

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 07-008228-00003-0000

Fecha: 2008-07-09 15:06:15 Dep. 2020 NUECREACIONE
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 538 PETICION Folios: 2

Clarke, Modet & Cº

COLOMBIA

SEÑORES
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES
E.S.D.

REF: EXPEDIENTE No. 07-008.228
SOLICITANTE: SOLVAY (SOCIÉTÉ ANONYME)

ASUNTO: SOLICITUD EXAMEN DE PATENTABILIDAD

DILIA RODRÍGUEZ D'ALEMAN identificada como aparece al pie de mi firma, domiciliada en Bogotá, en la Carrera 11 No. 86-53, piso 6, obrando como apoderada de la sociedad solicitante, pido a usted que se proceda a examinar si la invención, cuya patente se tramita en el expediente de la referencia, es patentable.

Adjunto al presente memorial el recibo No.08-49,735 de 20 de junio de 2008, por la suma de \$420.000.00, con lo cual queda cubierta la tasa oficial correspondiente a dicho estudio.

Señor Superintendente,

DILIA RODRIGUEZ D'ALEMAN
C.C. 41.654.882 de Bogotá
T.P. 20824 del C.S.J.

P-887 ①

P887

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RÉCIBO OFICIAL DE CAJA : 08 - 49,735
 FECHA : JUNIO 20 DE 2008

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***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CLARKE MODET Y CO. COLOMB	CONSIGNACION	BANCO DE BOGOTA	062754387	3418236	20/06/2008	46,620,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	
		85 EXAMEN DE PATENTABILIDAD DE INVEN	420,000.00
		TOTAL :	\$ 420,000.00

SOM: CUATROCIENTOS VEINTE MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

DIVISIÓN DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 07-08228

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION**

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **587** DE

FECHA **18 DE ENERO DE 2008** EL TÉRMINO HÁBIL SEÑALADO POR LA LEY

EXPIRA EL **16 DE ABRIL DE 2008**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X

PATENT SPECIFICATION

1,027,182

1,027,182



Inventor: JOHN WYLIE.

Date of filing Complete Specification: June 27, 1963.

Application Date: July 5, 1962.

No. 25740/62.

Complete Specification Published: April 27, 1966.

© Crown Copyright 1966.

Index at Acceptance:—F4 S16B.

Int. Cl.:—F 25 h.

COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Vessels Controlling the Temperature of the Contained Fluids

We, THE DISTILLERS COMPANY LIMITED, a British Company, of 12, Torphichen Street, Edinburgh 3, Scotland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to vessels suitable for containing fluids. In particular it relates to vessels which are adapted to control the temperature of the contained fluids and to such vessels when suitable for use in fermentation processes.

Vessels are known in which the temperature of the contained fluid can be controlled by external cooling jackets. Where it is desired to maintain the contained fluid under pressure the walls of these vessels are thick and consequently have poor thermal conductivity thus interfering with the temperature control.

It is an object of the present invention to provide an improved vessel in which the temperature of the contained fluids can be controlled.

Accordingly the present invention is a vessel for controlling the temperature of fluids contained in a cavity therein the vessel comprising an outer wall having sufficient rigidity to withstand pressure from fluid contained in the cavity and an inner wall deformable under said pressure, the walls so formed that heating or cooling fluids can be passed between them without entering the cavity, the inner wall having projections or ridges on its interior and exterior surface wherein the projections or ridges on the exterior surface are so formed as to contact the outer wall and derive support therefrom to prevent deformation.

The vessel can be any desired shape and when used for fermentation processes it is

preferably cylindrical with at least one end of the cylinder sealed by an end plate.

The outer wall can be made from any material having sufficient rigidity to withstand the pressure from fluid contained by the vessel. Relatively cheap materials such as for example mild steel are often suitable. Where desired, for example, where steam sterilisation of the contained fluids is required, it can be surrounded by a layer of thermally insulating material.

