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(54) **Device for crushing and/or cutting material.**

Vorrichtung zum Brechen und/oder Schneiden von Materialien

Dispositif pour concasser et/ou couper des matériaux.

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- **PATENT ABSTRACTS OF JAPAN vol. 1998, no. 02, 30 January 1998 (1998-01-30) -& JP 09 279862 A (TAKACHIHO KOGYO KK), 28 October 1997 (1997-10-28)**

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Description

[0001] The invention relates to a device for crushing and/or cutting material according to the preamble of claim 1. .

[0002] Such a device is known, for example from German Gebrauchsmuster No. 29715490 U1 and European patent No. 0 641 618 B1. Two pin bores must be aligned with corresponding openings formed in the frame for connecting the first jaw to the frame. After alignment, the first jaw is connected to the frame by means of fixing pins, which must be driven through the aligned openings and pin bores by means of a hand tool. Likewise, the fixing pins must be removed from the aligned openings and pin bores by means of a hand tool for disconnecting the first jaw from the frame.

[0003] The connecting and disconnecting method as described in German Gebrauchsmuster No. 29715490 U1 and European patent No. 0 614 618 is now considered to be laborious and time-consuming. In addition, the alignment of the first jaw with the frame and the subsequent provision of the fixing pins is made more difficult by the presence of dirt (sand, water, etc) that may accumulate between the various parts, and also by deformations of material on the various parts, which may occur during normal use of the device. Said deformations affect the dimensions of the various parts, making it difficult in the long run to precisely align the first jaw and the frame and to connect and disconnect the first jaw to the frame.

[0004] The object of the invention is to overcome the above drawbacks and to provide a device of the kind referred to in the introduction, which device on the one hand is of simple construction, comprising fewer parts, and by means of which furthermore the assembly of jaws can be connected to and disconnected from the frame in a quick, reliable manner without having to carry out time-consuming adjusting operations. According to the invention, the device is characterized according to the features of claim 1. The construction that is obtained in this way is not only simpler but above all stronger (stiffer), because all the forces that act one the pivot pin are directly transmitted to the frame.

[0005] In this way a reliable and above all quick coupling method is obtained, which on the one hand is not liable to wear or other kinds of deformations, and which on the other hand does not require any additional, time-consuming adjusting operations.

[0006] In a specific, functional embodiment, which guarantees rapid coupling and uncoupling, the coupling means comprise hook-shaped parts on the one hand and pins fitting in said hook-shaped parts, which function as first and second points of engagement, on the other hand. The points of engagement may be provided on the first jaw and the hook-shaped parts may be provided on the frame.

[0007] In a very functional embodiment, the first point of engagement is located on the pivot pin, which pivot pin is provided with projecting pin ends, which function as first points of engagement.

[0008] More in particular, the device according to the invention is characterized in that the fixing means comprise at least one extension element, which, in a first position of use, enables the coupling means to become disengaged from each other and which, in a second position of use, keeps at least one pin in engagement with a corresponding hook-shaped part. This simple construction makes it possible to connect the first jaw to the frame and disconnect it therefrom quickly and without time-consuming operations and maintain said connection during operation.

[0009] More specifically, the fixing means can be hydraulically actuated, in particular by means of the hydraulics of the setting cylinder. This enables a simple construction of the device according to the invention as regards the manner of coupling.

[0010] In one embodiment, the extension element is a spindle, whilst in another embodiment the extension element is the piston of an extension cylinder.

[0011] In this latter embodiment, the extension cylinder comprises two chambers, which chambers are connected to the hydraulics of the setting cylinder via a four-way adjusting valve. This enables a simple manner of actuating the fixing means and operating the setting cylinder. More in particular, a non-return valve is mounted in the hydraulic line to the chamber for the outward stroke, which valve functions to prevent the fixing from being undesirably released during normal operation.

[0012] In a specific embodiment, the outer circumference of each pin end may furthermore be provided with a bevelled surface, which functions as a contact surface for the extension element. This guarantees a correct engagement between the extension elements and the coupling means.

[0013] The invention will now be explained in more detail with reference to a drawing, in which:

Fig. 1 shows an embodiment of a device according to the prior art, which is coupled to the jib of an excavator;
Fig. 2 shows a device according to the prior art;
Figs. 3a-3c are partial views of the prior art device that is shown in Fig. 2;
Fig. 4 shows a first embodiment of a device according to the invention;
Figs. 5a and 5b are further views of an embodiment of a device according to the invention ;
Figs. 6a and 6b are other views of an embodiment of a device according to the invention;
Fig. 7 shows an embodiment of the hydraulics for use with a device according to the invention.

[0014] For a better understanding of the invention, like parts will be indicated by the same numerals in the description of the figures below.

[0015] The prior art device that is shown in Figs. 1-3 comprises a frame 1 including a first frame part 2, which

frame part 2 is coupled to a second frame part 3 by means of a turntable 2'. The two frame parts 2 and 3 are rotatable with respect to each other by means not shown, for example hydraulically operated setting means, which are known per se.

[0016] The frame part 2 is fitted with coupling means 4, 4' that are known per se, by which the device 1 can be coupled to the end of an arm 51 of an excavator 50 or a similar earthmoving machine, for example.

[0017] Furthermore, a first jaw 12 is connected to the frame part 3 of the frame 1 by means of a pivot pin 10 and a pin 11, which is spaced from the pivot pin 10, extending parallel thereto. The two pins 10 and 11 are accommodated in corresponding openings or bores 3a-3b formed in the frame part 3. Furthermore, a second movable jaw 13 can be pivoted about the pivot pin 10 by the setting cylinder 8, to which purpose the end 14a of a piston rod 14 of the setting cylinder 8 is coupled to one end of the pivotable jaw 13 by means of a pin 15 that extends parallel to the pivot pin 10. The setting cylinder 8 pivoted in the frame part 3 about pivot point 9 so as to enable outward movement of the piston rod 14.

