503170205 02/06/2015

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT3216820

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|-----------------------|----------------|
| GOPICHANDRA SURNILLA | 12/01/2014 |
| DANIEL JOSEPH STYLES | 11/24/2014 |
| JAMES ALFRED HILDITCH | 11/19/2014 |
| IMTIAZ ALI | 11/19/2014 |
| YAN WANG | 11/11/2014 |
| TODD ANTHONY RUMPSA | 12/03/2014 |

RECEIVING PARTY DATA

| Name: | FORD GLOBAL TECHNOLOGIES, LLC |
|-------------------|---------------------------------|
| Street Address: | FAIRLANE PLAZA SOUTH, SUITE 800 |
| Internal Address: | 330 TOWN CENTER DRIVE |
| City: | DEARBORN |
| State/Country: | MICHIGAN |
| Postal Code: | 48126 |

PROPERTY NUMBERS Total: 1

| Property Type | Number | |
|---------------------|----------|--|
| Application Number: | 14616496 | |

CORRESPONDENCE DATA

Fax Number: (503)459-4142

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

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| ATTORNEY DOCKET NUMBER: | 83488013 |
|-------------------------|-----------------|
| NAME OF SUBMITTER: | JIBEK ENABNIT |
| SIGNATURE: | /Jibek Enabnit/ |
| DATE SIGNED: | 02/06/2015 |

PATENT REEL: 034911 FRAME: 0914

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Total Attachments: 6source=Executed Assignment 83488013#page1.tif source=Executed Assignment 83488013#page2.tif source=Executed Assignment 83488013#page3.tif source=Executed Assignment 83488013#page4.tif

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Use an additional declaration form for each additional inventor.

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|------------------------|--|
| Attorney Docket Number | 83488013 |

ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| Title of Invention | SYSTEM AND METHODS FOR OPERATING AN EXHAUST GAS RECIRCULATION VALVE BASED ON A TEMPERATURE DIFFERENCE OF THE VALVE | |
|--|---|--|
| This declaration is direc | sted to: | |
| | stached application, or d States application or PCT international application number filed on | |
| The above-identified ap | plication was made or authorized to be made by me. | |
| I hereby state that I had including the claims. | ive reviewed and understand the contents of the specification in the above-identified application, | |
| I believe that I am the o | riginal inventor or an original joint inventor of a claimed invention in the application. | |
| continuation-in-part ap | to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for plications, material information which became available between the filing date of the prior and or PCT international filing date of the continuation-in-part application. | |
| Pursuant to my employment agreement heretofore made or by contractual obligation, I do sell, assign and set over unto FORD GLOBAL TECHNOLOGIES, LLC, a Ford Motor Company subsidiary, organized and existing by virtue of the laws of the State of Delaware, having its principal place of business at Dearborn, County of Wayne, and State of Michigan, hereinafter referred to as the ASSIGNEE, its successors, assigns or other legal representatives, the entire right, title and interest, domestic and foreign, in and to the inventions and discoveries in the above-identified invention including the right of the ASSIGNEE, its successors, assigns or other legal representatives to make applications and to receive Letters Patent for the inventions and discoveries in any and all countries, entities and intergovernmental organizations, in its or their own name or names, or in my name, at its or their election (and I hereby authorize the ASSIGNEE or ASSIGNEE's attorney to insert the serial/application number and filing date of the application to receive Letters Patent herein: Serial No. 14/616,496 , Filing Date February 6,2015), and I hereby sell, assign and set over to the ASSIGNEE, its successors, assigns or other legal representatives, all rights of priority, including any provisional applications, in and to the inventions and discoveries in any and all countries, entities and intergovernmental organizations including all applications claiming benefit of the filing date hereof, continuations, continuations-in-part, divisionals, reexaminations and reissue applications. | | |
| including applications forganizations, and to pe | myself, my heirs, successors, assigns or other legal representatives to execute any and all papers, for Letters Patent of any and all kinds and in any and all countries, entities and intergovernmental erform any and all acts which the ASSIGNEE, its successors, assigns or other legal representatives secure thereto the rights herein sold, assigned and set over. | |
| And I hereby represent and warrant that I have not granted any rights inconsistent with the rights granted herein. | | |
| or imprisonment of not | hat any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine more than five (5) years or both. | |
| LEGAL NAME OF IN | | |
| Inventor: Gopicha | ndra Surnilla Date: | |
| Signature: | | |
| Note: An Application De | ta Sheet (PTO/SR/14 ar equivalent), including gaming the entire inventive entity, must accompany this form | |

