Patent claims

1. A method for removing filling material (32) from a cavity present in a component (13), the cavity having a connection opening (24) to the surroundings of the component (13), having the following method steps:

- holding the component (13) in a movable mounting (16),
- moving the component (13) while at the same time removing the filling material (32) through the connection opening (24),

wherein a processor (P) processes the geometry data of the component (13), a computer program that runs on the processor (P)

- taking into account the geometry of the cavity and of the connection opening (24) in the component (13),
- while taking gravitational force into account, calculating a necessary positioning of the component (13) and a subsequent necessary sequence of movements for moving the component (13) in space in order that the filling material (32) is removed through the cavity to the connection opening (24) and through the connection opening (24) out of the component (13).

2. The method as claimed in claim 1,
characterized
in that

- the removal of the filling material (32) is simulated by the computer program, the flow properties of the filling material (32) being taken into account in the simulation,
- simulations with different positionings and/or different sequences of movements are carried out repeatedly,
- the positioning and the sequence of movements with which most filling material (32) or all of the filling material (32) is removed from the component (13) in the shortest time is chosen.

3. The method as claimed in one of the preceding claims, characterized
in that before and/or after moving the component (13), a suction removal of filling material through the connection opening (24) is performed.

4. The method as claimed in one of the preceding claims, characterized
in that the mounting (16) is located on a robot (15) and the sequence of movements is performed by the robot (15).

5. The method as claimed in claim 4,
characterized
in that the robot (15) allows movements about at least three axes.

6. The method as claimed in one of the preceding claims, characterized
in that the component (13) is made to undergo mechanical vibrations by a vibration generator (30).

7. The method as claimed in claim 6,
characterized
in that the vibrations are in the ultrasonic range.

8. The method as claimed in one of the preceding claims, characterized
in that the filling material (32) consists of a powder and the flow behavior of the powder is calculated by the computer program from the parameters particle size and/or particle shape and/or particle material and/or particle density.

9. The method as claimed in one of the preceding claims, characterized

in that the taking into account the geometry of the cavity and of the connection opening (24) in the component (13) comprises using data for production of the component (13).

10. A computer program
wherein with this program

- the geometry of a cavity in a component (13) and of a connection opening (24) between the cavity and the surroundings of the component (13), the cavity being filled with a filling material (32), are transferable as input variables by way of an input interface (26),
- while taking gravitational force into account, a necessary positioning of the component (13) and a subsequent necessary sequence of movements of the component (13) in space in order that the filling material (32) is removed through the cavity to the connection opening (24) and through the connection opening (24) out of the component (13) can be calculated,
- the positioning and the sequence of movements of the component can then be output as output variables by way of an output interface (28).

11. The computer program as claimed in claim 10,
characterized
in that it allows a method as claimed in one of claims 1 to 9 to be carried out.

12. A production unit,
characterized
in that it has:

- a movable mounting (16) for holding a component (13)
- a processor (P), on which a computer program as claimed in claim 10 is installed,
- an actuator, in particular a robot (15), for movement of the movable mounting,

- a controller for moving the actuator, the positioning and the sequence of movements being transferable as input variables via an interface (29).

13. The production unit as claimed in claim 12,
characterized
in that it additionally has:

- an installation (12) for additively manufacturing the component (13) and
- a material interface (14) for receiving the component (13) by the mounting (16).