[0018] To exchange the jaws 12-13 of a prior art device 1, which is mounted to the jib 51 of an excavator in the manner that is shown in Fig. 1, the pins 10, 11 and 15 must be removed in the position in which the device 1 is supported by the jib 51 in the manner that is shown in Fig. 1, preferably after the jaws 12 and 13 have been closed. The jaws 12-13 will remain connected to the jib 51, because the jaws will remain supported by hook-shaped parts 98, which engage behind a pin 101 of the frame part 3.

[0019] To disconnect the jaws 12-13, the free end of the fixed jaw 12 must be supported on the ground through suitable pivoting of the jib 51 of the excavator 50, as is shown in Fig. 2. Then the pin 15 must be removed by means of a hand tool, for example a sledgehammer, as is also shown in Fig. 2. The pins 10 and 11 must be removed by means of the same hand tool as well.

[0020] The frame part 3 can be disconnected from the first jaw 12 through suitable pivoting of the jib 51 of the excavator 50, as is shown from the left to the right in the successive views (a), (b) and (c) of Fig. 3, wherein the pins 101 are completely withdrawn from the hook-shaped parts 98 and the interconnected jaws 12 and 13 can be left behind on the ground, as is shown in view (c) of Fig. 3.

[0021] It will be apparent that the reverse order will be used for connecting the jaws. First the rod or pin 101 is hooked into the hook-shaped parts 98 through suitable manipulation of the frame part 3 that is coupled to the end of the jib 51, after which the coupled jaws 12-13 can be lifted in such a manner that they will pivot about the pin 101 until the fixed first jaw 12 abuts against the frame part 3.

[0022] In this position the passages formed in the jaws 12-13 for receiving the pins 10 and 11 will be aligned with the respective openings 3a-3b in the frame part 3. Subsequently, the pins 10-11 must be fitted by hand again. After the pins 10 and 11 have been fitted, the eye 14a fixed to the end of the piston rod 14 can be moved to a suitable position for inserting the pin 15 by moving the piston rod 14 outward.

[0023] The above-described coupling and uncoupling method according to the prior art is very laborious and time-consuming. The presence of dirt (sand, water, etc) that may accumulate between the various parts interferes with the alignment of the first jaw 12 with the frame part 3 and the subsequent insertion of the pins 10 and 11. Furthermore, as a result of the intensive use the various parts are subject to wear and to deformations of material. Said deformations affect the dimensions of the various parts, making it difficult in the long run to precisely align the first jaw and the frame and to couple and uncouple the first jaw 12 and the frame part 3.

[0024] Figs. 4, 5a-5b and 6a-6b show an embodiment of a device according to the invention that does not exhibit the above-described drawbacks of the prior art. As is shown in Figs. 4 and 5a-5b, which show the frame 2-3 (Fig. 4) and the assembly of the first jaw 12 and the second jaw 13 (Figs. 5a-5b), said frame and said assembly are according to the invention provided with coupling means 20a-20b and 21-21b, respectively, which jointly form two points of engagement, which enable the frame 2, 3 and the assembly of jaws 12-13 to interlock.

[0025] The coupling means 20a-20b as provided on the frame part 3 are configured as hook-shaped parts, which engage round projecting pins 21a-21b formed on the first jaw 12, which function as first and second points of engagement. Using this coupling method, the first jaw 12 and the further jaw 13 can be coupled to the frame part 3 in a simple manner by skilfully pivoting the frame part 3 by means of the jib of an excavator (see Fig. 1).

[0026] The points of engagement 21a-21b are configured as projecting stub ends, more in particular, the first point of engagement 21a forms part of the pivot pin 10. The pivot pin 10 is provided with projecting pin ends 21a, behind which the hook-shaped part 20a of the frame part 3 can hook.

[0027] According to the invention, fixing means 23 are furthermore provided, which function to keep the coupling means 20a-21a, 20b-21b interlocked.

[0028] The fixing means 23 are provided with an extension element 24, which can be suitably extended after the projecting pin ends 21a-21b of the first jaw 12 and the hook-shaped parts 20a-20b of the frame part 3 have been hooked together, so that the pin end 21b is retained in the hook-shaped part 20a. In this way a reliable engagement between the frame part 3 and the first jaw 12 is ensured and undesirable detachment of the first jaw 12 from the frame part 3 during operation is prevented.

[0029] Above all, the hook-shaped parts 20a and 20b are mounted to the frame part 3 in such a manner that said frame part 3 can optimally absorb most of the forces exerted by the setting cylinder 8. This significantly reduces the risk of play. Furthermore, the hook-shaped parts 20a-20b and the fixing means 24 are formed or integrated

in the side walls of the frame part 3. On the one hand a more robust construction is obtained in this manner, which enables the hook-shaped parts 20a-20b to absorb large forces exerted thereon by the setting cylinder 8 and/or the jaws 12-13 during operation. On the other hand it is thus ensured that the setting cylinder remains accessible for maintenance and the like.

[0030] In contrast to the prior art it is not necessary to fit additional pins or locking members by hand after the first jaw 12 has been connected to the frame part 3. It is only necessary to connect the second jaw 13 to the end 14 a of the extension rod 14 of the setting cylinder 8 by means of the pin 15.

[0031] To ensure that the projecting pins 21a-21b are properly retained in the corresponding hook-shaped parts 20a-20b, the circumferential surface of the projecting pin 21b is provided with a flattened portion 22, which functions as a contact surface for the extension element 24. In an optional embodiment, the pins 21a-21b are accommodated in the frame part 3 with some play, so that the contact surface 22 can adjust itself upon engagement with the hook-shaped parts 20a-20b so as to effect an optimum abutment of and engagement with the outwardly moved extension element 24.

[0032] The extension element 24 of the fixing means 23 may be in the form of a spindle, for example, or the piston of an extension cylinder. In both embodiments the extension element may be hydraulically actuated, in particular by the hydraulics of the setting cylinder 8. This makes it possible to use a simple construction for the device, making use of existing driving and/or actuating techniques, so that it is not necessary to provide separate, additional driving means.

