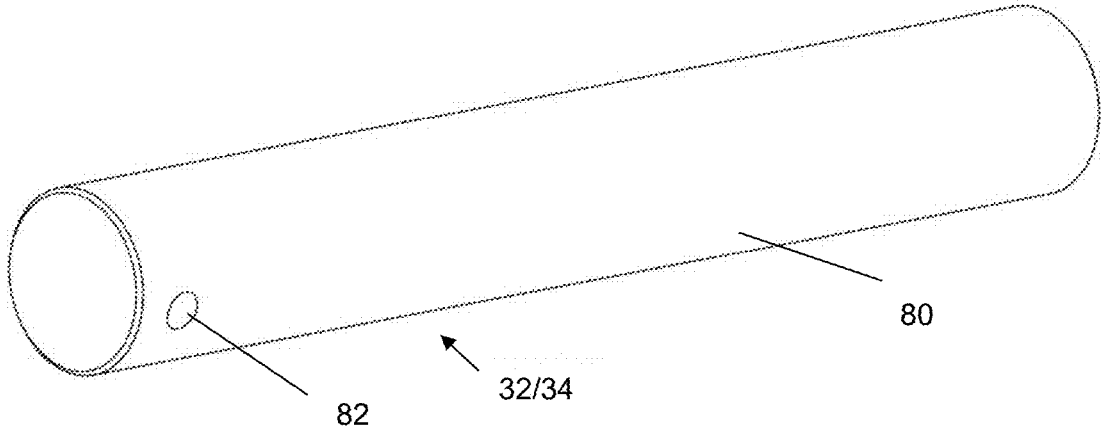


FIG. 5

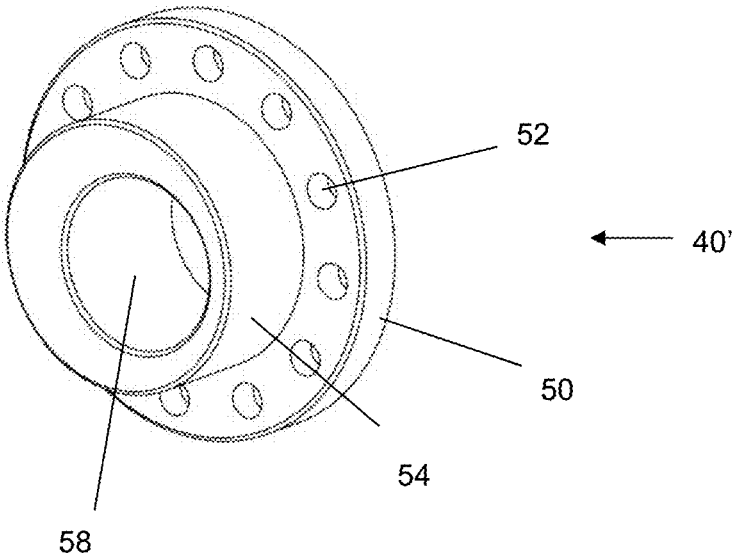


FIG. 6

TOOL ATTACHMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of Australian Patent Application No. 2016901849, which was filed May 18, 2016 and titled "A Tool Attachment." The contents of the above-captioned Australian Application are relied upon and incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to an attachment mechanism for attaching a tool to the arm configuration of an excavating machine.

BACKGROUND

[0003] Hydraulic excavating machines are well known. They essentially comprise a power plant mounted to a movable frame. Commonly a track system is used to allow movement of the frame. The power plant is commonly rotatable with respect to the track system, but this need not be the case. A mechanical arm configuration is mounted to the power plant so that a tool can be positioned and operated. There are various types of tool that can be attached to the end of the arm, such as for example a bucket, grapple, rock breaker, compactor and pipe lifters for grasping to name but a few.

