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[Continued on next page]

(54) Title: METHODS FOR FORMING INJECTED MOLDED PARTS AND IN-MOLD SENSORS THEREFOR

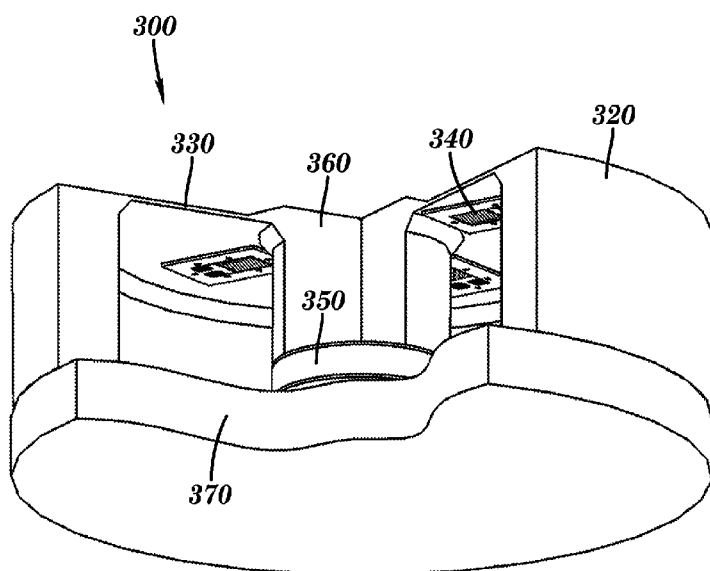


FIG. 8

(57) Abstract: A method for use in forming a molded part includes providing a mold (100, 200, 500) having a cavity and a movable pin (310, 420, 620, 720), injecting a moldable material into the cavity, biasing the movable pin to maintain an end of the movable pin in contact with the moldable material in the cavity during the curing of the moldable material and until the moldable material is cured, and monitoring movement of the biased movable pin during curing of the moldable material in the mold. Also disclosed is a sensor (300, 400, 600, 700) engageable with an end of a movable pin of a mold for monitoring the forming of a moldable part, and systems employing the same.

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) , DELPHION, Espacenet, JPO, USPTO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5519211 A (BUR et al.) 21 MAY 1996 See the abstract; figures; claims; column 3, line 19 - column 4, line 54.	1-35
A	US 6649095 B2 (BUJA) 18 NOVEMBER 2003 See the abstract; figures; claims; column 9, line 7 - column 12, line 31.	1-35
A	JP 11-224275 A (MATSUSHITA ELECTRIC WORKS LTD.) 17 AUGUST 1999 See the abstract; figures; claims; paragraphs [0015]-[0019].	1-35
A	JP 2003-326581 A (CANON INC.) 19 NOVEMBER 2003 See the abstract; figures; claims; paragraphs [0013]-[0018].	1-35
A	JP 2003-103565 A (SUNALLOMER LTD. et al.) 9 APRIL 2003 See the abstract; figures; claims; paragraphs [0042]-[0064].	1-35



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

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Information on patent family members

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Patent document
cited in search report

Publication
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Patent family member(s)

Publication
date

US 5519211 A

21.05.1996

NONE

US 6649095 B2

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US 2002-084543 A1

04.07.2002

JP 11-224275 A

17.08.1999

NONE

JP 2003-326581 A

19.11.2003

NONE

JP 2003-103565 A

09.04.2003

JP 3889587 B2

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