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**EP-A-0 021 461**
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**Description**

This invention relates to burners for the partial oxidation of a particulate fuel, for example to a burner for introducing a combustible mixture comprising hydrocarbon fuel, free oxygen-containing gas, and optionally a temperature moderator (liquid or vapor) into a free-flow partial oxidation synthesis gas generator.

In the partial combustion of a hydrocarbon with oxygen, or air enriched with oxygen, in the presence of steam and/or carbon dioxide, temperatures between 1,100° and 1,500°C are often reached. Special requirements are therefore placed on the design and the material from which the burner is constructed to avoid damage to the latter.

An essential requirement in such burner construction is that it be cooled or otherwise protected from the high temperature environment. This is often achieved by circulating water or other coolant through the unit. Thus, by constructing the burner both internally and externally with coolant passages, a sufficient amount of heat transfer to the circulating cooling fluid can be achieved to reduce and stabilize the temperature which the burner itself reaches.

Normally, the oxidizing flame which combusts the mixture introduces the hot flame as well as the products of combustion into a generator such as the reaction chamber of a synthesis gas generator. The latter is lined with a suitable refractory material to avoid damage as a result of the high temperatures that will be reached and sustained.

A relatively vulnerable part of the burner is that portion which is continuously exposed for extended periods of time to the high reactor temperatures. Although means have been provided for cooling internal portions of the burner, the problems which result from the high temperature still persist.

For example, external walls of the burner are generally surrounded with a cooling coil or the like which circulates a liquid such as water to effectuate a cooling action. Further, the lower or flame end of the burner is provided with internal passages which permit coolant to be internally circulated to maintain a desired temperature range.

In either instance, the forward most vulnerable face of the burner can reach certain temperatures, or range of temperatures, within which accumulations of particulate slag or ash will tend to cling to the exposed burner face. Such a slag build-up will cause a reduction in burn efficiency and eventually impairment of operation and eventual unit shutdown.

These accumulations are prompted generally by back mixing of the combustible particles or ash as the particles enter the reactor. Here they are caught up into the violently turbulent flows of the gas associated with the high velocity flame.

More specifically it is found that if the temperature on the exposed burner face is in excess of 400° to 500°C, ash particles will be prone to stick thereto. If, on the other hand, the temperature is kept lower than 400° to 500°C on the face of the burner, the ash sticking will be substantially avoided.

In burners that function as required, it is found that a particle build-up along the burner face will generally commence at the lip of the discharge opening or nozzle. Thereafter, the build-up will progress radially outward from the nozzle and gradually cover a substantial portion of the exposed face. Slag will also build upon itself due to progressive insulation from the cooling coils and channels.

One way for precluding or at least limiting this slag build-up along the burner face is to inject steam directly into the combustible mixture within the burner itself. This step will facilitate the avoidance of undesired build-ups at the discharge lip. It will not, however, completely preclude the accumulations as herein mentioned.

For example, the back mixing and flow of the particulate matter as a result of the turbulence immediately inside the reactor, will continue to cause or prompt a certain degree of build-up at the burner face.

An object of the present invention is to achieve progress towards overcoming the above stated problems of slag build-up along the burner face.

According to the present invention there is provided a burner for the partial oxidation of a particulate fuel to form a gaseous product, characterised by:

an elongate burner body having a mixing compartment therein and a discharge end;

means for supplying a particulate fuel and a combustion supporting medium to said mixing compartment;

said burner having an end face with a discharge lip in said end face defining a nozzle for discharge of a gaseous stream of combustion mixture from said mixing compartment

an annular manifold disposed adjacent said end face and extending circumferentially of said discharge lip;

means for supplying pressurized fluid to said manifold; and

said manifold having a constricted opening positioned to deliver a pressurized stream of fluid from said manifold generally transversely of said burner end face towards said discharge lip, to cool the burner end face and to form a dynamic, fluid barrier which extends transversely of the burner end face to avoid the deposition of ash or other material on that face.

