

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 13-115292- -00005-0000

Fecha: 2014-04-11 15:25:08 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 34

Señores
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
División de Nuevas Creaciones
E. S. D.

Actuación: REMISIÓN DE COPIA CERTIFICADA PARA RECLAMAR
PRIORIDAD.

Expediente: 13-115292

Solicitante(s): ROMO PATENTS & RIGHTS CORP.

Respetados Señores,

DIEGO MUÑOZ MARROQUIN, identificado civil y profesionalmente como aparece al pie de mi firma, con domicilio y residencia en la ciudad de Bogotá D.C., obrando en calidad de apoderado del solicitante, comedidamente remito a su Honorable Despacho **COPIAS CERTIFICADAS PARA EFECTOS DE INVOCAR PRIORIDAD EN UNA SOLICITUD DE PATENTE** del expediente que se relaciona a continuación:

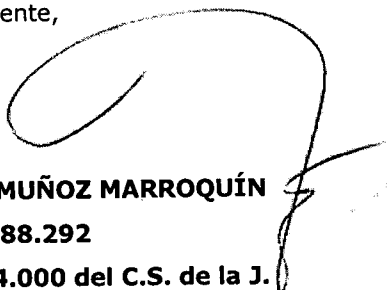
EXPEDIENTE	13-115292
TITULO	PROCESO NOVEDOSO PARA ROMPIMIENTO, REAGRUPACION MOLECULAR Y OPTIMIZACION Y AUMENTO DE VOLUMEN DE COMBUSTIBLE MEDIANTE CAVITACION HIDRODINAMICA Y ALTA PRESION CON LA ADICION DE AGUA Y OTROS ADITIVOS, TAMBIEN CONOCIDO COMO ROMO-APC"
FECHA DE SOLICITUD	08-05-2013
SOLICITANTE(S)	ROMO PATENTS & RIGHTS CORP.
APODERADO	DIEGO MUÑOZ MARROQUIN

Conforme a lo anterior, rogamos a este Despacho aceptar de manera conforme la copia certificada para efectos de la reivindicación de la prioridad.

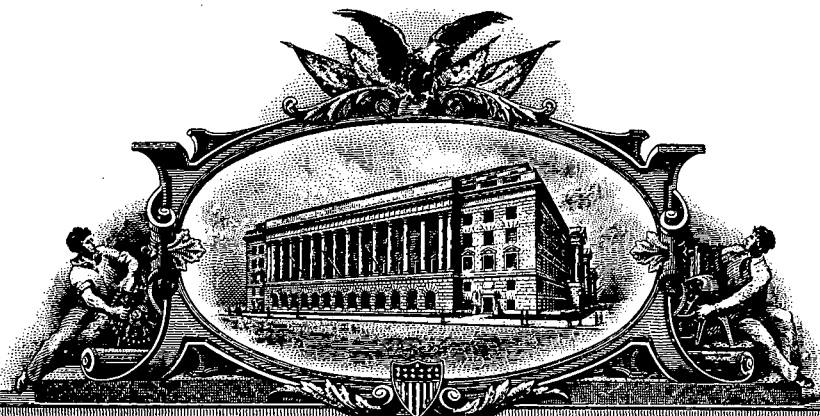
NOTIFICACIONES

Para todos los efectos recibiremos notificaciones en la carrera 5 No. 66-17 de Bogotá D.C.

Cordialmente,


DIEGO MUÑOZ MARROQUÍN
C.C. 7.688.292
T.P. 134.000 del C.S. de la J.





THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 04, 2014

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: *13/859,594*

FILING DATE: *April 09, 2013*

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS *US13/859,594*

By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office



W. Montgomery
W. MONTGOMERY
Certifying Officer

Electronic Acknowledgement Receipt

EFS ID:	15475541
Application Number:	13859594
International Application Number:	
Confirmation Number:	1011
Title of Invention:	NOVEL PROCESS FOR MOLECULAR RUPTURE, REORGANIZATION AND FUEL OPTIMIZATION AND VOLUME INCREASE THROUGH HIGH PRESSURE AND HYDRODYNAMIC CAVITATION WITH THE ADDITION OF WATER AND OTHER ADDITIVES A.K.A. ROMO-APC
First Named Inventor/Applicant Name:	Carlos Jose Gonzalez
Correspondence Address:	Carlos Gonzalez - La Torre de Plaza las Americas 525 F.D. Roosevelt Avenue, Suite 903 San Juan PR 00918-8058 US 787-753-1158 biodieselpr@aim.com
Filer:	Carlos Gonzalez
Filer Authorized By:	
Attorney Docket Number:	
Receipt Date:	09-APR-2013
Filing Date:	
Time Stamp:	19:01:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1600

RAM confirmation Number		5640			
Deposit Account					
Authorized User					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	sb0001l1eno.pdf	131078 fb6e80ba23c934a5e80602975a24f41c4d555b08	no	4
Warnings:					
Information:					
2	Application Data Sheet	ApplicationDataSheet.pdf	78279 6f2f92ab2cbde7f95dd2a59858cc7cabbcd66075	no	1
Warnings:					
Information:					
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3	Oath or Declaration filed	sb0002_filledl1eno.pdf	361038 2facc9fa428151a90705b4adebde5f97470f4703	no	3
Warnings:					
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4	Transmittal of New Application	UtilityPatentApplicationTransmittal.pdf	84201 12d3d7f16b57930ea0149fffbf6699859644e675	no	1
Warnings:					
Information:					
5	Abstract	AbstractROMO.pdf	21367 96fa470ee932d3e28a286852f5d07beb69429c35	no	1
Warnings:					
Information:					
6	Claims	ClaimsROMO.pdf	173250 fd15a35b754b7b2d8eb663e3bce46d33d7549ba9	no	6
Warnings:					
Information:					
7	Drawings-only black and white line drawings	DWGROMO.pdf	472244 2710ea380cbaad001a6fc361a155d4f0e09f273a	no	13
Warnings:					
Information:					

5

8	Fee Worksheet (SB06)	fee-info.pdf	33123 61cfcaa658b9c37a36cd5460c118bb8d376a822f	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			1354580		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

