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(54) Excavator stabilisers

(57) According to the invention there is provided in combination a pair of stabilisers for respectively opposite ends of a moveable elongate blade of a mechanical excavator of the type having a moveably mounted digger arm remote from the moveable blade and a tool-carrying end for carrying e.g. an excavator bucket on the end of the arm, the stabilisers each comprising or including a blade engaging portion adapted to be releasably secured onto or into a respective end of the blade, the blade engaging portion supporting an end structure, and a resiliently deformable foot portion forming part of the end structure, the foot portion being adapted to, in use, and in combination with the corresponding foot portion of the other stabiliser, prevent the lowermost edge of the blade from touching the ground when the blade is lowered theretowards.

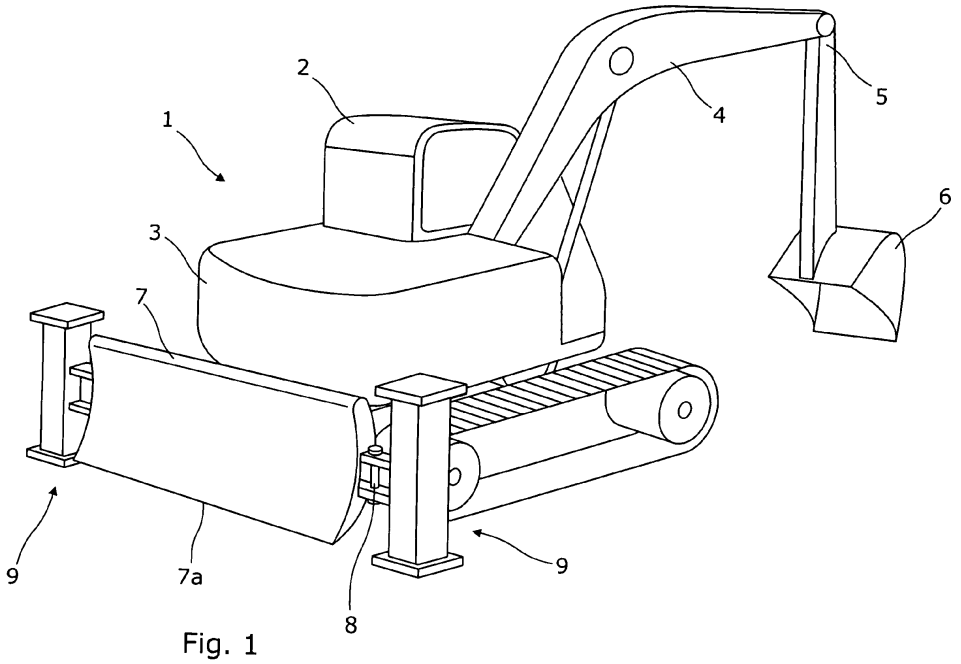

Fig. 1

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Description

[0001] This invention relates to mechanical diggers or excavators of the type having a movably mounted digger arm at one end, the arm having a tool-carrying end for carrying e.g. an excavation bucket, and a movably mounted elongated blade at the other end of the excavator to be lowered from a raised position to a ground level position for either pushing removed material such as sand and gravel in a direction away from the tool carrying end for e.g. flattening the ground, or operable in a ground engaging mode to stabilise the excavator during use of the digger arm and associated bucket. When operated in this latter mode it is usually necessary to ensure that the blade is lowered slightly beyond the plane of the ground on which the excavator is standing, thereby slightly raising that part of the body of the excavator such that the point of greatest weight is as far as possible away from the tool-carrying end of the digger arm, to thereby maximise the stability of the excavator for e.g. subsequently digging a trench.

[0002] The foregoing scenario for stabilising an excavator will inevitably leave a mark corresponding to the underside of the blade which, on soft ground, is not particularly problematic since it can be subsequently smoothed over. However, where the excavator is to be used on hard surfaces, such as roads, pavements and patios, the mark left by the underside of the blade can be very unsightly and can also cause unwanted damage, leading to penalties being imposed on e.g. utility companies by Local Councils. An obvious way of avoiding such problems is by putting wooden chocks or rubber tyres underneath the blade to ensure that it never touches the hard surface, but this has Health & Safety implications for the operator of the excavator, and it is also time consuming and tedious to reposition such objects every time the excavator is to be moved.

[0003] The present invention is derived from the realisation that there is a need for a solution to the foregoing problems that can be easily fixed in place and, when so fixed, permits the operator of the excavator to raise and lower the blade as required for moving the excavator from one position to another, without compromising the stability otherwise available by the use of the underside of the blade for this purpose.