The pressurized stream of fluid serves to provide a fluid dynamic shield which protects the entire burner face. A number of fluids such as steam, $CO_2$ or even water could serve as the protective dynamic shield. For the following description, however, the fluid will be considered to be steam.

One or more high velocity steam jets may be caused to sweep the burner face. The jets first of all form a barrier which precludes the hot particles from approaching and contacting the face. Secondly, the fluid jet is so aligned that it will flow parallel to the face, or will contact or impinge against the face preferably adjacent to the discharge lip. This creates a thermal radiation/convection shield to keep the burner face below 400° to 500°C. Thirdly, the flow will clear the face of any accumulation that might be initiated.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a view in cross-section of a portion of a partial oxidation generator, showing a burner according to the invention;

Figure 2 is an enlarged view in partial cross-section of the burner shown in Figure 1;

Figure 3 is a partial cross-section of a second embodiment of the burner discharge end;

Figure 4 is a view in cross-section of a portion of a further embodiment of a partial oxidation generator according to the invention;

Figure 5 is a partial cross-section of a portion of the burner in Figure 4; and

Figure 6 is a partial cross-section of another embodiment of the manifold.

One embodiment of a partial oxidation apparatus is shown in Figures 1 and 2 and comprises primarily a burner 10. The latter is connected to a source of oxygen 11 as well as to a source 12 of particulate hydrocarbon fuel such as a coal slurry or the like. Thus the two components when introduced to the burner will form a combustible mixture.

It will be appreciated that the apparatus is subjected to sustained high internal temperatures and is formed basically of a steel shell. The inner walls and openings of the shell, while not specifically shown here, are so constructed and lined with a refractory material that they will withstand the harsh environment.

The discharge end 13 of burner 10 is positioned to introduce the resulting flame as well as the products of combustion into refractory lined reactor 14. In the latter, the hot products of the partial combustion are collected.

Reactor or generator 14 is provided with a refractory lined opening 16 within which burner 10 is positioned. Said opening 16 as shown includes a neck 17 which surrounds the burner to provide a degree of protection thereto. The upper end of the burner 10 is provided with a flange 18. which mates with a support flange 19. The latter projects outwardly from reactor neck 17 to hold the burner 10 in place, and yet permit its ready removal for replacement or repair.

Burner 10 comprises an elongate body 21 (Figure 2) having a longitudinal passage which extends the length of the body 21. The lower end of said passage terminates at a constricted, cylindrical opening 22 which is defined by a peripheral lip 23 at the burner face 24. A progressively narrowing wall connects the body passage with lip 23, to define a mixing compartment 26.

The passage through the body 21 is provided with a conduit 27 disposed preferably coaxially thereof and has a discharge port 28 terminating at the mixing compartment 26.

For the present description, oxygen will be referred to as the combustion supporting medium and is introduced through the central conduit 27 by way of valved conduit 32.

The positioning of conduit 27 defines an annular passage 29 between the conduit wall and the wall of the body 21. Annular passage 29 communicates with the source 12 of coal slurry (and optionally a temperature moderator), by way of a valved conduit 31 for introduction of the fuel into the mixing compartment 26. A valve 33 in conduit 31 regulates the volume flow rate of particulate or finely ground coal mixture which is introduced from source 12 for combining with the oxygen to establish the desired combustible mixture in mixing compartment 26.

The lower face 24 of burner body 21 as herein noted is normally exposed to the maximum temperature and turbulent environment experienced within reactor 14. Said lower face 24 is normally formed of a heat resistant material such as Inconnel or the like which will be capable of functioning in spite of the high temperatures to which it is constantly exposed. However, said burner face 24, although capable of withstanding the elevated temperatures, is nonetheless susceptible to the herein noted accumulations of slag.

To achieve the desired degree of cooling within the burner 10, the latter is provided with one or more internal channels such as 34. The latter are arranged to circulate a coolant, preferably water. The cooling water channels are so arranged within burner body 21 to establish adequate heat removing capability thereby to stabilize the temperature within burner mixing compartment 26 and to protect the entire unit from excessive heating.