First Inventor

Carlos Gonzalez

Title

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)
2. ☐ Applicant claims small entity status.
See 37 CFR 1.27.
3. ☒ Specification [Total Pages 7]
Both the claims and abstract must start on a new page
(For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 13]
5. Oath or Declaration [Total Sheets 2]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ A copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s)
name in the prior application, see 37 CFR
1.63(d)(2) and 1.33(b).
6. ☒ Application Data Sheet. See 37 CFR 1.76
7. ☐ CD-ROM or CD-R in duplicate, large table or
Computer Program (Appendix)
☐ Landscape Table on CD
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, items a. - c. are required)
 - a. ☐ Computer Readable Form (CRF)
 - b. ☐ Specification Sequence Listing on:
 - i. ☐ CD-ROM or CD-R (2 copies); or
 - ii. ☐ Paper
 - c. ☐ Statements verifying identity of above copies

ADDRESS TO:

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
Name of Assignee _____
10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement (PTO/SB/08 or PTO-1449)
☐ Copies of citations attached
13. ☐ Preliminary Amendment
14. ☐ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i).
Applicant must attach form PTO/SB/35 or equivalent.
17. ☐ Other: _____

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation

☐ Divisional

☐ Continuation-in-part (CIP)

of prior application No.: _____

Prior application information:

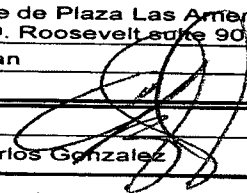
Examiner _____

Art Unit: _____

19. CORRESPONDENCE ADDRESS

☐ The address associated with Customer Number: _____

OR ☒ Correspondence address below

Name	Carlos Gonzalez				
Address	La Torre de Plaza Las Americas 525 F.D. Roosevelt suite 903				
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Country	USA	Telephone	787-753-1158	Email	biodieselpr@aim.com
Signature				Date	April 9, 2013
Name (Print/Type)	Carlos Gonzalez			Registration No. (Attorney/Agent)	

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

7

UTILITY PATENT APPLICATION OF

**Carlos González, ME
Miguel Jimenez, IE
Luis Fernando Gutiérrez, PhD**

FOR

**NOVEL PROCESS FOR MOLECULAR RUPTURE, REORGANIZATION AND FUEL
OPTIMIZATION AND VOLUME INCREASE THROUGH HIGH PRESSURE AND
HYDRODYNAMIC CAVITATION WITH THE ADDITION OF WATER AND OTHER
ADDITIVES A.K.A. ROMO-APC**

TECHNICAL FIELD

The present invention pertains mostly to the petrochemical sector. It relates to systems and methods for upgrading hydrocarbons and biofuels, mainly focused on the increase in fuel volume, fuel characteristics improvement, and refining or fractioning of fuels.

BACKGROUND INFORMATION

Fuel is one of the most important security issues for a country. With decreasing reserves of light crude oil, and crude in general, our fuel supply is being affected; prices are at a high and will continue to escalate as oil sites are depleted. The petroleum industry is always looking for more economical ways to crack, distil, refine and improve on fuel characteristics. Recent environmental requirements for fuels to conform to EPA standards, and having the rest of the World following in the footsteps of these

requirements, have prompted the industry to explore new methods to reduce these emissions in the least expensive manner.

The conventional process used in the petroleum industry for crude oil molecular rupture to obtain lighter fractions of fuel is thermal cracking. The thermal cracking is carried out under high temperature and pressure conditions using a catalyst, like Al_2O_3 (for example, Patent US4666875, Union Carbide Corporation, Patent US6306790, Exxon Mobil Chemical Patents Inc.), with sophisticated equipment and require extensive footprint.

On the other hand, hydrocracking is a process used in the oil industry to convert low quality raw materials into higher-value fuel. This process is the best way to obtain a diesel fuel with lower sulphur content and aromatics. Normally the hydrocracking process is carried out using two suspended bed catalytic packed reactors that operate at high pressure and temperature (Patent US7214309, Chevron USA Inc.). In the first reactor the molecule is ruptured, releasing sulfur and nitrogen, then the liquid fraction enters the second reactor where it is hydroisomerized and cracked. The hydrocracking process allows a variety of liquid fuels with certain undesirable characteristics to conform to existing environmental requirements.

These conventional processes have a high demand in energy and require large spaces for the process to take place, aside from the use of catalysts and other consumables which require periodical exchange or replacement. All this represents an added cost for the industry, especially now that we have to work with heavier fractions of crude oil. Aside from the previous downsides of current methods, none of the existing processes increase the volume of the fuel being treated.

ADVANTAGES

The following are some of the advantages for the usage of the ROMO-APC process in fuel cracking and optimization, among other aspects of this process. Though several more advantages will become apparent as well as the bellow mentioned after considering the ensuing description and related drawings.

- 1- Low energy consumption, power, heat, etc.
- 2- Fuel volume increase with cheaper additives (for example, water)
- 3- Simpler method for cracking fuels
- 4- Improvement in API index
- 5- Less floor space usage
- 6- Less expensive way to deliver additives stably to fuel at a molecular level

- 7- Creation of cleaner fuels
- 8- Reduction of undesirable elements in fuel such as:
 - a) Sulfur
 - b) CO
 - c) Nox
 - d) Carbon particulate at the moment of combustion
 - e) Crude Oil viscosity
- 9- It can be applied to biofuels as well as hydrocarbon fuels
- 10-Can be used in-line with power generation devices like turbines, boilers, etc. at higher water/additive ratios
- 11-Heating value improvement
- 12-Cetane level increase in D6 and D2
- 13-Maintenance reduction due to cleaner combustion
- 14-Lighter fuels can have an increase in octane levels
- 15-Others not stated

SUMMARY

The novel process that we developed, which we call ROMO-APC, is based on the use of a hydrodynamic cavitation reactor coupled with a high pressure system in the presence of non-hydrocarbon or hydrocarbon additives, including but not limited to water, ethanol, and methanol, among others, at various ratios, that allows the rupture and relocation of the molecules of any fuel, ostensibly improving its physical-chemical characteristics. As a result, when processing heavy fuels like D6 or D2 we obtain an increase in volume as well, with proven results of over 40% in volume increment. Regardless of the fuel refined through our process, the resulting fuel will always have better characteristics, since polymeric molecules are broken and rearranged, so that characteristics such as, for example, API in the case of crude oil, and flash point, Cetane level, and heating value in the case of diesel are substantially improved, among other treated fuels and improvements.