[0033] One embodiment of the driving hydraulics of the fixing means 23 is shown in Fig. 7.

[0034] The fixing means 23 are connected to the hydraulics of the setting cylinder 8 by means of a four-way adjusting valve 26. The setting cylinder 8 has two cylinder chambers 8a and 8b for supplying a hydraulic medium under pressure (e.g. oil) via the hydraulic lines 8a' and 8b', respectively, for the outward stroke and the inward stroke, respectively, of the extension rod 14, which is connected to the second jaw 13, as is shown in the preceding figures.

[0035] With a view to ensuring a reliable operation it is essential that the engagement between the coupling means 20a-21b and 20b-21b be maintained when the first jaw 13 is being connected to the frame part 3. To that end, the extended position of the extension element 24 must be permanently maintained during operation, which means that the operating pressure of the hydraulic medium in the cylinder chamber 23a is to be maintained.

[0036] During the inward stroke of the extension rod 14, a medium under pressure (e.g. oil) will be supplied to the cylinder chamber 8b via the supply line 8b'. In the position of the four-way adjusting valve 26 that is shown in Fig. 7, the pressurised medium will be carried to the cylinder chambers 23a via the supply line 8b', the adjusting valve 26 and the supply lines 28' and 23a', via the one-way valves 25. The pressure increase in the cylinder chamber 23a that is created in this manner causes the extension elements 24 to extend, which extension elements thus ensure the engagement between the projecting pins 21b and the corresponding hook-shaped element 20b.

[0037] The one-way valves 25 guarantee or maintain the operating pressure in the cylinder chamber 23a, thus preventing undesirable return movement of the extension element 24, as a result of which the engagement between the coupling means 20a-21a and 20b-21b would be lost, which would lead to risky operating conditions.

[0038] During the outward stroke of the extension rod 14, pressurised hydraulic medium will be supplied to the cylinder chamber 8a via the supply line 8a'. The one-way valve 27 in the line section 29' prevents the pressurized medium that is being supplied via the line 8a' from being carried to the cylinder chamber of the fixing means 23 via the adjusting valve 26, the line 29' and the line 23b'. The hydraulic medium that is present in the cylinder chamber 8b will be returned to a storage vessel via the line 8b'.

[0039] The one-way valves 25 prevent the pressurised medium in the cylinder chamber 23a from flowing to the storage vessel via the lines 23a' and 28' and via the adjusting valve 26 and the line 8b'. This prevents undesirable return movement of the extension element 24.

[0040] To disconnect the first jaw 12 (together with the second jaw 13), the second jaw 13 must be closed, which is done by causing the extension rod 14 to move outward. This causes the second jaw 13 to move towards the first jaw 12. The jaw 13 is disconnected from the extension rod 14 in the closed position by removing the pin 15. Following this, the extension rod 14 is retracted from its extended position under the influence of medium under pressure. During the inward stroke of the extension rod 14, the medium that is present in the chamber 8a is carried back, for example to a storage vessel, in non-pressurised condition via the line 8a'. The one-way valve 27 prevents said medium from being carried to the chambers 23b of the fixing means 23 via the adjusting valve 26, the line 29' and via the lines 23b'. After being retracted, the extension rod 14 is locked or secured or fixed by means of a locking pin (not shown). As a result, the extension cylinder 14 does not interfere with the coupling and uncoupling of the jaws 12-13.

[0041] Subsequently, the adjusting valve 26 is turned through 90°, so that the line 8b' is connected to the line section 23b' and the cylinder chambers 23b. The cylinder chambers 23a are connected to the line 8a' via the line 23a' and the valve 26. Then the line 8b' is pressurized, so that medium under pressure is carried to the cylinder chambers 23b via the valve 26, the line section 29' and the line 23b'. The one-way valves 25 are in communication with the lines 23b' via an excess pressure pipe 25' , so that the one-way valves 25 are opened when the pres-

sure in the lines 23b' and the cylinder chambers 23b increases.

[0042] Thus, the extension element 24 can be returned or retracted, and the hydraulic medium that is present in the chamber 23a can be discharged in non-pressurized condition via the open one-way valve 25, the lines 23a' and the line 28', the adjusting valve 26, the one-way valve 27 and the line 8a'.

[0043] After retraction of the extension elements 24, the coupling means 20a-20b, 21a-21b apart by a rectilinear movement of the frame 2-3. The assembly of the first jaw 12 and the second jaw 13 remains behind on the supporting surface. Subsequently, another jaw assembly can be coupled to the frame part 3 again in the reverse order. The operator of the excavating machine does not need to pivot the frame 3, therefore, he only needs to impose a rectilinear movement, so that coupling and uncoupling can be carried out in a simpler and more rapid manner, in contrast to the techniques that are currently known.

[0044] Another tool provided with similar coupling means can be coupled to the frame part in a very simple and rapid manner, after which the adjusting valve 26 must be adjusted a quarter turn again (as shown in Fig. 7). By subsequently supplying a medium under pressure via the supply line 8b', said medium will on the one hand be carried to the chamber 8b, thereby maintaining the extension rod 14 in the retracted position thereof. On the other hand, the pressurised medium will be carried to the chambers 23a of the fixing means 23 via the adjusting valve 26 and the lines 28' and 23a' via the one-way valves. As a result of the pressure build-up in said chambers 23a, the extension element 24 is moved to its outward position and maintained in that position. The medium that is present in the chambers 23b will be discharged in non-pressurised condition via the lines 23b', the line 29', the adjusting valve 26 and the one-way valve 27 via the other line 8a.

