

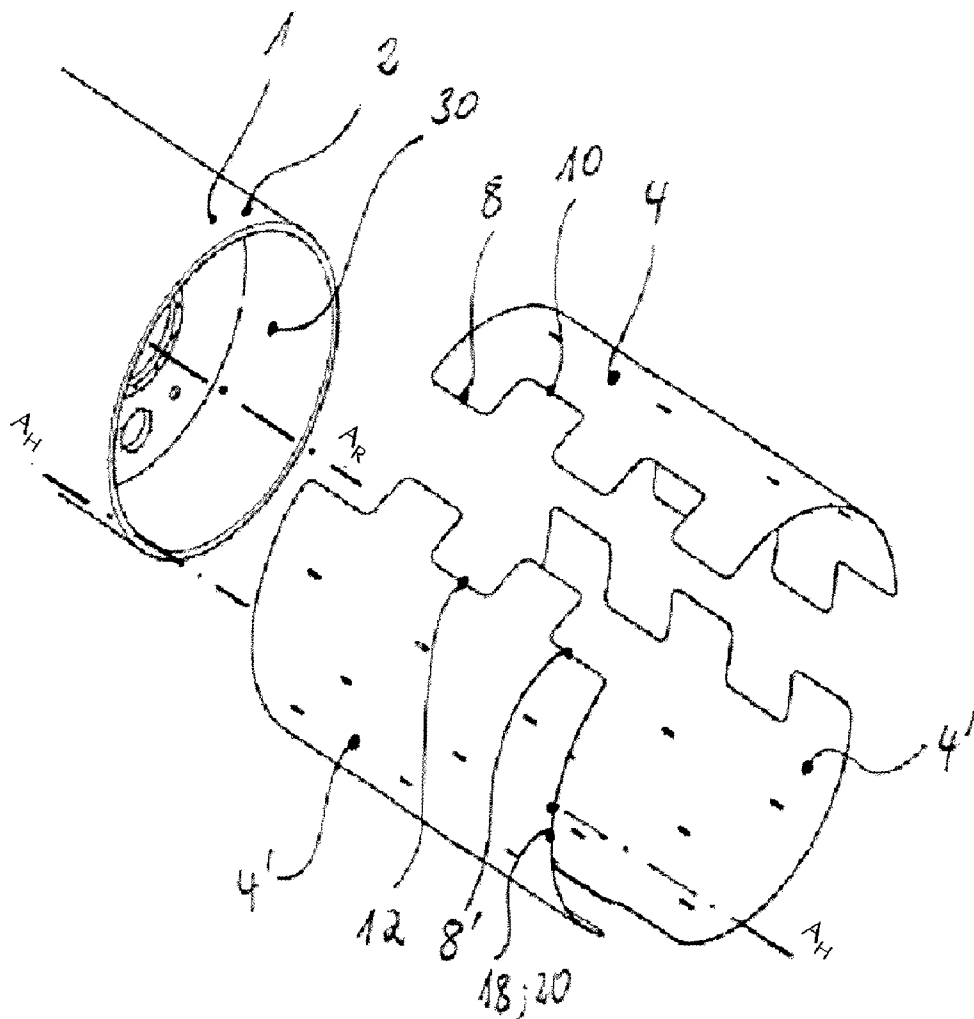


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(19) **United States**(12) **Patent Application Publication**
Doetsch et al.(10) **Pub. No.: US 2011/0251036 A1**(43) **Pub. Date: Oct. 13, 2011**(54) **APPARATUS FOR REPAIRING A VIBRATION ROLLER****Publication Classification**(75) Inventors: **Theo Doetsch**, Koblenz (DE); **Jens F. Algesheimer**, Bingen (DE)(51) **Int. Cl.**
B21B 27/00 (2006.01)(73) Assignee: **BOMAG GMBH**, Boppard (DE)(52) **U.S. Cl.** **492/48; 29/33 E**(21) Appl. No.: **13/076,879**(22) Filed: **Mar. 31, 2011**(57) **ABSTRACT**(30) **Foreign Application Priority Data**

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The present invention relates to an apparatus for repairing a vibration roller or a similar rotational tool, the outside jacket of which has been worn out up to a wear limit, comprising at least two repair segments which are arranged especially in their inside geometry in an at least partly complementary way with respect to the outside jacket and can be placed on the same by forming a repair jacket.



