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(54) High-penetration excavator bucket

(57) A high-penetration backhoe bucket for excavators provided, proximate to the eyes for coupling to the excavator working arm, with a variable-frequency vibrating assembly (3) connected rigidly thereto.

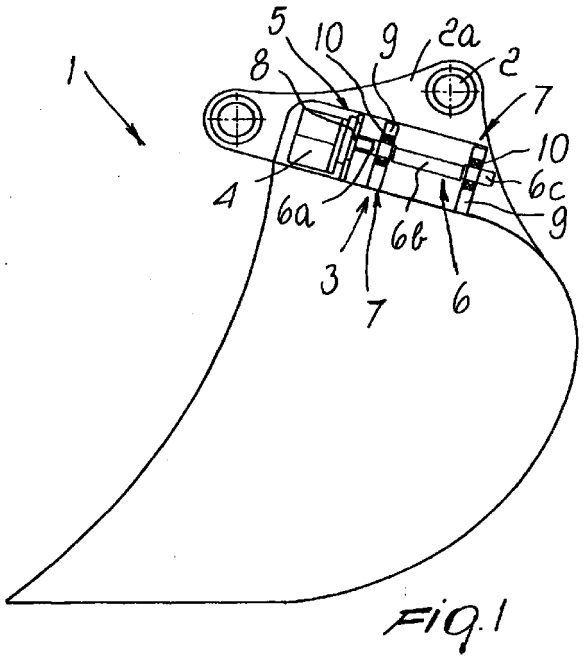

Fig.1

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Description

[0001] The present invention relates to a high-penetration backhoe bucket for excavators.

[0002] During the use of excavators it is often necessary to produce a breakthrough action in order to allow the bucket to penetrate for example through a layer of asphalt covering material or through stratifications of rocky soil which accordingly are mechanically highly resistant.

[0003] In such cases, before using the conventional bucket, a pointed tool, known as hammer, is fined to the arm of the excavator instead of the bucket and the machine bites into the soil with said tool.

[0004] Then, once the hard section has been broken up, the hammer is removed and the bucket is reinstalled in order to perform the actual excavation by removing the residual material.

[0005] As an alternative, a pneumatic hammer is used to break up said material, and the excavator can intervene only thereafter in order to remove the material.

[0006] Such prior art requires substantially complex and time-wasting and accordingly uneconomic operations, since a number of maneuvers are necessary for the consecutive disassembly and refitting of at least two tools on the arm of the excavator or requires the intervention of operators assigned to handling the pneumatic hammers in addition to the working step for actual excavation performed by the excavator.

[0007] Besides this first problem, conventional backhoe buckets suffer a second problem which is constituted by the necessity to ensure, during the emptying of the bucket, that all the loaded material falls out leaving the bucket completely empty.

[0008] Currently, in order to solve this problem transverse partitions are fitted inside buckets and are fixed to the actuation arm, and the bucket can rotate with respect to them; these partitions accordingly sweep all of the internal part and drag all the material towards the front lip.

[0009] This structure is substantially complicated to provide in practice and is in any case an additional factor in the manufacturing costs of the buckets.

[0010] The aim of the present invention is to solve the above-mentioned problems of the prior art by providing a high-penetration backhoe bucket for excavators which allows to eliminate the necessity to use multiple tools in case of mechanically highly resistant soils or, as an alternative, the auxiliary intervention of pneumatic hammers, and is at the same time self-cleaning without the intervention of additional devices inside the bucket.

[0011] This aim and other objects are achieved by a high-penetration backhoe bucket for excavators, characterized in that proximate to the eyes for coupling to the working arm of excavators it is rigidly provided with a variable-frequency vibrating assembly.

[0012] Further characteristics and advantages will become better apparent from the following detailed description of a preferred embodiment of a high-penetration backhoe bucket for excavators, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic side view, in phantom lines, of the backhoe bucket according to the invention;
Figure 2 is a corresponding rear view thereof.

[0013] With reference to the above figures, 1 designates a high-penetration backhoe bucket for excavators which is rigidly provided, proximate to the eyes 2 for coupling to the working arm of the excavator, with a variable-frequency vibrating assembly 3.