| Attorney Docket Number 83488013 |
|---------------------------------|
| |

ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| Title of Invention | | SYSTEM AND METHODS VALVE BASED ON | FOR OPERATING AN E A TEMPERATURE DIFF | XHAUST GAS RECIRCULATION FERENCE OF THE VALVE |
|--|--|--|--|---|
| This declaration | is direct | ed to: | | |
| The attached application, or United States application or PCT international application number filed on | | | | |
| The above-identi | fied app | olication was made or authorized | to be made by me. | |
| | at I hav | | The state of the s | on in the above-identified application, |
| I believe that I as | n the or | ginal inventor or an original joint | t inventor of a claimed inver | ntion in the application. |
| AND DESCRIPTION OF THE PROPERTY OF THE PERSON OF THE PERSO | տուլ գերը | o disclose information which is milications, material information hal or PCT international filing date | Which became available b | efined in 37 C.F.R. 1.56, including for between the filing date of the prior t application. |
| of the State of E hereinafter referrinterest, domestic of the ASSIGNE for the inventions name or names, cinsert the serial 14/616, 49 ASSIGNEE, its applications, in a including all appreciaminations ar | Delaware ed to as and for E, its su sand dis applicat 6 success and to the olication ad reissu | the ASSIGNEE, its successors, reign, in and to the inventions and accessors, assigns or other legal recoveries in any and all countries name, at its or their election (an ion number and filing date of Filing Date Februar ors, assigns or other legal repersions, assigns or other legal repersions. | company substitiary, organ business at Dearborn, Coun, assigns or other legal representatives to make apple, entities and intergovernment of the application to receive (1967), and I horesentatives, all rights of my and all countries, entities g date hereof, continuation | ized and existing by virtue of the laws ty of Wayne, and State of Michigan, resentatives, the entire right, title and dentified invention including the right lications and to receive Letters Patent ental organizations, in its or their own issigned or ASSIGNEE's attorney to be Letters Patent herein: Serial No. ereby sell, assign and set over to the priority, including any provisional and intergovernmental organizations is, continuations-in-part, divisionals, |
| organizations, and | i to peri | ECHOLO LARGII UL MIV MIGLARI KI | ings and in any and all cou | tatives to execute any and all papers, ntries, entities and intergovernmental assigns or other legal representatives |
| And I hereby repr | esent an | d warrant that I have not granted | any rights inconsistent with | the rights granted herein. |
| s, maparacettificati (| 25 51676 1554 | he man nive (3) years or both. | le in this declaration is pun | ishable under 18 U.S.C. 1001 by fine |
| EGAL NAME C nventor: Da | | :NTUK eph Styles | Patri | 11-24-14 |
| ilgnature: <u>D</u> | artenis de la constitución de la | Josp Shu | Date: | 117 |
| iote: An Applicati Isc an additional de | on Data claration | Sheet (PTO/SB/14 or equivalent), in form for each additional inventor. | cluding naming the entire inve | entive entity, must accompany this form. |

| <u>:</u> | | | |
|----------|-----------------------|----------|--|
| Α | ttorney Docket Number | 83488013 | |
| | | 02100012 | |

ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| Title of Inventio |)\$33 | SYSTEM AND METHODS FOR VALVE BASED ON A TE | OPERATING AN EX MPERATURE DIFFI | HAUST GAS RECIRCUL ERENCE OF THE VALVI | ATION |
|---|---|---|---|--|--|
| This declaration is | direct | | | | |
| | | tached application, or I States application or PCT internationa filed on | al application number | | |
| The above-identific | ed app | lication was made or authorized to be r | nade by me. | | |
| I hereby state that including the claim | I hav is. | e reviewed and understand the conter | nts of the specification | in the above-identified ap | plication, |
| I believe that I am t | the ori | iginal inventor or an original joint inver | ntor of a claimed invent | tion in the application. | |
| communion-m-par | app | o disclose information which is material lications, material information which hal or PCT international filing date of the | i became available be | etween the filing data of a | uding for the prior |
| of the State of Del hereinafter referred interest, domestic as of the ASSIGNEE, for the inventions a name or names, or insert the serial/ap 14/616, 496 ASSIGNEE, its suapplications, in and including all applications and | laware laware l to as and for its su and dis in my opticati uccessed to the cations reissu | · · | sany subsidiary, organizes at Dearborn, County on other legal representatives in the above-identatives to make applicates and intergovernment reby authorize the ASS application to receive 2015, and I hereafted all countries, entities a hereof, continuations | zed and existing by virtue of y of Wayne, and State of Mesentatives, the entire right, ientified invention including ications and to receive Letterntal organizations, in its or the SIGNEE or ASSIGNEE's attended to be before the Letters and set owe priority, including any property, including any property, continuations-in-part, div | the laws. Alchigan, title and the right rs Patent heir own torney to erial. No. er to the ovisional nizations visionals, |
| organizations, and to | ms tor to perf | nyself, my heirs, successors, assigns of Letters Patent of any and all kinds as form any and all acts which the ASSIC cure thereto the rights herein sold, assigned | nd in any and all count INEE, its successors, a | tries entities and intervover | ramental |
| And I hereby represe | ent and | d warrant that I have not granted any ri | ghts inconsistent with t | he rights granted herein. | |
| or unprisonment of i | not me | t any willful false statement made in to ore than five (5) years or both. | his declaration is punis | hable under 18 U.S.C. 1001 | by fine |
| LEGAL NAME OF nventor:Jame | | | | 11/11/2 | |
| Signature: Jame | $\frac{\mathbf{s}}{2}$ | red Hilditch HULL | Date: | 11/19/2014 | B . |
| ote: An Application see an additional decir | Data : | Sheet (PTO/SB/14 or equivalent), including form for each additional inventor. | g naming the entire inver | ntive entity, must accompany th | his form. |