A hydrodynamic cavitation reactor is a device which reproduces the cavitation phenomenon or cavitation bubbles in the liquid; here a fluid is subjected to a strong change of pressure with the aim of achieving a phase shift among other functions. In the reactor, pressure reached is equal to the vapor pressure of the fluid, causing the formation of cavitation bubbles known as cavities. These reactors provide the formation

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

of cavities which then implode generating high frequency pulses that shock the fluid causing the rupture and reorganization of the polymer chains in the fuel to occur.

During the ROMO-APC process the molecular rupture of the polymer chains forms what we call a "temporary active binding center", also known as radical, which is ready to combine chemically with other organic or inorganic molecules. These active binding sites can be joined to other molecules present in the treated fuel by introducing foreign substances that are added during the process (referred to as additives). The additives can be any compound which improves the treated fuel characteristics and in some cases its resulting volume is also increased.

Any polymer chain fluid that is submitted to this strong pressure change suffers rupture and reorganization of its molecules. When the rupture occurs, unstable molecular "active" sites are formed and become available to be combined in situ with other molecules (additives). The formation of these active sites is what makes possible the reorganization and recombination of the fuel's molecules therefore improving the fuel's overall quality and characteristics.

Molecular rupture caused by the ROMO-APC process is used to add other molecular compounds that bind chemically to the treated fuel. For example you can use water to form a new polymer chain containing hydrogen and oxygen within its final structure. This process improves fuels such as diesel, or bunker, to name a few, by adding water in a certain predetermined percentage (we have tested at over 40%), increasing the volume of the finished product by the determined percentage, and even creating a new fuel with enhanced features and characteristics while remaining molecularly stable.

The physics and chemistry behind the ROMO-APC process is based on studies of the induced chemical reactions on inorganic and organic material after being submitted to ultrasound. In our specific process, the ROMO-APC process, the ultrasound energy is replaced by the formation of cavities in the fluid due to the change in pressure induced by the hydrodynamic cavitation reactor. The high inlet pressure is violently reduced inside the reactor, causing a thermodynamic change which is used to aid in the formation of cavities within the fluid (cavitation bubbles). When the fluid returns to its initial conditions the cavities then collapse and release a large amount of energy which is absorbed by the fluid rupturing its molecular structure and reorganizing the molecules in a more orderly and stable form for combustion. The intensity in which we create the cavities or cavitation bubbles within the fluid is a function of the system pressure which also determines the frequency and the intensity of the shock wave that causes the molecular rupture.

During the phenomenon of creation and subsequent collapse of cavities or cavitation bubbles, the ROMO-APC process reaches up to 500 atmospheres of pressure and hundreds of degrees in temperature, which rupture all polymer chain liquid fluid molecules. This same energy is used to form new polymer chains that are more stable and have better properties for combustion.

Based on the above mentioned, it is clear that the reactions happen due to a local increase in the temperature, pressure and the formation of molecular radicals. All of these chemical and physical changes are due to the rupture of the fluid molecular links caused by the collapse of the cavitation bubbles created during the process of cavitation. Depending on the nature of the liquid being cavitated, different effects can be obtained such as: radical creation, depolymerization, Lysis, liquid emulsions, rupture of solid particles, and acceleration of chemical reactions, among others.

WE CLAIM THAT:

1- When this embodiment is applied to diesel fuel in a water-diesel relationship from 1% to 50%

- a) A reduction in the expenditure of up to 35% fuel is achieved
- b) An increase in Cetane levels is achieved
- c) The engine power is increased up to 5% is achieved
- d) A reduction in CO and CH emissions between 40% and 50% is achieved

2- When this embodiment is applied to bunker, fuel oil in a water-fuel relationship between 1% and 50%

- a) Boilers increase their thermal efficiency between 3-5%
- b) A reduction in the emission of polluting substances in the atmosphere such as:
 - 1. CO by 75%

12

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

2. NO_x between 25-50%

3. SO₂ between 30-70%.

3- The method of claim 1 and claim 2 when treated fuel is used in boilers, a reduction of soot formation on the surface of the heat exchange of the boiler between 1.5 and 2 times less than without treatment, reducing the fuel usage between 3-6%.

4- When this embodiment is applied to crude oil we achieve:

a) A decrease in viscosity between 30% and 45%.

b) A gain in API index between 10% and 70%.

5- When this embodiment is applied to gasoline in a water-fuel relationship between 1% and 10% we achieve:

a) An improvement in octane levels between 10% and 40%.

b) A reduction of emissions of polluting substances.

UTILITY PATENT APPLICATION OF

**Carlos González, ME
Miguel Jimenez, IE
Luis Fernando Gutiérrez, PhD**

FOR

**NOVEL PROCESS FOR MOLECULAR RUPTURE, REORGANIZATION AND FUEL
OPTIMIZATION AND VOLUME INCREASE THROUGH HIGH PRESSURE AND
HYDRODYNAMIC CAVITATION WITH THE ADDITION OF WATER AND OTHER
ADDITIVES A.K.A. ROMO-APC**

ABSTRACT

The ROMO-APC Process is a molecular rupture and recombination of fuels with additives or fuel enhancers such as, but not limited to, non-hydrocarbon and/or hydrocarbon substances such as but not limited to, water, methanol, ethanol, naphtha, and other lighter fluids, through the use of a hydrodynamic cavitation apparatus or reactor to cause the molecular rupture, coupled to a high pressure system where the recombination of the molecules (fuel and additives) stably occur, while increasing the treated fuel's volume.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)		Attorney Docket Number	
		First Named Inventor	Carlos Gonzalez
☒ Declaration Submitted With Initial Filing OR ☐ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(f)) required)		COMPLETE IF KNOWN	
		Application Number	
		Filing Date	April 9, 2013
		Art Unit	
		Examiner Name	

I hereby declare that: (1) Each inventor's residence, mailing address, and citizenship are as stated below next to their name; and (2) I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled:

Carlos Gonzalez, 43 Altura los Pineros, Cayey, PR, 00736-9319, US Citizen
 Miguel Jimenez, Calle sexta #610 Las Acacias S-11, Zipaquira, Colombia. Citizen of Spain
 Luis Fernando Gutierrez, Calle 105A, #27-05, Manizales, Caldas, Colombia, Citizen of Colombia

(Title of the Invention)

the application of which was made or was authorized to be made by me and

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) _____ as United States Application Number or PCT International

Application Number _____ and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 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.