[0004] According to a first aspect of the invention there is provided in combination a pair of stabilisers for respectively opposite ends of a moveable elongate blade of a mechanical excavator of the type having a moveably mounted digger arm remote from the moveable blade and a tool-carrying end for carrying e.g. an excavator bucket on the end of the arm, the stabilisers each comprising or including a blade engaging portion adapted to be releasably secured onto or into a respective end of the blade, the blade engaging portion supporting an end structure, and a resiliently deformable foot portion forming part of the end structure, the foot portion being adapted to, in use, and in combination with the corresponding foot portion of the other stabiliser, prevent the lowermost edge of the blade from touching the ground when the blade is lowered theretowards.

[0005] With this arrangement the stabilisers may be secured to respective ends of the blade in any convenient manner but, when so secured, the excavator is therefore converted for use on e.g. roads or pavements without any risk of the blade damaging the surface when it is lowered theretowards in order to stabilise the excavator.

[0006] Conveniently, where the excavator is of the type having an elongated blade adapted to receive extension pieces at each end, the extension pieces being slotted into an upper, tubular, part of the blade and thereafter secured in place with a pin, a stabiliser in accordance with the invention may be used instead, with the stabiliser arm being inserted into the tubular opening up to a required limit, which may be variable, and then secured in position, with a corresponding stabiliser being secured on the other end of the blade.

[0007] In one embodiment, the blade engaging portion is an arm adapted to be releasably secured onto or into a respective end of the blade, and the end structure is a leg, in which the resiliently deformable foot portion forms part of the leg. The leg may be of a length greater than the lowermost edge of the blade when the stabiliser arm is fitted thereto. Stabilisers of this type are particularly suited for use with relatively lightweight mechanical diggers or excavators such as 1.5 tonne devices.

[0008] Advantageously, the leg of each stabiliser is mounted on the arm transverse to it, and each leg is symmetrical about the major axis of the arm and having a foot portion on each end, thereby to ensure that when the stabiliser is fitted to the blade in either orientation the lowermost edge of the blade cannot be grounded.

[0009] In further embodiments, the blade engaging portion includes an elongate portion for insertion into a tubular part of the blade and securing thereto, for example with a pin which is inserted into an aperture formed in the elongate portion. The end structure may include a bracket adapted to be secured against the underside of the blade, the deformable foot portion forming part of the bracket.

[0010] Advantageously, each stabiliser is formed in two or more pieces, in which a first piece includes the elongate portion and a second piece includes the bracket, the first and second pieces being releasably coupleable, either directly or indirectly. In these embodiments, the blade engaging portion may include an end fixing structure for positioning against one end of the blade, in which the elongate portion extends from the end fixing structure. The blade engaging portion may further include a bracket engaging elongate portion which extends from the end fixing structure and is releasably coupleable with a receiving portion on the bracket which receives the bracket engaging elongate portion. Embodiments of this type are particularly advantageous with relatively large mechanical diggers or excavators, such as diggers or excavators of greater than 1.5 tonnes weight.

[0011] Conveniently, the or each foot portion is made of an elastomeric material and is replaceable so that as the elastomeric material wears out through continuous use the foot portion can simply be replaced.

[0012] According to a second aspect of the invention there is provided a method of preventing damage to a ground surface on which a mechanical excavator of the type described is resting, including the steps of fitting a respectively opposite pair of stabilisers to the ends of the excavator blade when in its raised condition, and thereafter lowering the blade until the foot portions of the pair of stabilisers contact the ground, and thereafter commencing work with the moveably mounted digger arm and associated tools.

[0013] The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the rear and one side of a mechanical excavator;

Figure 2 shows a first embodiment of a stabiliser;

Figure 3 shows (a) an end view and (b) a rear view of a bracket of a second embodiment of a stabiliser; and

Figure 4 shows (a) an end view and (b) a rear view of an end fixing plate of the second embodiment of the stabiliser.

[0014] Figure 1 is a perspective view of the rear and one side of a mechanical excavator shown generally at 1 comprising an operator cab 2 swivelably mounted on a tracked chassis 3 and having at its forward end a moveably mounted digger arm 4. At the free end of the digger arm 4 is a tool-carrying end 5 for, typically, carrying an excavation bucket 6, which may be of variable size.

