(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 451 268 A1**

(12) **EUROPEAN PATENT APPLICATION published in accordance with Art. 158(3) EPC**

(21) Application number: **89911867.3**

(22) Date of filing: **30.10.89**

(86) International application number: **PCT/JP89/01113**

(87) International publication number: **WO 91/06384 (16.05.91 91/11)**

(51) Int. Cl.5: **B21H 1/04**, B21H 1/10, B21D 22/14, B21D 41/04

(43) Date of publication of application: **16.10.91 Bulletin 91/42**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

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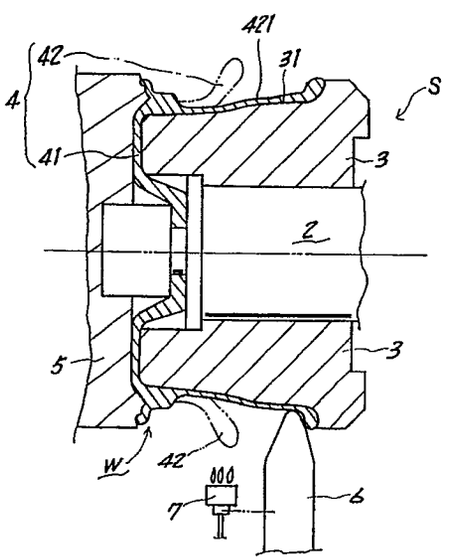
(54) **SPIN MOLDING APPARATUS.**

(57) A spin molding apparatus, in which a heating means (7) is operatively connected to a pressure spatula (6) with a material (4) to be molded set on a mandrel (3), the material (4) being heated to a predetermined temperature with the heating means (7) as the mandrel (3) is rotated, the heated material (4) being squeezed along the mandrel (3) by the pressure spatula (6) to spin-mold the material (4). A gas burner can be used as the heating means (7).

Fig. 1



EP 0 451 268 A1

Field of the Technique

This invention relates to a spin molding apparatus, and more particularly to a spin molding apparatus which is used when a material is heated and spin-molded at the same time.

Background of the Art

Conventionally, the spin molding is effected as follows. A material to be molded is set on a mandrel, rotated together with the mandrel, and then pressed onto and squeezed along the mandrel by a pressure spatula as this material is rotated together with the mandrel, thereby spin-molding the material into a predetermined configuration.

However, since the above-mentioned spin molding is one of molding processes utilizing the ductility of a material to be molded, it has such disadvantage as that where, for example, a material to be molded is required to be rapidly spin-molded into a complicated configuration, excessive stress is incurred to the material and as a result, cracks tend to occur in the material.

Accordingly, it is an object of the present invention to provide, in order to obviate the above-mentioned disadvantage, a spin molding apparatus, in which no excessive stress is incurred to a material to be molded even when the material is spin-molded into a complicated configuration or even when the material is subjected to rapid spin-molding, and as a result, the material is not readily cracked.

Disclosure of the Invention

In a spin molding apparatus in which a material to be molded is set on a mandrel, said material being rotated by rotating said mandrel , said rotating material being pressed onto and squeezed along said mandrel by a pressure spatula,

a spin molding apparatus according to the present invention being characterized in that said pressure spatula is provided with heating means operatively connected thereto for joint movement, so that said material can be heated to a predetermined temperature with said heating means.

Accordingly, since the heating means is capable of heating the pressure spatula only at an operating portion thereof during the spin molding operation, the material can be spin-molded into a complicated configuration rapidly and efficiently.

Where a gas burner is used as the heating means, the apparatus can be made compact and the heating temperature can be adjusted with ease.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a first embodiment of the present invention.

Best Mode for carrying out the Invention

In order to explain the present invention in more detail, the invention will be described with reference to the accompanying drawings.

In Fig. 1, the reference character S denotes a spin molding apparatus, and the reference numeral 2 denotes a rotary shaft of the spin molding apparatus S. The rotary shaft 2 is rotatable about the axis. The numeral 3 denotes a mandrel which is removably fitted to the outer side of the rotary shaft 2. The peripheral surface of the mandrel 3 forms a mold portion 31 designed for spin molding a wheel W for the use of a vehicle. The numeral 4 denotes a wheel material (corresponding to the "material to be molded" of the present invention) for a vehicle which is made by casting. The material 4 is set on one side of the mandrel 3 and clamped by a tail stock 5. By virtue of the foregoing arrangement, the vehicle wheel material 4 is rotated in the same direction as the mandrel 3 in accordance with the rotation thereof. The vehicle wheel material 4 is formed by casting and comprises a disk portion 41 sandwiched between the mandrel 3 and the tail stock 5 and a rim material (see the imaginary line in Figure) 42. When the rim material 42 is squeezed, by a pressure spatula 6, in the direction as shown by an arrow as the mandrel 3 is rotated, a rim 421 is spin-molded. The numeral 7 denotes a burner (corresponding to the "heating means" of the present invention) which is adapted to heat the rim material 42. The burner 7 is installed on the pressure spatula 6 and moved in accordance with the movement of the pressure spatula 6. Thus, the operating portion of the pressure spatula 6 can be locally heated. When the rim 421 is spin-molded, it is desirable that the rim material 42 is heated to approximately 300 ° C. In order to set the temperature of the rim material 42 in the above-mentioned temperature range (approximately 300 ° C), the temperature of the molding portion of the rim material 42 is measured by an infrared ray thermometer and the thermal power of the gas burner 7 is adjusted by a feedback system. Upon start of the rotation of the mandrel 3, the burner 7 is ignited and upon stop of the mandrel 3, the burner 7 is extinguished.