Further cooling of the unit is achieved on body 21 by an externally positioned cooling coil 36. The latter is formed as shown of a thermally conductive material to withstand the extreme temperatures, and yet be capable of conducting a flow of water at sufficient rate to maintain a desired temperature gradient.

The avoid the herein mentioned undesired solid deposit of ash, slag and other particulate matter along the face 24 of the burner, an annular manifold 37 is provided. The manifold cooperates with burner 10 and is communicated with a source of pressurized steam 38 by way of pipe 39 and control valve 41.

In the embodiment shown, annular manifold 37 depends from the lower end of the body 21, and extends preferably slightly forward of face 24. Said manifold 37 comprises in essence an annular chamber 40 which is formed of a series of welded plates or compartments. The latter are adapted to either engage the lower end of the burner itself, or to be positioned sufficiently close thereto as to permit regulation of the steam flow which is projected transversely of the burner face.

As shown in Figure 2, in one embodiment manifold 37 is provided with a single circumferentially extending constricted opening 42 which communicates with the steam chamber 40 or compartment to direct a pressurized jet of steam across the burner face 24. To function most effectively, the steam preferably traverses across burner face 24 in a substantially uninterrupted pattern.

Thus, the steam will achieve at least two functions. Firstly, the steam will define a dynamic curtain or barrier across the burner face 24 to substantially preclude slag or ash particles from contacting the face. Secondly, the velocity of the steam will be such that it will dislodge any solid accumulation which might be initiated at lip 23. Thirdly, the disposition of the jet will be such as to provide a thermal radiation shield.

The volume of steam which leaves constricted opening 42 will be regulated to avoid adversely affecting production of a partially oxidized product.

As presently shown, manifold 37 is connected directly to, and depends from the peripheral forward end of burner body 21. In such an instance, the manifold 37 provides an annular arrangement which can be either welded or otherwise fastened in place to extend slightly forward of the burner face 24.

In an alternative embodiment, the manifold can be arranged to cooperate with neck 17 of reactor 14. In such an instance, the torus-like manifold is adapted to slidably register the forward end of burner 10 and to properly position face 24 with respect to constricted opening 42 thereby permitting the steam jet from the latter to sweep across face 24.

In still another embodiment of the manifold and as shown in Figure 3, the burner 10 can comprise an arrangement similar to that shown in Figure 2. Here, however, manifold 37 can be provided with a plurality of discrete constricted openings 43. The latter as shown define a plurality of passages, each of which is communicated with the manifold chamber 37 to receive the pressurized fluid.

The respective openings 43 are provided with a configuration such that the high velocity steam which leaves the respective openings is directed centrally toward the longitudinal axis of burner 10.

Openings 43 can further be constructed as to provide the issuing steam with a particular configuration. The openings may be formed by replaceable nozzles in a wall of the manifold. In one embodiment, the configuration can be substantially in the form of an fan-like flow to best provide the desired overlapping coverage across the face of burner 24.

In any event the plurality of streams will be directed substantially parallel to face 24 to form the barrier and achieve the above noted two functions, i.e. providing a shield, and also keeping the face clear of solid matter. Thus the manifold can be provided with a single constricted opening as shown in Figure 2, or with a plurality of circularly arranged and spaced apart constricted openings as shown in Figure 3.

In either instance, the stream directing openings can be spaced downwardly from face 24 rather than positioned immediately contiguously therewith. Thus, the dynamic barrier or shield forming steam will be directed upwardly from the spaced apart openings and toward face 24. The focus of the steam jets in this instance will be at the discharge lip 43. Fine particulate ash or slag will thereby be caught up into the steam jet and carried away from face 24. Further, any solid material that does engage or cling to lip 23 will be dislodged and swept away by the steam impinged thereagainst.

It is found that by use of the above described arrangement, the life of the burner 10 can be greatly improved and the replacement thereof deferred for longer periods of time than for a similar burner without the presently disclosed shielding facility.