[0045] It will be understood that a very rapid and safe exchange system for a gripping or demolishing tool is realised by means of this construction, which obviates the need for additional operations, such as the manual placement and removal of pins that is required in the prior art. Using the invention, a tool can be quickly coupled and uncoupled by means of the frame that is connected to the jib of an excavating machine, whilst furthermore the coupling or engagement between the frame part and the tool in question can be ensured under all operating conditions. This guarantees a safe operation of the device, whilst the risk of undesirable detachment of the tool from the frame part (with the dangerous situations that may result therefrom) is ruled out.

[0046] The extension elements 24 are locked to the frame part 3 by means of a locking pawl or pin 23' (see Fig. 6B). If an undesirable malfunction in the hydraulic system should occur, the extension element 24 can be also be disconnected mechanically by manually removing the locking pawl 23'. If the extension elements 24 are in the form of a spindle, said elements can likewise by manually turned to their retracted position (using a suitable tool) in the case of a hydraulic malfunction.

Claims

1. A device for crushing and/or cutting material, comprising

   a frame (1) connectable to the jib (103) of an excavator (104) or the like,
   a first jaw (12) connectable to the frame, which takes up a fixed position with respect to the frame during operation,
   a second jaw (13) that mates with said first jaw (12), which second jaw (13) is pivotable about a pivot pin (10) with respect to the frame (1) in a direction towards the first jaw and in a direction away from the first jaw by means of a setting cylinder (8),
   said first jaw (12) being provided with coupling means that are to interlock with coupling means forming part of the frame for hooking the first jaw to the frame, wherein
   the coupling means are composed of two spaced-apart points (20a-20b; 21a-21b) for engagement, at which engagement points the first jaw and the frame can interlock, and fixing means (23) are furthermore provided for keeping the coupling means interlocked at said engagement points, **characterized in that** the first point (20a;21a) of engagement is located on the pivot pin (10).

2. A device according to claim 1, further **characterized in that** said coupling means comprise hook-shaped parts (20a-20b) on the one hand and pins (21a-21b) fitting in said hook-shaped parts, which function as first and second points of engagement, on the other hand.

3. A device according to claim 2, further **characterized in that** the points of engagement are provided on the first jaw and the hook-shaped parts are provided on the frame.

4. A device according to claim 1, further **characterized in that** said pivot pin is provided with projecting pin ends , which function as first points of engagement.

5. A device according to any one or more of the preceding claims, further **characterized in that** the fixing means (23) comprise at least one extension element (24), which, in a first position of use, enables the coupling means to become disengaged from each other and which, in a second position of use, keeps at least one pin in engagement with a corre-

sponding hook-shaped part.

6. A device according to claim 5, further **characterized in that** the fixing means (23) can be hydraulically actuated, in particular by means of the hydraulics of the setting cylinder (8).

7. A device according to claim 5 or 6, further **characterized in that** the extension element is a spindle.

8. A device according to claim 5 or 6, further **characterized in that** the extension element (24) is the piston of an extension cylinder (23).

9. A device according to claim 8, further **characterized in that** the extension cylinder comprises two chambers (23a-23b), which chambers are connected to the hydraulics of the setting cylinder (8) via a four-way adjusting valve (26).

10. A device according to claim 9, further **characterized in that** a non-return valve (25) is mounted in the hydraulic line (23a') to the chamber (23a) for the outward stroke.

11. A device according to any one of the claims 5-10, further **characterized in that** the outer circumference of each pin end (21 b) is provided with a bevelled surface (22), which functions as a contact surface for the extension element (24).

Patentansprüche

1. Vorrichtung zum Zerkleinern und/oder Zerschneiden von Material, mit

einem Rahmen (1), der mit dem Ausleger (103) eines Baggers (104) oder dergleichen verbunden werden kann,
einer ersten Backe (12), die mit dem Rahmen verbunden werden kann und im Betrieb eine feste Stellung in Bezug auf den Rahmen einnimmt,
einer zweiten Backe (13), die mit der ersten Bakke (12) zusammenpasst,
wobei die zweite Backe (13) mittels eines Einstellzylinders (8) in Bezug auf den Rahmen (1) in eine Richtung zur ersten Backe hin und in eine Richtung von der ersten Backe weg um einen Gelenkbolzen (10) verschwenkt werden kann,
wobei die erste Backe (12) mit Verbindungsmitteln versehen ist, die mit Verbindungsmitteln in Eingriff gelangen sollen, die einen Teil des Rahmens bilden, um die erste Backe an den Rahmen festzuhaken, wobei
die Verbindungsmittel aus zwei voneinander beabstandeten Eingriffsstellen (20a-20b; 21a-21b) bestehen, an denen die erste Backe und der Rahmen in Eingriff gelangen können, und wobei außerdem Befestigungsmittel (23) vorgesehen sind, um die Verbindungsmittel an den Eingriffsstellen in Eingriff zu halten, **dadurch gekennzeichnet, dass** sich die erste Eingriffsstelle (20a, 21 a) am Gelenkbolzen (10) befindet.

2. Vorrichtung nach Anspruch 1, die ferner **dadurch gekennzeichnet ist, dass** die Verbindungsmittel einerseits hakenförmigeTeile (20a-20b) und andererseits in die hakenförmigen Teile passende Bolzen (21 a-21 b) aufweisen, die als erste und zweite Eingriffsstellen dienen.

3. Vorrichtung nach Anspruch 2, die ferner **dadurch gekennzeichnet, ist, dass** die Eingriffsstellen an der ersten Backe und die hakenförmigen Teile am Rahmen vorgesehen sind.

4. Vorrichtung nach Anspruch 1, die ferner **dadurch gekennzeichnet ist, dass** der Gelenkbolzen mit vorstehenden Bolzenenden versehen ist, die als erste Eingriffsstellen dienen.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, die ferner **dadurch gekennzeichnet ist, dass** die Befestigungsmittel (23) mindestens ein Verlängerungselement (24) aufweisen, das es in einer ersten Verwendungsstellung ermöglicht, die Verbindungsmittel außer Eingriff zu bringen, und in einer zweiten Verwendungsstellung mindestens einen Bolzen in Eingriff mit einem entsprechenden hakenförmigen Teil hält.