[0014] The assembly comprises a motor 4 whose frame is supported on the bucket 1 by way of corresponding first means 5 and from which a rotating shaft 6 protrudes; said shaft also is supported by the bucket by way of corresponding second means 7 and is divided into three consecutive longitudinal sections: a first proximal one 6a and a third distal one 6c, which are coaxial to the motor 4, and a second intermediate one 6b, which is eccentrically axially offset.

[0015] The first means 5 for supporting the frame of the motor 4 on the bucket 1 consist of a first transverse flange 8 which is rigidly fitted between the brackets 2a that support the eyes 2 for coupling to the arm of the excavator.

[0016] The second means 7 for supporting the rotating shaft 6 consist of two additional transverse flanges 9 which are arranged in succession and parallel with respect to the first flange 8 and are rigidly coupled between the brackets 2a.

[0017] Antifriction means, constituted by respective bearings 10 with low rolling friction, are interposed between the rotating shaft 6 and the brackets 2a.

[0018] The operation of the present invention can be clearly deduced from the above description: when the bucket 1 is used for excavation, in the presence of soil with high mechanical resistance to penetration the motor 4 is activated, turning the shaft 6.

[0019] The intermediate portion 6b of the shaft produces a vibration of the entire bucket 1 which allows the front chisel lip of the bucket to overcome the mechanical resistance of the soil and penetrate deeply.

[0020] Likewise, during the emptying of the removed material, said induced vibration and the downward-facing position of the bucket 1 achieve the complete emptying of said bucket without having to provide partitions or other appendages suitable for the purpose.

[0021] In practice it has been observed that the above-described invention achieves the intended aim and objects.

[0022] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0023] Moreover, all the details may be replaced

with other technically equivalent ones.

[0024] In practice, the materials employed, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the protective scope of the appended claims.

[0025] The disclosures in Italian Patent Application No. MO99A000124 from which this application claims priority are incorporated herein by reference.

[0026] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A high-penetration backhoe bucket for excavators, characterized in that it comprises, proximate to the eyes (2) for coupling to the working arm of excavators, a variable-frequency vibrating assembly (3), connected rigidly thereto.

2. The bucket according to claim 1, characterized in that said vibrating assembly comprises a motor (4) whose frame is supported on said bucket (1) by virtue of corresponding first means (5) and from which a rotating shaft (6) protrudes which also is supported on the bucket (1) by way of corresponding second means (7) and is divided into three consecutive longitudinal sections, a first proximal one (6a) and a third distal one (6c) being coaxial to said motor (4), a second intermediate section (6b) being eccentrically axially offset.

3. The bucket according to claim 2, characterized in that said first means (5) for supporting the frame of the motor (4) on the bucket (1) are constituted by a first transverse flange (8) which is rigidly fitted between the brackets (2a) for supporting the eyes (2) for coupling to the arm of the excavator.

4. The bucket according to claim 2, characterized in that said second means (7) for supporting said rotating shaft (6) are constituted by two additional transverse flanges (9) which are arranged in succession and parallel to said first flange (8) and are rigidly coupled between said eye supporting brackets (2a), antifriction means (10) being interposed between said rotating shaft (6) and said brackets (2a).

5. The bucket according to claim 4, characterized in that said antifriction means are constituted by respective bearings (10) with low rolling friction.

