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(54) **MASTERHITCH EXCAVATOR BUCKET COUPLING SYSTEM**

SCHNELLKUPPLUNGSSYSTEM FÜR BAGGERSCHAUFEL

DISPOSITIF D'ACCROCHAGE D'UN GODET D'EXCAVATEUR

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Description

This invention relates to a coupling system for attaching different digging buckets and accessories on to an excavator.

EP-A-0 273 828 for example discloses an excarvator bucket attachment coupling system, where the hitch part is wedged between a locking plate and a tubular chassis of the bucket.

On all excavators there is a requirement to attach different sizes and shapes of digging buckets and other attachments. Usually only one of these is attached to the machine at any time. The traditional method of attaching these excavator buckets is by removing the main two connecting pins ("Bucket pins"), and re-positioning the arm of the excavator in line with the new attachment or bucket, and re-fitting and securing these bucket pins.

Depending upon the nature of the work that the excavator is involved with, this changing process could be carried out up to 10 times in any one day. This process is awkward, time consuming and often results in damage to that part of the excavator and bucket.

In addition, buckets manufactured to fit one make and size of excavator will not usually fit any others (this is due to different bucket pin sizes and widths and geometry of the bucket rotation mechanism). With a "Bucket coupling system", once this has been fitted to the excavator, all sizes of bucket can be fitted to all makes of excavator, (provided that it is in the same weight class). This is of considerable assistance and saves stocking many different sizes and type of buckets.

There is therefore a requirement for a quick and easy method of changing excavator buckets, or 'bucket hitch'. Other types of coupling systems have been designed and produced in the past, in an attempt to find a solution to this problem.

The MASTERHITCH excavator bucket coupling system as described is a simple, quick and easy method of attaching and removing different buckets to the same excavator. The MASTERHITCH works by having the main top chassis member of the bucket or attachment made in the form of a tubular section. There is a back plate welded to this tube, forming the back of the bucket. There is a slot of fixed dimensions cut into the back plate in the centre of the bucket and adjacent to the tube. The hitch part attached to the excavator has a fixed length of steel tube, cut in half down its length fixed to it. It is mounted between two hook sections, which locate in to the fixed slot in the back plate of the bucket.

This half steel tube is rotated around the steel tubular section of the bucket until the hitch lays flat on the back plate of the bucket. At this time, a steel end plate with two locking pins mounted therein, comes in to line with another steel locking plate mounted on the back plate. This has two locking holes drilled in it. The two locking pins are activated, which lock in to this locking plate. The hitch which is totally sealed is permanently secured to the bucket until such time as the locking pins are withdrawn.

This invention provides a secure fastening between the hitch and the bucket (or any other attachment) of an excavator, whereby a half tube section of the hitch is rotated around the tubular section which forms the main chassis of an excavator bucket until the end plate on the hitch comes into line with the locking plate mounted on the back plate of the bucket. At this time the two locking pins in the hitch are powered out through the two locking holes in the locking plate. This rotating and locking action "jams" the hitch between the tubular section of the bucket and the locking plate mounted on the bucket.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig: 1 shows a typical bucket with the hitch half hooked on.

Fig: 2 is a cross section through the hitch and bucket in the locked position showing the key parts.

Fig: 3 is a plan view of the two locking pins showing the hydraulic ram and the moving, guide, end and locking plates in the unlocked position.

Fig: 4 is a plan view of the two locking pins showing the hydraulic ram and the moving, guide, end and locking plates in the locked position.

With reference to the drawings, the bucket or attachment to be mounted on the excavator consists of a main tubular chassis section 1. To this there is fixed the back plate 2. To attach the hitch to the bucket, the hitch body 4 is lined up with the bucket or attachment. To facilitate this, two "wings" are fixed to either side of the rectangular hole at an angle of 45°. The hook section 3 of the hitch is hooked in to the rectangular hole cut into the back plate of the bucket. The hitch is then rotated until the end plate 7 lines up with the locking plate 6 (which is fixed to the bucket or attachment). The two locking pins 9, linked together by the moving plate 15, guided by the two guide plates 11 are then powered hydraulically by the hydraulic ram 12 from the excavator's hydraulics until they pass fully through the locking plate 6, guided by the tapers on the ends of the pins.