6. Vorrichtung nach Anspruch 5, die ferner **dadurch gekennzeichnet ist, dass** die Befestigungsmittel (23) hydraulisch, insbesondere mittels der Hydraulik des Einstellzylinders (8) betätigt werden können.

7. Vorrichtung nach Anspruch 5 oder 6, die ferner **dadurch gekennzeichnet ist, dass** das Verlängerungselement eine Spindel ist.

8. Vorrichtung nach Anspruch 5 oder 6, die ferner **dadurch gekennzeichnet ist, dass** das Verlängerungselement (24) der Kolben eines Ausfahrzylinders (23) ist.

9. Vorrichtung nach Anspruch 8, die ferner **dadurch gekennzeichnet ist, dass** der Ausfahrzylinder zwei Kammern (23a-23b) aufweist, die über ein Vierwege-Einstellventil (26) mit der Hydraulik des Einstellzylinders (8) verbunden sind.

10. Vorrichtung nach Anspruch 9, die ferner **dadurch gekennzeichnet ist, dass** in der Hydraulikleitung

(23a') zur Kammer (23a) ein Rückschlagventil (25) für den Hub nach außen angebracht ist.

11. Vorrichtung nach einem der Ansprüche 5 bis 10, die ferner **dadurch gekennzeichnet ist, dass** der Außenumfang jedes Bolzenendes (21 b) mit einer abgeschrägten Fläche (22) versehen ist, die als Kontaktfläche für das Verlängerungselement (24) dient.

Revendications

1. Dispositif pour concasser et/ou couper des matériaux, comprenant :

un bâti (1) pouvant être raccordé au bras (103) d'un excavateur (104) ou analogue ;
une première mâchoire (12) pouvant être raccordée au bâti, laquelle occupe une position fixe par rapport au bâti pendant une opération ;
une seconde mâchoire (13) qui s'adapte à ladite première mâchoire (12), laquelle seconde mâchoire (13) peut pivoter autour d'une broche de pivotement (10) par rapport au bâti (1), suivant une direction orientée vers la première mâchoire et suivant une direction qui l'éloigné de la première mâchoire au moyen d'un cylindre de réglage (8),
ladite première mâchoire (12) étant pourvue de moyens de couplage qui sont verrouillés mutuellement avec des moyens de couplage faisant partie du bâti en vue de suspendre la première mâchoire au bâti, dans lequel
les moyens de couplage sont composés de deux points séparés l'un de l'autre (20a-20b ; 21a-21b) pour s'engager, points d'engagement au niveau desquels la première mâchoire et le bâti peuvent se verrouiller mutuellement, et des moyens de fixation (23) sont prévus, de plus, pour maintenir les moyens de couplage verrouillés au niveau desdits points d'engagement, **caractérisé en ce que** le premier point (20a ; 21a) d'engagement est situé sur la broche de pivotement (10).

2. Dispositif selon la revendication 1, **caractérisé, de plus, en ce que** lesdits moyens de couplage comportent des pièces configurées en forme de crochet (20a-20b), d'une part, et des broches (21a-21b) s'ajustant dans lesdites pièces configurées en forme de crochet, lesquelles fonctionnent comme des premier et deuxième points d'engagement, d'autre part.

3. Dispositif selon la revendication 2, **caractérisé, de plus, en ce que** les points d'engagement sont prévus sur la première mâchoire et **en ce que** les pièces configurées en forme de crochet sont prévues sur le bâti.

4. Dispositif selon la revendication 1, **caractérisé, de plus, en ce que** ladite broche de pivotement est dotée d'extrémités de broche en saillie, lesquelles fonctionnent comme des premiers points d'engagement.

5. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé, de plus, en ce que** les moyens de fixation (23) comportent au moins un élément d'extension (24), lequel, dans une première position d'utilisation, permet aux moyens de couplage de se désengager les uns des autres et qui, dans une deuxième position d'utilisation, maintient au moins une broche en engagement avec une pièce configurée en forme de crochet correspondante.

6. Dispositif selon la revendication 5, **caractérisé, de plus, en ce que** les moyens de fixation (23) peuvent être actionnés hydrauliquement, en particulier au moyen des fluides hydrauliques du cylindre de réglage (8).

7. Dispositif selon la revendication 5 ou 6, **caractérisé, de plus, en ce que** l'élément d'extension est une broche.

8. Dispositif selon la revendication 5 ou 6, **caractérisé, de plus, en ce que** l'élément d'extension (24) est le piston d'un cylindre d'extension (23).

9. Dispositif selon la revendication 8, **caractérisé, de plus, en ce que** le cylindre d'extension comporte deux chambres (23a-23b), lesquelles chambres sont connectées aux fluides hydrauliques du cylindre de réglage (8) par l'intermédiaire d'une vanne de réglage à quatre voies (26).

10. Dispositif selon la revendication 9, **caractérisé, de plus, en ce qu'**une soupape de non retour (25) est montée dans la ligne hydraulique (23a') vers la chambre (23a) destinée à la course vers l'extérieur.

11. Dispositif selon l'une quelconque des revendications 5 à 10, **caractérisé, de plus, en ce que** la circonférence extérieure de chaque extrémité de broche (21b) est dotée d'une surface en biseau (22), laquelle opère comme une surface de contact pour l'élément d'extension (24).