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| Attorney Docket Number | |

ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| line of invention | | VALVE BASED ON A TEMPERATURE DIFFERENCE OF THE VALVE | | |
|---|---|--|--|--|
| This declaration is directed to: | | | | |
| | United | tached application, or States application or PCT international application number filed on | | |
| The above-ident | ified app | lication was made or authorized to be made by me. | | |
| I hereby state the including the cla | | re reviewed and understand the contents of the specification in the above-identified application, | | |
| I believe that I as | m the or | iginal inventor or an original joint inventor of a claimed invention in the application. | | |
| continuation-in-p | ert app | o disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for lications, material information which became available between the filing date of the prior nal or PCT international filing date of the continuation-in-part application. | | |
| FORD GLOBAL of the State of I hereinafter refer interest, domesti of the ASSIGNE for the invention name or names, insert the serial 14/616, 49 ASSIGNEE, its applications, in a | TECH Delawar red to a c and fo E, its si s and di or in my /applica /applica success and to th oplication | nent agreement heretofore made or by contractual obligation, I do sell, assign and set over unto NOLOGIES, LLC, a Ford Motor Company subsidiary, organized and existing by virtue of the laws e, having its principal place of business at Dearborn, County of Wayne, and State of Michigan, as the ASSIGNEE, its successors, assigns or other legal representatives, the entire right, title and reign, in and to the inventions and discoveries in the above-identified invention including the right accessors, assigns or other legal representatives to make applications and to receive Letters Patent scoveries in any and all countries, entities and intergovernmental organizations, in its or their own mame, at its or their election (and I hereby authorize the ASSIGNEE or ASSIGNEE's attorney to the number and filing date of the application to receive Letters Patent herein: Serial No. ——————————————————————————————————— | | |
| including applications, ar | ations fo nd to per | myself, my heirs, successors, assigns or other legal representatives to execute any and all papers, or Letters Patent of any and all kinds and in any and all countries, entities and intergovernmental form any and all acts which the ASSIGNEE, its successors, assigns or other legal representatives ecure thereto the rights herein sold, assigned and set over. | | |
| And I hereby represent and warrant that I have not granted any rights inconsistent with the rights granted herein. | | | | |
| | | at any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine nore than five (5) years or both. | | |
| LEGAL NAME | OF INV | ENTOR I. IA | | |
| | ntiaz A | | | |
| Signature: | | alla. | | |
| | | a Sheet (PTO/SB/14 or equivalent), including marning the entire inventive entity, must accompany this form. In form for each additional inventor. | | |

| Attorney Docket Number | 83488013 | |
|------------------------|----------|--|

ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| Title of Invention | SYSTEM AND METHODS FOR OPERATING AN EXHAUST GAS RECIRCULATION VALVE BASED ON A TEMPERATURE DIFFERENCE OF THE VALVE |
|--|---|
| This declaration is a | lirected to: |
| | The attached application, or Inited States application or PCT international application number filed on |
| The above-identifie | d application was made or authorized to be made by me. |
| l hereby state that including the claims | I have reviewed and understand the contents of the specification in the above-identified application, s. |
| I believe that I am the | he original inventor or an original joint inventor of a claimed invention in the application. |
| continuation-in-part | uty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for applications, material information which became available between the filing date of the prior national or PCT international filing date of the continuation-in-part application. |
| FORD GLOBAL T of the State of Delhereinafter referred interest, domestic at of the ASSIGNEE, for the inventions a name or names, or insert the serial/ap. 14/616, 496 ASSIGNEE, its suapplications, in and including all applies | ployment agreement heretofore made or by contractual obligation, I do sell, assign and set over unto ECHNOLOGIES, LLC, a Ford Motor Company subsidiary, organized and existing by virtue of the laws aware, having its principal place of business at Dearborn, County of Wayne, and State of Michigan, to as the ASSIGNEE, its successors, assigns or other legal representatives, the entire right, title and not foreign, in and to the inventions and discoveries in the above-identified invention including the right its successors, assigns or other legal representatives to make applications and to receive Letters Patent and discoveries in any and all countries, entities and intergovernmental organizations, in its or their own in my name, at its or their election (and I hereby authorize the ASSIGNEE or ASSIGNEE's attorney to plication number and filing date of the application to receive Letters Patent herein: Serial No. ——————————————————————————————————— |
| including application organizations, and t | for myself, my heirs, successors, assigns or other legal representatives to execute any and all papers, ons for Letters Patent of any and all kinds and in any and all countries, entities and intergovernmental to perform any and all acts which the ASSIGNEE, its successors, assigns or other legal representatives to secure thereto the rights herein sold, assigned and set over. |
| And I hereby repres | ent and warrant that I have not granted any rights inconsistent with the rights granted herein. |
| or imprisonment of | ge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine not more than five (5) years or both. |
| LEGAL NAME OF | |
| Inventor: Yan | Wang Date: 1/11/ |
| Signature: | ya-y |
| Note: An Application Use an additional deel | 1 Data Sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form, aration form for each additional inventor. |

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ASSIGNMENT AND DECLARATION (37 C.F.R. 1.63) FOR UTILITY, PROVISIONAL OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

| Title of Invention | SYSTEM AND METHODS FOR OPERATING AN EXHAUST GAS RECIRCULATION VALVE BASED ON A TEMPERATURE DIFFERENCE OF THE VALVE | | | |
|--|---|--|--|--|
| This declaration is directe | d to: | | | |
| United | sched application, or States application or PCT international application number filed on | | | |
| The above-identified appl | ication was made or authorized to be made by me. | | | |
| I hereby state that I have reviewed and understand the contents of the specification in the above-identified application, including the claims. | | | | |
| I believe that I am the original inventor or an original joint inventor of a claimed invention in the application. | | | | |
| I am aware of the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application. | | | | |
| Pursuant to my employment agreement heretofore made or by contractual obligation, I do sell, assign and set over unto FORD GLOBAL TECHNOLOGIES, LLC, a Ford Motor Company subsidiary, organized and existing by virtue of the laws of the State of Delaware, having its principal place of business at Dearborn, County of Wayne, and State of Michigan, hereinafter referred to as the ASSIGNEE, its successors, assigns or other legal representatives, the entire right, title and interest, domestic and foreign, in and to the inventions and discoveries in the above-identified invention including the right of the ASSIGNEE, its successors, assigns or other legal representatives to make applications and to receive Letters Patent for the inventions and discoveries in any and all countries, entities and intergovernmental organizations, in its or their own name or names, or in my name, at its or their election (and I hereby authorize the ASSIGNEE or ASSIGNEE's attorney to insert the serial/application number and filing date of the application to receive Letters Patent herein: Serial No. 14/616,496 , Filing Date February 6,2015), and I hereby sell, assign and set over to the ASSIGNEE, its successors, assigns or other legal representatives, all rights of priority, including any provisional applications, in and to the inventions and discoveries in any and all countries, entities and intergovernmental organizations including all applications claiming benefit of the filing date hereof, continuations, continuations-in-part, divisionals, reexaminations and reissue applications. | | | | |
| And I hereby agree for myself, my heirs, successors, assigns or other legal representatives to execute any and all papers, including applications for Letters Patent of any and all kinds and in any and all countries, entities and intergovernmental organizations, and to perform any and all acts which the ASSIGNEE, its successors, assigns or other legal representatives may deem necessary to secure thereto the rights herein sold, assigned and set over. | | | | |
| And I hereby represent an | d warrant that I have not granted any rights inconsistent with the rights granted herein. | | | |
| I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years or both. | | | | |
| LEGAL NAME OF INVE Inventor: Todd Anth | NTOR ony Rumpsa Date: 72/3/2014 | | | |
| Signature: 2 | 0ny Rumpsa Date: 12/3/2014 | | | |
| Note: An Application Data | Sherri (PTO/SR/14 or equivalent), including namina dea angle (acauti, acauti, | | | |
| Note: An Application Data Sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional declaration form for each additional inventor. | | | | |

PATENT REEL: 034911 FRAME: 0921

RECORDED: 02/06/2015