

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
10 March 2022 (10.03.2022)



(10) International Publication Number
WO 2022/049463 A1

(51) International Patent Classification:

B01F 3/08 (2006.01) *B01F 13/10* (2006.01)
B01F 5/10 (2006.01) *B01F 11/02* (2006.01)
B01F 13/08 (2006.01) *B01F 5/02* (2006.01)

(21) International Application Number:

PCT/IB2021/057825

(22) International Filing Date:

26 August 2021 (26.08.2021)

(25) Filing Language:

Italian

(26) Publication Language:

English

(30) Priority Data:

102020000020803 01 September 2020 (01.09.2020) IT

(71) Applicant: **QUANTUMKORE INNOVATION INC.**

[US/US]: 122 East 42nd Street, Suite 2005, NEW YORK,
NY 10168 (US).

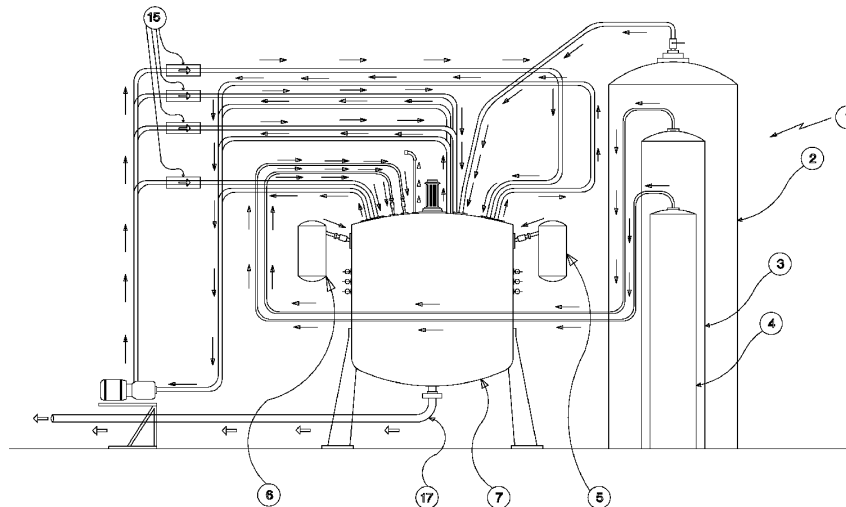
(72) Inventor: **FUMAGALLI, Enrico Carlo**; via Zorzi, 39,
CH-6900 Paradiso, Lugano (CH).

(74) Agent: **BRASCA, Marco**; c/o PGA S.p.A., Via
Mascheroni, 31, I-20145 Milano (IT).

(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, 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, IT, 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,

(54) Title: APPARATUS FOR STABLE NANO EMULSIONS OF WATER IN DIESEL FUEL

FIG.2



(57) **Abstract:** An apparatus for stable nano emulsion of water in diesel fuel, comprises a diesel fuel feeding unit (2), a water feeding unit (3), a magnetite nano-particles feeding unit (4); a mixing tank (7) in fluid communication with the diesel fuel feeding unit (2), with the water feeding unit (3) and with the magnetite nano-particles feeding unit (4); a recirculation conduit (8a, 8b, 8c, 8d) presenting opposite ends connected to the mixing tank (7). A pump (9) is placed on the recirculation conduit (8a, 8b, 8c, 8d) and is configured to recirculate a mixture comprising the diesel fuel (F), the water (W) and the magnetite nano-particles (MNP). A dynamic magnetic field generator (25) is operationally coupled to the recirculation conduit (8a, 8b, 8c, 8d) and is configured to generate a dynamic magnetic field inside at least a section of the recirculation conduit (8a, 8b, 8c, 8d) to activate the magnetite nano-particles.

[Continued on next page]

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))