

membrane walls, the use limit is about 1000°F, so the dry steam from the separator outlet **56** is sufficient to cool the membrane walls.

[0081] In **FIG. 6**, the firing rate indicates the relative amount of heat being generated by the boiler. The boiler is run at about 10% for four hours using oil before the boiler is ramped up to 100% capacity. This permits the formation of steam sufficient to fill the steam-cooled tubes. For the first two hours, the steam diversion path **100** is open, and afterwards is closed to permit steam to fill the walls of the convection pass. After four hours, the high-pressure turbine is fully loaded as well, and the fuel is switched to coal. The firing rate, steam flow, and throttle pressure are then increased to their steady-state operating values.

[0082] Advantageously, the supply of steam for start-up using this approach comes from the steam separator **54**. This allows the boiler **10** to be put in service without the use of auxiliary steam and/or an auxiliary steam boiler. It will again be appreciated that the disclosed approach for cooling membrane walls during start-up may be employed in a wide range of boilers besides the illustrative boiler **10** of **FIG. 1**.

[0083] The present disclosure has been described with reference to exemplary embodiments. Obviously, modifications and alterations will occur to others upon reading and understanding the preceding detailed description. It is intended that the present disclosure be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

CLAIMS:

We claim:

1. A boiler comprising:
 - a furnace including burners and steam-cooled membrane walls, the steam-cooled membrane walls comprising pipes sealed by membrane;
 - a steam separator having a dry steam outlet;
 - a steam-cooled circuit connected to the dry steam outlet of the steam separator, the steam-cooled circuit including at least (i) a primary superheater comprising pipes without membrane and (ii) the steam-cooled membrane walls of the furnace, wherein the steam-cooled membrane walls of the furnace are located downstream of the primary superheater in the steam-cooled circuit; and
 - startup control circuitry configured to (i) reduce flow to the primary superheater and (ii) divert flow from the dry steam outlet of the steam separator to the steam-cooled membrane walls of the furnace.
2. The boiler of claim 1, wherein the startup control circuitry includes:
 - at least one diversion valve that when opened operatively connects the dry steam outlet of the steam separator to the steam-cooled membrane walls of the furnace; and
 - at least one reduction valve in the steam-cooled circuit that is operative to reduce flow through the primary superheater.
3. The boiler of claim 2, wherein the startup control circuitry further includes an electronic controller configured to set the startup control circuitry into one of:
 - a startup mode in which the at least one diversion valve is opened and the at least one reduction valve is operated to reduce flow through the primary superheater;
 - or
 - a normal operating mode in which the at least one diversion valve is closed and the at least one reduction valve is fully open.

4. The boiler of claim 1, wherein the startup control circuitry includes:
a valved diversion path connecting the dry steam outlet of the steam separator to the steam-cooled membrane walls of the furnace; and
at least one reduction valve in the steam-cooled circuit that is operative to reduce flow through the primary superheater.

5. The boiler of claim 4, wherein the startup control circuitry further includes an electronic controller configured to set the startup control circuitry into one of:
a startup mode in which the valved diversion path is open and the at least one reduction valve is operated to reduce flow through the primary superheater; or
a normal operating mode in which the valved diversion path is closed and the at least one reduction valve is fully open.

6. The boiler of claim 5, further comprising a secondary superheater located downstream of the steam-cooled membrane walls of the furnace in the steam-cooled circuit.

7. The boiler of any one of claims 1-6, wherein the furnace includes:
a steam-cooled upper furnace having the steam-cooled membrane walls;
and
a water-cooled lower furnace formed by water-cooled membrane walls that comprise pipes sealed by membrane, the water-cooled membrane walls not being included in the steam-cooled circuit connected to the dry steam outlet of the steam separator.

8. A boiler, comprising:

a furnace including at least one steam-cooled membrane wall, the at least one steam-cooled membrane wall comprising pipes sealed by membrane;

a steam separator having a dry steam outlet;

one or more primary superheaters comprising pipes without membrane;

a steam-cooled circuit running from the dry steam outlet to the one or more primary superheaters and subsequently to the at least one steam-cooled membrane wall of the furnace, and containing one or more reduction valves between the one or more primary superheaters and the at least one steam-cooled membrane wall of the furnace;

a diversion path running from the dry steam outlet through one or more diversion valves to a location upstream of the at least one steam-cooled membrane wall of the furnace and downstream of the one or more primary superheaters; and

control circuitry for switching dry steam flow from the steam separator through the steam-cooled circuit or the diversion path.

