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(54) **Vibrator**

(57) The invention relates to a vibrator (1) for sinking a tube (2) into the ground by means of vibration, comprising at least one vibrator block, which is equipped with at least two rotatable eccentric weights for the generation

of a vibration, and a clamping device for clampingly coupling the vibrator block with the tube, wherein the clamping device (6) comprises a clamping chain (7).

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Description

[0001] The invention relates to a vibrator for sinking a tube into the ground by means of vibration, comprising at least one vibrator block, which is equipped with at least two rotatable eccentric weights for the generation of a vibration, and a clamping device for clampingly coupling the vibrator block with the tube.

[0002] Such a vibrator is known from practice and from EP-B-0 524 056.

[0003] The known vibrator makes it possible to sink objects into the ground by adjusting the eccentric weights of the vibrator block so as to cause the apparatus to vibrate. This vibration is transmitted to the object to be sunk into the ground.

[0004] The known vibrator is used, for example, for installing sheet piling. The present invention, however, relates to a vibrator that is used for vibrating a tube into the ground.

[0005] In order to transmit the vibration from the vibrator to the tube, the known vibrator is equipped with cylindrical sections that facilitate a clamping application around the tube.

[0006] A disadvantage of the known vibrator is that the construction is very sensitive to dimensional tolerances and welding seams that may be present at the tube's circumference. These may be the cause of excessive wear.

[0007] It is an object of the invention to provide a vibrator with which this problem is avoided.

[0008] To this end the vibrator according to the invention is characterized in that the clamping device comprises a clamping chain.

[0009] Due to the clamping function being derived from the clamping chain, the problem is effectively solved. The clamping chain is able to simply adapt to the dimensional inconsistencies of the tube, while possible unevennesses on the tube's circumference such as caused by welding seams, have no effect on the clamping function provided by the chain.

[0010] The intended advantages of the invention are already achieved in an embodiment of the vibrator that is characterized in that during use, the clamping chain is in clamping contact with at least a portion of the tube's circumference.

[0011] A preferred embodiment of the vibrator according to the invention is characterized in that the clamping chain has a first end having a fixed point of rotation on the vibrator, and a second end that is adjustable between a release position, in which the clamping chain is not in clamping contact with the tube and a clamping position, in which the clamping chain is in clamping contact with the tube.

[0012] This embodiment is very easy to use and allows the vibrator to be quickly coupled to or uncoupled from the tube.

[0013] The just referred to function can be realised especially simply by embodying the vibrator such that the

second end of the clamping chain is coupled with an adjusting cylinder.

[0014] It is further observed that the vibrator may be equipped with more than one vibrator block, more specifically, with two vibrator blocks that may be positioned at both sides of the tube so as to symmetrically distribute the load on the tube.

[0015] It is further desirable that the clamping device comprise two clamping chains positioned at the vibrator's top side and bottom side, respectively.

[0016] This provides a solid coupling between vibrator and tube.

[0017] For the sake of completeness, applicant wishes to point out that the use of a clamping chain as such is known from US-A-3,594,999. However, this publication concerns a completely different field of technology, namely not the sinking of a tube into the ground by means of vibration, but a vibrator for shaking a nut or fruit tree with the object of shaking the nuts or fruit down off the tree.

[0018] Hereinafter the invention will be further elucidated by way of the drawing and an exemplary embodiment that forms no restriction on the appended claims.

[0019] The drawing shows in:

- Figure 1 a perspective front view of a vibrator according to the invention while the same is clampingly coupled with a tube, and
- Figure 2 a top view of the apparatus shown in Figure 1.

[0020] Identical reference numerals used in the figures refer to similar parts.

[0021] In Figure 1, reference numeral 1 indicates the vibrator according to the invention, which is provided with a first vibrator block 3, positioned at the left of a tube 2 and a second vibrator block 4 positioned at the right of the tube 2. As already mentioned above, one of these two vibrator blocks 3, 4 may also be absent.

[0022] In a manner well-known to the person skilled in the art, each vibrator block 3, 4 is equipped with at least two rotatable eccentric weights for the generation of a vibration of the vibrator block 3, 4. In general there are four eccentric weights. However, vibrator blocks equipped with more eccentric weights are also known.

[0023] When, as in the case illustrated, two vibrator blocks 3, 4 are used, there is also a coupling provided in the drive of the eccentric weights of the two vibrator blocks 3, 4. In Figure 1, the coupling is effected with the coupling spindle 5.

[0024] Figure 1 also shows that the vibrator 1 is provided with a clamping device 6, 7 for clampingly coupling the vibrator blocks 3, 4 with the tube 2. Said clamping device 6, 7 preferably comprises a first clamping chain 6 at the upper side and a second clamping chain 7 at the lower side of the vibrator 1.

[0025] The situation in Figure 2 shows that during use, the clamping chain 6, 7 is in clamping contact with at

least a portion of the circumference of the tube 2.