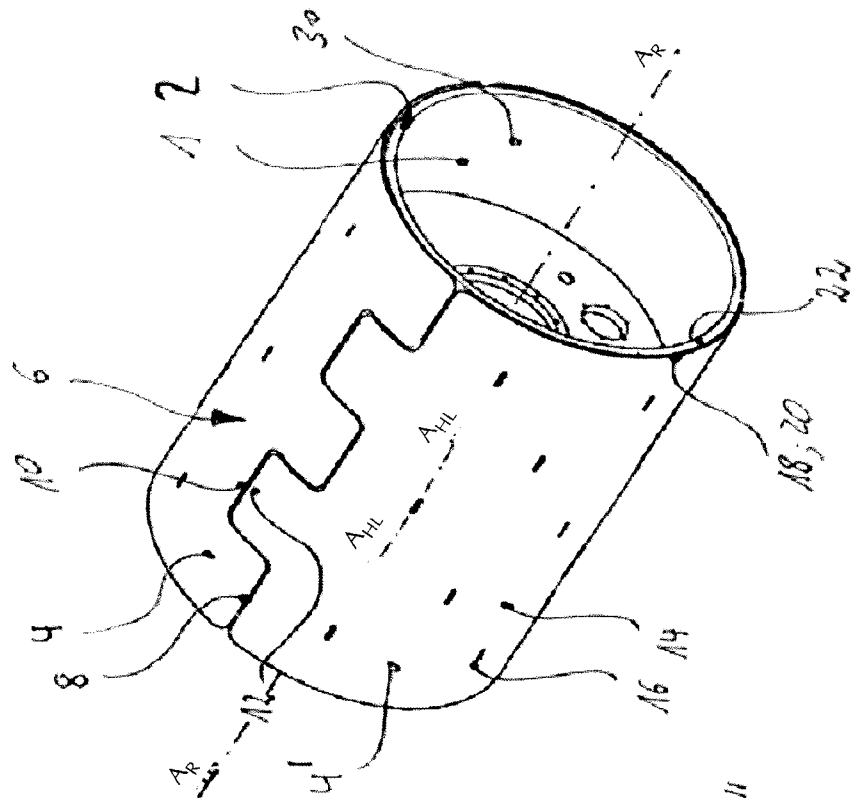


Fig. 1

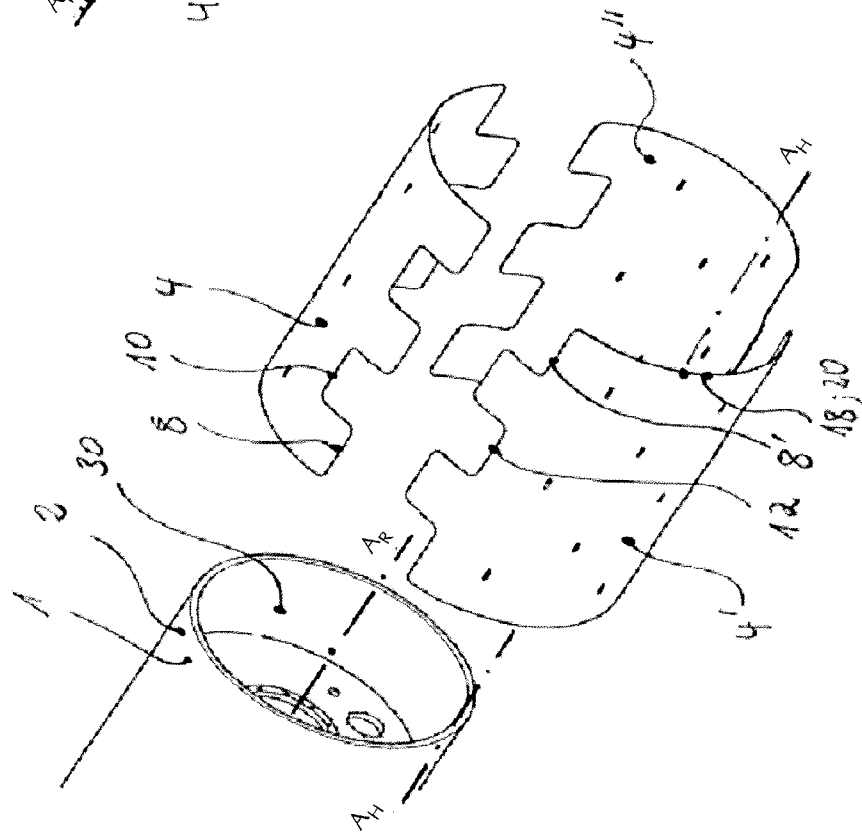


Fig. 2

APPARATUS FOR REPAIRING A VIBRATION ROLLER

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus for repairing a vibration roller or a similar rotational tool.