[0015] At the other end of the excavator 1 is a stabiliser blade 7 which can be raised and lowered as required to either push loose material such as sand and gravel for the purposes of levelling it, or to act instead as a stabiliser when the digger arm 4 is in use. In such latter configuration, the lowermost edge 7a of the blade 7 is normally pressed into the ground so as to stabilise the rest of the excavator 1 when the digger arm 4 is in use. As is well known, the blade 7 is in some respects of hollow construction to the extent that sockets 8 may be provided at both ends for the purposes of e.g. fitting extension blades (not shown) so as to widen the overall length of the blade 7. However, whether or not extension pieces to the blade 7 are attached it will be understood that when the lowermost edge 7a of the blade 7 is in contact with hard surfaces such as roads and pavements there is a danger of causing damage thereto, and this problem is addressed in accordance with this embodiment of the invention by the use of generally 'T'-shaped stabilisers 9 inserted within respective sockets 8 at each end of the blade 7. As is shown more clearly with reference to Figure 2 each stabiliser 9 comprises a generally channel-shaped arm 10 for fitting into the socket 8, the arm 10 also including a through bore 11 positioned to align with corresponding bores (not shown) within the socket 8 and into which a retaining pin may be inserted to releasably secure the arm 10 within the socket 8.

[0016] The arm 10 is fixed to a leg 12 mounted transverse to it, on each end of which is a foot portion 13 with an elastomeric outer layer 14. The leg 12 is symmetrical relative to the major axis of the arm 10 so that, whether used on one side or the other of the blade 7, the spacing between the major plane of the arm 10 and each foot 13 remains the same. This spacing is greater than the distance between the major axis of the arm 10 and the lowermost edge 7a of the blade 7 so that, when the stabilisers 9 are fitted to respective ends of the blade 7 it can never engage with the ground. In this condition, when the blade 7 is lowered the feet 13 and hence elastomeric pads 14 engage the ground instead, thus preventing any damage to the surface. In addition, the effective length of the stabiliser blade 7 is increased, such that overall stability for the excavator 1 is correspondingly increased.

[0017] When the excavator 1 has to be moved to a new working position it is simply necessary for the blade 7 to be raised and then lowered again in the new working position without the need for the operator of the excavator to leave the cab 2 and provide alternative means of ensuring that the lower edge 7a of the blade 7 does not come into contact with the ground. The invention therefore provides an elegantly simple solution to a potentially serious problem by using existing formations or recesses in the blade 7 for the purpose of ensuring that when it is to be used as a stabiliser on hard ground it can be easily prevented from causing damage thereto without compromising the safety of the operator.

[0018] Figures 3 and 4 show a second embodiment of a stabiliser which is particularly useful for fitting to larger excavator devices up to and including 8 tonne excavators. The stabiliser of the second embodiment is in two-part form. Figure 3 shows a bracket, depicted generally at 30, and Figure 4 shows an end fixing plate, depicted generally at 40, which, in use, is coupled to the bracket 30. The bracket 30 comprises a main body portion 31 generally of triangular cross-sectional shape which is fitted underneath the blade. A plate 32 is upstanding from the body portion 31 so as to be locatable at the rear of the blade. The plate 32 upstands from a rear wall 31 a of the body portion 31. Also in connection with the rear wall 31 a is an elongate socket 33. The body portion 31 also comprises an upstanding front lip 31 b which locates against the lower front edge of the blade. A foot portion 34 is attached to a lower portion 31 c of the body portion 31 by any convenient means, such as via screws, bolts or other fixing elements. The foot portion 13 is formed from a suitable resiliently deformable material such as nylon or an elastomer. The end fixing plate 40 comprises a main plate 41 which may be shaped so as to generally conform with the shape of the end of the blade. A locating piece 42 is positioned at the front of the end fixing plate 40 so as to locate on the front end of the blade. The end

fixing plate 40 further comprises first and second elongate portions 43, 44 which extend inwardly from an inner surface of the plate 41. It is understood that the terms 'inwardly' and 'inner' refer to the end fixing plate when fitted to the end of the blade. The first elongate portion 43 extends from near to the top of the plate 41, and in use is disposed in the socket of the blade. The first elongate portion 43 has a through bore 43a which is positioned to align with corresponding bores within the socket of the blade, thereby permitting the end fixing plate 40 to be releasably secured to the blade via a pin in a manner substantially identical to that described earlier in relation to the first embodiment. The second elongate portion 44 is disposed near to the bottom of the plate 41, and is sized and positioned so as to be received in an inner bore 33a formed in the socket 33. The second elongate portion has a through bore 44a for receiving a pin which also extends through a bore formed in the socket 33 (not shown). In this way, the bracket 30 can be releasably secured to the end fixing plate 40, which in turn is releasably secured to the blade 7. The plate 32, socket 33 and locating piece 42 may be conveniently welded into place. At least part of the main portion 31 of the bracket 30 can be conveniently and advantageously formed by appropriate folding of a metal plate into shape. The lower portion 31 c of the main portion 31 may be reinforced with another plate. Alternatively, the lower portion 31 c may be formed from a separate base plate which may be folded to produce the lip 31 b. The end fixing plate 40 may be formed in adjustable multiple parts, or may be otherwise adjustable so as to facilitate positioning against blades of different sizes and shapes.