9. The boiler of claim 8, wherein the control circuitry includes an electronic controller configured to operate the one or more reduction valves and the one or more diversion valves.

10. The boiler of claim 8, further comprising a convection pass formed by steam-cooled convection pass membrane walls, the convection pass membrane walls being located upstream of the one or more primary superheaters in the steam-cooled circuit.

11. The boiler of claim 10, further comprising secondary superheaters comprising pipes without membrane, the secondary superheaters being located downstream of the at least one steam-cooled membrane wall of the furnace in the steam-cooled circuit.

12. The boiler of claims 11, wherein the furnace includes:

a steam-cooled upper furnace having an upper furnace that includes the at least one steam-cooled membrane wall; and

a water-cooled lower furnace formed by water-cooled membrane walls, the water-cooled membrane walls not being included in the steam-cooled circuit connected to the dry steam outlet of the steam separator.

13. A boiler start-up method for starting a boiler having a steam separator, steam-cooled membrane walls forming at least a portion of a furnace, and a primary superheater interposed in a steam-cooled circuit between a dry steam outlet of the steam separator and the steam-cooled membrane walls, the method comprising:

reducing dry steam flow through the steam-cooled circuit; and

diverting dry steam flow through a diversion path that runs from the dry steam outlet to a location upstream of the steam-cooled membrane walls of the furnace and downstream of the primary superheater, wherein the diversion path bypasses the primary superheater.

14. The boiler start-up method of claim 13, wherein the diverting comprises opening a diversion valve upstream of the primary superheater.

15. The boiler start-up method of claim 13, wherein the reducing comprises closing a reduction valve located in the steam-cooled circuit downstream of the primary superheater.

16. The boiler start-up method of claim 14, further comprising:

firing up the boiler using oil as fuel;

terminating the reducing and diverting responsive to a switch-over condition; and

after the terminating, switching over from using oil as fuel to using coal as fuel.

17. The boiler start-up method of claim 16, wherein the steam-cooled circuit further comprises steam-cooled convection pass membrane walls, the convection pass membrane walls being located upstream of the primary superheater in the steam-cooled circuit.

18. The boiler start-up method of claim 17, wherein the steam-cooled circuit further comprises secondary superheaters comprising pipes without membrane, the secondary superheaters being located downstream of the steam-cooled membrane walls of the furnace in the steam-cooled circuit.

19. The boiler start-up method of claim 14, wherein the reducing comprises closing a reduction valve located in the steam-cooled circuit downstream of the primary superheater.

20. The boiler start-up method of claim 19, further comprising:
firing up the boiler using oil as fuel;
terminating the reducing and diverting responsive to a switch-over condition; and
after the terminating, switching over from using oil as fuel to using coal as fuel.

**HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER
FURNACE AND START-UP METHODS**

ABSTRACT OF THE DISCLOSURE

A boiler is disclosed in which the furnace is divided into a lower furnace and an upper furnace. The lower furnace uses water-cooled membrane walls, while the upper furnace uses steam-cooled membrane walls that act as superheating surfaces. A steam-cooled circuit includes a steam separator, a primary superheater, and the steam-cooled membrane walls of the upper furnace. During start-up, a diversion path is opened that reduces dry steam flow through the primary superheater and increases dry steam flow through the steam-cooled membrane walls of the upper furnace. This protects the steam-cooled membrane walls from excessive thermal stresses during start-up.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION
(37 CFR §1.63)

Rev. 09/2012/13 (ptik)

Attorney Docket No. 7709

As below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject, **HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS**, the specification of which:

Check one ☒ is attached hereto

☐ was filed on _____ as United States or PCT International application Serial No. _____ and was amended on _____ (if applicable).

The above-identified application was made or authorized to be made by me.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose to the United States Patent and Trademark Office (USPTO) all information known to me 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.

I hereby claim foreign priority benefits under 35 USC §119(a)-(d) or (f) or §365(b) of any foreign application(s) for patent or inventor's certificate, or under §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International application, having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

(Number) _____ (Country) _____ (Day/Month/Year Filed) _____ Priority Claimed: Yes ☐ No ☐

I hereby claim the benefit under 35 USC §119(e) of any United States provisional applications:

(Application Serial No.) _____ (Month/Day/Year Filed) _____

I hereby claim the benefit under 35 USC §120 of any United States application(s), or under §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 USC §112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56 which become available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application Serial No.) _____ (Filing Date) _____ (Status--patented, pending, abandoned) _____

Address all telephone calls to **Michael J. Seymour** at telephone no. **(330) 860-6710**
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US PTO CUSTOMER NUMBER

41669 -
BWPGG

Authorization To Permit Access To Application by Participating Offices:

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 application is filed access to above-identified patent application. See 37 CFR §1.14(c) and (h).