Another embodiment is shown in Figures 4 and 5. A burner 50 is connected to a source of oxygen 51 and a source 52 of particulate hydrocarbon such as a coal slurry. The two components form a combustible mixture which, as it burns, forms products of combustion which are discharged into the reaction chamber 53 of a synthesis gas generator 54. The generator comprises a steel shell 56 constructed and lined with a refractory material 57 to withstand the harsh environment.

The discharge end of burner 50 is positioned to introduce the resulting flame, as well as the products of combustion into chamber 53. In the latter, the hot products of the partial combustion are collected. The chamber 53 is provided with a neck 58 defining a refractory lined access opening 59, within which burner 10 is registered. The upper end of burner 50 is provided with a flange 52A which mates with a support flange 53A. The latter projects outwardly from neck 58 to hold the burner in place through bolts, and yet permit its ready removal for replacement or repair.

Burner 50 comprises an elongate body 60 having a longitudinal passage terminating at a cylindrical opening 61 defined by a peripheral lip 62 at the burner face 63. A progressively narrowing wall 64 connects the passage with lip 62, to define a mixing compartment 65. The elongate passage through body 26 is provided with a conduit 66 disposed preferably coaxially thereof and having a discharge port 67 terminating at the mixing compartment 65.

Conduit 66 defines an annular passage 68 between the conduit and the body 60. Annular passage 68 is communicated with source 52 of coal slurry by way of a valved conductor 69. The valve is operable to regulate the volume of particulate or finely ground coal mixture which is introduced from source 52 for combining with oxygen, to establish the desired combustible mixture in mixing compartment 65. The oxygen is introduced through conduit 66 by way of valved coolant 70.

The lower face 63 of burner body 60 is exposed to the maximum temperature and the turbulent environment experienced within reaction chamber 53. The lower face 63 is normally formed of a heat resistant material such as Inconel. However, although capable of withstanding the elevated temperatures, face 63 is nonetheless susceptible to the herein noted particulate accumulations of slag.

To achieve the desired degree of cooling and thermal protection for burner 50, the latter is provided with one or more internal channels 72 arranged to circulate a coolant, preferably water. The cooling water channels are so arranged within burner body 60 to assure adequate heat removing capability thereby to stabilize the temperature within burner mixing compartment 65, and to protect the entire unit from excessive heating. Further cooling of the burner is achieved on body 60 by an externally positioned cooling coil 71 formed of a thermally conductive material.

To avoid the herein mentioned undesired solid deposit of ash, slag and other particulate matter along burner face 63, an annular manifold 73 is provided. The manifold is disposed within reaction chamber 53 to cooperate with burner 50, and is communicated with a pressurized source 74 of fluid by way of pipe 76 and control valve 77. The torus-shaped, annular manifold 73 depends downwardly from generator shell 56 at the lower end of neck 58. Preferably, it extends inwardly to engage the burner face 63.

Manifold 73 comprises a substantially closed annular chamber 78 which is formed of a series of welded plates or communicated compartments. The manifold can engage the lower end of burner 50, or it can be positioned sufficiently close thereto as to permit direction of the fluid flow which is projected transversely of the burner face 63.

As shown in Figure 5 manifold 73 is provided with a single constricted opening 79 which communicates with fluid chamber 78 to direct a pressurized stream of fluid across the burner face 63. To function most effectively, the fluid, such as steam, preferably traverses burner face 63 in a substantially uninterrupted pattern.

The stream will thus achieve at least two functions. Firstly, it will define a dynamic curtain or barrier across burner face 63. This will substantially preclude slag or ash particles from physically contacting the face. Secondly, the velocity of the steam jet or jets will be such as to dislodge any solid accumulation which might be initiated at lip 62. Thirdly, the disposition of the jet will be such as to afford a thermal radiation shield between face 63 and reaction chamber 53.

The volume of steam which leaves constricted opening 79 is regulated to avoid adversely affecting production of the partially oxidized product in reaction chamber 53.