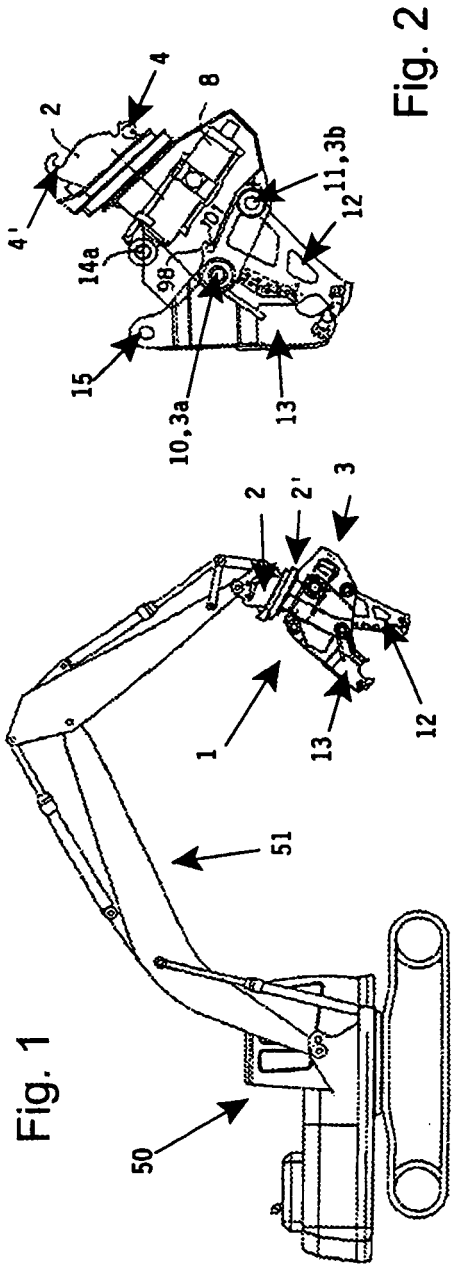


Fig. 1

Fig. 2

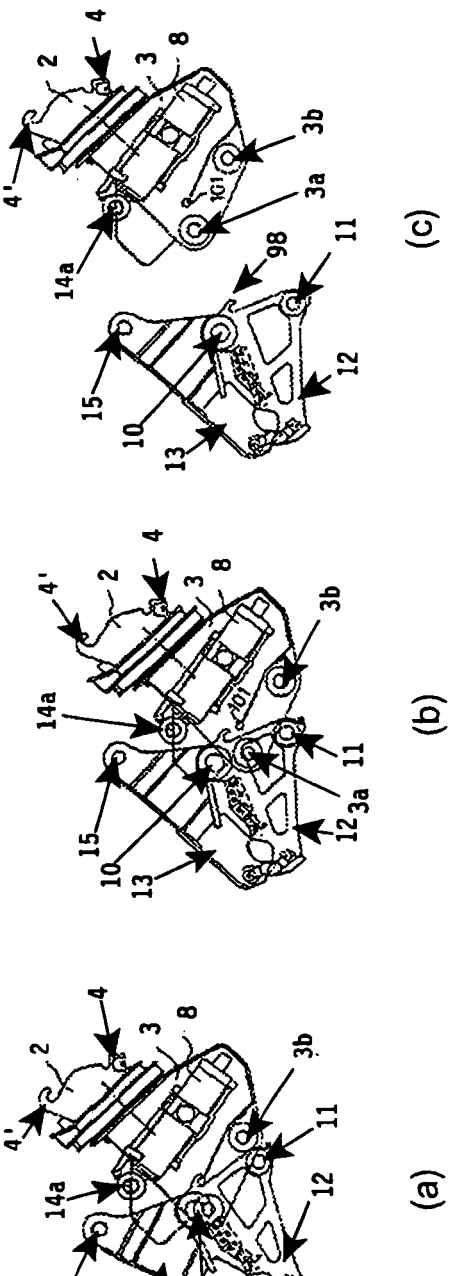


Fig. 3

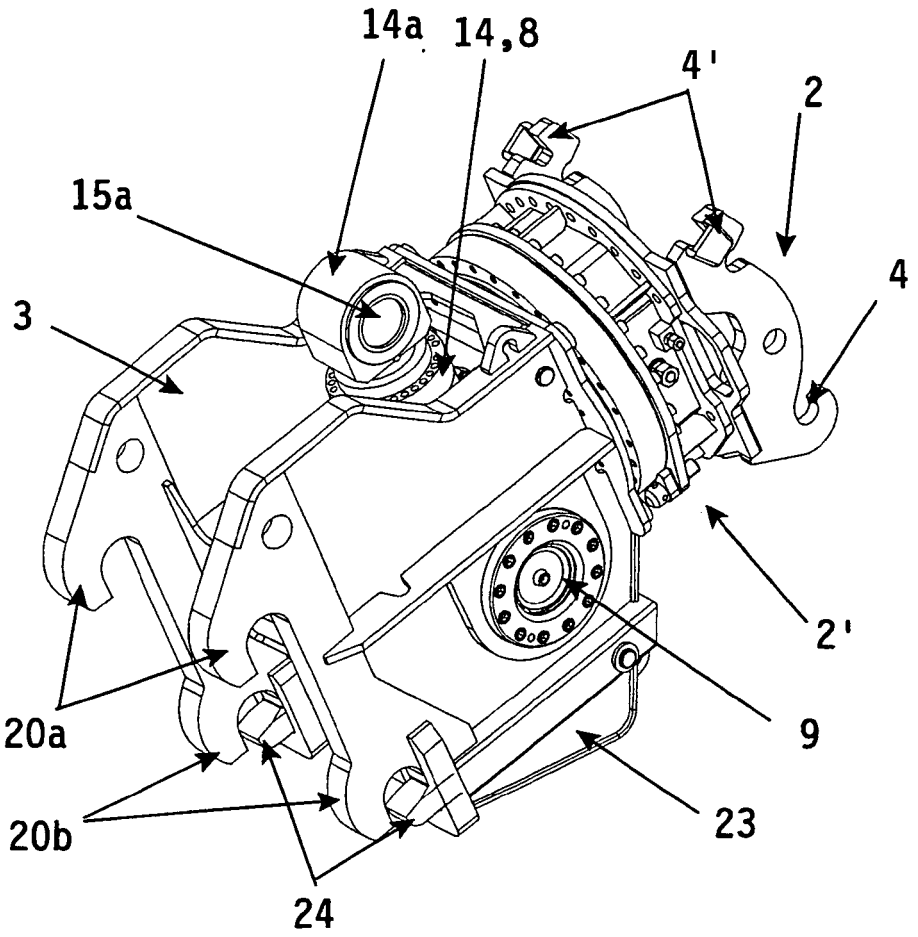


Fig. 4

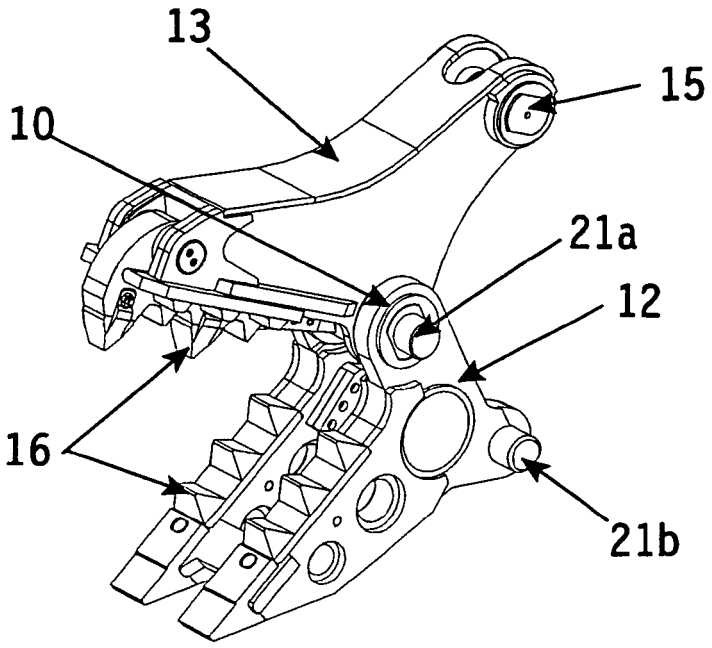


