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(54) **Method and apparatus for manufacturing propeller nozzle ring**

(57) A method and apparatus is disclosed for manufacturing a propeller nozzle ring (230), the method comprising forming a circular mould (220) having a side profile (222) that widens towards one end (226) of the mould (220), the mould (220) being arrangeable to the neck of an end (204) of a cylinder (200) so that a first end (224) of the mould (220) is towards the interior of the cylinder (200) and a second end (226) of the mould (220) has a cross-sectional surface greater than the end (204) in question of the cylinder (200); and forcing the mould (220) into the cylinder (200) for a predetermined distance so that the outer surface of the side profile (222) of the mould (220) runs against the inner surface of the cylinder (200) and thereby widens at least part of the cylinder (200) to match the widening shape of the side profile (222) of the mould (220), the cylinder (200) thus reaching the shape of the nozzle ring (230).

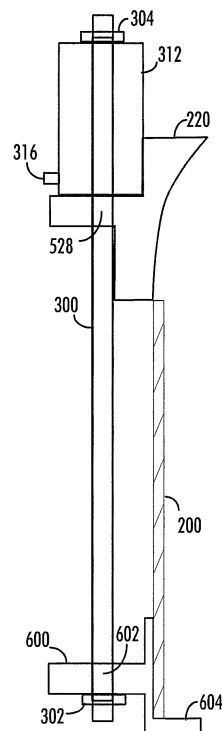


FIG. 3A

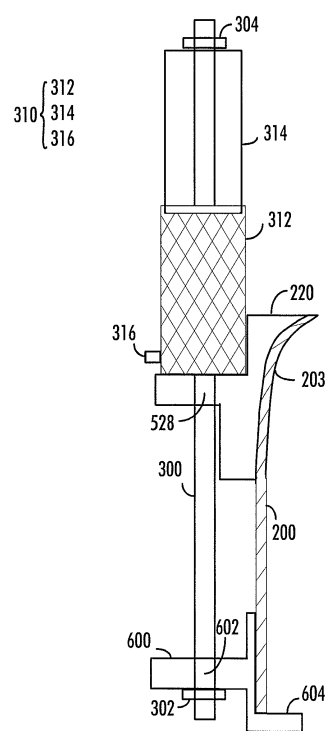


FIG. 3B



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 6338

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP H05 226 U (UNKNOWN) 8 January 1993 (1993-01-08) * figure 5 *	1-3,5,7,8	INV. B21D22/02
A	US 5 799 394 A (RICE JOSE LUIS [MX]) 1 September 1998 (1998-09-01) * the whole document *	1,7	ADD. B63H5/16
A	US 5 531 370 A (ROHRBERG RODERICK G [US]) 2 July 1996 (1996-07-02) * abstract; figure 2 *	1,7	
			TECHNICAL FIELDS SEARCHED (IPC)
			B21D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 October 2016	Examiner Pieracci, Andrea
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 15 6338

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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26-10-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H05226	U	08-01-1993	NONE
US 5799394	A	01-09-1998	NONE
US 5531370	A	02-07-1996	NONE