Preferably the shape of the inner wall approximates to the shape of the outer wall and must be so formed that heating or cooling fluids can be passed between the walls without entering the cavity of the vessel. The interior surface of the inner wall has projections or ridges which can be any desired pattern and size. By interior surface is meant the surface which defines the cavity of the vessel. The choice of the most suitable pattern and size is governed by the nature of the fluid contents of the vessel and the temperature at which these contents are to be controlled. When the vessel is used for fermentation processes, particularly when concerned with the culture of yeast, it is preferred that the inner wall is corrugated with ridges which run substantially parallel to the axis of the vessel. In a preferred arrangement this inner corrugated wall is not circumferentially continuous but is divided into sections to accommodate a radially spoked internal cooling device of the Vogelbusch type.

The projections or ridges on the exterior surface of the inner wall must be so formed as to contact the outer wall and derive support therefrom to prevent deformation. The inner wall can be secured to the outer wall by any suitable means. It is preferred to attach it at the points of contact made with the corrugations by such means as "plug"

[Price 4s. 6d.]

Price 75p

welding through punched slots or spot-welding.

The inner wall can be made from any material which does not react unfavourably with the fluids with which it is contacted. It can be relatively thin when compared with the outer wall since it is supported against internal pressure by the outer wall through the contact therewith by the projections or ridges on the exterior surface of the inner wall. Therefore it can be made from any material which is a good conductor of heat. Thin stainless steel is particularly suitable when the vessel is to be used for fermentation processes.

Cooling or heating fluids can be passed between the inner and outer walls by any suitable means, such as for example under the influence of a pump.

When the vessel is to be used to contain fluids under pressure the outer and inner walls are preferably cylindrical in shape, with the inner wall corrugated so that the pressure from the contained fluid is transmitted by the corrugations to the outer wall of the vessel.

Vessels according to the present invention are particularly suitable for use in industrial fermentation processes where it is required to control the temperature of large volumes of liquid. The corrugated inner wall gives a comparatively large cooling surface area whilst retaining a virtually unobstructed interior. Thus enabling the inside of the vessel to be readily cleaned. The corrugated construction can be designed to have a high resistance to pressure and in consequence the inner wall can be made from thin gauge material with good heat conducting properties and corrosion resistance.

An embodiment of the present invention is illustrated by the drawing filed with the provisional specification in which Figure 1 shows a longitudinal section through the vessel and Figure 2 shows a section along the line A-A of Figure 1. Figure 3 is a longitudinal section of a header arrangement for supplying heating or cooling fluid between the inner and outer walls.

Figures 1 and 2 show the outer wall 1 as cylindrical in shape and surrounding the inner wall 2. The inner wall is corrugated in cross section and has a plurality of ridges running in the direction of the longitudinal axis of the vessel. The inner wall is secured to the outer wall at the points of contact made by the ridges with the outer wall by means of the bolts 3. Heating or cooling fluid can be passed between the walls through the cavities 4 via the headers 5. Figure 3 shows an enlarged view of a header 5 set into the fermenter wall 1.

WHAT WE CLAIM IS:—

1. A vessel for controlling the temperature of fluids contained in a cavity therein, the vessel wall having sufficient rigidity to withstand pressure from fluid contained in the cavity comprising an outer and an inner wall deformable under said pressure, the walls so formed that heating or cooling fluids can be passed between them without entering the cavity, the inner wall having projections or ridges on its interior and exterior surface, wherein the projections or ridges on the exterior surface are so formed as to contact the outer wall and derive support therefrom to prevent deformation.

2. A vessel as claimed in claim 1 wherein the outer and inner walls are cylindrical in shape.

3. A vessel as claimed in either claim 1 or claim 2 wherein the inner wall is corrugated with ridges which run substantially parallel to the axis of the vessel.

4. A vessel as claimed in any one of the preceding claims wherein the inner wall is divided into sections to accommodate a radially spaced internal cooling device.

