

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
19 May 2023 (19.05.2023)



(10) International Publication Number
WO 2023/086029 A2

(51) International Patent Classification:
Not classified

(21) International Application Number:
PCT/SG2022/050820

(22) International Filing Date:
11 November 2022 (11.11.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10202112568Y 11 November 2021 (11.11.2021) SG

(71) Applicant: NATIONAL UNIVERSITY OF SINGAPORE [SG/SG]; 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(72) Inventors: BHAT, Ajinkya, Sarang; c/o National University of Singapore, NUS Graduate School for Integrative Sciences and Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). YEOW, Chen, Hua; c/o Nation-

al University of Singapore - Faculty of Engineering, Department of Biomedical Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(74) Agent: PINTAS-IPHOUSE PTE. LTD.; 151 Chin Swee Road, #12-14 Manhattan House, Singapore 169876 (SG).

(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, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, 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, CV,

(54) Title: SOFT ROBOTIC MODULAR AND RECONFIGURABLE ACTUATOR

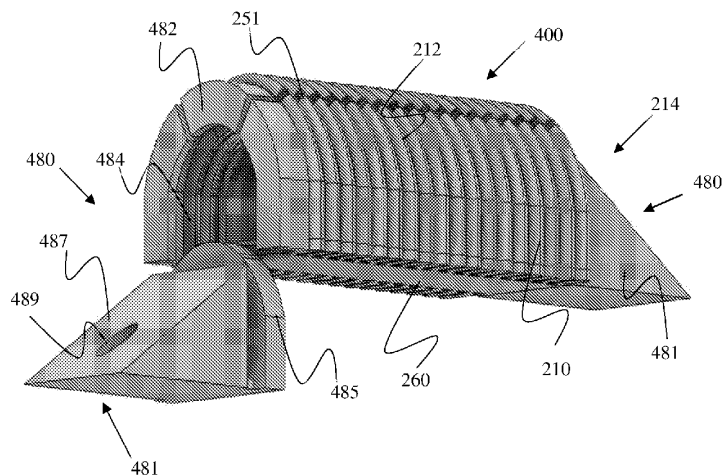


FIG. 7

(57) Abstract: The present invention describes soft robotic actuators (300, 400). Each robotic actuator (300, 400) is made up of a corrugated sleeve (110, 110a, 210, 210a), an expandable bladder (120, 220) and a lock member (370, 480). The corrugated sleeve (110, 110a, 210, 210a) has a hollow passageway (111, 211) with a plurality of folds (112, 212) extending along the passageway, with the hollow passageway extending along a length of the corrugated sleeve. The expandable bladder (120, 220) is detachably inserted inside the hollow passageway (111, 211) and being kept inside the corrugated sleeve (110, 110a, 210, 210a) by the lock member (370, 480). In a use application, a fluid medium is communicable into the bladder under pressure through a tubing opening formed on the lock member (370, 480) results in reversible inflation of the bladder (120, 220). Inflation of the bladder causes the bladder to press against and deform the corrugated sleeve, thereby generating a force output and controlled extension/bending of the robotic actuators (300, 400).

[Continued on next page]

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, ME, 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).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*