The hitch is then securely wedged between the tubular chassis section of the bucket and the locking plate. For additional safety, a locking bar is inserted through the locking bar hole 14, and spans the full width of the hitch. With this locking bar in place, even should the hydraulics be operated accidentally, the locking pins could not be withdrawn.

An electronic switch inside the hitch body senses any movement of either the locking pins or the moving plate 15. This operates a warning light and a buzzer inside the cab of the excavator, to draw to the attention of the operator the fact that the locking pins are being withdrawn (either accidentally or deliberately). There is an integral tested lifting hook built into the hitch body.

To remove or change the bucket or attachment, the locking bar is removed and the locking pins are hydraulically withdrawn. The hitch can then be rolled off the bucket, and moved to the new bucket or attachment and the above process repeated.

Claims

1. An excavator bucket and attachment coupling system, where the hitch part (4), incorporating a steel tube (8) cut in half down its length, locates over the main tubular chassis of the bucket (5), two hook sections (3) of the hitch (4) locate into a rectangular hole of fixed dimensions on the bucket (5), the hitch (4) is locked into place by rotating the hitch around the tubular chassis (1) until the end plate of the hitch (4) lines up with the locking plate (6) fixed to the bucket (5) or attachment, two locking pins (9) are then powered through holes in the end plate (7) and locking plate (6), this wedges the hitch (4) between the locking plate (6) and the tubular chassis (1).

2. An excavator bucket and attachment coupling system, as claimed in claim 1, where the hitch is guided on to the bucket by two tapered curved hooks which locate into a slot in the bucket.

3. An excavator bucket and attachment coupling system, as claimed in claim 1, where the locking pins (9) are powered hydraulically by a self contained hydraulic ram (12), fed from the hydraulics of the excavator.

4. An excavator bucket and attachment coupling system, as claimed in claim 1, where the locking pins are prevented from accidental withdrawal by a locking bar inserted manually.

5. An excavator bucket and attachment coupling system, as claimed in claim 1, where the whole mechanism is totally sealed against all ingress of dirt, water and the like.

6. An excavator bucket and attachment coupling system, as claimed in claim 1, where the hitch has an integral tested hook (13) for the attachment of lifting chains and slings.

7. An excavator bucket and attachment coupling system, as claimed in claim 1, where there are two guiding "Wings" fixed to the tubular section of the bucket to enable simple location of the hooks on the hitch body (4) into the rectangular hole in the bucket.

8. An excavator bucket and attachment coupling system, as claimed in claim 1, where location and sideways movement of the hitch body against the bucket is prevented by the extension of the hitch body (4) on either side of the locking plate (6).

9. An excavator bucket and attachment coupling system, as claimed in claim 1, where an electronic switch senses the movement of the locking pins and moving plate, and sends an electric signal to the instruments mounted in the cab of the excavator.

Patentansprüche

1. Ein Baggerschaufel- und Zubehörkopplungssystem, wobei das Anhängerteil (4) mit integriertem, der Länge nach halbiertem Stahlrohr (8), über das Hauptrohrchassis der Schaufel (5) passt und zwei Hakenteile (3) des Anhängers (4) in ein rechtwinkliges Loch fester Abmessung der Schaufel (5) einhaken. Der Anhänger (4) wird durch Drehen des Anhängers um das Rohrchassis (1) abgesichert, bis die Endplatte des Anhängers (4) mit der Sperrplatte (6) abgestimmt ist, die an der Schaufel (5) oder am Zübehor befestig ist. Zwei Sperrstifte (9) werden dann durch die Löcher in der Endplatte (7) und der Sperrplatte (6) getrieben. Dadurch wird der Anhänger (4) zwischen der Sperrplatte (6) und dem Rohrchassis (1) festgeklemmt.

2. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei der Anhänger durch zwei spitz zulaufende, gebogene Haken, die in einen Schlitz in der Schaufel passen, in die Schaufel eingeführt wird.

3. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei die Sperrstifte (9) durch einen hydraulischen Stößel (12), der von der Baggerhydraulik angetrieben wird, hydraulisch eingetrieben werden.

4. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei die Sperrstifte durch eine Sperrleiste, die manuell eingeführt wird, am versehentlichen Abzug gehindert werden.

5. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei der gesamte Mechanismus komplett gegen Eindringen von Schmutz, Wasser und Ähnlichen abgedichtet ist.

6. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei die Anhängerkupplung einen intern getesteten Haken (13) zum Anhängen von Hebeketten und -schlingen hat.

7. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei zwei 'Führungsflügel'

vorgesehen sind, die an dem Rohrteil der Schaufel befestigt sind, um ein problemloses Ausrichten der Haken am Anhängerkörper (4) im rechtwinkligen Loch des Schaufel zu ermöglischen.

8. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei Ausrichten des Anhängerkörpers an der und seitliche Bewegung gegen die Schaufel durch die Verlängerung des Anhängerkörpers (4) an beiden Seiten der Sicherungsplatte (6) verhindert wird.

9. Ein Baggerschaufel- und Zubehörkopplungssystem laut Anspruch 1, wobei ein elektronischer Schalter die Bewegung der Sperrstifte und Bewegungsplatte festellt und ein elektronisches Signal an die in der Fahrerkabine des Baggers ausgeführten Instrumente sendet.

Revendications

1. Un godet d'excavation et une système d'attelage où l'attelage (4) inclus une tube en acier coupée (8) en deux à son longeur, se trouve sur la chassis tubulaire pricipale du godet (5), deux sections crochet (3) de l'attelage (4) s'accrochent à la fente rectangulaire dimension fixe dans le godet (5), l'attelage (4) est fixé en place par pivotage autour de la châssis tubulaire (1) jusqu'au point où la plaque d'attelage (4) s'alligne avec la plaque fixée (6) au godet (5) ou l'accessoire les deux axes (9) sont conduit hydrauliquement par des fentes sur la plaque du godet (7) et la plaque de verrouillage (6). Cette action fixe l'attelage (4) entre la plaque de verrouillage (6) et la châssis tubulaire (1).

2. Un godet d'excavation et l'attelage, comme reclamation 1, où l'attelage est guidée sur le godet par deux crochets pointés qui entrent dans une fente dans le godet.

3. Un godet d'excavation et système d'attelage, comme reclamation 1, où les axes verouillables (9) sont mise en route par la puissance hydraulique (12) d'un verin hydraulique sur la pelle hydraulique.

4. Un godet d'excavation et système d'attelage, comme reclamation 1, où les axes verouillables sont empechées d'être retirer par accident par un bar de verouillage inseré à la main.

5. Un godet d'excavation et système d'attelage, comme reclamation 1, où le mechanism est completement étanche contre l'eau, la boue etc.

6. Un godet d'excavation et système d'attelage, comme reclamation 1, où l'attelage a un crochet pour attacher les chaines de levage et des courroies.

7. Un godet d'excavation et système d'attelage, comme reclamation 1, où il existe deux 'ailettes' fixées sur la section tubulaire du godet pour guider les crochets de l'attelage dans la fente rectangulaire du godet.

8. Un godet d'excavation et système d'attelage, comme reclamation 1, où les mouvements et l'attelage contre le godet est empeché par l'extension de l'attelage chaque côté de la plaque verouillage.

9. Un godet d'excavation et système d'attelage, comme reclamation 1, où le bouton éléctronique envoie des signaux aux instruments dans la cabine de la pelle hydraulique.