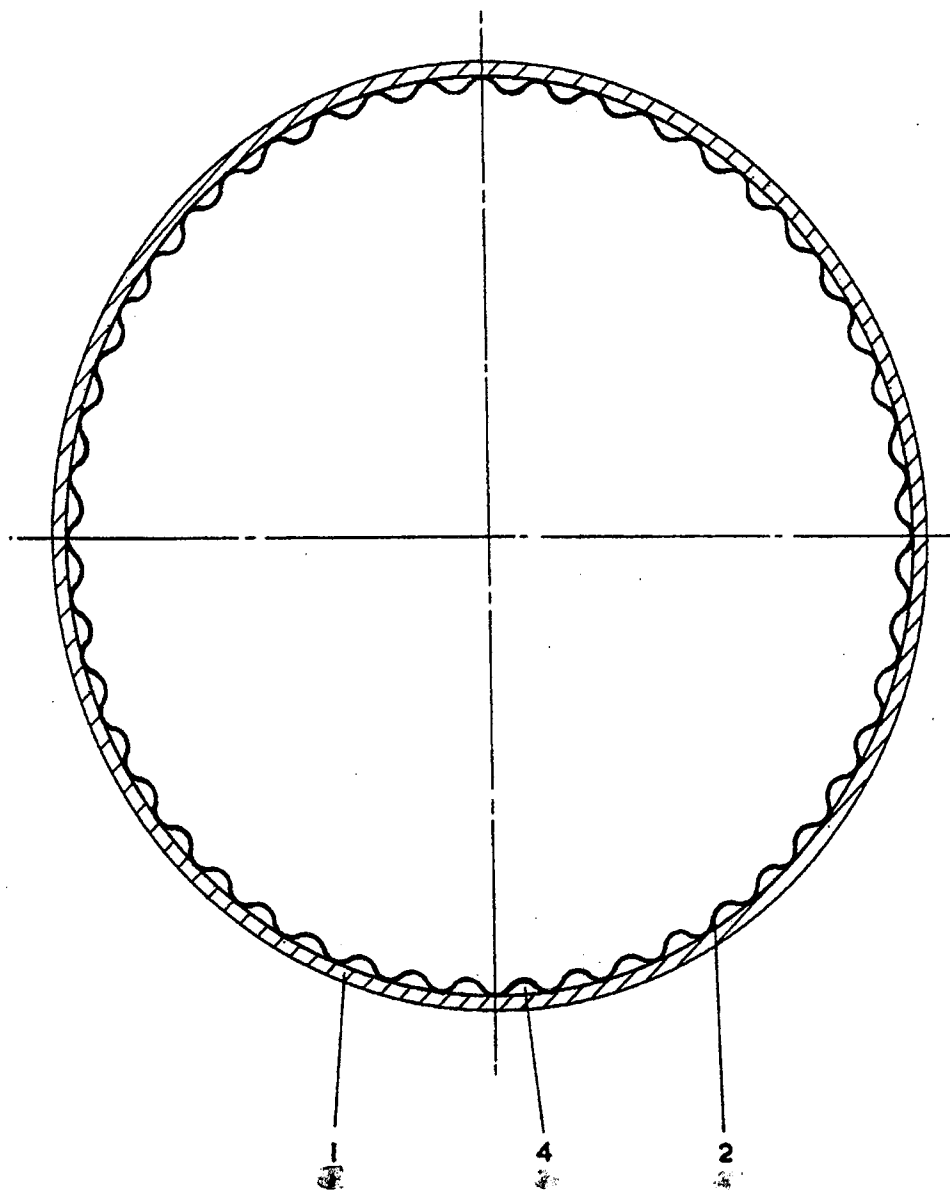
5. A vessel as claimed in any one of the preceding claims wherein the inner wall is made from stainless steel.

6. A vessel as hereinbefore described with reference to the drawings accompanying the provisional specification.

J. GAMMON.

(Agent for the Applicants).
Great Burgh, Epsom, Surrey.

FIGURE 2
... of the



United States Patent [19]

Greene

[11] 4,221,763

[45] Sep. 9, 1980

[54] MULTI TUBE HIGH PRESSURE, HIGH TEMPERATURE REACTOR

[75] Inventor: Marvin I. Greene, Somerset, N.J.

[73] Assignee: Cities Service Company, Tulsa, Okla.