In accordance with 37 CFR §1.14(h)(3), access will be provided to a copy of the above-identified with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified application claims priority under 35 USC 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 from which benefit is sought in the above-identified 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.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION
(37 CFR §1.63)

Rev. 06/2013 (sm)

Attorney Docket No. 7709

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 §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's signature Albert J Bennett

Date 4/5/2016 Citizenship US

Residence DOYLESTOWN, OH

Post office address 12539 Hollow Ridge Drive
Doylestown, OH 44230

Full name of third inventor, if any

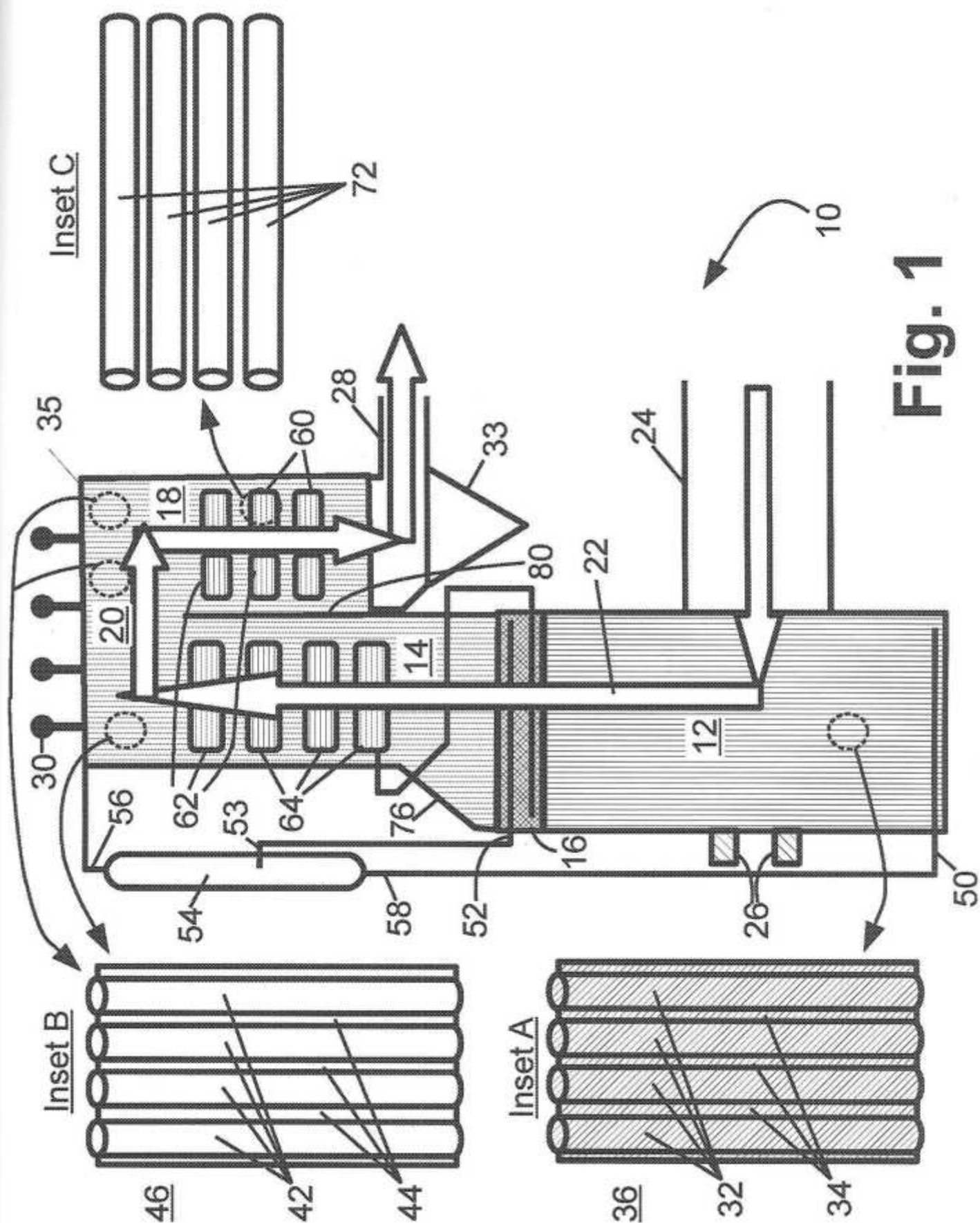
REMUS, JEREMY L

Inventor's signature _____

Date _____ Citizenship US

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Post office address 3211 W. Rangercrest Place
Sugar Land, TX 77479