[0004] The attachment of a tool to the coupling end of the mechanical arm generally comprises two spaced apart attachment parts, generally in the form of spaced apart plates, with spaced apart holes through each plate. The holes in each plate align and are for receiving pick-up pins that extend between the attachment parts. The coupling end of the arm comprises a linkage for connection to the pick-up pins. There will often be a hydraulic ram which moves the linkage, thereby changing the relative position of the pick-up pins with respect to the arm, to for example tilt or crowd the bucket. The tool may also have other components, such as a hydraulic ram for operation of a thumb or jaw part of a grapple.

[0005] Different manufacturers provide slightly different dimensioned attachment mechanisms for their tools to their mechanical arms. This results there being different sized pick-up pins and linkages for each manufacturer. Thus a tool from one manufacturer is generally not usable on the excavator of another manufacture.

[0006] The present invention have been developed with this problem in mind.

[0007] U.S. Pat. No. 7,770,311 is directed to a similar problem, but implements a solution that is different to the present invention.

[0008] Any references to documents that are made in this specification are not intended to be an admission that the information contained in those documents form part of the common general knowledge known to a person skilled in the field of the invention, unless explicitly stated as such.

SUMMARY OF THE INVENTION

[0009] According to an aspect of the present invention there is provided a tool attachment comprising a plurality of pick-up pins or excavator bucket pins, each for threading through a pair of spaced apart holes in a mounting part of the

tool, a bush for each hole, fasteners for fastening each bush to a surround of the respective hole and retainers for each end of each pick-up pin, wherein each of the bushes has an eccentric hole there through for receiving a portion of one of the pick-up pins so that the spacing between the pick-up pins can be selected according to the axial orientation of the bushes in relation to the surround.

[0010] In an embodiment the centre of the eccentric hole is orbitally movable about an axis with axial rotation of the bush with respect to the surround. In an embodiment the pick-up pins are narrower than the hole in the mounting part of the tool. In an embodiment the pick-up pin is able to pass through the hole in the mounting part of the tool irrespective of the orientation of the bush in the hole.

[0011] In an embodiment there is a spacer for each hole, wherein the spacers are dimensioned in thickness according to the required spacing between the bushes on the same pick-up pin. In an embodiment each spacer is in the form of a disc.

[0012] In an embodiment the fasteners are a set of bolts and nuts.

[0013] In an embodiment each retainer is a bolt and a respective nut. In an embodiment the respective nut is self-tightening.

[0014] In an embodiment the bushes comprise a radially extending flange with a plurality of holes there through for receiving the fasteners. In an embodiment the mounting part has a set of holes for alignment with the holes of each of the bushes and for receiving the fasteners.

[0015] In an embodiment the pick-up pin is a tube with transverses holes adjacent each end for receiving the retainers.

[0016] In an embodiment the tool is a bucket tool or a grapple tool for attachment to the arm or quick hitch of an excavator.

[0017] In an embodiment the spacer thickness is selected according to the dimension of the surrounds of the mounting part of the tool. Where the tool has wider apart mounting parts, the spacers can be thicker. Thus tools of different spacing between mounting parts can be used for a given type of arm coupling that attached to the pick-up pins. In an embodiment the spacers each comprise a plurality of holes for receiving the fasteners.

[0018] In an embodiment the rotational orientation of the bushes is selected according to the required spacing of the pick-up pins for a given type of arm coupling.

[0019] The present invention allows for coupling of a tool with spaced apart mounting parts to be able to be used with a given arm with different spacing of the mounting parts. The present invention allows for coupling of a tool with spaced apart holes for receiving the pick-up pins of one size to the used with a given arm would a coupling for a different spacing of the holes.

[0020] According to an aspect of the present invention there is provided an excavator comprising an arm, a tool, and an attachment mechanism for attaching the tool to the arm, the attachment mechanism comprising a plurality of pick-up pins, each for threading through a pair of spaced apart holes in a mounting part of the tool, a bush for each hole, fasteners for fastening each bush to the surround of the respective hole and retainers for each end of each pick-up pin, wherein each of the bushes has an eccentric hole there through for receiving a portion of one of the pick-up pins so that the

spacing between the pick-up pins can be selected according to the axial orientation of the bushes in relation to the surround.

