



(51) International Patent Classification:

E05F 3/10 (2006.01) *E05F 3/22* (2006.01)
E05F 3/12 (2006.01)

(21) International Application Number:

PCT/US2020/017472

(22) International Filing Date:

10 February 2020 (10.02.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/271,184 08 February 2019 (08.02.2019) US

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,

(54) Title: DOOR CLOSER WITH BACKOUT PREVENTION

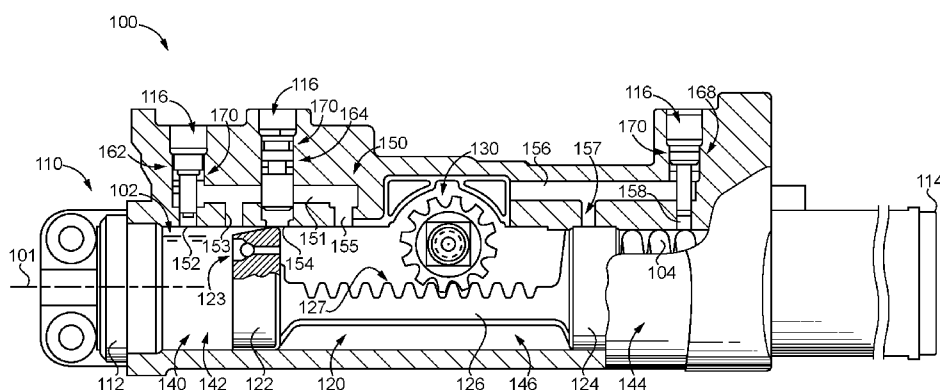


FIG. 1

(57) Abstract: An exemplary door closer includes a housing defining a hydraulic chamber having a hydraulic fluid disposed therein. A pinion is rotatably mounted to the housing and extends into the hydraulic chamber. A piston is mounted for reciprocal movement within the housing, and defines a rack engaged with the pinion. The housing further defines an aperture in fluid communication with the hydraulic chamber. A regulating screw is rotatably mounted within the aperture such that rotation of the regulating screw in a first direction advances the regulating screw into the hydraulic chamber and such that rotation of the regulating screw in an opposite second direction withdraws the regulating screw away from the hydraulic chamber. A stop member is mounted in the aperture such that the stop member limits withdrawing movement of the regulating screw to thereby prevent leaking of the hydraulic fluid from the hydraulic chamber via the aperture.





CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

- (84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, 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))*

(88) Date of publication of the international search report:

01 October 2020 (01.10.2020)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 20/17472

A. CLASSIFICATION OF SUBJECT MATTER

IPC - E05F 3/10, E05F 3/12, E05F 3/22 (2020.01)

CPC - E05F 3/12, E05F 3/102, E05F 3/227, E05Y 2201/41, E05Y 2201/716, E05Y 2600/46, E05Y 2600/45, E05Y 2900/132, E05Y 2400/82, E05Y 2201/20, E05Y 2201/25, E05Y 2201/212, E05Y 2201/256, E05Y 2201/492, Y10T 16/27, Y10T 16/2804

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.
Y	US 4,378,612 A (BEERS) 5 April 1983 (05.04.1983), entire document	1-3/(1-2), 14
A		15-17(15-16)
Y	JP 2007298061 A (SHOWA CORP et al.) 15 November 2007 (15.11.2007), entire document	1-3/(1-2), 14
A		15-17(15-16)
A	US 5,301,776 A (BECK) 12 April 1994 (12.04.1994), entire document	15-17(15-16)
A	US 4,048,694 A (NEWMAN et al.) 20 September 1977 (20.09.1977), entire document	1-3/(1-2), 14-17(15-16)
A	GB 888854 A (MAITLAND et al.) 7 February 1962 (07.02.1962), entire document	1-3/(1-2), 14-17(15-16)
A	US 5,535,514 A (LUCAS) 16 July 1996 (16.07.1996), entire document	1-3/(1-2), 14-17(15-16)
A	US 4,414,703 A (SCHNARR et al.) 15 November 1983 (15.11.1983), entire document	1-3/(1-2), 14-17(15-16)
A	US 2013/0086771 A1 (BLOCKLEY) 11 April 2013 (11.04.2013), entire document	1-3/(1-2), 14-17(15-16)
A	US 4,573,238 A (PHILLIPS) 4 March 1986 (04.03.1986), entire document	1-3/(1-2), 14-17(15-16)

☐ 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

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"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

10 JUNE 2020

Date of mailing of the international search report

10 AUG 2020

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

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 20/17472

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.: 4-13, 18-23
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:

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.:

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.