Authorization To Permit Access To Application by Participating Offices

☐ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified patent application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

[Page 1 of 3]

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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DECLARATION — Utility or Design Patent Application

Claim of Foreign Priority Benefits

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐

Additional foreign application number(s) are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

16

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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: ☐	The address associated with Customer Number:	OR	☐ Correspondence address below
Name Carlos Gonzalez			
Address La Torre de Plaza las Americas, 525 F.D. Roosevelt Ave. Suite 903			
City San Juan		State Puerto Rico	Zip 00918-8058
Country US	Telephone 787-753-1158	Email biodieselpr@aim.com	
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
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.			
NAME OF SOLE OR FIRST INVENTOR:		☒ A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any]) Carlos Jose		Family Name or Surname Gonzalez	
Inventor's Signature		Date April 9, 2013	
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[Page 3 of 3]

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	NOVEL PROCESS FOR MOLECULAR RUPTURE, REORGANIZATION AND FUEL OPTIMIZATION AND VOLUME INCREASE THROUGH HIGH PRESSURE AND HYDRODYNAMIC CAVITATION WITH THE ADDITION OF WATER AND OTHER ADDITIVES A.K.A. ROMO-APC
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As the below named inventor(s), I/we declare that:

This declaration is directed to: ☒ The attached application, or
☐ United States application or PCT international application number _____
 filed on _____
☐ As amended on _____ (if applicable);

I/we believe that I/we am/are the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought;

I/we have reviewed and understand the contents of the above-identified application, including the claims, as amended by any amendment specifically referred to above;

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 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. The above-identified application was made or authorized to be made by me/us.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

All statements made herein of my/our own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon. 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) or both.

FULL NAME OF INVENTOR(S)

Inventor one: Carlos Jose Gonzalez Date: April 9, 2013

Signature: [Signature] Citizen of: USA

Inventor two: Miguel Jimenez Date: April 9, 2013

Signature: _____ Citizen of: Spain

☐ Additional inventors or a legal representative are being named on _____ additional form(s) attached hereto.

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DECLARATION	ADDITIONAL INVENTOR(S) Supplemental Sheet
Page _____ of _____	

Name of Additional Joint Inventor, if any:		☒ A petition has been filed for this unsigned inventor	
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Name of Additional Joint Inventor, if any:		☒ A petition has been filed for this unsigned inventor	
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Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
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UTILITY PATENT APPLICATION OF

**Carlos González, ME
Miguel Jimenez, IE
Luis Fernando Gutiérrez, PhD**

FOR

**NOVEL PROCESS FOR MOLECULAR RUPTURE, REORGANIZATION AND FUEL
OPTIMIZATION AND VOLUME INCREASE THROUGH HIGH PRESSURE AND
HYDRODYNAMIC CAVITATION WITH THE ADDITION OF WATER AND OTHER
ADDITIVES A.K.A. ROMO-APC**

BRIEF DRAWINGS DESCRIPTION

One or more preferred embodiments that illustrate the best mode(s) are set forth in the drawings and in the following descriptions. The appended claims particularly and distinctly point out and set forth the invention.

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate various example methods, and other example embodiments of various aspects of the invention. It will be appreciated that the illustrated element boundaries (for example, boxes, groups of boxes, or other shapes) in the figures represent one example of the boundaries. One of ordinary skill in the art will appreciate that in some examples one element may be designed as multiple elements or that multiple elements may be designed as one element. In some examples, an element shown as an internal component of another element may be implemented as an external component and vice versa. Furthermore, elements may not be drawn to scale.

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

Figure 1 illustrates the first embodiment of a system for molecular rupture and reorganization, ROMO-APC, by means of a system flow chart/diagram.

Figure 2 illustrates a more detailed system flow chart/drawing of the preferred dosing and mixing element used in the first embodiment.

Figure 3 illustrates an isometric view of the first embodiment for a better description.

Figure 4 illustrates a detailed view of a preferred hydrodynamic cavitation reactor setup in the first embodiment.

Figure 5 illustrates an Isometric view of a preferred tank design for water and additives in the first embodiment.

Figure 6 and 6a illustrate a detailed drawing of the preferred heated fuel tank and jacket used in the first embodiment.

Figure 7 illustrates a more detailed drawing of the preferred heat exchanger element used in the first embodiment.

Figure 8 illustrates a more detailed drawing of the preferred dosing and mixing element used in the first embodiment.

Figure 9 illustrates an example of molecular rupture and polymerization in the first embodiment.

DETAILED DRAWING DESCRIPTION

Figure 1 illustrates the first embodiment of the ROMO-APC system used to improve fuel quality as well as volume. The ROMO-APC system improves fuels to produce less polluting fuels as well as increasing its final volume. In the first embodiment the ROMO-APC system is comprised of a dosing and mixing station (104), a hydrodynamic cavitation reactor (106), and a heat exchanger (109). The dosing and mixing station receives fuel from tank (103) which is preheated by a heater (153), as well as water from storage tank (101) and additive from storage tank (102) by means of pumps (141,142,143). Before arriving at the station (104) the various liquids travel through a check valve (121,122,123) and each flow is controlled by volume through an adjustable control flow valve (131,132,133). At the dosing and mixing station (104) we keep liquids in both phases (gas, Liquid) for a predetermined time while a micro emulsion is

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

obtained. After this, the mixture passes through a high pressure pump where the fluid reaches a high pressure of up to 300 atmospheres. At this high pressure, the fluid enters the hydrodynamic cavitation reactor (106) where cavitation bubbles form and the depolymerization and new polymeric chain formation happens. After the mixture has been cavitated under pre-established pressure and temperature conditions, the enhanced or treated fuel is stored in the insulated storage tank (111). The treated fuel is cooled in the heat exchanger (109). The chilled fuel is ready to be used or collected through exit valve (107). Since we cool the fuel in heat exchanger (109), our cooling medium gains enough heat to pre-heat the fuel to be treated stored in the fuel storage tank (103) by means of the recycling of the closed loop system (110) and return through (108).