Section A-A

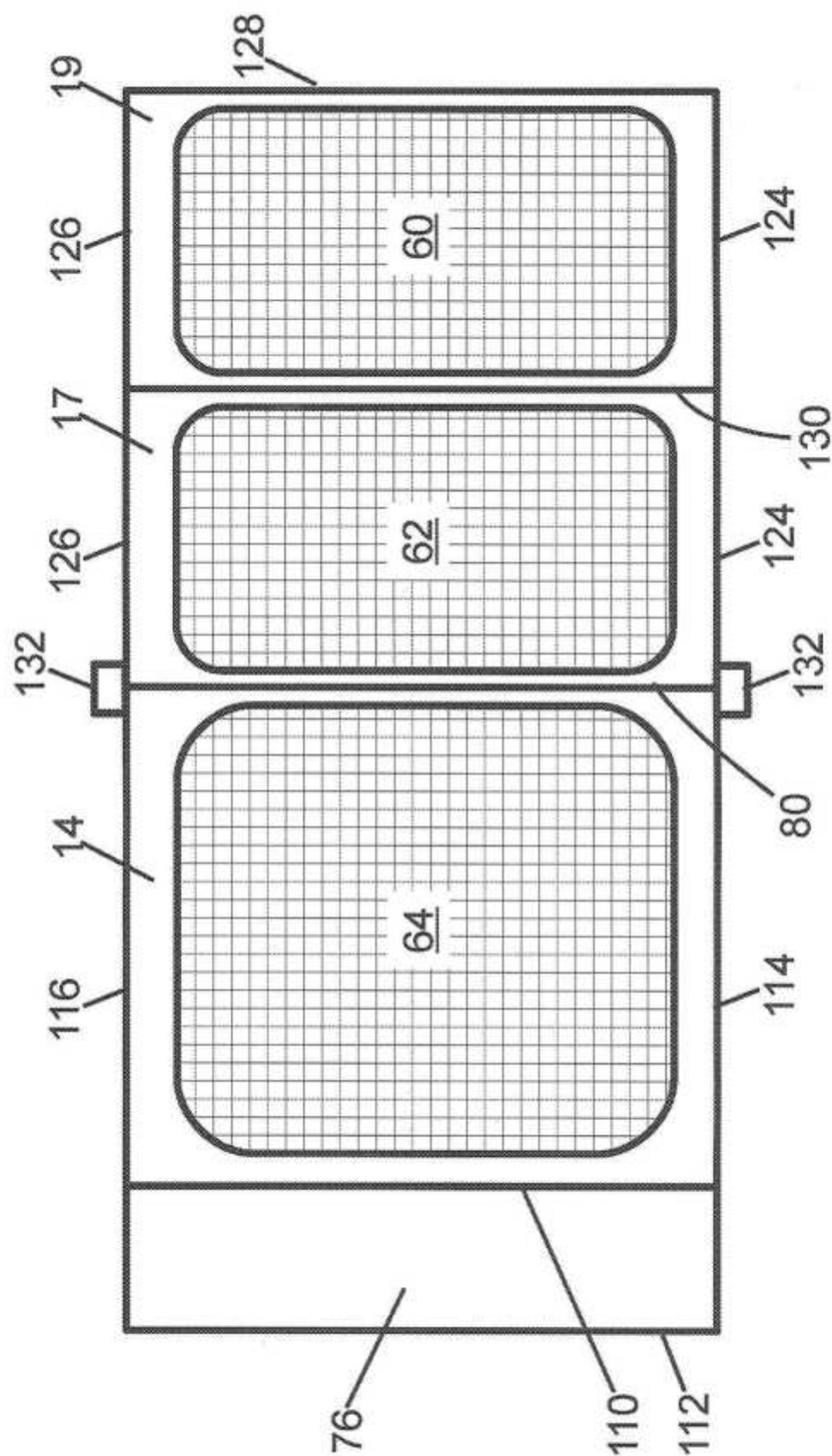
