

FORM PTO-1619A

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U.S. Department of Commerce  
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PD-R98064

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Assignment



Security Agreement



License



Change of Name



Merger



Other

U.S. Government

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Departmental File



Secret File

## Conveying Party(ies)



Mark if additional names of conveying parties attached

Name (line 1)

Kenneth D. Price

Execution Date  
Month Day Year

04-18-1999

Name (line 2)

## Second Party

Execution Date  
Month Day Year

04-12-1999

Name (line 1)

Carl S. Kirkconnell

Name (line 2)

## Receiving Party



Mark if additional names of receiving parties attached

Name (line 1)

RAYTHEON COMPANY

If document to be recorded  
is an assignment and the  
receiving party is not  
domiciled in the United  
States, an appointment  
of a domestic  
representative is attached.  
(Designation must be a  
separate document from  
Assignment.)

Name (line 2)

Address (line 1)

Bldg. R11. M/S M365

Address (line 2)

P.O. Box 902

Address (line 3)

El Segundo

California

90245

City

State/Country

Zip Code

## Domestic Representative Name and Address

Enter for the first Receiving Party only.

Name

Colin M. Raufer. Reg. No. 40.781

Address (line 1)

Bldg. R11. M.S. M365

Address (line 2)

P.O. Box 902

Address (line 3)

El Segundo. California 90245

Address (line 4)

04/26/1999 DNGUYEN 00000351 500616 09292028

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## Correspondent Name and Address

Area Code and Telephone Number

(310) 334-3232

Name Patent Records Administration

Address (line 1) RAYTHEON COMPANY

Address (line 2) Bldg. R11, M/S M365

Address (line 3) P.O. Box 902

Address (line 4) El Segundo, California 90245

## Pages

Enter the total number of pages of the attached conveyance document  
including any attachments.

# 6

## Application Number(s) or Patent Number(s)

☐

Mark if additional numbers attached

Enter either the Patent Application Number or the Patent Number (DO NOT ENTER BOTH numbers for the same property).

Patent Application Number(s)

Patent Number(s)


If this document is being filed together with a new Patent Application, enter the date the patent application was  
signed by the first named executing inventor.Month Day Year  
04-18-1999

## Patent Cooperation Treaty (PCT)

Enter PCT application number  
only if a U.S. Application Number  
has not been assigned.PCT PCT PCT  
PCT PCT PCT

## Number of Properties

Enter the total number of properties involved.

# 1

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Fee Amount for Properties Listed (37 CFR 3.41): \$ 40.00

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indicated herein.*

Colin M. Raufer, Reg. No. 40,781

Name of Person Signing

Colin M. Raufer

Signature

04/16/99

Date

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CONTINUATION  
PATENTS ONLYU.S. Department of Commerce  
Patent and Trademark Office

PATENT

## Conveying Party(ies)

☐

Mark if additional names of conveying parties attached

Enter additional Conveying Parties

Name (line 1) Stephen C. Neville

Name (line 2)

Name (line 1)

Name (line 2)

Name (line 1)

Name (line 2)

Execution Date  
Month Day Year

04-12-1999

Execution Date  
Month Day YearExecution Date  
Month Day Year

## Receiving Party(ies)

☐

Mark if additional names of receiving parties attached

Enter additional Receiving Party(ies)

Name (line 1)

Name (line 2)

Address (line 1)

Address (line 2)

Address (line 3)

City

State/Country

Zip Code

Name (line 1)

Name (line 2)

Address (line 1)

Address (line 2)

Address (line 3)

City

State/Country

Zip Code

☐ If document to be recorded is an assignment and the receiving party is not domiciled in the United States, an appointment of a domestic representative is attached. (Designation must be a separate document from Assignment.)☐ If document to be recorded is an assignment and the receiving party is not domiciled in the United States, an appointment of a domestic representative is attached. (Designation must be a separate document from Assignment.)

## Application Number(s) or Patent Number(s)

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Enter either the Patent Application Number or the Patent Number (DO NOT ENTER BOTH numbers for the same property).

## Patent Application Number(s)

## Patent Number(s)



**ASSIGNMENT**Page 1 of 2  
PD-R98064

WHEREAS, I, as below named sole inventor (if only one name is listed below) or joint inventor (if plural names are listed below) of the city and state as stated below next to my name, have invented a(an) **SINGLE-FLUID STIRLING/PULSE TUBE HYBRID EXPANDER** for which application for Letters Patent of the United States has been executed by me on or before this day, or (if the following is completed) filed on \_\_\_\_\_ as Serial No. \_\_\_\_\_; and

WHEREAS, RAYTHEON COMPANY, (hereinafter referred to as Raytheon), a Delaware Corporation, having its principal place of business in Lexington, Massachusetts, is desirous of acquiring the entire and exclusive right, title and interest in, to and under said invention, said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world;