[0021] Throughout the specification and claims, unless the context requires otherwise, the word “comprise” or variations such as “comprises” or “comprising”, will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

BRIEF DESCRIPTION OF DRAWINGS

[0022] In order to provide a better understanding of the present invention embodiments will now be described, by way of example only, with reference to the drawings, in which:

[0023] FIG. 1 is a perspective view of a tool attachment attached to a tool according to an embodiment of the present invention;

[0024] FIG. 2 is an exploded view of the tool attachment of FIG. 1;

[0025] FIG. 3 is a perspective view of a bush of the tool attachment of FIG. 1;

[0026] FIG. 4 is a perspective view of a spacer of the tool attachment of FIG. 1;

[0027] FIG. 5 is a perspective view of a pick-up pin of the tool attachment of FIG. 1; and

[0028] FIG. 6 is a perspective view of another bush of the tool attachment of FIG. 1, which is different to that shown in FIG. 3 and shown from the opposite side of side seen in FIG. 3.

DETAILED DESCRIPTION OF EMBODIMENT OF THE PRESENT INVENTION

[0029] Referring to FIG. 1, there is shown a tool attachment 10 attached to a tool 12. In this embodiment the tool 12 is in the form of a grapple. In other embodiment the tool may be a different type of tool, such as for example a bucket. The grapple comprises a ripper or finger part 14 and an opposable, pivotable jaw 16, comprising two fingers. The jaw 16 is pivotable about pivot axis 18. The jaw 16 is actuated by a ram pivotally attached at pivot 20.

[0030] The part 14 has a mounting part comprising two spaced apart plates 24 extending orthogonal to the plane of operation of the fingers of the part 14. These plates each have two spaced apart holes 26 and 28, where the holes 26 of one plate 22 are aligned with the holes 28 of the other plate 24 to receive pick-up pins 32 and 34. Commonly a standard bush will be used to couple the pick-up pins to the plates. In the present invention the standard bushes are removed.

[0031] The tool attachment 10 comprises a plurality of pick-up pins, in this case two pick up pins 32 and 34, and an eccentric bush 40 for each hole 26/28. In one form the tool attachment 10 also comprises a spacer 42 for each hole 26/28, fasteners 44 for fastening each bush to the surround of the respective hole 26/28 and retainers 46 for each end of each pick-up pin.

[0032] As seen in FIG. 2, the bushes 40 have an eccentric hole 58 therethrough for receiving a portion of one of the pick-up pins 32/34 so that the spacing between the pick-up pins 32 and 34 can be selected according to the axial orientation of the bushes in relation to the plate 22/24.

[0033] The spacers 42 are dimensioned in thickness according to the required spacing between the bushes 40 on the same pick-up pin 32/34.

[0034] In an embodiment the fasteners 44 are a set of bolts and nuts. In an embodiment each retainer 46 is a bolt and a respective nut. In an embodiment the respective nut is self tightening.

[0035] Referring to FIG. 3, the bush 40 is shown in isolation. The bush comprises a radially extending flange 50 with holes 52 therethrough for receiving the fasteners 44. An external collar portion 56 has the axial hole 58 therethrough, where the hole centre is axially off-set from the centre of the circular flange 50, thereby making the bush eccentric. The collar portion 56 has a transverse set of holes 60 for receiving one of the retainers 46. The bush also comprise an insert collar 54.

[0036] Referring to FIG. 6, the insert collar 54 is inserted in a respective one of the holes 26/28. This will result in two bushes facing one direction from plate 22 (orientation of FIG. 3) and two bushes facing in the opposite direction from the other plate 24 (with an orientation of FIG. 6). The eccentric nature of the hole 58 is more readily appreciated in FIG. 6.