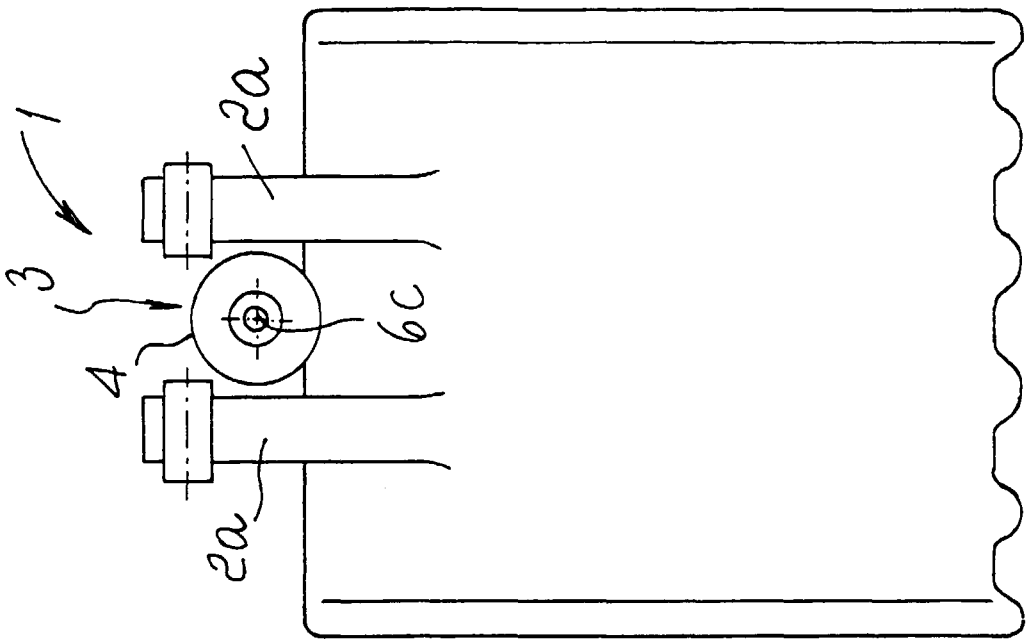

Fig. 2

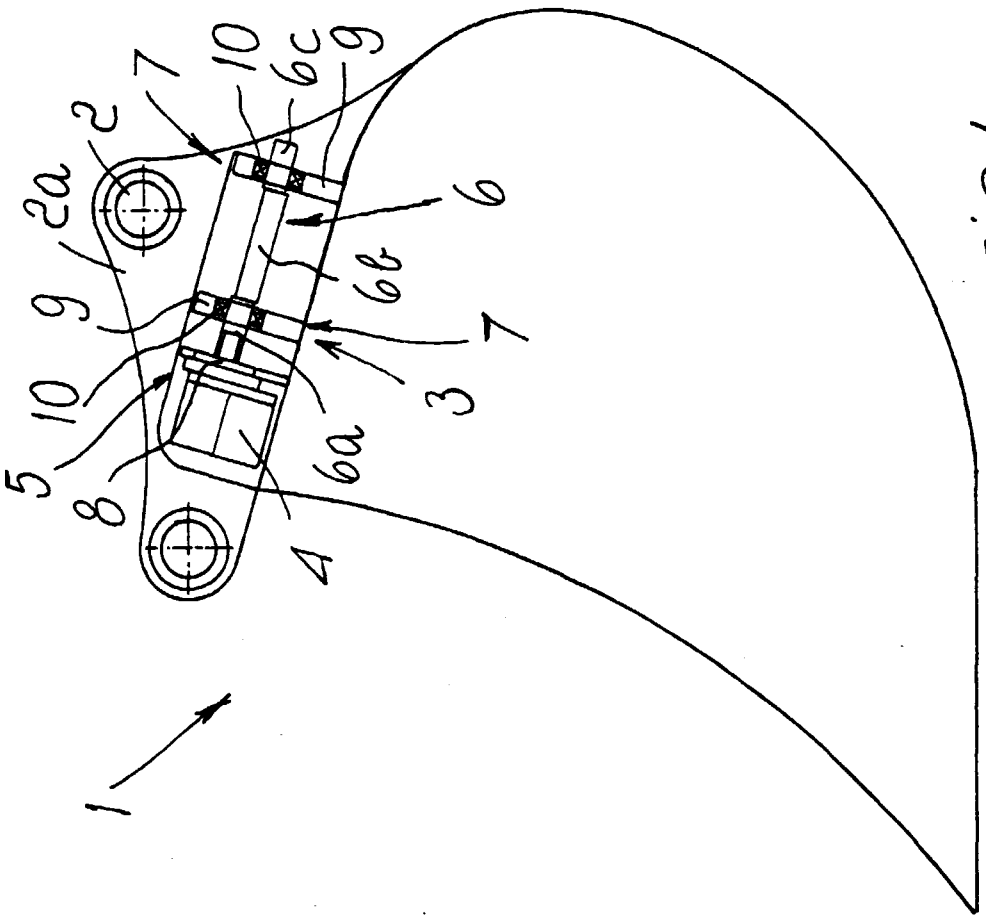

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 00 11 1051

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A	* abstract * * page 6, line 8 - page 7, line 4 * * page 11, line 34 - page 12, line 7 * * figures 1-6 *	3-5	
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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	15 August 2000	Guthmuller, J

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Application Number
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The present search report has been drawn up for all claims

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