[21] Appl. No.: 937,891

[22] Filed: Aug. 29, 1978

[51] Int. Cl.² B01J 3/00[52] U.S. Cl. 422/197; 165/83;
165/158; 422/201; 422/241; 422/242[58] Field of Search 422/196, 197, 200, 201,
422/241, 242, 312; 165/83, 158

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Primary Examiner—Arnold Turk

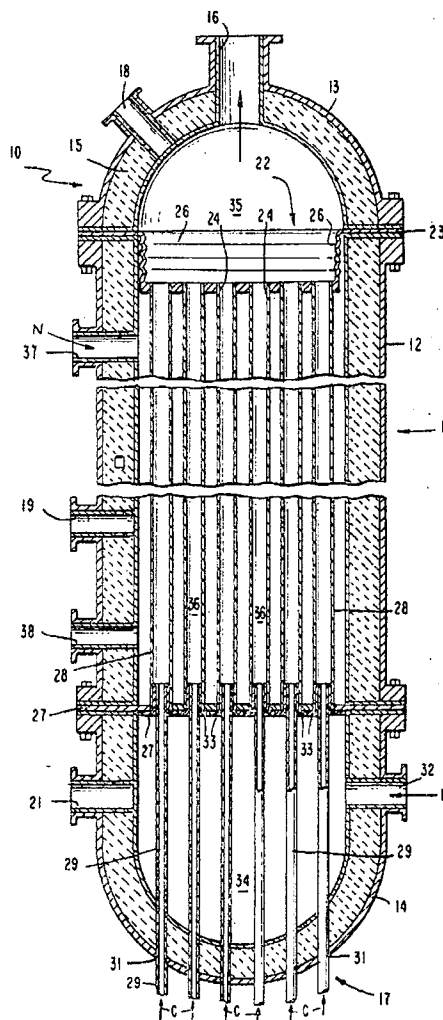
Attorney, Agent, or Firm—George L. Rushton; Richard S. Strickler

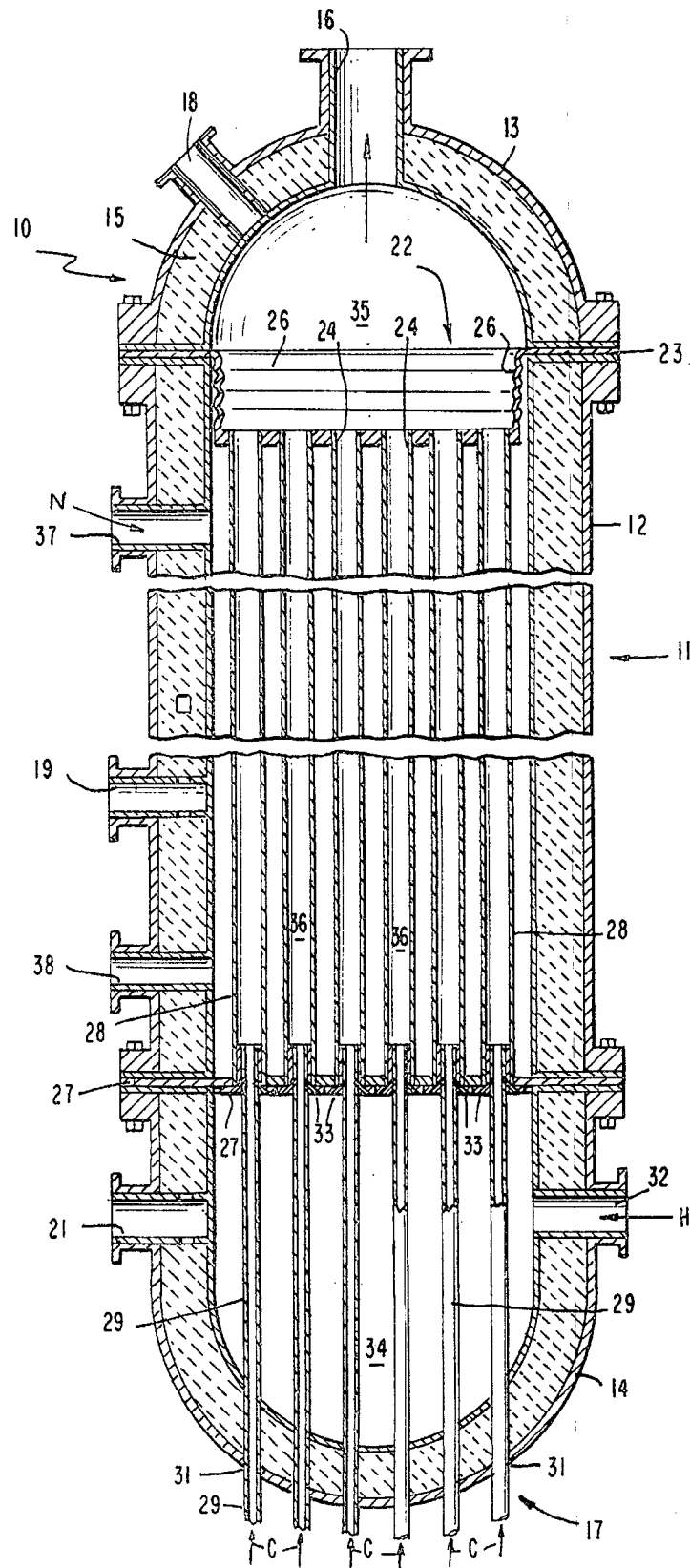
[57]