Manifold 73 is suspended within the reaction chamber 53 to cooperate with the removable burner 10, and yet itself be removable from the generator 54. Thus, manifold 73 is removably fastened to a series of elongated support brackets 80. The latter are fastened to the neck 58, preferably behind the refractory brick layer which forms the inner wall of the neck. Said brackets 80 are so shaped to position burner 50 and also to maintain contact with the latter in spite of thermal expansion and contraction while operating. The brackets thus embody a transverse segment 81 that will permit the burner to expand downwardly against manifold 73 when the burner becomes heated.

The fluid connection 76 which conducts steam into manifold 73 can also be disposed behind the refractory brick layer within the neck 58.

The manifold 73 extends inwardly toward the discharge end of burner 50. To facilitate cooperation with the burner face 63, the manifold upper side can be contoured or shaped that it slidably or abuttingly receives the lower edge of the burner 50. To this end, manifold support members 80, 81 can be conformed with neck 58 to permit the manifold to be displaced downwardly, and remain in contact with burner 10 when the latter is bolted into place at flange 53.

**Claims**

1. A burner (10) for the partial oxidation of a particulate fuel to form a gaseous product, characterized by:

an elongate burner body (21) having a mixing compartment (26) therein and a discharge end;

means for supplying a particulate fuel (29) and a combustion supporting medium (27) to said mixing compartment (26);

said burner having an end face (24) with a discharge lip (23) in said end face defining a nozzle (22) for discharge of a gaseous stream of combustion mixture from said mixing compartment (26);

an annular manifold (37) disposed adjacent said end face and extending circumferentially of said discharge lip (23);

means (39) for supplying pressurized fluid to said manifold (37); and

said manifold (37) having a constricted opening (42, 43) positioned to deliver a pressurized stream of fluid from said manifold generally transversely of said burner end face (24) towards said discharge lip (23), to cool the burner end face (24) and to form a dynamic, fluid barrier which extends transversely of the burner end face (24) to avoid the deposition of ash or other material on that face (24).

2. A burner according to Claim 1 characterized in that said constricted opening (42, 43) is disposed substantially adjacent the burner end face (24) to deliver said pressurized fluid stream in a path substantially parallel to said burner end face.

3. A burner according to Claim 1 characterized in that said constricted opening (42, 43) is spaced radially away from said burner end face (24) and is aligned to direct said pressurized fluid stream in a path towards the discharge lip (23).

4. A burner according to claim 2 or claim 3 characterised in that said constricted opening comprises a single substantially continuous opening (42) extending circumferentially around and radially outward of said discharge lip (23).

5. A burner according to claim 2 or claim 3 characterised in that said constricted opening comprises a plurality of circumferentially spaced apart openings (43) positioned to deliver individual jets of fluid towards said discharge lip (23).

6. A burner according to claim 5 characterised in that said openings (43) are formed by replaceable nozzles in a wall of said manifold.

7. A burner according to any one of claims 1 to 6 characterised in that said manifold (37) is disposed in contact with a peripheral region of said end face (24) of said burner body (21).

8. A burner according to any one of claims 1 to 7 characterised in that said manifold (73) has a radially inner wall that diverges outwardly away from said end face (63) of said burner body (60).

9. A burner according to any one of claims 1 to 8 characterised in that said means (39) for supplying pressurized fluid to said manifold comprises means for supplying pressurised steam.

10. Partial oxidation apparatus characterized by a reaction chamber (14) to form a gaseous product by the partial oxidation of a particulate fuel, said reaction chamber having an access opening (16) and a burner (10) as claimed in any one of Claims 1 to 9 received and located in said access opening (16) to direct products of combustion into said reaction chamber.

11. Apparatus according to Claim 10, wherein said burner (10) is removably registered in said access opening (16) and said manifold (73) depends from a wall of said reactor chamber (14) adjacent said access opening (16) and is in contact with but independent of said burner end face (24), said manifold comprising a torus-like body defining an annular fluid chamber (78) therein forming a circumferentially collar about about said access opening (16) and being spaced outwardly of said discharge lip (62).