BACKGROUND OF THE INVENTION

[0002] Vibration rollers or similar rotational tools are understood to be all rotating tools which are used especially for soil compaction in road construction. Such rollers usually comprise an outside jacket over their circumference which is especially provided with tools and which is used for example to apply forces to the ground during compacting operation. This outside jacket is subjected to a high amount of wear and tear, wherein it is necessary to exchange the complete vibration roller or the respective rotational tool upon reaching a wear limit. This leads to very high costs.

[0003] It is the object of the present invention to provide an apparatus for repairing such a vibration roller or to provide a repaired vibration roller which allows an extension of the original service life beyond the wear limit of the outside jacket.

SUMMARY OF THE INVENTION

[0004] In particular, this object is achieved by an apparatus for repairing a vibration roller or a similar rotational tool, the outside jacket of which has been worn off substantially up to a wear limit, with the apparatus comprising at least two repair segments which are arranged especially in their inside geometry at least partly in a complementary manner relative to the outside jacket and can be placed on the same by forming a repair jacket.

[0005] Moreover, the object is also achieved by a vibration roller or a similar rotational tool, comprising a roller body on whose outside circumference an outside jacket is formed, with an apparatus of the kind mentioned above being provided for repair.

[0006] One relevant item of the apparatus in accordance with the present invention is the use of at least two repair segments which can be arranged on the worn-out outside jacket of the vibration roller by encasing the same and by forming a repair jacket. Once the wear limit of the outside jacket of the vibration roller has been reached, the repair segments in accordance with the invention can be placed on the worn-out outside jacket in such a way that the repair jacket which is formed by them allows further operation as intended or obviously also different operation. As intended shall mean that it is possible to arrange the repair segments in such a way that the repair jacket formed by them fulfils the same functions as the previously used and now worn-out outside jacket of the vibration roller. Another purpose shall mean that it is obviously also possible to arrange the repair segments in such a way that they fulfil a different function in compacting operation or during operation of the vibration roller per se than was the case with the "original" outside jacket of the vibration roller. It is possible in this case for example to arrange improved tools and especially compacting protruding teeth etc on the repair segments.

[0007] Preferably, the repair segments are arranged on the outside jacket in such a way that they cover the same over the full circumference. This guarantees a new continuous repair jacket which ensures optimal function of the vibration roller.

[0008] Preferably, the repair segments are arranged as cylinder wall segments, with their main extension axes extending especially substantially parallel to the rotational axis of the vibration roller. These cylinder wall segments, and especially preferably at least three cylinder wall segments, are arranged around the outside jacket of the vibration roller especially with abutting lateral edges in such a way that they especially form the repair jacket in a substantially transition-free manner. As will be described below in closer detail, the abutting lateral edges of the repair segments can comprise respective fastening means in order to ensure mutual fastening of the repair segments. An abutting lateral edge shall be understood within the scope of this application as such a lateral edge which is disposed opposite of an adjacent repair segment.

[0009] Preferably, the abutting lateral edges of the repair segments extend substantially parallel to the rotational axis of the vibration roller. Substantially parallel shall mean in this case that the abutting lateral edges extend parallel to the rotational axis in their main direction. As will be explained below in closer detail, the abutting lateral edges can still comprise respective gearings etc which guarantee mutual action of the abutting repair segments.

[0010] As already explained above, a gearing is arranged preferably on at least one abutting lateral edge of at least one repair segment, which gearing can be brought into operative engagement with a mating gearing on at least one abutting lateral edge of at least one other repair segment or vice versa, which mating gearing is arranged in a complementary manner. Such a gearing can be at least one gearing protrusion for example which engages in a complementary arranged gearing receiver of an adjacent repair segment. It is also possible to arrange such a gearing as a digitally formed gearing which engages in a respectively complementary arranged mating gearing. The repair segments can thus be brought into operative connection with one another in such a way that they are in operative connection with each other in at least one direction and applied forces can be discharged securely and especially without any damage to the respective segments. The operative engagement preferably extends tangentially to the repair jacket. It is obvious that an engagement in another axis is also possible, especially radially thereto.

