Patent Claims

1. A method for manufacturing a component of a rotary machine, the component extending in an axial direction as well as in a radial direction perpendicular to the axial direction, the component having at least one inner channel, which extends from a first end in a center of the component to a second end at a radial limiting surface of the component and which is at least partially closed, said method comprising:

providing a blank comprising the center of the component, wherein the blank is limited by an outer surface in the radial direction, and the maximum dimension of the outer surface in the radial direction is smaller than the dimension of the radial limiting surface in the radial direction;

performing a first subtractive process step during which a radially-inner part of the at least one inner channel is manufactured by a machining process, with said radially-inner part extending from the first end of the channel to the outer surface of the blank; and

finishing the at least one inner channel by creating a radially-outer part of the channel using an additive manufacturing process step performed on the blank by applying a shapeless or a neutrally shaped material that is shaped into the radially-outer part of the channel.

2. A method according to claim 1, wherein the component comprises a plurality of inner channels, each of which extending from a first end in the center of the component to a second end at the radial limiting surface of the component, wherein adjacent channels are respectively separated by a separating wall, wherein in each case one part of the channel is manufactured of each channel in the first subtractive process step, with said part extending from the respective first end of the channel into the outer

surface of the blank, and wherein each separating wall and each channel is only finished by means of the additive manufacturing process.

3. A method according to claim 1 or 2, wherein the component is built up part by part after the first subtractive process step.

4. A method according to claim 3 when dependent from claim 2, wherein, after the first subtractive process step, the additive manufacturing process comprises first completing only each separating wall.

5. A method according to anyone of the preceding claims, wherein the blank has a central bore before the first subtractive process step, said bore being arranged radially inwardly such that, in the finished state of the component, each first end of a channel arranged in the center is separated from the central bore by an annular body.

6. A method according to anyone of the preceding claims, wherein the first subtractive process step is performed in such that, after finishing the first subtractive process step, the outer surface of the blank comprises a contiguous annular area covering the confluence of each channel into the outer surface.

7. A method according to anyone of the preceding claims, wherein the additive manufacturing process is performed layer by layer.

8. A method according to any one of the preceding claims, wherein the additive manufacturing process comprises several additive process steps to successively build up the component.

9. A method according to claim 8, wherein at least one further subtractive process step is performed between the additive process steps.

10. A method according to claim 8 or 9, wherein in each case one further subtractive process step is performed between two additive process steps.

11. A method according to any one of the preceding claims, wherein the additive manufacturing process is performed by means of a laser.

12. A method according to any one of the preceding claims, wherein the component is designed as an impeller, as a guide wheel or as a diffusor of a rotary machine.

13. A method according to claim 12, wherein the rotary machine is a pump, a turbine, a compressor, a compactor, or an expander.

14. A method for repairing a component of a rotary machine, the component extending in an axial direction as well as in a radial direction perpendicular to the axial direction, the component comprising a plurality of inner channels, each of which extend from a first end in the center of the component to a second end at the radial limiting surface of the component, wherein adjacent channels are respectively separated by a separating wall, said method comprising:

identifying damaged areas of the component at the radial limiting surface or at one of the channels or at one of the separating walls;

manufacturing a blank by a machining removal or by a separating removal of the damaged areas, the blank comprising the center of the component and being limited by an outer surface in the radial direction, wherein the maximum dimension of the outer surface in the radial direction is smaller than the dimension of the radial limiting surface in the radial direction, the blank further comprising a radially-inner part of the channels extending from

the first end of the channels to the outer surface of the blank; and

replacing the removed damaged areas by means of an additive manufacturing process on the blank in order to obtain the final form of the component, the additive manufacturing process being effected directly from a shapeless or a neutrally shaped material applied to the blank.

15. A method according to anyone of the preceding claims, wherein at least one material is used for the additive manufacturing process, said material being different from the material of which the blank consists.

16. A method according to any one of the preceding claims, wherein the or each inner channel has an open end at the first end and has another open end at the second end.