In a second and preferred embodiment, the dosing and mixing station (104) is comprised of four mixing tanks (221, 222, 223, 224) which receive water through pipe (201), additive through pipe (202) and pre-heated fuel from pipe (203). The mixing that takes place in the tanks (221, 222, 223, 224) occurs by recirculating with a high pressure pump (231, 232, 233, 234). Mixing takes place for a pre-determined amount of time, at such time a computer controlled valve (241, 242, 243, 244) is opened, allowing the mixed fluid enter the hydrodynamic cavitation reactor (261, 262). After the mixture has been cavitated under pre-established pressure and temperature conditions, the enhanced or treated fuel is sent through a pipe (270) to the insulated storage tank.

The configuration of the ROMO-APC embodiment as seen in figure 3 provides for a wide range of variables where the volumes of fuel in tank (303) can be combined with volumes of water from tank (301) at a ratio ranging from 1% to 50% under pre-set computer controlled parameters that occur at dosing and mixing station (304). Other additives, such as, but not limited to alcohols (methanol, naphtha, ethanol, etc.) can be mixed as well based on the desired traits we wish to obtain in the treated fuel. The process initiates with the high pressure mixing pumps (305) recirculating for a predetermined amount of time when it creates a micro emulsion between the different fluids contained in the station (304). At this time a valve is opened and the mixed liquid is sent to the hydrodynamic cavitation reactor (306) where the shock produced by the collapsing cavitation bubbles create temporary active binding centers that recombine including all molecules present at this stage. This one pass process ensures that the treated fuel will be molecularly stable and will exit to the insulated tank (311), and subsequently pumped by pump (312) through the heat exchanger (309) at which time the cooled fuel would be ready for storage or usage through exit pipe (307).

The preferred embodiment for hydrodynamic cavitation reactor is illustrated in figure 4. The preferred composition material would be stainless steel, among other possibilities.

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

The embodiment is comprised of high pressure pump (401), a TEKMAH cavitation valve, among other available suppliers (402), a Schedule 40 SS 1" diameter pipe (403), all contained in one module, specifically the TEKMAH valve contains the following zones: liquid entrance zone (404), a cavitation bubble formation zone (405), and a shock zone (406) where the molecular rupture and reorganization occurs.

The preferred embodiment for water and additive storage tank is illustrated in figure 5. The preferred composition material would be stainless steel, among other possibilities. The embodiment is comprised of an entrance pipe connector (501), a cylindrical tank, among other shapes (502), an exit pipe connector (503), and a support frame (504) when deemed necessary.

The preferred embodiment for heated fuel storage tank is illustrated in figure 6. The preferred composition material would be stainless steel, among other possibilities. The embodiment is comprised of an entrance pipe connector (601), a cooling liquid entrance pipe connector (602), a cooling liquid exit pipe connector (603), a cylindrical tank, among other shapes (604), an exit pipe connector (605), and a support frame when deemed necessary.

The preferred embodiment for the heater at the fuel storage tank is illustrated in figure 6a. The preferred composition material would be stainless steel, among other possibilities. The embodiment is comprised of an entrance pipe, an exit pipe and a "C" shaped funnel like serpentine that is welded to the embodiment shown in figure 6.

The preferred embodiment for the heat exchanger is a shell and tube type heat exchanger and is illustrated in figure 7. The preferred composition material would be stainless steel, among other possibilities. The embodiment is comprised of a cooling liquid entrance pipe connector (701), a temperature sensor (702), a treated fuel entrance pipe connector (703), a cooling liquid exit pipe connector (704), a treated fuel exit pipe connector (705), and four baffles (706) to ensure proper heat exchange between fluids.

The preferred embodiment for the dosing and mixing station is illustrated in figure 8. The preferred composition material would be stainless steel, among other possibilities. The embodiment is comprised of a water entrance pipe connector (801), an additive entrance pipe connector (802), a heated fuel entrance pipe connector (803), a cylindrical tank, among other available shapes (805), a mixed fuel/water/additive exit pipe connector (804), all held together with a steel frame.

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For ROMO-APC process continued

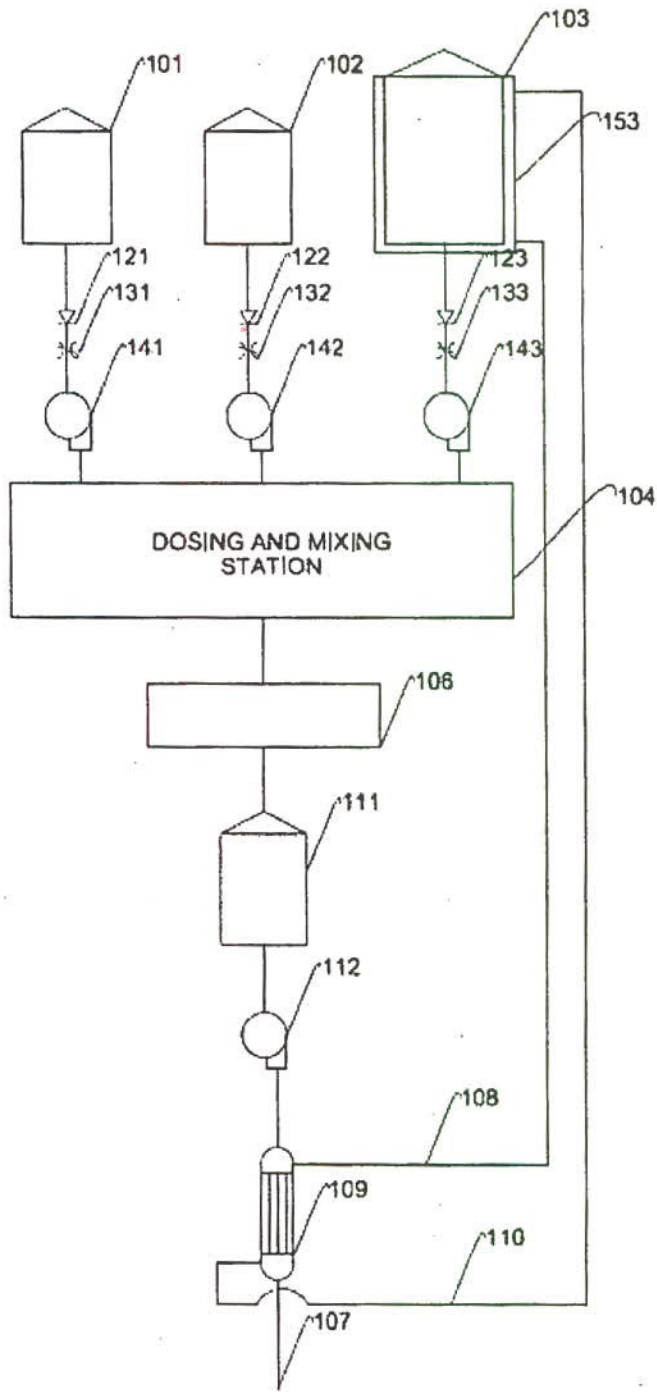


Figure 1- System flow diagram for the ROMO-APC embodiment.

