Claims

1. A method for automatically changing a disc tool to a tool holder of an automated machine working with disc tools, the method comprising in a disc tool replacement machine:

detecting that the automated machine has replaced a tool holder, causing a gripper to move a tool holder released by the automated machine to a replacement area of the disc tool replacement machine for replacement of the disc tool;

determining that the tool holder is in ~~a~~ the replacement area in the disc tool replacement machine;

unfastening a fixing member of the tool holder by applying an unfastening force to the fixing member, wherein the fixing member fixes a disc tool to a backing plate of the tool holder through a through hole at a centre of the disc tool;

removing the disc tool from the tool holder after said unfastening;

inserting a new disc tool to the tool holder;

fastening the fixing member of the tool holder by applying a fastening force to the fixing member, thus fixing the disc tool to the backing plate of the tool holder through the through hole; and

causing the gripper to move the tool holder to a second area to wait for the automated machine to change the tool holder.

2. The method of claim 1, wherein the fixing member is a centre nut locking member, wherein unfastening the fixing member comprises unscrewing the fixing member off from the tool holder, and wherein fastening comprises screwing the fixing member to the tool holder.

3. The method of claim 2, wherein the fastening and the unfastening are performed by a screwing tool comprising a tool tip that matches with a

counterpart in the fixing member and providing the tool tip with a translational motion to bring the tool tip into contact with and to detach the tool tip from the counterpart of the fixing member and a rotational motion to screw and unscrew the fixing member.

4. The method of any preceding claim, wherein the tool holder is positioned in the replacement area such that the disc tool is faced downwards towards a fastening tool that unfastens the fixing member, wherein the disc tool detaches from the tool holder and remains on top of the fastening tool after said unfastening, the method further comprising:

gripping the disc tool from the fastening tool for removal;

inserting the new disc tool on top of the fastening tool; and

raising the fastening tool towards the tool holder to bring the disc tool into contact with the backing plate.

5. The method of claim 4, wherein a flange is provided at a head of the fastening tool to support the disc tool.

6. The method of claim 4 of 5, wherein the disc tool replacement machine comprises a first storage area storing used disc tools and a second storage area storing unused disc tools, the method further comprising:

gripping the disc tool with a replacement member when removing the disc tool from the top of the fastening tool and moving the disc tool to the second storage area;

gripping the new disc tool from the first storage area and placing it on top of the fastening tool before fastening the fixing member to the tool holder.

7. The method of claim 6, wherein the replacement member comprises an arm and at least one vacuum cup at an end of the arm, wherein the arm is arranged to be movable under an automated guidance and wherein said at

least one vacuum cup is arranged to grip the disc tools.

~~8. The method of any preceding claim, wherein a gripper is arranged to move between the replacement area and a second area a determined distance away from the replacement area, to grip the tool holder in the second area, deliver the tool holder to the replacement area for the replacement of the disc tool, deliver tool holder back to the second area, and release the grip from the tool holder in the second area.~~

~~9.~~8. The method of claim ~~8~~1, wherein the gripper is arranged to grip the tool holder such that the grip prevents rotation of the disc tool when fastening and unfastening the fixing member.

~~10.~~9. The method of any preceding claim, wherein the disc tool replacement machine comprises at least two storage areas for unused disc tools, further comprising:

providing a communication link with the automated machine;

associating each storage area storing the unused disc tools with a different type of disc tool;

receiving from the automated machine a request to change the disc tool type and information specifying a new disc tool type;

selecting an unused disc tool from a storage area matching with the new disc tool type requested by the automated machine; and

inserting the selected disc tool to the tool holder.

~~11.~~10. The method of any preceding claim, wherein the tool holder is detachably attachable to the automated machine, and wherein the tool holder is detached from the automated machine during the replacement of the disc tool.

~~12.~~11. The method of any preceding claim 1 to 10, wherein the tool holder is fixed to an arm of the automated machine during the replacement of the disc tool.

~~13.~~12. A disc tool replacement machine comprising means for carrying out all the steps of any preceding claim 1 to ~~12~~11.

~~14.~~13. A computer program product embodied on a distribution medium readable by a computer and comprising program instructions which, when loaded into the computer, cause the computer to control all execution of all the steps of the method according to any preceding claim 1 to ~~12~~11.