12. Apparatus according to Claim 11 characterized by support means (80) extending inwardly from said wall of said reaction chamber adjacent said access opening, said manifold (73) of said burner being supported by said support means (80).

**Patentansprüche**

1. Brenner (10) für die Partialoxidation eines teilchenförmigen Brennstoffs zur Erzeugung eines gasförmigen Produkts, gekennzeichnet durch:

einen langen Brennerkörper (21) mit einer darin befindlichen Mischkammer (26) und einem Austrittsende;

Mittel zur Zuführung eines teilchenförmigen Brennstoffs (29) und eines die Verbrennung unterstützenden Mediums (27) zur Mischkammer (26);

wobei der Brenner eine Stirnfläche (24) mit einer darin befindlichen, eine Düse (22) definierende Austrittslippe (23) aufweist zur Abgabe eines gasförmigen Verbrennungsgemischstroms aus der Mischkammer (26);

einen ringförmigen Verteiler (37), der angrenzend an die Stirnfläche angeordnet ist und um den Umfang der Austrittslippe (23) verläuft;

Mittel (39) zur Zuführung von Druckfluid zu dem Verteiler (37); und

wobei der Verteiler (37) eine verengte Öffnung (42, 43) aufweist, die so positioniert ist, daß sie einen Druckfluidstrom aus dem Verteiler im allgemeinen quer zur Brennerstirnfläche (24) in Richtung zur Austrittslippe (23) liefert zur Kühlung der Brennerstirnfläche (24) und Bildung einer dynamischen Fluidbarriere, die sich quer zur Brennerstirnfläche (24) erstreckt, um die Ablagerung von Asche oder anderen Stoffen auf dieser Fläche (24) zu verhindern.

2. Brenner nach Anspruch 1, dadurch gekennzeichnet, daß die verengte Öffnung (42, 43) im wesentlichen angrenzend an die Brennerstirnfläche (24) angeordnet ist und den Druckfluidstrom auf einer im wesentlichen parallel zur Brennerstirnfläche verlaufenden Bahn abgibt.

3. Brenner nach Anspruch 1, dadurch gekennzeichnet, daß die verengte Öffnung (42, 43) von der Brennerstirnfläche (24) in Radialrichtung beabstandet und so ausgerichtet ist, daß der Druckfluidstrom auf einer zur Austrittslippe (23) gerichteten Bahn geführt wird.

4. Brenner nach Anspruch 2 oder Anspruch 3, dadurch gekennzeichnet, daß die verengte Öffnung eine einzige, im wesentlichen durchgehende Öffnung (42) ist, die um den Umfang der Austrittslippe (23) und davon nach radial außen verläuft.

5. Brenner nach Anspruch 2 oder Anspruch 3, dadurch gekennzeichnet, daß die verengte Öffnung mehrere in Umfangsrichtung beabstandete Öffnungen (43) umfaßt, die so positioniert sind, daß sie einzelne Fluidstrahlen in Richtung zur Austrittslippe (23) abgeben.

6. Brenner nach Anspruch 5, dadurch gekennzeichnet, daß die Öffnungen (43) durch auswechselbare Düsen in einer Wand des Verteilers gebildet sind.

7. Brenner nach einem der Ansprüche 1—6, dadurch gekennzeichnet, daß der Verteiler (37) in Kontakt mit einem Randbereich der Stirnfläche (24) des Brennerkörpers (21) angeordnet ist.

8. Brenner nach einem der Ansprüche 1—7, dadurch gekennzeichnet, daß der Verteiler (73) eine radial innere Wand aufweist, die von der Stirnfläche (63) des Brennerkörpers (60) nach außen divergiert.

9. Brenner nach einem der Ansprüche 1—8, dadurch gekennzeichnet, daß die Mittel (39) zur Zuführung von Druckfluid zum Verteiler Mittel zur Zuführung von Druckdampf umfassen.