Claims

1. In combination a pair of stabilisers for respectively opposite ends of a moveable elongate blade of a mechanical excavator of the type having a moveably mounted digger arm remote from the moveable blade and a tool-carrying end for carrying e.g. an excavator bucket on the end of the arm, the stabilisers each comprising or including a blade engaging portion adapted to be releasably secured onto or into a respective end of the blade, the blade engaging portion supporting an end structure, and a resiliently deformable foot portion forming part of the end structure, the foot portion being adapted to, in use, and in combination with the corresponding foot portion of the other stabiliser, prevent the lowermost edge of the blade from touching the ground when the blade is lowered theretowards.

2. A pair of stabilisers according to claim 1 in which the blade engaging portion is an arm adapted to be releasably secured onto or into a respective end of the blade and the end structure is a leg, in which the resiliently deformable foot portion forms part of the leg.

3. A pair of stabilisers according to claim 2 in which the leg is of a length greater than the lowermost edge of the blade when the stabiliser arm is fitted thereto.

4. A pair of stabilisers according to claim 2 or claim 3 in which the leg of each stabiliser is transversely mounted on the arm, and each leg is symmetrical about the major axis of the arm and has a foot portion on each end, thereby to ensure that when the stabiliser is fitted to the blade in either orientation the lowermost edge of the blade cannot be grounded.

5. A pair of stabilisers according to any previous claim in which the blade engaging portion includes an elongate portion for insertion into a tubular part of the blade and securing thereto.

6. A pair of stabilisers according to claim 5 wherein each stabiliser further includes a pin which can be inserted into an aperture formed in the elongate portion to secure the elongate portion to the blade.

7. A pair of stabilisers according to any previous claim in which the end structure includes a bracket adapted to be secured against the underside of the blade, the deformable foot portion forming part of the bracket.

8. A pair of stabilisers according to claim 7 wherein each stabiliser is formed in two or more pieces, in which a first piece includes the elongate portion and a second piece includes the bracket, the first and second pieces being releasably coupleable, either directly or indirectly.

9. A pair of stabilisers according to claim 8 in which the blade engaging portion includes an end fixing structure for positioning against one end of the blade, in which the elongate portion extends from the end fixing structure.

10. A pair of stabilisers according to claim 9 in which the blade engaging portion further includes a bracket engaging elongate portion which extends from the end fixing structure and is releasably coupleable with a receiving portion on the bracket which receives the bracket engaging elongate portion.

11. A pair of stabilisers according to any previous claim in which each foot portion is made of an elastomeric material.

12. A pair of stabilisers according to claim 11 in which the elastomeric material is replaceable so that as the elastomeric material wears out the foot portion can be replaced.

13. A method of preventing damage to a ground surface on which a mechanical excavator is resting, the mechanical excavator being of the type having a moveable elongate blade, a moveably mounted digger arm remote from the moveable blade and a tool-carrying end for carrying e.g. an excavator bucket on the end of the arm, including the steps of fitting a respectively opposite pair of stabilisers to the ends of the excavator blade, lowering the blade until the foot portions of the pair of stabilisers contact the ground, and thereafter commencing work with the moveably mounted digger arm and associated tools.

14. A mechanical excavator of the type having a moveably elongate blade, a moveably mounted digger arm remote from the moveable blade, and a tool-carrying end for carrying e.g. an excavator bucket on the end of the arm, the mechanical excavator further comprising a pair of stabilisers, in which the stabilisers each comprise or include a blade engaging portion which is releasably secured onto or into a respective end of the blade, the blade engaging portion supporting an end structure, and a resiliently deformable foot portion forming part of the end structure, the foot portion in combination with the corresponding foot portion of the other stabiliser preventing the lowermost edge of the blade from touching the ground when the blade is lowered theretowards.