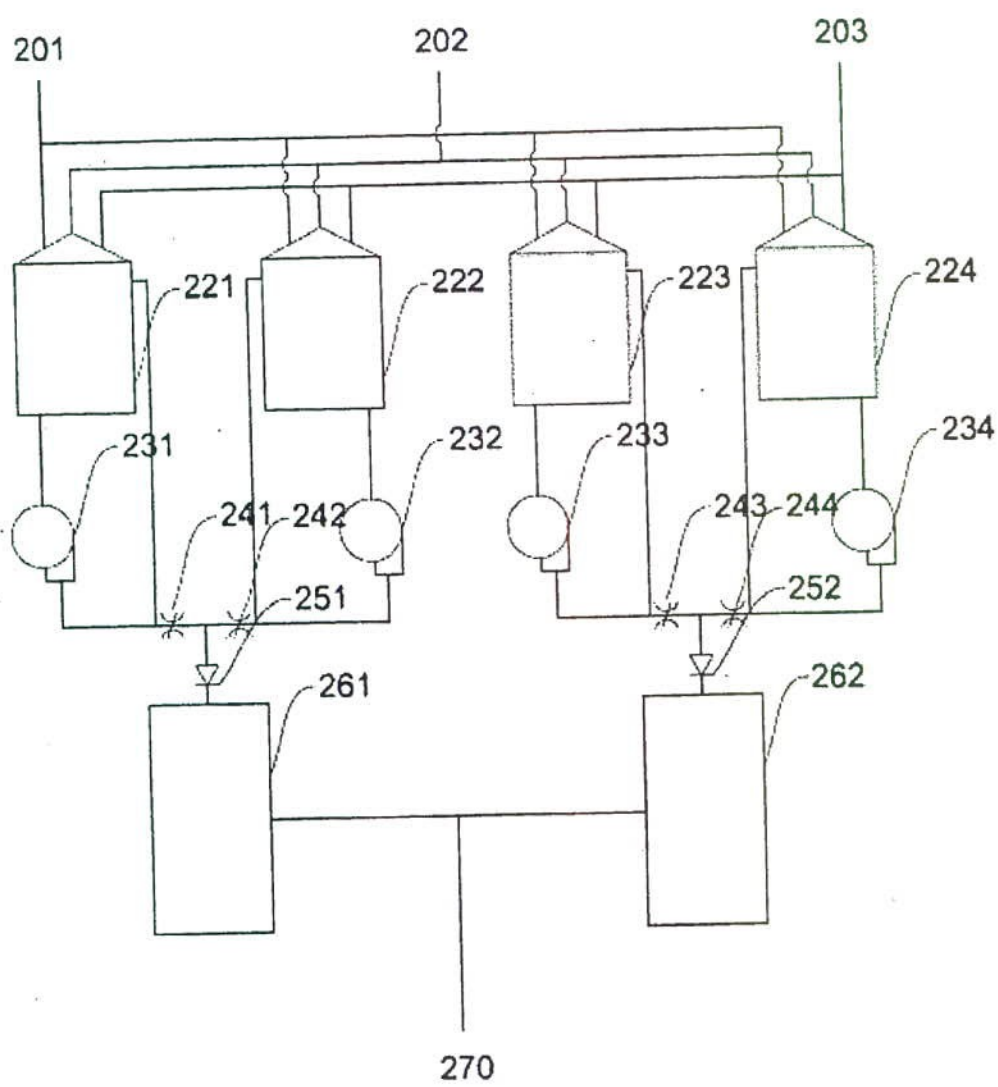


Figure 1- Dosing, Mixing and Cavitation configuration for the ROMO-APC embodiment.