[0026] Figure 2 further clearly shows that the clamping chain 6, 7 possesses a first end 8 having a fixed point of rotation on the vibrator 1 and a second end 9, coupling the clamping chain 6, 7 with an adjusting cylinder 10. 5

[0027] By adjusting the adjusting cylinder 10, the second end 9 may simply be adjusted between a release position on the one hand, in which clamping contact of the clamping chain 6, 7 on the tube 2 is absent and the clamping position shown in Figure 2 on the other hand, in which the clamping chain 6, 7 is in clamping contact with the tube 2. 10

[0028] For the record it should be observed that the exemplary embodiment shown solely serves to elucidate the appended claims, while the provided specific exemplary embodiment must not be considered to limit the claims. The provided exemplary embodiment merely serves to clarify possible ambiguities in these claims without restricting them in any way. 15

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Claims

1. A vibrator (1) for sinking a tube (2) into the ground by means of vibration, comprising at least one vibrator block (3,4), which is equipped with at least two rotatable eccentric weights for the generation of a vibration, and a clamping device (6,7) for clampingly coupling the vibrator block (3,4) with the tube (2), **characterised in that** the clamping device (6,7) comprises a clamping chain. 25
2. A vibrator (1) according to claim 1, **characterised in that** during use, the clamping chain (6,7) is in clamping contact with at least a portion of the tube's circumference. 30
3. A vibrator (1) according to claim 1 or 2, **characterised in that** the clamping chain 6,7) has a first end (8) having a fixed point of rotation on the vibrator, and a second end (9) that is adjustable between a release position, in which the clamping chain (6,7) is not in clamping contact with the tube (2) and a clamping position, in which the clamping chain is in clamping contact with the tube (2). 35
4. A vibrator according to claim 3, **characterised in that** the second end (9) of the clamping chain (6,7) is coupled with an adjusting cylinder (10). 40
5. A vibrator according to one of the preceding claims, **characterised in that** the clamping device comprises two clamping chains (6,7) positioned at the vibrator's top side and bottom side, respectively. 45

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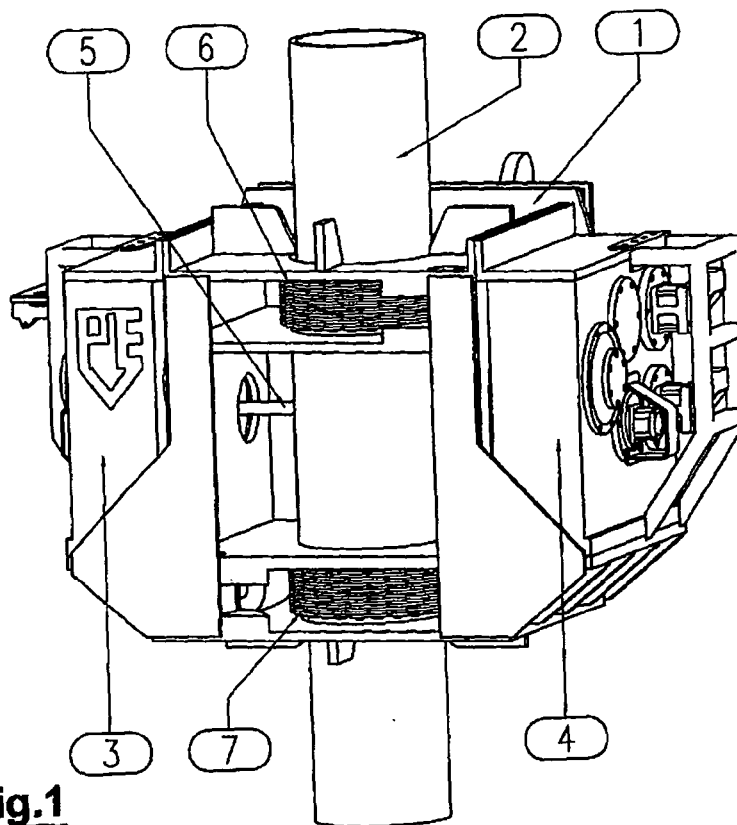


Fig.1

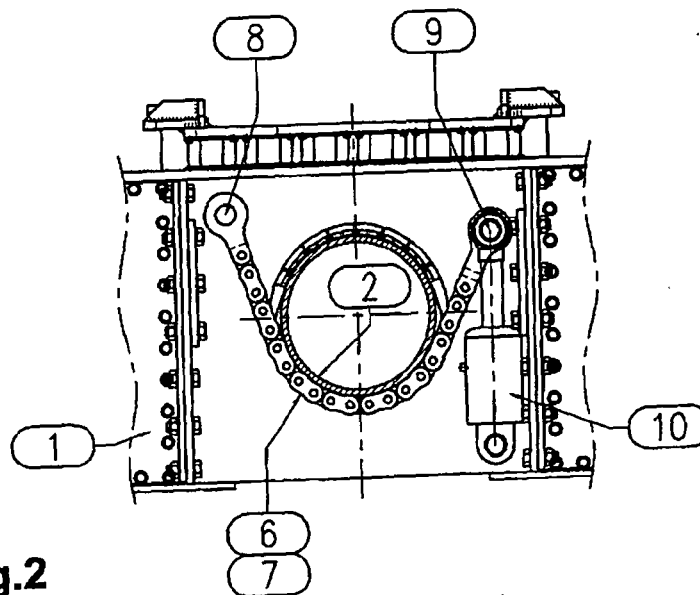


Fig.2