

Title (en)
TUBULAR CAMSHAFT MANUFACTURING PROCESS

Publication
EP 0364028 B1 19920325 (DE)

Application
EP 89202500 A 19891005

Priority
DE 3834401 A 19881010

Abstract (en)
[origin: JPH02141506A] PURPOSE: To reduce the wall thickness in a tubular shaft without limiting the selection of materials by incorporating a shaft and a cam material powder into a desirable outer coating applying isostatic pressing with a pressure medium, simultaneously invading the pressure medium into the inner part of the shaft and sintering a powder green compact. CONSTITUTION: At the time of manufacturing the tubular cam shaft to which the individual cam consisting of the cam material is attached onto the pre-fabricated tubular shaft, e.g. a plastic outer cover blow-formed, is used on the pressing outer cover. The powdery cam material is charged into the cam position in the outer cover and successively, the tubular shaft is introduced into the outer cover and the outer cover is closed at both ends. Under this condition, the isostatic pressing is applied in the isostatic press with the water as the pressure medium. At the same time, the deformation of the shaft is prevented so that the pressure medium can freely invade in the inner part of the tubular shaft, and also, the powder is uniformly compacted and the compact material size is easily maintained. Successively, the green compact is heated in a sintering furnace and the outer cover is decomposed and lost, and the green compact is sintered and combined on the shaft.

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B22F 3/12; **B22F 7/08**; **F01L 1/04**

IPC 8 full level
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CPC (source: EP US)
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Citation (examination)
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Cited by
US5887557A; EP0866216A1

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