28

Utility Patent Application of Jimenez et al.
For ROMO-APC process continued

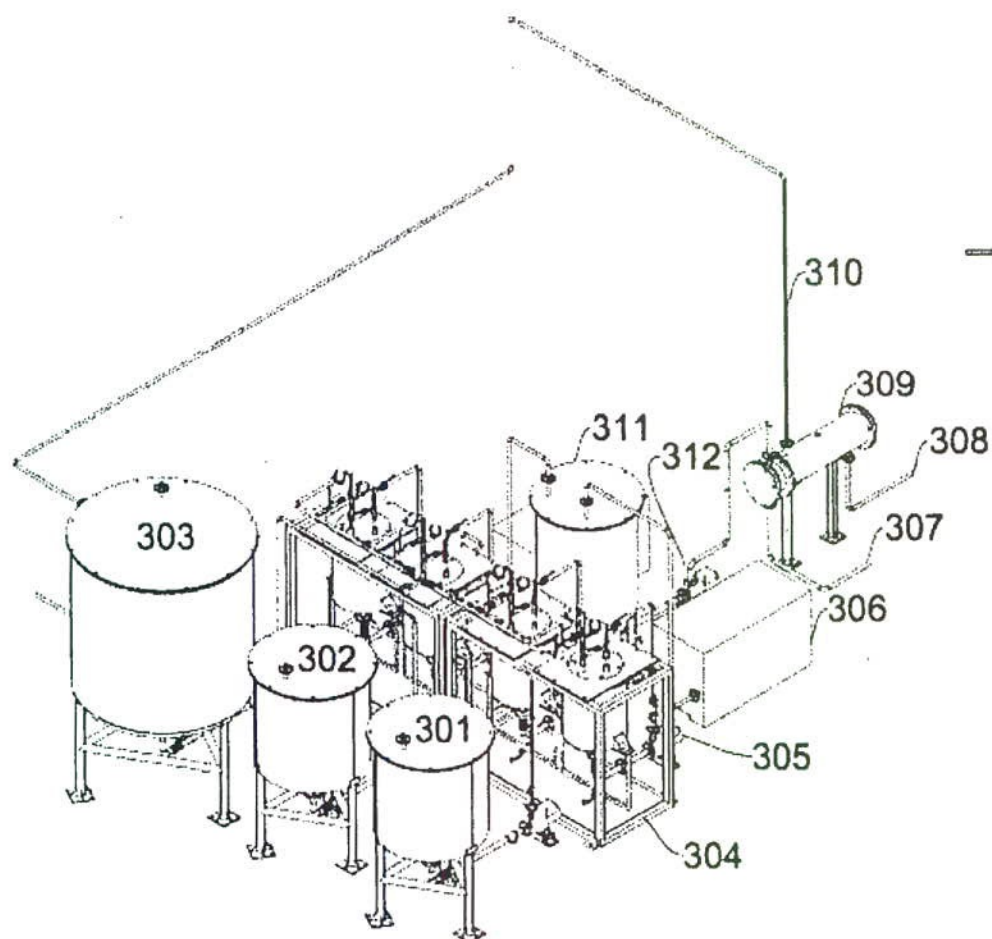


Figure 3- General Machine Isometric diagram for the ROMO-APC embodiment.

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For ROMO-APC process continued

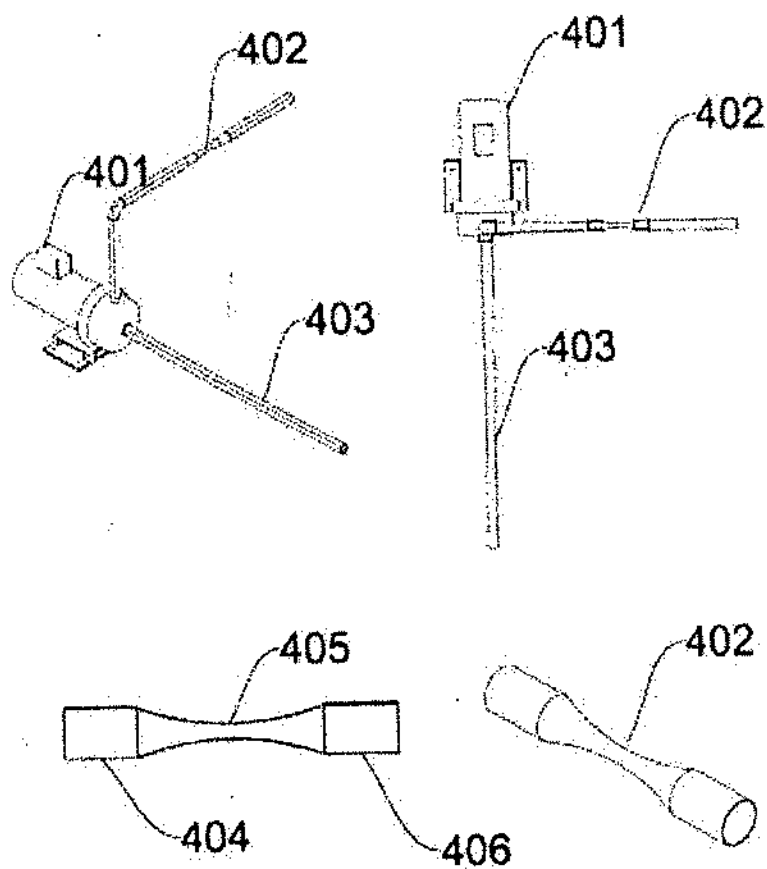


Figure 4- Preferred Hydrodynamic Cavitation Reactor system detail.

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For ROMO-APC process continued

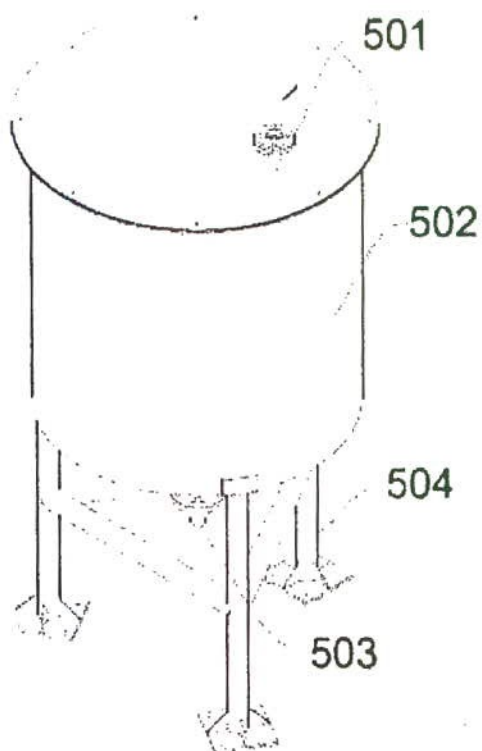


Figure 5- Isometric view of Water and Additives Tank from system.

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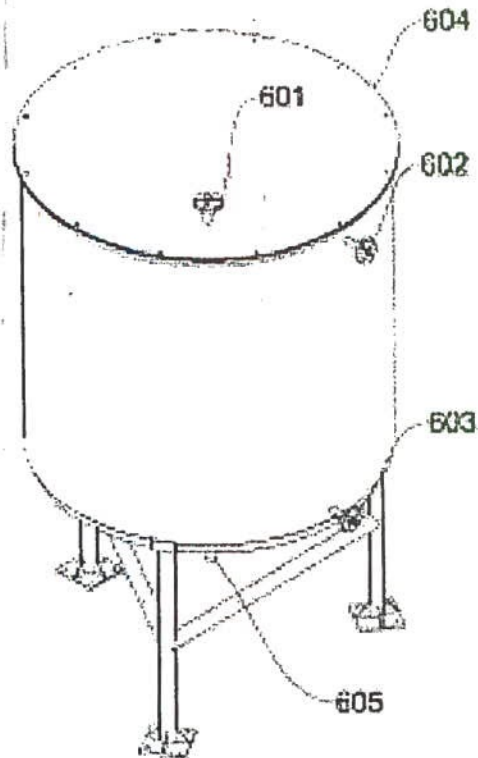