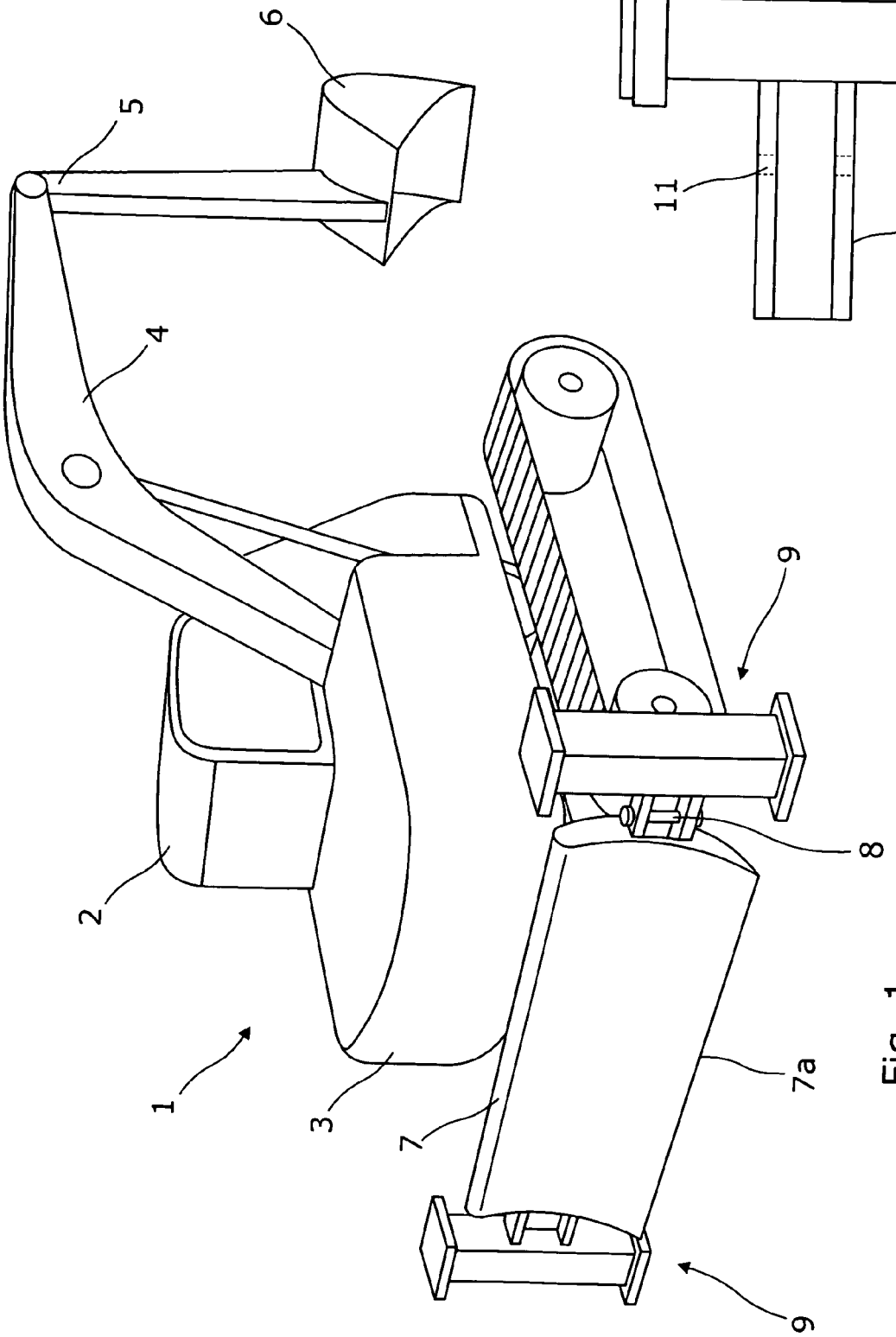

Fig. 1

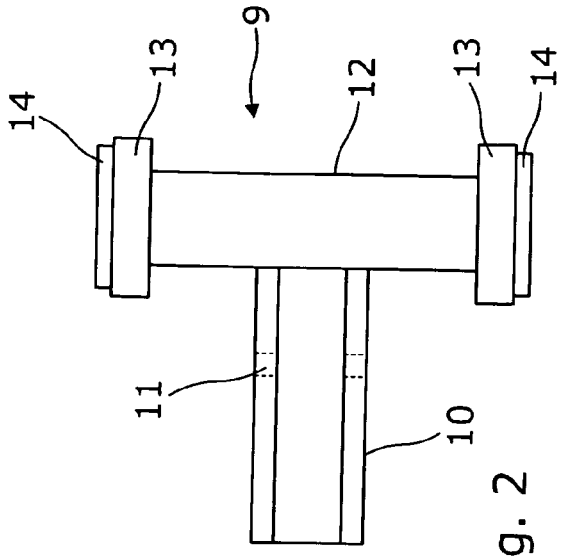

Fig. 2

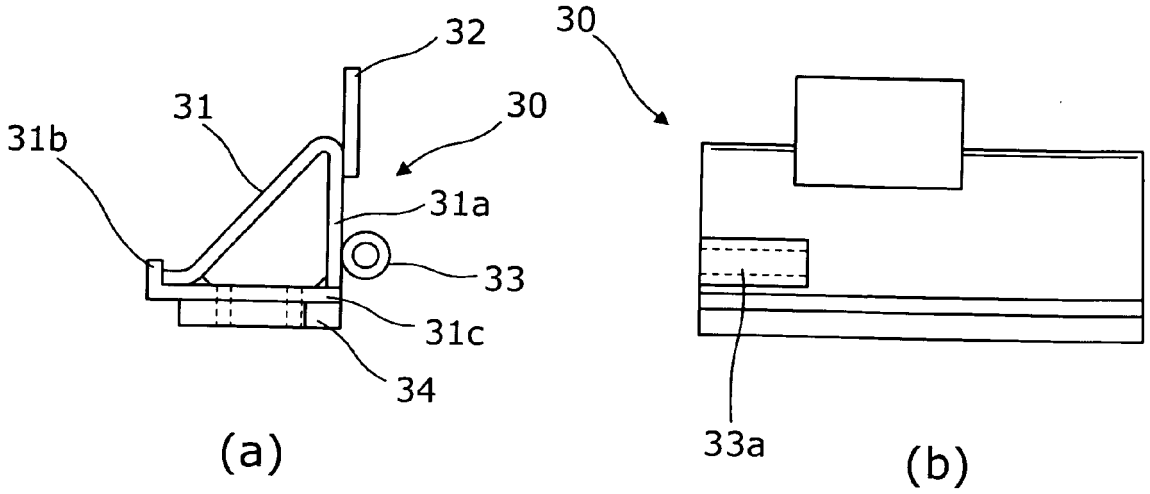

Fig. 3

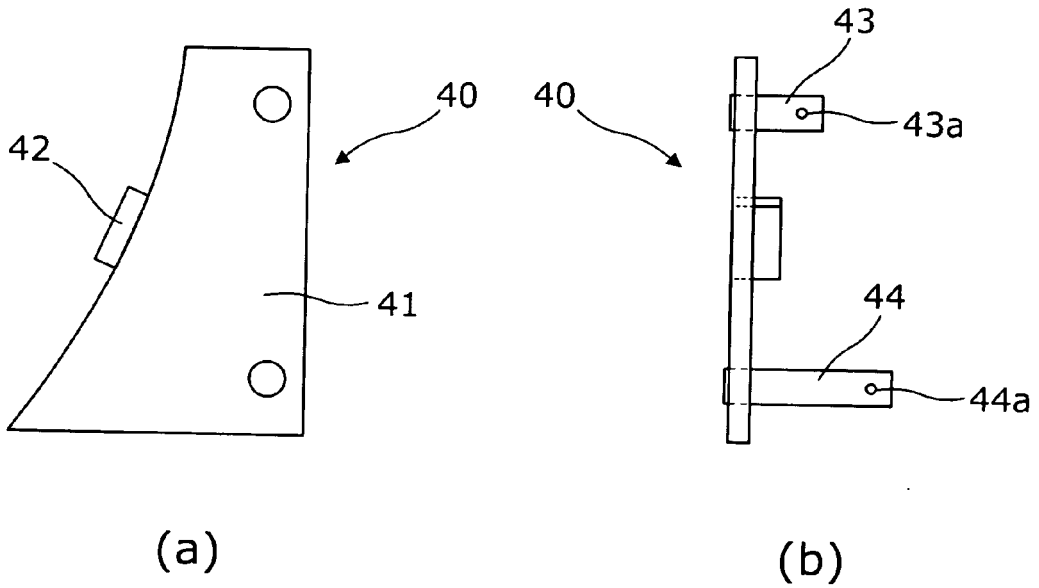

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 11 27 5112

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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
Munich	13 January 2012	Clarke, Alister

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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