

Title (en)  
TOOL FOR AND METHOD OF MAKING HOLLOW ARTICLES

Publication  
**EP 0153810 B1 19880720 (EN)**

Application  
**EP 85300486 A 19850124**

Priority  
GB 8404321 A 19840218

Abstract (en)  
[origin: EP0153810A1] A tool for use in the manufacture of the outer member of a cross-groove type of constant velocity ratio universal joint by forming a blank in a die with the tool in the interior of the blank to define the internal shape of the joint member. The tool comprises first and second elements (33, 37) with portions (34, 38) which together define the shape required in the joint outer member, having formations (34a, 38a) which form the grooves therein, and have an internal cavity (40) which receives an expander (23) to hold the elements in their operative positions. After withdrawal of the expander, the first elements (33) can be moved radially inwardly to disengage them from the formed joint member and withdrawn, following which the second elements (34) can be moved inwardly and subsequently withdrawn.

IPC 1-7  
**B21K 1/76**; **B21D 53/84**

IPC 8 full level  
**B21K 1/14** (2006.01); **B21D 53/84** (2006.01); **B21J 5/12** (2006.01); **B21K 1/76** (2006.01)

CPC (source: EP US)  
**B21J 5/12** (2013.01 - EP US); **B21K 1/762** (2013.01 - EP US); **B21K 1/765** (2013.01 - EP)

Cited by  
EP0421144A3; DE19832503A1; DE4138126A1; EP0421143A3; EP0358784A1; US5001920A; FR2613645A1

Designated contracting state (EPC)  
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**EP 0153810 A1 19850904**; **EP 0153810 B1 19880720**; AT E35784 T1 19880815; AU 3887985 A 19850910; AU 583260 B2 19890427; BR 8507121 A 19870714; CA 1272371 A 19900807; DE 3563821 D1 19880825; EP 0201499 A1 19861120; ES 540499 A0 19851216; ES 8603308 A1 19851216; GB 2183187 A 19870603; GB 2183187 B 19880615; GB 8404321 D0 19840321; GB 8618146 D0 19860903; JP S61501831 A 19860828; MX 162499 A 19910513; WO 8503655 A1 19850829; ZA 85834 B 19850925

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