10. Partialoxidationseinrichtung, gekennzeichnet durch einen Reaktionsraum (14) zur Erzeugung eines gasförmigen Produkts durch die Partialoxidation eines teilchenförmigen Brennstoffs, wobei der Reaktionsraum eine Zugangsöffnung (16) und einen Brenner (10) nach einem der Ansprüche 1—9 aufweist, der in der Zugangsöffnung aufgenommen und festgelegt ist und Verbrennungsprodukte in den Reaktionsraum richtet.

11. Einrichtung nach Anspruch 10, wobei der Brenner (10) in der Zugangsöffnung (16) lösbar ausgerichtet ist und der Verteiler (73) von einer Wand des Reaktorraums (14) angrenzend an die Zugangsöffnung (16) nach unten verläuft und die Brennerstirnfläche (24) zwar kontaktiert, jedoch von ihr unabhängig ist, wobei der Verteiler einen torusartigen Körper umfaßt, der eine ringförmige Fluidkammer (78) definiert die um die Zugangsöffnung (16) einen in Umfangsrichtung verlaufenden Kragen bildet und von der Austrittslippe (62) nach außen beabstandet ist.

12. Einrichtung nach Anspruch 11, gekennzeichnet durch Stützmittel (80), die von der Wand des Reaktionsraums angrenzend an die Zugangsöffnung nach innen verlaufen, wobei der Verteiler (73) des Brenners von den Stützmitteln (80) gehaltert ist.

**Revendications**

1. Brûleur (10) pour l'oxydation partielle d'un combustible particulaire afin de former un produit gazeux, caractérisé par:

un corps de brûleur allongé (21) comportant un compartiment de mélange (26) et une extrémité d'éjection;

un moyen pour assurer l'alimentation en combustible particulaire (29) et en agent d'entretien de la combustion (27) dans ledit compartiment de mélange (26);

ledit brûleur ayant une face d'extrémité (24) munie d'un bec d'éjection (23) dans ladite face d'extrémité, définissant une buse (22) pour l'éjection d'un courant gazeux de mélange de combustion provenant dudit compartiment de mélange (26);

une tubulure annulaire (37) disposée au voisinage de ladite face d'extrémité et entourant ledit bec d'éjection (23);

un moyen (39) pour assurer l'alimentation en fluide sous pression de ladite tubulure (37); et

ladite tubulure (37) ayant un orifice rétréci (42, 43) placé de manière à délivrer un courant de fluide sous pression en provenance de ladite tubulure, globalement transversalement par rapport à ladite face d'extrémité de brûleur (24) vers ledit bec d'éjection (23), afin de refroidir la face d'extrémité (24) du brûleur et de former une barrière dynamique de fluide qui est disposée transversalement par rapport à la face d'extrémité (24) du brûleur afin d'éviter le dépôt de cendres ou d'autres matériaux sur cette face (24).

2. Brûleur selon la revendication 1, caractérisé en ce que ledit orifice rétréci (42, 43) est disposé pratiquement au voisinage de la face d'extrémité (24) du brûleur pour délivrer ledit courant de fluide sous pression suivant une trajectoire sensiblement parallèle à ladite face d'extrémité du brûleur.

3. Brûleur selon la revendication 1, caractérisé en ce que ledit orifice rétréci (42, 43) est radialement éloigné de ladite face d'extrémité (24) du brûleur et est aligné de manière à diriger ledit courant de fluide sous pression selon une trajectoire orientée vers le bec d'éjection (23).

4. Brûleur selon la revendication 2 ou 3, caractérisé en ce que ledit orifice rétréci comprend un orifice unique sensiblement continu (42) s'étendant circonférentiellement autour du bec d'éjection (23) et radialement vers l'extérieur de celui-ci.

5. Brûleur selon la revendication 2 ou 3, caractérisé en ce que ledit orifice rétréci comprend une pluralité d'orifices circonférentiellement espacés (43) disposés de manière à délivrer des jets individuels de fluide vers ledit bec d'éjection (23).

6. