

HAMMERING DEVICE MEANT FOR HAMMERING POLES INTO THE GROUND

5 The invention relates to a hammering device which is meant for hammering poles, steel profiles and other elongated objects into the ground which device comprises a body which can be attached to a power tool, a vibrator device which is attached to the body with the help of damping cushions and movable gripping jaws which are adjusted to the mentioned vibrator device for gripping the object to be hammered at least with a side grip
10 in which case the gripping elements of the gripping jaws can be brought closer and farther away with the help of a regulating unit, such as a hydraulic cylinder.

Hammering devices according to the above mentioned preamble are previously known in which hammering devices the vibrator device and another body are attached to the body of
15 the hammering device with the help of damping cushions in which case the another body partly surrounds the mentioned vibrator device. Gripping jaws are attached to the another body either to be stiff or to be turning with the help of a joint. A Finnish patent specification nr. 106219 can be mentioned as an example.

20 The disadvantage of these solutions is the fact that when the arms of both gripping jaws are turning, the piece to be compressed between them does not necessarily get settled symmetrically in relation to the jaws because the jaws can have a different turning angle when they reach the compression stage. If the jaw solution, in which one jaw is fixed and the other can be moved, is used, the piece which has been taken between them always gets
25 settled against the fixed jaw and the position of the movable jaw depends on the thickness of the piece which has been gripped. Due to these both above mentioned matters at least one of the jaws possibly compresses the piece diagonally. This is easily the case when gripping pieces, which are formed according to the forms of the piece to be gripped, are used in the jaws.

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In order to eliminate these disadvantages a new hammering device has been developed with which hammering device the above mentioned problems can be solved and the right, planned grip can be ensured for the jaws. It is characteristic of the invention that in order to maintain the mutual symmetry of the gripping jaws during their movement, the gripping

jaws essentially comprise arms which are attached to be stiff at the location of their turning joints which arms are directed in such a way that the ends of the arms are located next to each other and essentially stay next to each other during the turning movements
5 meant for the gripping jaws and that the ends of the mentioned arms are connected to each other with the help of a short arm which has a pivot mounting.

The advantage of the invention is the fact that the object which has been taken to the hammering device to be hammered is always located symmetrically in relation to the jaws
10 in which case both jaws will have the same load. Further when one uses pieces of the jaw which are formed according to the object to be hammered, the invention ensures the fact that the mutual position of the pieces of the jaw and the object is the right one.

In the following the invention is described more detailed by referring to the accompanying
15 drawings in which

Figure 1 shows a body of the hammering device.

Figure 2 shows a vibrator device which can be adjusted inside the body of the hammering device of the figure 1.

Figure 3 shows a vibrator device diagonally seen which vibrator device comprises
20 gripping jaws in position and they are connected to each other according to the invention.

Figure 4 shows an arrangement according to the invention which arrangement is attached to the gripping jaws seen from above.

Figure 5 shows gripping jaws when they have been moved into another position in relation
25 to the figure 4.

The body 1 of the hammering device according to the invention is shown in the figure 1 on top of which body there is an attachment plate 32 to the power tool, such as in order to attach the body to an excavator with the help of coupling elements 34, 35. There are gaps
30 33 in the body 1 into which gaps some parts of the damping cushions of the vibrator device are located in order to attach the vibrator device to this body with the help of the damping cushions.

A vibrator device of the figure 1 which can be adjusted inside the body 1 and can easily be changed is shown in the figure 2 of which vibrator device it is characteristic that the measure s stays constant even though the power category of the device changes. Several
5 vibrator devices 6 of a different power category can thus be adjusted to the hammering device if one wants to have various hammering effects. The weights and the width d included in the vibrator device 6 can change when the power category changes. Damping cushions 9 are attached to the sides of the vibrator device 6 as structural units 7
10 in which case these units 7 are attached to the sides of the vibrator device 6 to be easily opened. Gaps 8 have also been directed through these units 7 through which gaps the joint pins 20 or 21, which are related to the attachment of the gripping elements 10, can be adjusted. There is a jaw at the lower surface of the vibrator device 6 with which jaw one can hammer from the top of the pole or pull the pole up. The jaw comprises a fixed part 17, a movable part 18 and a cylinder 19 which moves the movable part 18.