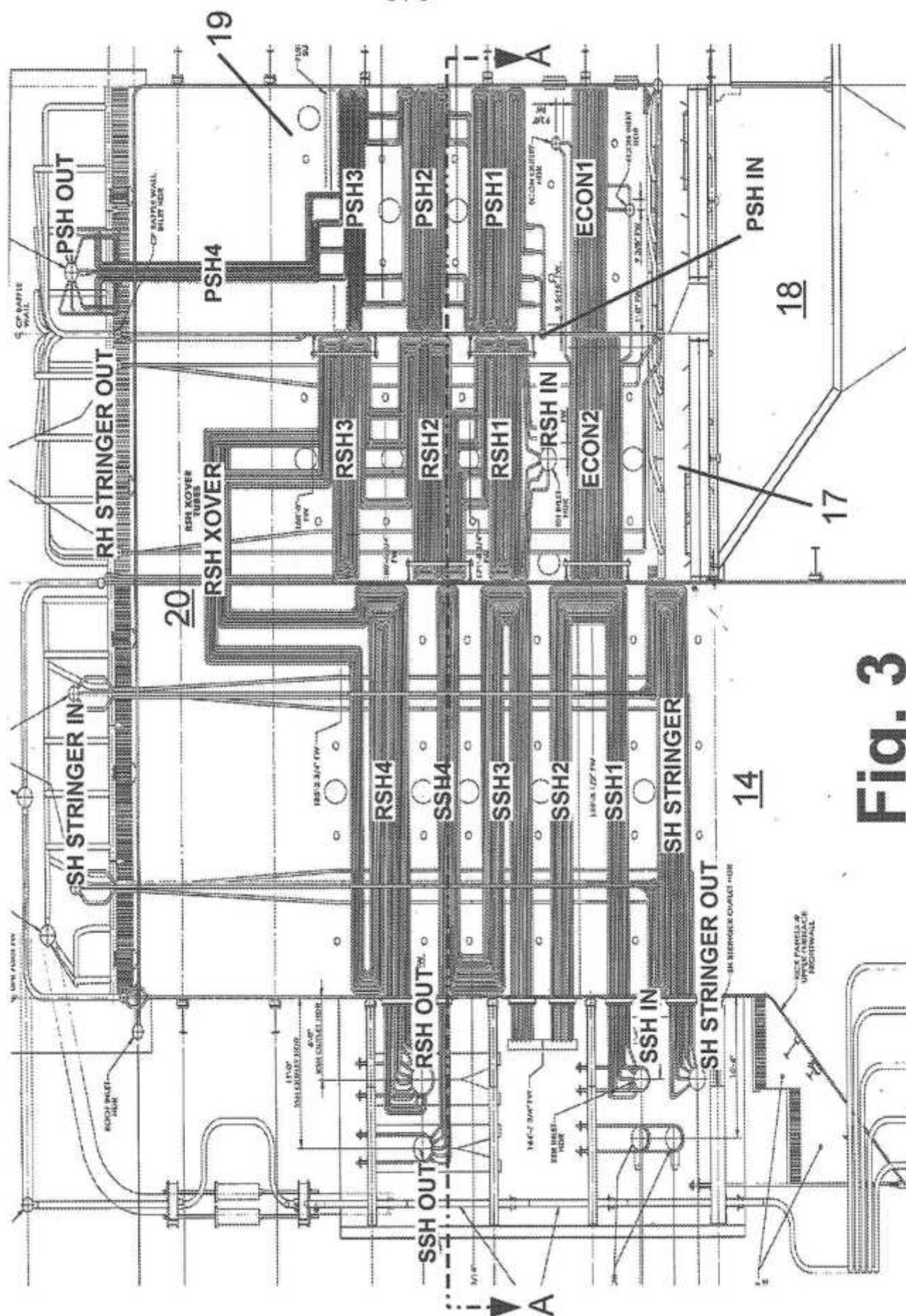