When the vehicle wheel W is spin-molded by such spin molding apparatus S, the vehicle wheel material 4 is set on the mandrel 3 first. After the material 4 is clamped by the tail stock 5, the mandrel 3 is rotated at approximately 300 rpm. At that time, the burner 7 is ignited simultaneously and starts heating the rim material 42. When the temperature of the rim material 42 has reached the

predetermined temperature (approximately 300° C), the material 42 is squeezed in the direction as shown by an arrow, by the pressure spatula 6. As a result, the vehicle wheel W is obtained. After the vehicle wheel W is molded, the mandrel 3 is stopped rotation. At that time, the gas burner 7 is extinguished simultaneously.

Possibility of Industrial Exploitation

As described in the foregoing, the spin molding apparatus according to the present invention is useful as means for spin-molding a cast material into a complicated configuration rapidly and efficiently and particularly suitable for molding a rim portion of a vehicle wheel.

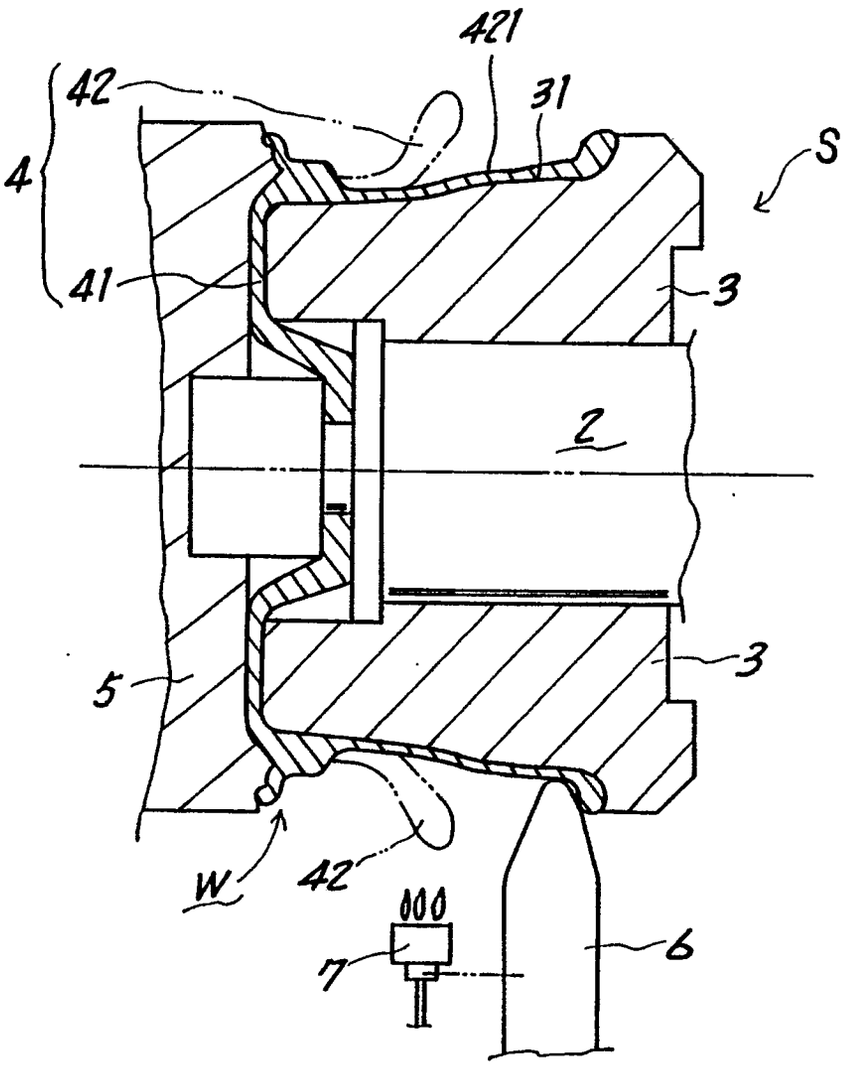
Claims

1. In a spin molding apparatus in which a material (4) to be molded is set on a mandrel (3), said material (4) being rotated by rotating said mandrel (3), said rotating material (4) being pressed onto and squeezed along said mandrel (3) with a pressure spatula (6),

   said spin molding apparatus being characterized in that said pressure spatula (6) is provided with heating means (7) operatively connected thereto for joint movement, so that said material (4) can be heated to a predetermined temperature with said heating means (7).

2. A spin molding apparatus as claimed in claim 1, wherein said heating means (7) is a gas burner.

Fig. 1



INTERNATIONAL SEARCH REPORT

International Application No PCT/JP89/01113

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[5] B21H1/04, 1/10, B21D22/14, 41/04

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC	B21H1/04, 1/10, B21D22/14 - 22/18, 41/04

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

Jitsuyo Shinan Koho	1942 - 1989
Kokai Jitsuyo Shinan Koho	1971 - 1989

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	JP, B1, 48-25878 (Matsushita Electric Ind. Co., Ltd.), 1 August 1973 (01. 08. 73), Column 2, lines 15 to 27, Fig. 2, (Family: none)	1
Y	JP, B1, 48-25878 (Matsushita Electric Ind. Co., Ltd.), 1 August 1973 (01. 08. 73), Column 2, lines 15 to 27, Fig. 2, (Family: none)	2
Y	JP, B2, 55-37574 (NKK Corporation), 29 September 1980 (29. 09. 80), Column 2, line 1 to column 3, line 21, Fig. 4, (Family: none)	2

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
January 9, 1990 (09. 01. 90)	January 22, 1990 (22. 01. 90)
International Searching Authority	**Signature of Authorized Officer**
Japanese Patent Office	