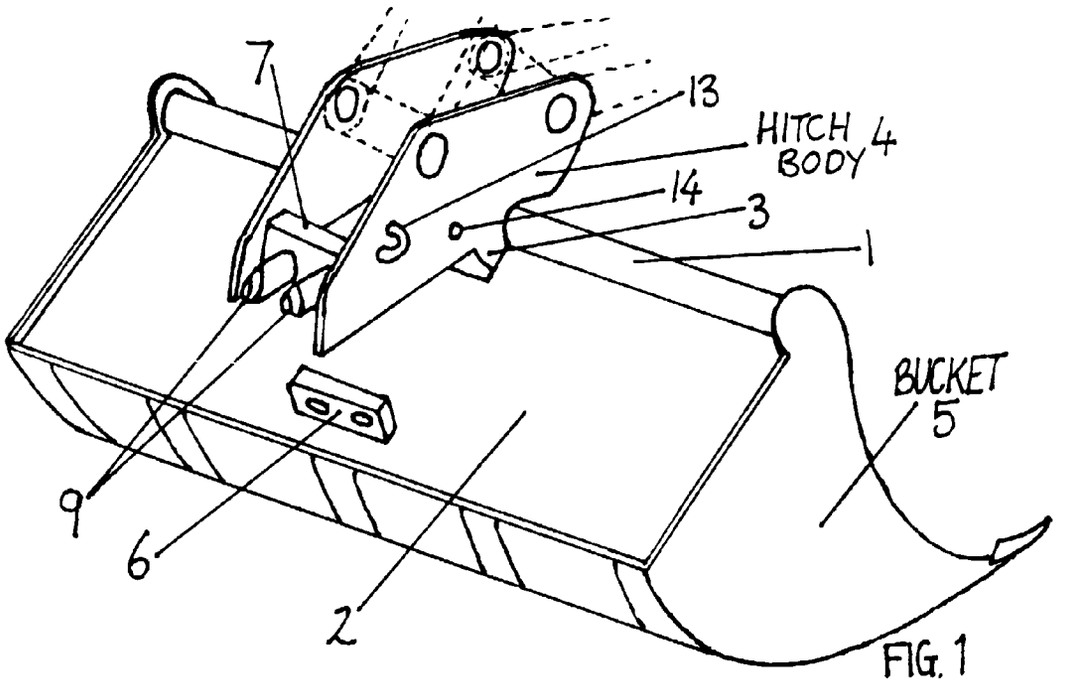

FIG. 1

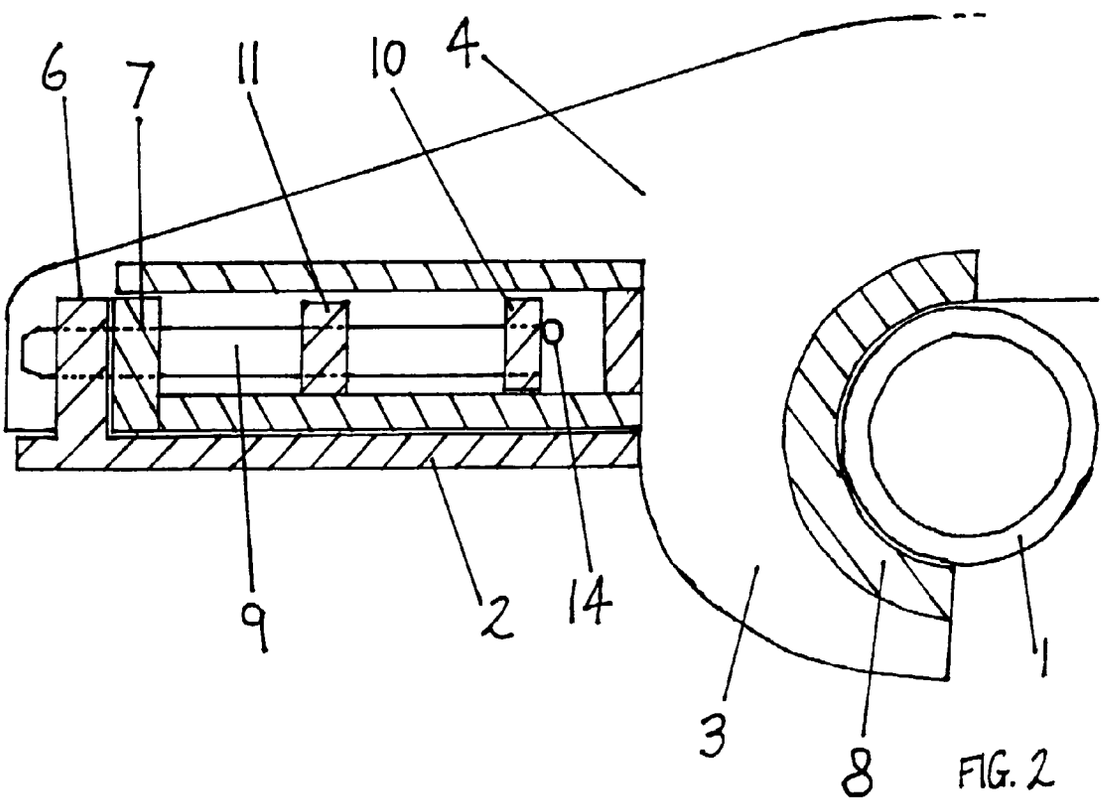

FIG. 2