[0011] It is therefore principally possible here to arrange the gearings of the respective repair segments which are in operative engagement with one another in a surface-planar way and in such a way that they act merely within the formed cylinder surface of the repair jacket, therefore especially tangentially to the repair jacket. It is also possible however to arrange respective gearings in such a way that they prevent a lifting of the respective repair segments in the radial direction relative to the repair jacket, i.e. forming respective fastening means on the abutting lateral edges which allow fastening the plates among one another and/or to the roller itself.

[0012] Preferably, at least one repair segment comprises at least one recess and especially one opening in its segment wall, which opening is arranged in such a way that it allows the fastening of the repair segment to the outside jacket of the vibration roller. A recess can be understood in this case as being both areas with a segment wall which is weakened in comparison to the remaining repair segment and areas in which the segment wall has been broken open completely and allows free passage to the underlying outside jacket. Such a recess allows fastening the respective repair segment to the

outside jacket of the vibration roller, so that secure fastening of the repair segments is ensured especially in the case of very large vibration rollers.

[0013] Preferably, the recess is arranged as a weld recess in such a way that it allows the welding or similar thermal fixing of the repair segment to the outside jacket of the vibration roller. Such a weld recess guarantees secure fastening of the repair segment to the outside jacket of the vibration roller.

[0014] It is especially the arrangement of an oblong hole as a recess which allows optimal fastening of the repair segment with respect to the loads to be expected in a vibration roller. In addition to the formation of weld recesses and oblong holes, it is obviously also possible to provide respective other fastening recesses such as screw and rivet devices in the repair segments in order to enable fastening to the outside jacket.

[0015] When the recess is arranged as an oblong hole, this oblong hole is preferably aligned in such a way that its main extension axis extends parallel to the rotational axis of the vibration roller. This guarantees an especially reliable fastening of the repair segment to the outside skin and considerably reduces the damage to be expected in the fastening area.

[0016] Preferably, at least one repair segment comprises a fastening area on at least one face-side edge which is arranged in such a way that it allows the fastening and especially the welding or similar thermal fixing of a repair segment to the outside jacket and/or the face-side edge of the vibration roller. This enables secure fastening of the respective repair segments to the vibration roller.

[0017] Express notice shall be taken that the scope of disclosure in relation to the above apparatuses also includes a method in accordance with the invention especially for repairing a vibration roller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention will be described below by a reference to an embodiment which is explained below in closer detail by reference to the enclosed drawings, wherein:

[0019] FIG. 1 shows an embodiment of the apparatus in accordance with the present invention shortly before mounting on a vibration roller, and

[0020] FIG. 2 shows the embodiment of the apparatus according to FIG. 1 in the mounted state.

[0021] The same reference numerals will be used below for the same and similarly acting components, with superscript indexes being used occasionally for differentiation.

DETAILED DESCRIPTION OF THE INVENTION

[0022] FIG. 1 shows an embodiment of the apparatus in accordance with the present invention for repairing a vibration roller 1. The apparatus here comprises three repair segments 4 which are provided for repairing an at least partly worn-out outside jacket 2 of a vibration roller 1 and are placed on the same by forming a repair jacket 6 (see especially FIG. 2).

[0023] The repair segments 4 are respectively arranged for this purpose as cylinder wall segments and are formed in a complementary manner with respect to each other in such a way that after the arrangement on the outside jacket 2 of the vibration roller 1 they will enclose the same completely and form a new repair jacket 6 which substantially corresponds to the old outside jacket 2, but has a slightly larger radius with respect to the rotational axis A_R of the vibration roller 1. It is possible that tools (not shown) optionally arranged on the

repair segments 4 correspond to tools (also not shown) arranged on the outside jacket 2, or are different from them. The term tools shall be understood as being any kind of surface or material configuration.

[0024] The repair segments 4 comprise gearings 10 on their abutting lateral edges 8, which gearings 10 engage in complementary arranged mating gearings 12 of an adjacent repair segment, which in this case is the repair segment 4'. This gearing 10 or mating gearing 12 is arranged in this case for example as a digital gearing with projections and complementary receivers for the projections.

[0025] In the mounted state as shown in FIG. 2, the gearing 10 engages in the mating gearing 12 in such a way that a substantially meshed structure of the respective repair segments 4 is obtained. In these meshed regions it is possible to provide welding of the repair segments 4 with respect to each other and/or on the outside jacket 2 of the vibration roller 1 or any other kind of fastening.