ABSTRACT

A high pressure, high temperature reactor device having a pair of spaced tube sheets for supporting a tube nest, one tube sheet being formed with a bellows to compensate for expansion and contraction of the tube nest longitudinally during temperature changes and the second tube sheet supporting the opposite end tubes of the tube nest, with injector tubes mating with each reactor tube and projecting through the reactor shell.

1 Claim, 1 Drawing Figure





4,221,763

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MULTI TUBE HIGH PRESSURE, HIGH TEMPERATURE REACTOR

BACKGROUND OF THE INVENTION

The present invention relates to reactors and, in particular, to high temperature, high pressure reactors useful to carry out processes such as disclosed and described in U.S. Pat. No. 3,960,700, issued June 1, 1976, to Rosen et al., entitled "Coal Hydrogenation to Produce Liquids".

The Rosen et al. process converts hydrogen and coal to gas, benzene and char while the residence time of the coal in the reactor is less than two seconds.

Representative prior art reactors are illustrated and described in U.S. Pat. Nos. 4,042,334, issued Aug. 16, 1977 and 4,044,117, issued Aug. 23, 1977 to Edwin Matovich.

BRIEF DESCRIPTION OF THE INVENTION

A particular feature of the invention is the provision of a pressure vessel or reactor which involves low risk in scale-up from pilot size to commercial size.

A further feature of the invention is the provision of a reactor which houses a plurality of reactor tubes supported on each end in tube sheets.

A further feature of the invention is the provision of a reactor structure having enhanced heat transfer characteristics to and from the interior of the tubes.

A further feature of the invention is the provision of a pressure balance between the reaction medium within the tubes and the heat transfer medium surrounding the tubes, thereby precluding collapse or rupture of the tube walls.

A still further feature of the invention is the provision of a plurality of paths for positive movement of reaction material along unobstructed or straight through paths, precluding eddy currents, bridging a quiescent zones commonly encountered in single tube reactors.

A further feature of the present invention is the provision of a multi path (multi tube) reactor providing the operator the option of using all or some of the tube paths, in one combination or another, so that idle or inoperative paths do not interfere with overall reactor operation.

A further feature of the invention is the provision of a high pressure, high temperature reaction vessel which by virtue of its internal tube bundle structure in combination with the maintenance of counter-balancing pressures within and without the tubes, provides economies in that the shell of the reactor is the only element that need be fabricated of high strength steel.

A representative embodiment of the reactor of the present invention may comprise a generally cylindrical body having opposed ends, each end of said body being closed by separable hemispherical caps, said body and caps defining a pressure shell having an inlet and a discharge end, a refractory liner in areal contact with the interior of the pressure shell, an expandable tube sheet secured to the pressure shell at the discharge end for supporting one end of a plurality or nest of reactor tubes, a second tube sheet fixed to the shell at the inlet end for supporting the opposite ends of said tubes, injector tubes mating with each reactor tube projecting through the pressure shell at the inlet end and making a fluid type connection with mating tubes and the pressure shell, conduit means providing an inlet and an outlet to and from the pressure shell to provide for

circulation of heat transfer material within the pressure shell between the tube sheets and around and about the exterior of the tubes, a second conduit means communicating with the refractory liner to provide for the introduction of inert gases permeating the refractory liner to block undesirable gaseous media to and from the refractory, a reaction material inlet communicating with the interior of the inlet cap and communicating with the interior of each reaction tube through said second tube sheet whereby reaction material, such as hydrogen, introduced into the tubes will react with reaction material, such as coal, introduced through said injector tubes with the result that products of the reaction are advanced through the tube nest and are discharged from the reactor outlet.