[0037] As seen in FIG. 5, the pick-up pin 32/34 is a tube 80 with transverse holes 82 adjacent each end for receiving the retainers 46.

[0038] In an embodiment the centre of the eccentric hole is orbitally movable about an axis with axial rotation of the bush 40 with respect to the plates 22 and 24. In an embodiment the spacing of the pick-up pins 32 and 34 can be selected. Where the linkage requires narrower spacing between the pick-up pins 32/34 this can be adjusted by rotation of the bushes 40.

[0039] Also the pick-up pin 32/34 is able to pass through the respective hole 26/28 in the mounting part of the tool irrespective of the orientation of the bush 40 in the hole 26/28.

[0040] In an embodiment the rotational orientation of the bushes 40 is selected according to the required spacing of the pick-up pins 32/34 for a given type of arm linkage.

[0041] The spacer 42 is shown in more detail in FIG. 4. The spacer 42 is in the form of a disc with a hole 72 through its centre. The spacer 42 has a set of holes in a circular pattern for receiving the fasteners 44. In an embodiment the thickness 70 of the spacer 42 is selected according to the spacing between the plates 22 and 24. Where the tool has wider apart plates 22 and 24, the spacers 42 can be thicker. Thus tools of different spacing between mounting plates 22 and 24 can be used for a given type of arm linkage that attaches to the pick-up pins.

[0042] The present invention allows for coupling of a tool with spaced apart mounting parts to be able to be used with a given arm with different spacing of the mounting parts. The present invention allows for coupling of a tool with spaced apart holes for receiving the pick-up pins of one size to the used with a given arm would a coupling for a different spacing of the holes.

[0043] Modifications may be made to the present invention within the context of that described and shown in the drawings. Such modifications are intended to form part of the invention described in this specification.

I claim:

1. A tool attachment comprising a plurality of pick-up pins or excavator bucket pins, each for threading through a pair

of spaced apart holes in a mounting part of the tool, a bush for each hole, fasteners for fastening each bush to a surround of the respective hole and retainers for each end of each pick-up pin, wherein each of the bushes has an eccentric hole there through for receiving a portion of one of the pick-up pins so that the spacing between the pick-up pins can be selected according to the axial orientation of the bushes in relation to the surround.

2. The tool attachment according to claim 1, wherein the centre of the eccentric hole is orbitally movable about an axis with axial rotation of the bush with respect to the surround.

3. The tool attachment according to claim 1, wherein the pick-up pins are narrower than the hole in the mounting part of the tool.

4. The tool attachment according to claim 1, wherein the pick-up pin is able to pass through the hole in the mounting part of the tool irrespective of the orientation of the bush in the hole.

5. The tool attachment according to claim 1, further comprising a spacer for each hole, wherein the spacers are dimensioned in thickness according to the required spacing between the bushes on the same pick-up pin.

6. The tool attachment according to claim 5, wherein each spacer is in the form of a disc.

7. The tool attachment according to claim 1, wherein the fasteners are a set of bolts and nuts.

8. The tool attachment according to claim 1, wherein each retainer is a bolt and a respective nut.

9. The tool attachment according to claim 1, wherein the bushes each comprise a radially extending flange with a plurality of holes there through for receiving the fasteners.

10. The tool attachment according to claim 9, wherein the mounting part has a set of holes for alignment with the holes of each of the bushes and for receiving the fasteners.

11. The tool attachment according to claim 1, wherein the pick-up pin is a tube with transverses holes adjacent each end for receiving the retainers.

12. The tool attachment according to claim 1, wherein each spacer has thickness selected according to the dimension of the surrounds of the mounting part of the tool.

13. The tool attachment according to claim 1, wherein the spacers each comprise a plurality of holes for receiving the fasteners.

14. The tool attachment according to claim 1, wherein the rotational orientation of the bushes is selected according to the required spacing of the pick-up pins for a given type of arm coupling.

15. An excavator comprising an arm, a tool, and a tool attachment according to claim 1.

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