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(54) Title: SYSTEM AND METHODS FOR AN INJECTION MOLDING MACHINE OPERABLE WITH AN ADDITIVE FEEDER SYSTEM

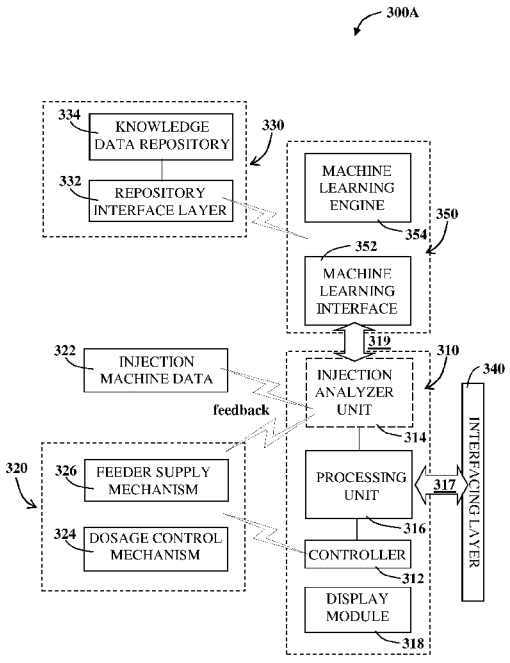

Fig. 3A

(57) Abstract: An additive feeder system is presented which is operable for use in a plastic injection molding machine including an injection component and a clamping component. The additive feeder system includes a feeder control unit, a feeder supply mechanism and feeder dosage control mechanism. The additive feeder system is operable to provide a specific dosage of the additive material in real-time for mixing with the raw material to achieve desired product characteristics. The additive feeder system may be applied to injection molding and extrusion, such as molding processes, plastic molding processes, blow molding, compression molding, extrusion molding, injection molding and laminating, and comprising additive feeders, for example for color mixing and nutrient supplements.

[Continued on next page]

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 17/51289

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B29B 9/00 (2017.01)
CPC - B29C 2045/1841

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)
See Search History Document

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,848,915 A (FINTEL) 18 July 1989 (18.07.1989) Figs. 1-3; col 2 ln 36-41, col 3 ln 37-43, 55 -60, 63-66, col 4 ln 8-10.	1, 3-6, 14, 19-20, 25-26, 30-35
Y		15, 17-18, 23-24
A		16, 21-22, 27-29
X	US 5,439,623 A (FINTEL) 08 August 1995 (08.08.1995) Figs. 1-2; col 3 ln 7-16, 45-46, col 5 ln 40-45.	1, 9-10, 12
Y		7-8, 13
A		2, 11
Y	US 2004/0197435 A1 (SHEPHERD) 07 October 2004 (07.10.2004) Figs. 1-2; paras [0012-4].	7-8
Y	US 3,564,650 A (IRVING) 23 February 1971 (23.02.1971) Figs. 1, 6-7; col 1 ln 70 - col 2 ln 3, col 5 ln 2-7, col 4 ln 39-43.	13
Y	US 2008/0063869 A1 (MORTAZAVI) 13 March 2008 (13.03.2008) Fig. 6; paras [0047], [0050-1].	15, 17-18, 23-24
A		16, 21-22
A	US 6,772,151 B1 (JOHNSTON et al.) 03 August 2004 (03.08.2004) Figs. 1-4; col 4 ln 11-39.	1-35
A	US 8,444,923 B2 (PERSINGER et al.) 21 May 2013 (21.05.2013) Figs. 1-3; col 12 ln 44-55.	1-35

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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

Date of the actual completion of the international search	Date of mailing of the international search report
30 November 2017	26 DEC 2017
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 17/51289

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
-*- See Extra Sheet -*-

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-35

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

-*- Continuation of Box III - Observations where unity of invention is lacking -*-

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I Claims 1-35, directed to an additive feeder system comprising one or more feed-lines fed by the feeder supply mechanism into the feeder dosage control mechanism.

Group II Claims 36-39, directed to a method for use in an additive feeder system including a software application and data.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the lack the same or corresponding special technical feature(s) for the following reasons:

SPECIAL TECHNICAL FEATURES

Group I requires the special technical features of one or more feed-lines fed by the feeder supply mechanism into the feeder dosage control mechanism, not required by the claims of Group II.

Group II requires the special technical features of a software application obtaining a setup configuration and transmitting at least one control signal based on the setup configuration, monitored data, and at least one cutter motor, not required by the claims of Group I.

COMMON TECHNICAL FEATURES

The only shared technical feature(s) that would otherwise unify Groups I-II are an additive feeder system disposed to supply an additive material, the additive feeder system comprising:
a feeder control unit;
a feeder supply mechanism with one or more feed-lines; and
a feeder dosage control mechanism operable to administer the additive material at a desired dosage.

However, these technical features do not represent a contribution to the prior art, because they are anticipated by DE 10223374 B4 to BERNDSEN et al. (hereinafter "Berndsen").

Berndsen teaches an additive feeder system (unnumbered; the apparatus illustrated in Fig. 1; para [0013]) disposed to supply an additive material (color(s) 1, Fig. 1; para [0013]), the additive feeder system comprising:
a feeder control unit (which includes solenoid valve 4 and controller 5, Fig. 1; para [0014]);
a feeder supply mechanism (which includes line(s) 14, Fig. 1; para [0013-4]) with one or more feed-lines (the portions of continuous cycle 3 above pumps 2, as illustrated in Fig. 1; para [0014]; these are self-evidently lines similar to lines 14); and
a feeder dosage control mechanism (pumps 2, Fig. 1; para [0013]) operable to administer the additive material at a desired dosage ("to produce a desired shade" and "precise metering" para [0013]).

As the common technical feature(s) of Groups I-II were known in the art at the time of the invention, they cannot be considered to be common technical feature(s) that would otherwise unify Groups I-II.

Therefore, Groups I-II lack unity under PCT Rule 13.