Fig. 2



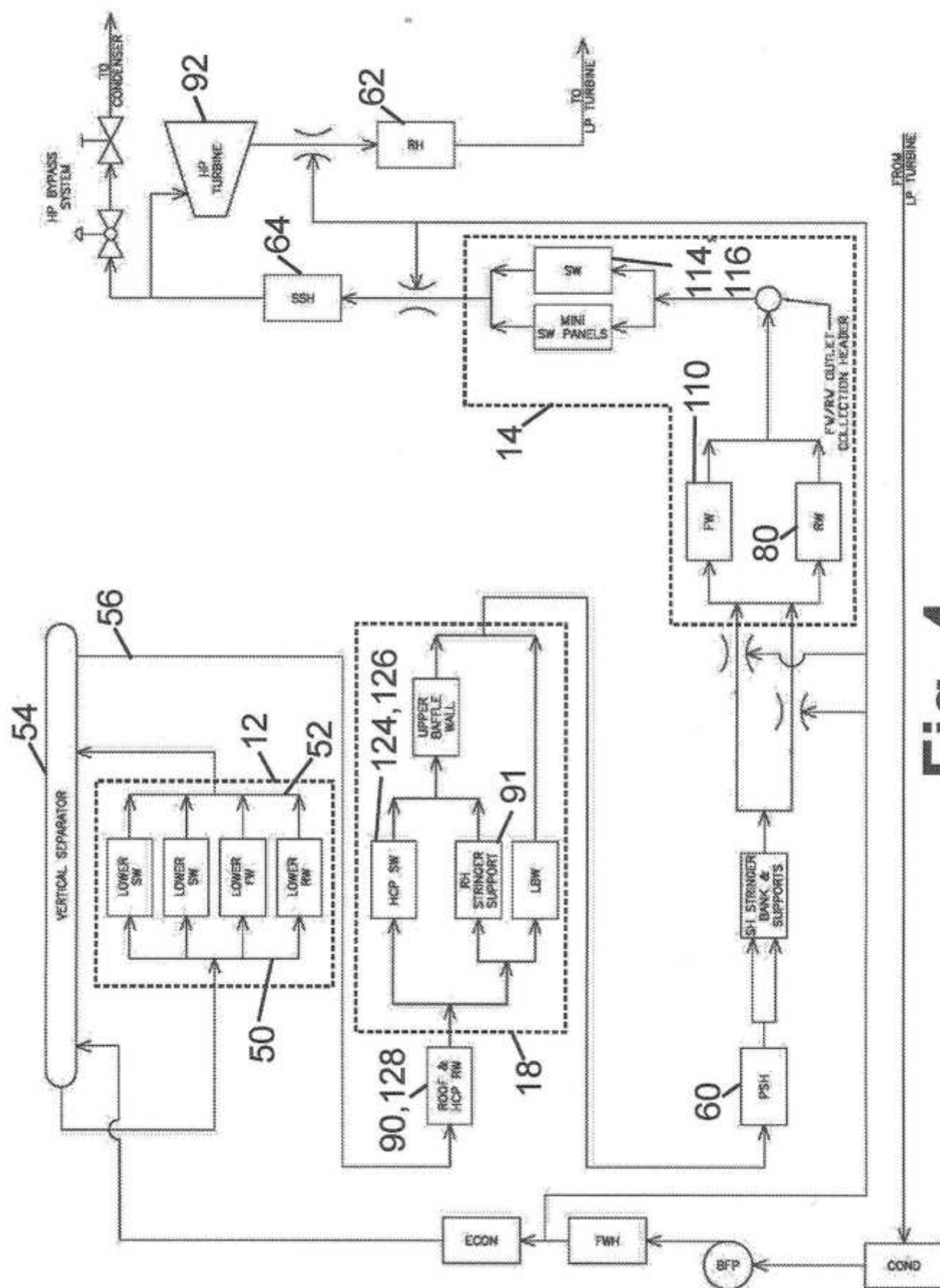


Fig. 4

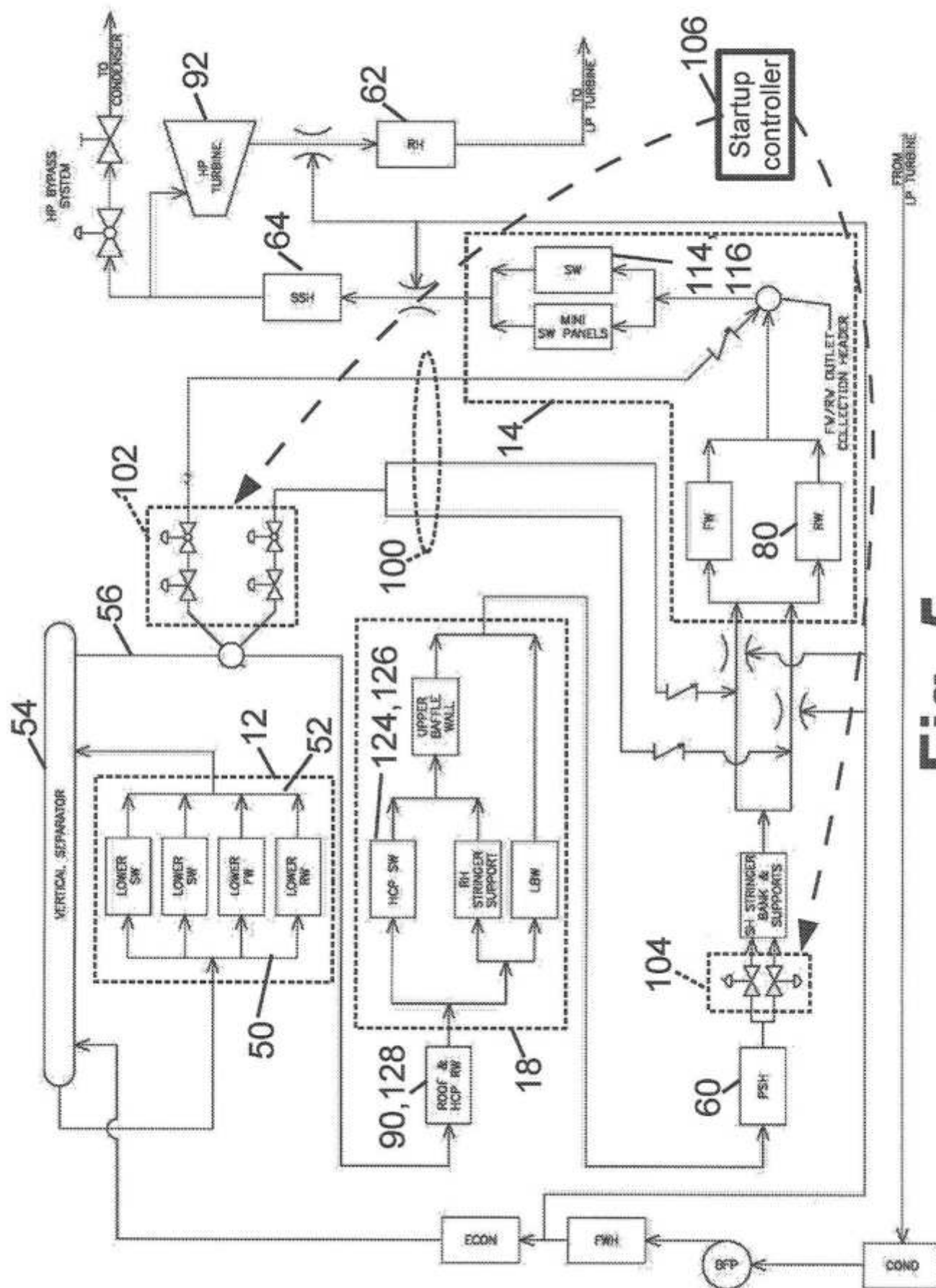


Fig. 5

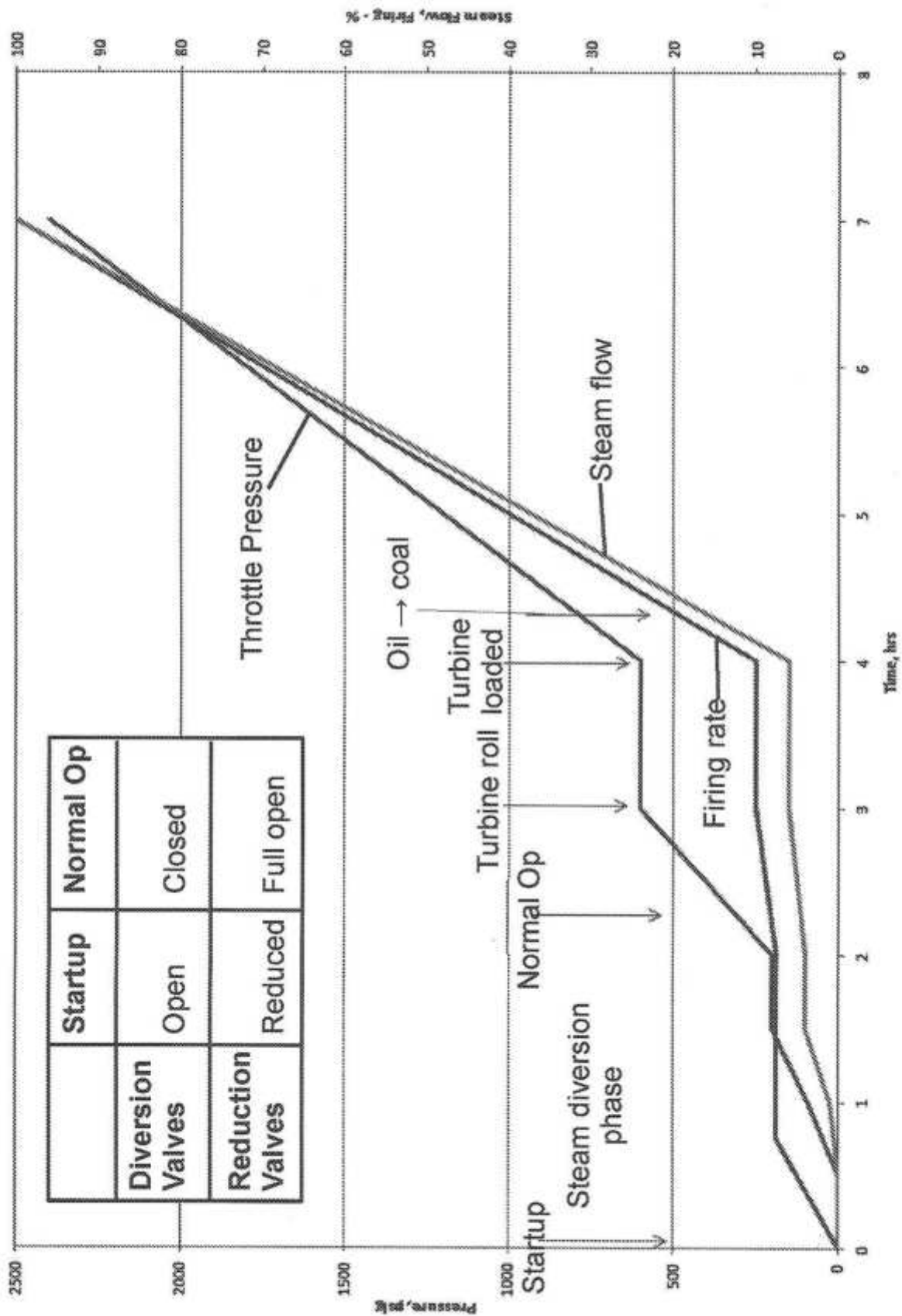


Fig. 6

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Eric	L	Wells			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Massillon	State/Province	OH	Country of Residence	US	
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City	Massillon	State/Province	OH			
Postal Code	44646-9560	Country i	US			
Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Albert	J	Bennett			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Doylestown	State/Province	OH	Country of Residence	US	
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Address 2						
City	Doylestown	State/Province	OH			
Postal Code	44230	Country i	US			
Inventor	3				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Jeremy	L	Remus			
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		Case 7709	
		Application Number			
Title of Invention		HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS			