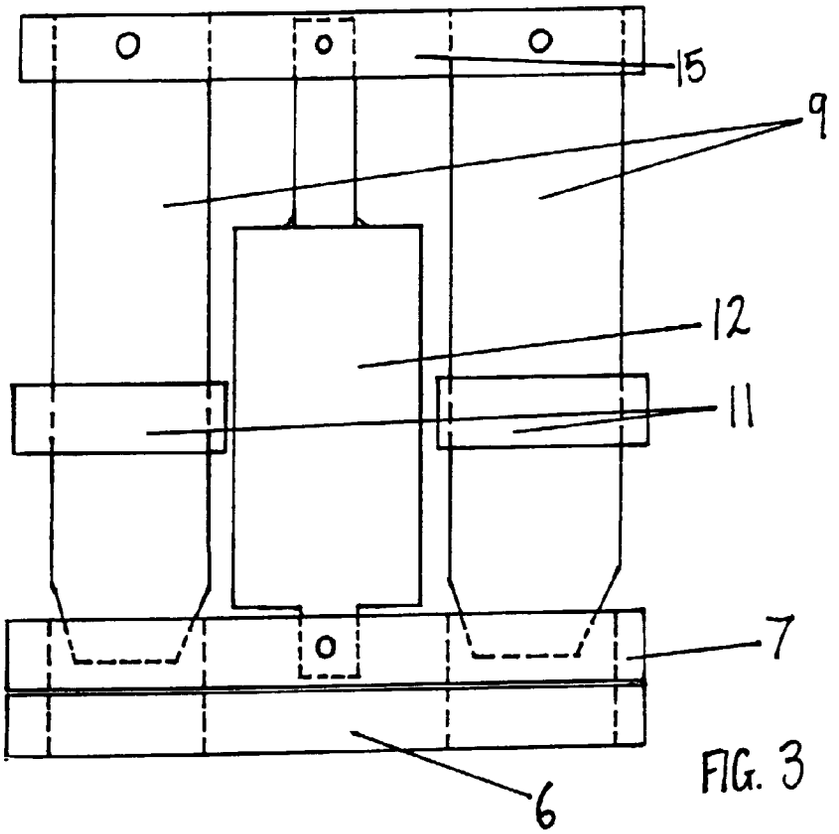

FIG. 3

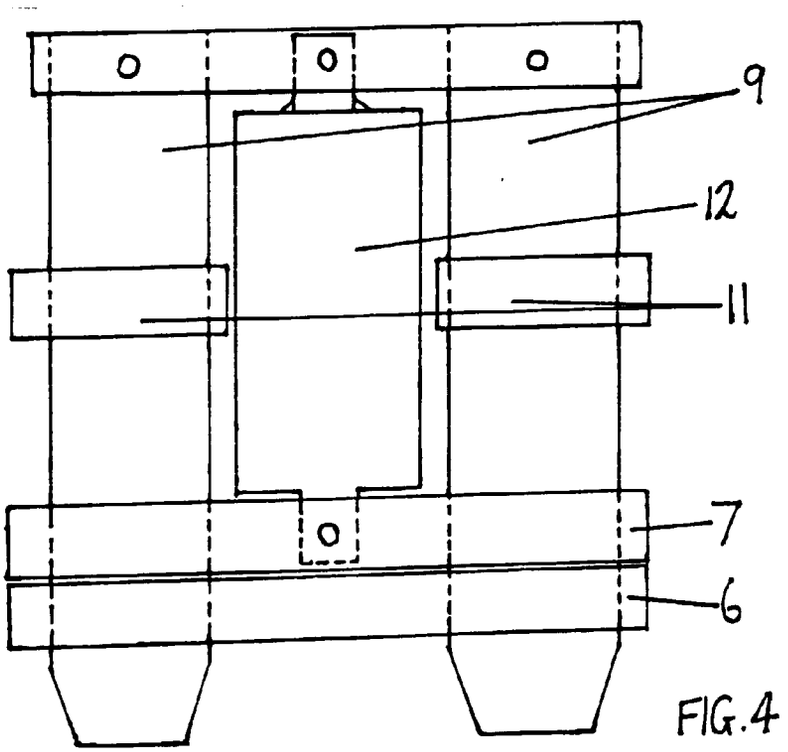

FIG. 4