Fig. 5A

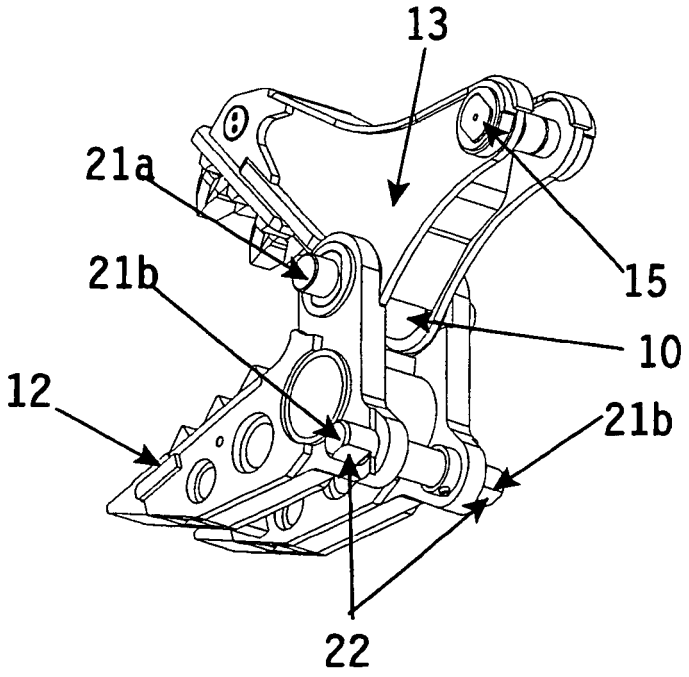


Fig. 5B

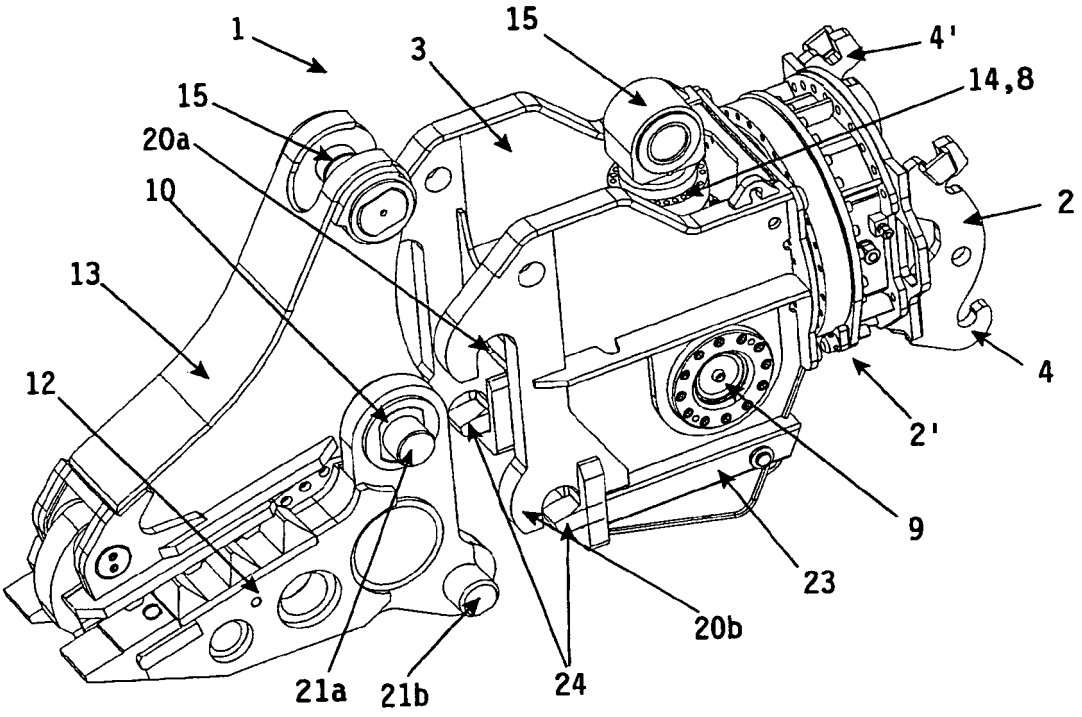


Fig. 6A

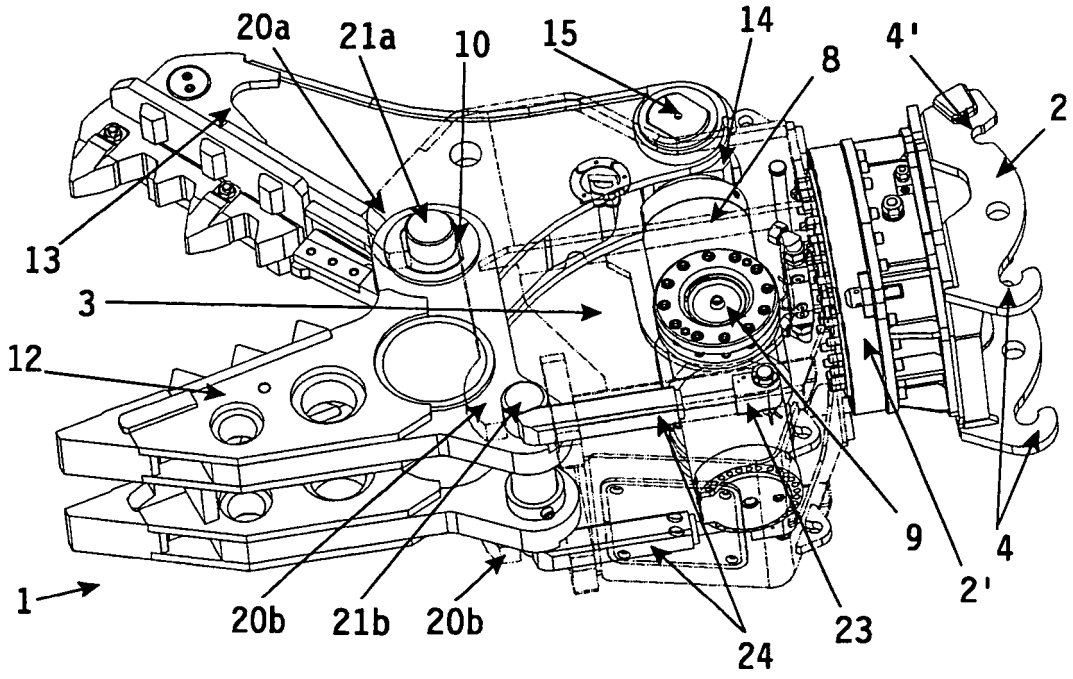


Fig. 6B

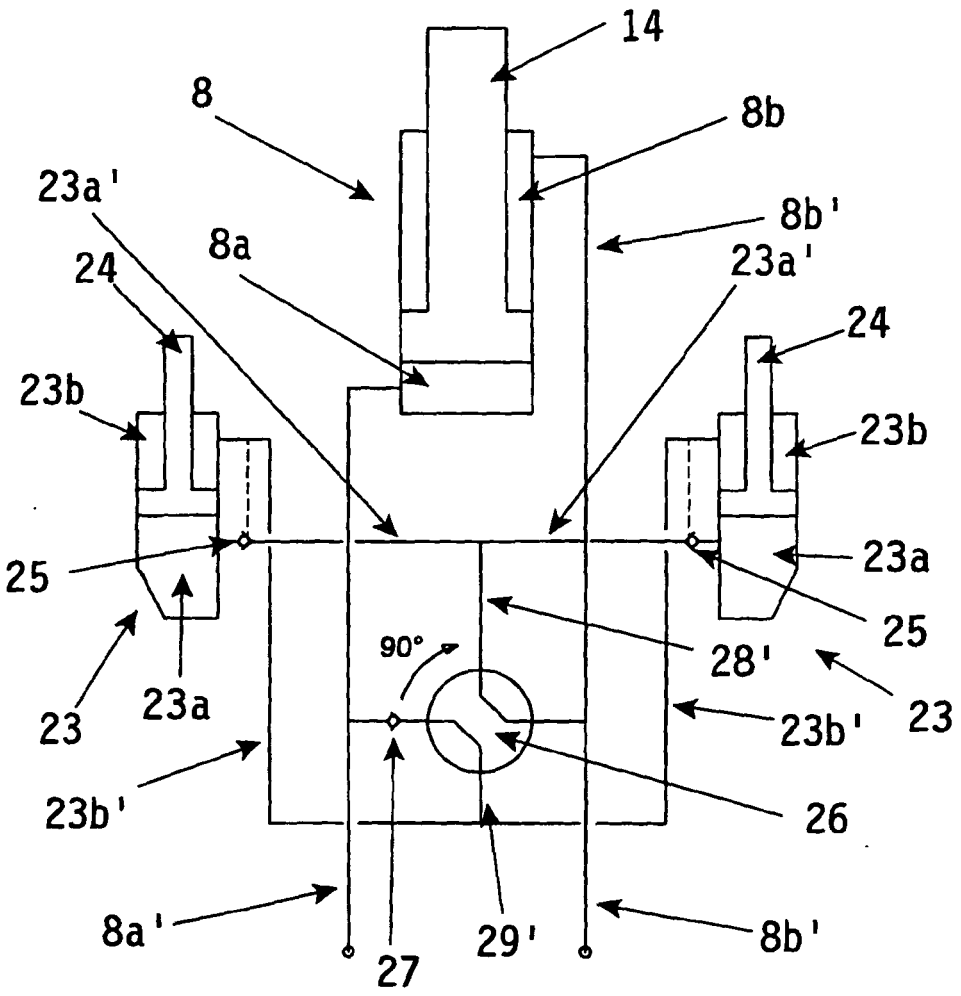

14
8
8b
23a'
8b'
8a
24
23a'
24
23b
23b
25
23a
25
90°
28'
23
23a
23b'
23
23b'
26
8a'
27
29'
8b'

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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