[0026] As is shown especially in FIG. 2, the abutting lateral edges 8 of the repair segments 4 extend in this embodiment substantially parallel to the rotational axis A_R of the vibration roller 1. A roller body 30 with a new repaired repair jacket 6 is obtained after the fastening of the repair segments 4 to the vibration roller 1, which repair jacket allows further operating time beyond the old operating time.

[0027] In addition to possible fastening of the repair segments 4 to the vibration roller 1 in the region of the abutting lateral edges 8, the repair segments 4 can also be fastened to the vibration roller 1 via the face-side edges 18. For this purpose the respective repair segments 4 comprise respective fastening areas 20 which are arranged on the respective face-side edges 18. The fastening areas 20 are arranged in this embodiment as weldable fastening areas 20 for example which can be welded either onto the outside jacket 2 of the vibration roller 1 and/or its face-side edge 22 or in a similar thermally fixable manner. This enables secure fixing of the repair segments 4 to the vibration roller 1 in these areas. It would also be possible to arrange respective mounting shoes or similar means at least in sections on the repair segments, which shoes or means allow sliding or similar fixing on the outside jacket of the roller.

[0028] In addition to fastening the repair segments 4 via their boundary regions, i.e. the abutting lateral edges 8 and the face-side edges 18, fastening of the repair segments is also possible via recesses 16 which are arranged in this case in form of openings 16 in the respective repair segments 4. The openings 16 are arranged here as oblong hole openings and allow welding the repair segments 4 onto the outside jacket 2 of the underlying vibration roller 1. Instead of a welded connection it would also be possible to provide the recesses 18 with respective fastening means, e.g. bolt receiving means, by means of which the repair segments can then be screwed onto the vibration roller 1. The recesses can be provided with a continuous configuration, i.e. they are arranged as actual holes, or merely as weakened portions in the material which then especially allow welding through the material and fixing to the underlying vibration roller or its outside jacket 2. In accordance with the invention, the openings 16 which are arranged as oblong holes are arranged in such a way that their main extension axis H_{HL} extends parallel to the rotational axis A_R of vibration roller 1.

[0029] While the present invention has been illustrated by description of various embodiments and while those embodiments have been described in considerable detail, it is not the

intention of applicant to restrict or in any way limit the scope of the appended claims to such details. Additional advantages and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of Applicants' invention.

What is claimed is:

1. An apparatus for repairing a rotational tool having an outside jacket which is worn out up to a wear limit, comprising:

at least two repair segments which are arranged in a partly complementary manner in relation to the outside jacket and are placed on the outside jacket by forming a repair jacket, with at least one repair segment comprising in its segment wall at least one recess which is arranged in such a way that it allows the fastening of the repair segment to the outside jacket of the rotational tool.

2. An apparatus according to claim 1, wherein the repair segments are arranged as cylindrical wall segments, with their main extension axes A_H extending substantially parallel to a rotational axis A_R of the rotational tool.

3. An apparatus according to claim 1, wherein abutting lateral edges of the repair segments extend substantially parallel to a rotational axis A_R of the rotational tool.

4. An apparatus according to claim 1, wherein a gearing is arranged on at least one abutting lateral edge of at least one repair segment, which gearing can be brought into operative engagement with a complementary arranged mating gearing on at least one abutting lateral edge of at least one other repair segment.

5. An apparatus according to claim 1, wherein the at least one recess is arranged as a weld recess which is arranged in such a way that it allows thermal fixing of the repair segment to the outside jacket of the rotational tool.

6. An apparatus according to claim 12, wherein the oblong hole extends along a main extension axis A_{HL} parallel to a rotational axis A_R of the rotational tool.

7. An apparatus according to claim 1, wherein at least one repair segments on at least one face-side edge comprises a fastening area which is arranged in such a way that it allows fixing of the repair segment to the outside jacket and/or the face-side edge of the rotational tool.

8. A rotational tool, comprising;

a roller body with an outside jacket arranged on its outside circumference and comprising an apparatus for its repair according to claim 1.

9. The apparatus according to claim 1, wherein the apparatus comprises a vibration roller.

10. The apparatus according to claim 1, wherein each of the at least two repair segments has an inside geometry that is arranged in a complementary manner in relation to the outside jacket.

11. The apparatus according to claim 1, wherein the at least one recess comprises an opening.

12. The apparatus according to claim 5, wherein the at least one recess comprises an oblong hole.

13. The rotational tool according to claim 8, wherein the rotational tool comprises a vibration roller.

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