Figure 6- Fuel Tank Detail Drawing

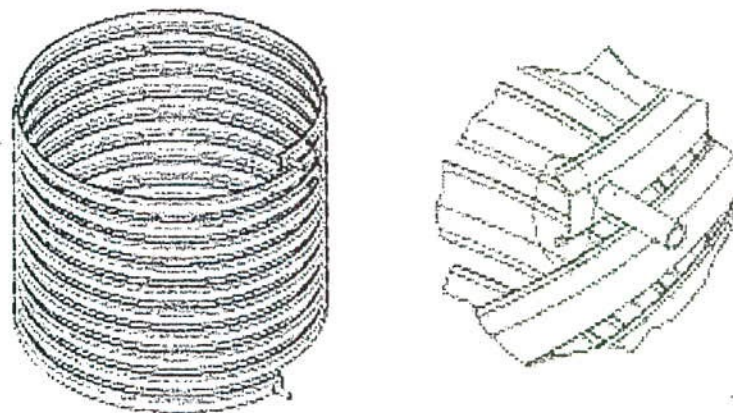


Figure 6a- Isometric Fuel Tank Heating Jacket Detail Drawing

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For ROMO-APC process continued

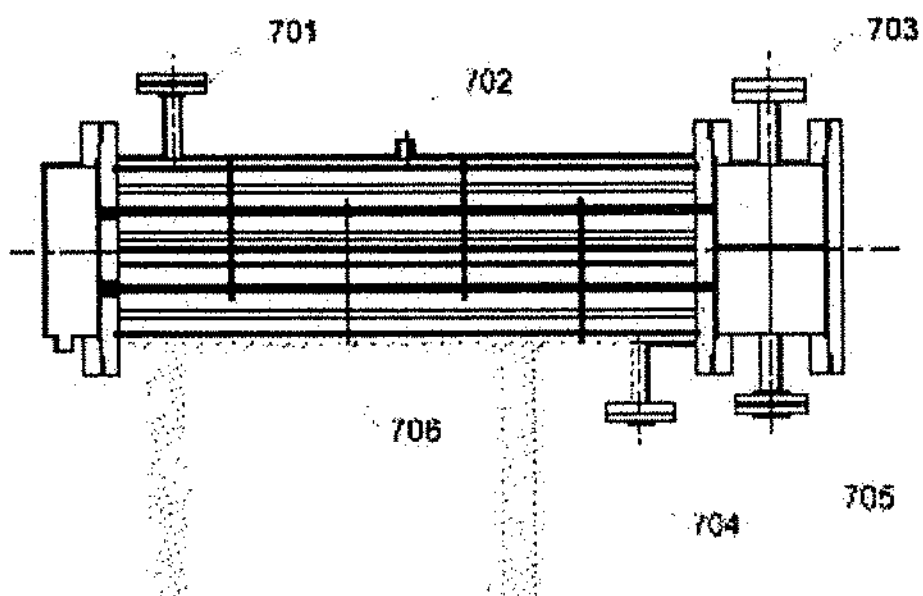


Figure 7- Heat exchanger detail drawing

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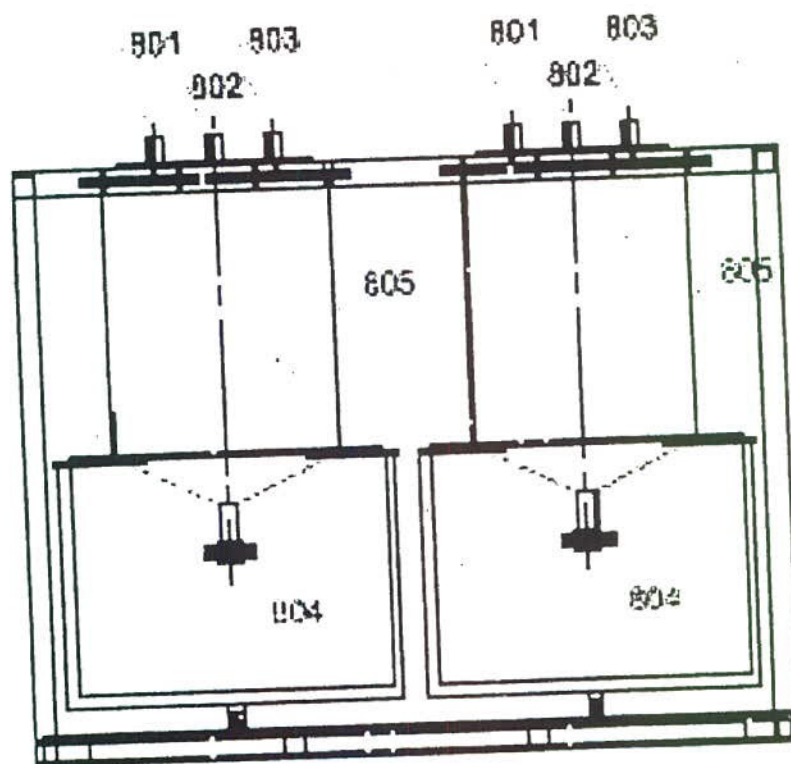


Figure 8- Dosing and mixing unit detail drawing

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For ROMO-APC process continued

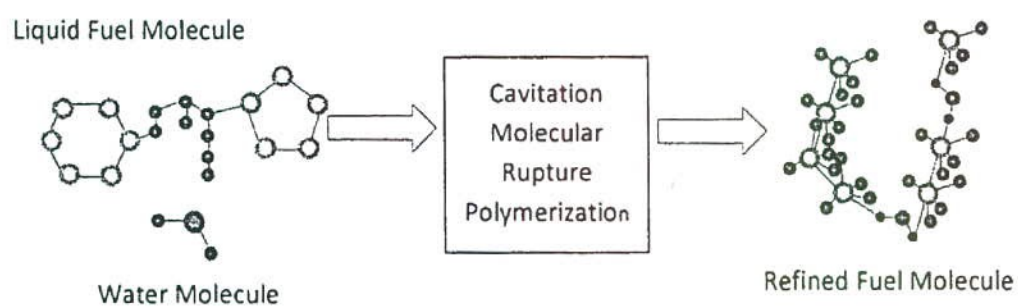


Figure 9- Molecular rupture and polymerization