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A vibrator device 6 which can be located between the body 1 is shown in the figure 3 in which vibrator device the gripping jaws 10 are attached to the vibrator device 6 with the help of pins 20. The pins 20 come up by forming pivots 8. The gripping jaws 10 are located on top of the vibrator device 6 and underneath it. Upper and lower gripping jaws
20 are connected to each other with the help of adapter plates 22 so that they function together. The gripping pieces 23 are attached to the gripping jaws 10. The gripping jaws 10 are connected with the help of an arrangement according to the invention which arrangement comprises arms 2, 3 which are attached in fixed way to the gripping jaws 10 and comprises joint points at the ends of the arms 2, 3 in such a way that the ends of the
25 arms 2, 3 can be connected with the help of a short arm 4.

The realization of the symmetrical movement of the gripping jaws 10 is shown in the figures 4 and 5 with an arrangement according to the invention in which arrangement the arms 2 and 3 are located at the gripping jaws 10 in a fixed way and these arms are directed
30 towards each other, but in such a way that in all symmetry stages of the gripping jaws 10 the ends of the arms 2, 3 are located next to each other and the arms 2, 3 are located partly interlocked in relation to each other. The ends of the arms 2, 3 are connected to each other with the help of a short arm 4 which is attached to the ends of the arms 2, 3 with the help of the joint pins. When gripping jaws 10 are being opened and closed, the short arm 4

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moves and turns a little and keeps the gripping jaws 10 at the same time in a symmetry stage. The arms 2, 3 are located and turn at the same level and the arm 4 connecting their ends is short and the distance d of its pivots is under 20 % compared to the distance D of the pivots 8 of the gripping jaws 10.

Both arms 2, 3 have separately such an open position in which it is being directed towards the turning joint 8 of an opposite gripping jaw 10. It is also advantageous that the arm 2, 3 has a shape of a triangle the base part of which arm is attached to the gripping jaw 10 essentially centrally in relation to the location of the turning joint 8.

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CLAIMS

1. Hammering device meant for hammering poles, steel profiles and other elongated
5 objects into the ground which hammering device comprises a body (1) which can be
attached to a power tool, a vibrator device (6) which is attached to the body (1) with the
help of damping cushions (9) and movable gripping jaws (10) which are adjusted to the
mentioned vibrator device (6) in order to grip the object to be hammered at least with a
side grip wherein the gripping elements (23) of the gripping jaws (10) can be brought
10 closer and farther away with the help of a regulating unit, such as a hydraulic cylinder
(16), **characterized** in that in order to maintain the mutual symmetry of the gripping jaws
(10) during their movement the gripping jaws (10) essentially comprise arms (2), (3)
which are attached to be stiff at the location of the turning joints (8) of the gripping jaws
which arms are directed in such a way that the ends of the arms (2), (3) are located next to
15 each other and stay essentially next to each other during the turning movements meant for
the gripping jaws (10), and in that the ends of the mentioned arms (2); (3) are connected to
each other with the help of a short arm (4) which has a pivot mounting.
2. Hammering device according to the claim 1, **characterized** in that the ends of the arms
20 (2); (3) are located next to each other and at the same time the arms are located partly
interlocked in relation to each other.
3. Hammering device according to the claim 1, **characterized** in that the arms (2); (3) are
located and turn essentially at the same level and the arm (4) connecting their ends is short
25 wherein the distance (d) of the centres of its joint elements is under 20 % compared to the
distance (D) of the pivots (8) of the gripping jaws (10).
4. Hammering device according to the claim 1, **characterized** in that both arms (2, 3)
have separately such an open position that the arm is directed towards the turning joint (8)
30 of the opposite gripping jaw.
5. Hammering device according to the claim 1, **characterized** in that the arm (2); (3) has a
shape of a triangle the base part of which arm is attached to the gripping jaw (10)
essentially centrally in relation to the location of the turning joint (8).