NOW, THEREFORE, in consideration of the obligations voluntarily assumed by me and set forth in an invention agreement between me and my employer, effective the date as stated below next to my name, and other good and valuable consideration, receipt of which is hereby acknowledged, I do hereby sell, assign and transfer to RAYTHEON, its successors, assigns or other legal representatives, the entire and exclusive right, title and interest in and to said invention invented by me, to said application and any and all applications which are continuations, continuations-in-part, divisions or substitutes of said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world on any of said applications and to any and all reexaminations, reissues, renewals or extensions of said Letters Patent in the United States and throughout the world for the full term or terms for which said Letters patent may be granted in the United States and throughout the world; authorize and request The Commissioner of Patents and Trademarks of the United States and all foreign countries to issue all such Letters Patent to said RAYTHEON, its successors, assigns or other legal representatives; covenant that no assignment, sale, agreement, transfer or encumbrance has been, or will be, made or entered into which would conflict with this assignment, sale and transfer; and agree to communicate to RAYTHEON, its successors, assigns or other legal representatives, upon request and at no cost or expense to me, any facts known by me respecting said invention, do all lawful acts, including the execution and delivery of all papers and proper oaths and giving of testimony that is deemed necessary or desirable by RAYTHEON, its successors, assigns or other legal representatives with regard to said invention for protecting, obtaining, maintaining and enforcing any and all of said Letters Patent in the United States and throughout the world for said invention and for perfecting, affirming, recording and maintaining the title of RAYTHEON, its successors, assigns or other legal representatives, and generally cooperate to the fullest extent in all matters pertaining to said invention, and any and all of said Letters Patent and the title thereto in RAYTHEON, its successors, assigns or other legal representatives.

IN WITNESS WHEREOF, I have executed this instrument.

FULL NAME OF SOLE OR JOINT INVENTOR Kenneth D. Price	INVENTOR'S SIGNATURE <i>Kenneth D. Price</i>	DATE 14 April, 1999
RESIDENCE (CITY AND STATE) 3706 Cerritos Avenue, Long Beach, California 90807		INVENTION AGREEMENT DATE August 2, 1972

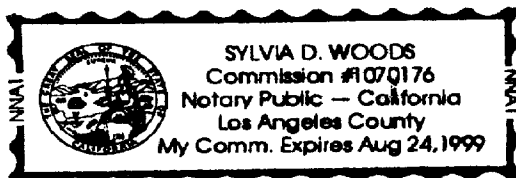
FULL NAME OF SOLE OR JOINT INVENTOR Carl S. Kirkconnell	INVENTOR'S SIGNATURE	DATE
RESIDENCE (CITY AND STATE) 19457 Surfset Drive, Huntington Beach, California 92648		INVENTION AGREEMENT DATE June 25, 1990

FULL NAME OF SOLE OR JOINT INVENTOR Stephen C. Neville	INVENTOR'S SIGNATURE	DATE
RESIDENCE (CITY AND STATE) 529 Loma Vista Street, El Segundo, California 90245		INVENTION AGREEMENT DATE September 14, 1972

STATE OF California )  
COUNTY OF Los Angeles ) SS:  
On April 14, 1999 before me, Sylvia D. Woods,  
a Notary Public in and for said State, personally appeared Kenneth D. Price

☐ personally known to me or ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.



Notary Public *[Signature]*

**ASSIGNMENT**Page 1 of 2  
PD-R98064

WHEREAS, I, as below named sole inventor (if only one name is listed below) or joint inventor (if plural names are listed below) of the city and state as stated below next to my name, have invented a(an) **SINGLE-FLUID STIRLING/PULSE TUBE HYBRID EXPANDER** for which application for Letters Patent of the United States has been executed by me on or before this day, or (if the following is completed) filed on \_\_\_\_\_ as Serial No. \_\_\_\_\_; and

WHEREAS, RAYTHEON COMPANY, (hereinafter referred to as Raytheon), a Delaware Corporation, having its principal place of business in Lexington, Massachusetts, is desirous of acquiring the entire and exclusive right, title and interest in, to and under said invention, said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world;

NOW, THEREFORE, in consideration of the obligations voluntarily assumed by me and set forth in an invention agreement between me and my employer, effective the date as stated below next to my name, and other good and valuable consideration, receipt of which is hereby acknowledged, I do hereby sell, assign and transfer to RAYTHEON, its successors, assigns or other legal representatives, the entire and exclusive right, title and interest in and to said invention invented by me, to said application and any and all applications which are continuations, continuations-in-part, divisions or substitutes of said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world on any of said applications and to any and all reexaminations, reissues, renewals or extensions of said Letters Patent in the United States and throughout the world for the full term or terms for which said Letters patent may be granted in the United States and throughout the world; authorize and request The Commissioner of Patents and Trademarks of the United States and all foreign countries to issue all such Letters Patent to said RAYTHEON, its successors, assigns or other legal representatives; covenant that no assignment, sale, agreement, transfer or encumbrance has been, or will be, made or entered into which would conflict with this assignment, sale and transfer; and agree to communicate to RAYTHEON, its successors, assigns or other legal representatives, upon request and at no cost or expense to me, any facts known by me respecting said invention, do all lawful acts, including the execution and delivery of all papers and proper oaths and giving of testimony that is deemed necessary or desirable by RAYTHEON, its successors, assigns or other legal representatives with regard to said invention for protecting, obtaining, maintaining and enforcing any and all of said Letters Patent in the United States and throughout the world for said invention and for perfecting, affirming, recording and maintaining the title of RAYTHEON, its successors, assigns or other legal representatives, and generally cooperate to the fullest extent in all matters pertaining to said invention, and any and all of said Letters Patent and the title thereto in RAYTHEON, its successors, assigns or other legal representatives.