Other features and advantages of the present invention will become more apparent from an examination of the succeeding specification when read in conjunction with the drawings; in which: a single FIGURE shows a vertical section of a reactor illustrating basic features of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference numeral 10 indicates generally a high pressure, high temperature reactor having a pressure shell 11 comprising a cylindrical body 12 and separable caps 13 and 14.

The cap 13 is provided with a reactor outlet 16 and the opposite end defines outlet 17.

The interior of the shell is lined with refractory 15 and conduits 18, 19 and 21 are provided for introduction of inert gas and for maintaining a head of pressure of said gas within the refractory to preclude transfer of undesirable gases to and from the refractory.

An expandable tube sheet indicated generally by the reference numeral 22 is supported by the pressure shell as shown at 23. The tube sheet 22, providing support for a plurality of reactor tubes 24—24, is formed with a corrugated collar or bellows 26 to facilitate expansion and contraction of the tube bundle longitudinally. A second tube sheet 27, fixed to the opposite end of the reactor vessel, supports the opposite ends 28—28 of the reactor tubes and provides a fluid tight joint and support for mating injector tubes 29—29.

Note that the injector tubes make a fluid tight seal with the pressure shell as shown at 31—31.

The reactor shell is formed with an inlet 32 defining an inlet for a reaction medium or material H. Correspondingly, the injectors 29—29 are inlets for a second reaction medium or material as indicated by the letter C.

Note that tube sheet 27 is formed with a plurality of openings 33—33, providing communication from chamber 34 to the interior 36—36 of each reaction tube, permitting reaction material H to co-mingle and react with reaction medium C with the result that products of the reaction within the tubes are discharged into chamber 35 and thence, through outlet 16 to suitable collectors or other process apparatus not shown.

Heat transfer material N, introduced through inlet 37, is circulated about the exterior of reaction tubes 24—24 between tube sheets 22 and 27 and is discharged through outlet 38.

The pressure of the reactants within the tubes is counter balanced by the pressure of the heat transfer medium surrounding the tubes, thereby precluding collapse or rupture of the tubes. In this arrangement, the

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requirement for high strength tube material is eliminated.

It is further noted that the principal high strength material is the cylinder 11 and cooperating hemispherical closures 13 and 14.

It is anticipated that a wide variety of modifications may be developed in the disclosed embodiment of the present invention without departing from the spirit and scope thereof.

I claim:

1. A reactor device comprising a generally cylindrical body having opposed ends, each end of said body being closed by separable hemispherical caps, said body and caps defining a pressure shell having an inlet end and a discharge end, a refractory liner in areal contact with the interior of the pressure shell, a plurality or nest of reactor tubes, an expandable tube sheet secured to the pressure shell at the discharge end for supporting one end of said plurality or nest of reactor tubes, a second tube sheet fixed to the shell at the inlet end for supporting the opposite ends of said tubes, injector tubes mating

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with each reactor tube projecting through the pressure shell at the inlet end and making a fluid tight connection with mating tubes and the pressure shell, conduit means providing an inlet and an outlet to and from the pressure shell to provide for circulation of heat transfer material within the pressure shell between the tube sheets and around and about the exterior of the tubes, a second conduit means communicating with the refractory liner to provide for the introduction of inert gases permeating the refractory liner to block undesirable gaseous mediums to and from the refractory, a reaction material inlet communicating with the interior of the inlet cap and communicating with the interior of each reaction tube through said second tube sheet whereby reaction material, introduced into the tubes, will react with other reaction material, introduced through said injector tubes with the result that products of the reaction are advanced through the tube nest and are discharged from the reactor outlet.

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