City	Sugar Land	State/Province	TX	Country of Residence	US
Mailing Address of Inventor:					
Address 1		3211 W. Rangercrest Place			
Address 2					
City	Sugar Land	State/Province	TX		
Postal Code	77479	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	41669		
Email Address	patent@babcock.com	Add Email	Remove Email

Application Information:

Title of the Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		
Attorney Docket Number	Case 7709	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	1

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	41669		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)	Remove
Additional Foreign Priority Data may be generated within this form by selecting the Add button.				Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐	This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ **A. Applicant DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ **B. Applicant DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee

Legal Representative under 35 U.S.C. 117

Joint Inventor

• Person to whom the inventor is obligated to assign.

Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name

The Babcock & Wilcox Company

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Barberton

State/Province

OH

Country

US

Postal Code

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Phone Number

Fax Number

Email Address

Additional Applicant Data may be generated within this form by selecting the Add button.

Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

Assignee | 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is **not** checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/mjseymour/		Date (YYYY-MM-DD)	2016-04-05
First Name	Michael	Last Name	Seymour	Registration Number
				54436

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Case 7709
		Application Number	
Title of Invention	HIGH TEMPERATURE SUB-CRITICAL BOILER WITH STEAM COOLED UPPER FURNACE AND START-UP METHODS		

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