IN WITNESS WHEREOF, I have executed this instrument.

FULL NAME OF SOLE OR JOINT INVENTOR Kenneth D. Price	INVENTOR'S SIGNATURE	DATE
RESIDENCE (CITY AND STATE) 3706 Cerritos Avenue, Long Beach, California 90807		INVENTION AGREEMENT DATE August 2, 1972

FULL NAME OF SOLE OR JOINT INVENTOR Carl S. Kirkconnell	INVENTOR'S SIGNATURE <i>Carl S. Kirkconnell</i>	DATE 4/12/99
RESIDENCE (CITY AND STATE) 19457 Surfset Drive, Huntington Beach, California 92648		INVENTION AGREEMENT DATE June 25, 1990

FULL NAME OF SOLE OR JOINT INVENTOR Stephen C. Neville	INVENTOR'S SIGNATURE	DATE
RESIDENCE (CITY AND STATE) 529 Loma Vista Street, El Segundo, California 90245		INVENTION AGREEMENT DATE September 14, 1972

STATE OF California )  
COUNTY OF Los Angeles ) SS:  
On April 12, 1999 before me, Anne E. Shirley,  
a Notary Public in and for said State, personally appeared Carl S. Kirkconnell

☐ personally known to me or ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Notary Public Anne E. Shirley



**ASSIGNMENT**Page 1 of 2  
PD-R98064

WHEREAS, I, as below named sole inventor (if only one name is listed below) or joint inventor (if plural names are listed below) of the city and state as stated below next to my name, have invented a(an) **SINGLE-FLUID STIRLING/PULSE TUBE HYBRID EXPANDER** for which application for Letters Patent of the United States has been executed by me on or before this day, or (if the following is completed) filed on \_\_\_\_\_ as Serial No. \_\_\_\_\_; and

WHEREAS, RAYTHEON COMPANY, (hereinafter referred to as Raytheon), a Delaware Corporation, having its principal place of business in Lexington, Massachusetts, is desirous of acquiring the entire and exclusive right, title and interest in, to and under said invention, said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world;

NOW, THEREFORE, in consideration of the obligations voluntarily assumed by me and set forth in an invention agreement between me and my employer, effective the date as stated below next to my name, and other good and valuable consideration, receipt of which is hereby acknowledged, I do hereby sell, assign and transfer to RAYTHEON, its successors, assigns or other legal representatives, the entire and exclusive right, title and interest in and to said invention invented by me, to said application and any and all applications which are continuations, continuations-in-part, divisions or substitutes of said application and any and all Letters Patent that may be granted therefor in the United States and throughout the world on any of said applications and to any and all reexaminations, reissues, renewals or extensions of said Letters Patent in the United States and throughout the world for the full term or terms for which said Letters patent may be granted in the United States and throughout the world; authorize and request The Commissioner of Patents and Trademarks of the United States and all foreign countries to issue all such Letters Patent to said RAYTHEON, its successors, assigns or other legal representatives; covenant that no assignment, sale, agreement, transfer or encumbrance has been, or will be, made or entered into which would conflict with this assignment, sale and transfer; and agree to communicate to RAYTHEON, its successors, assigns or other legal representatives, upon request and at no cost or expense to me, any facts known by me respecting said invention, do all lawful acts, including the execution and delivery of all papers and proper oaths and giving of testimony that is deemed necessary or desirable by RAYTHEON, its successors, assigns or other legal representatives with regard to said invention for protecting, obtaining, maintaining and enforcing any and all of said Letters Patent in the United States and throughout the world for said invention and for perfecting, affirming, recording and maintaining the title of RAYTHEON, its successors, assigns or other legal representatives, and generally cooperate to the fullest extent in all matters pertaining to said invention, and any and all of said Letters Patent and the title thereto in RAYTHEON, its successors, assigns or other legal representatives.



IN WITNESS WHEREOF, I have executed this instrument.

FULL NAME OF SOLE OR JOINT INVENTOR Kenneth D. Price	INVENTOR'S SIGNATURE	DATE
RESIDENCE (CITY AND STATE) 3706 Cerritos Avenue, Long Beach, California 90807		INVENTION AGREEMENT DATE August 2, 1972

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FULL NAME OF SOLE OR JOINT INVENTOR Stephen C. Neville	INVENTOR'S SIGNATURE <i>Stephen C Neville</i>	DATE 4/13/99
RESIDENCE (CITY AND STATE) 529 Loma Vista Street, El Segundo, California 90245		INVENTION AGREEMENT DATE September 14, 1972

STATE OF California )  
COUNTY OF Los Angeles ) SS:  
On 4-13-99 before me, M Dolores O'Hara,  
a Notary Public in and for said State, personally appeared Stephen C. Neville

☐ personally known to me or ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Notary Public *M Dolores O'Hara*

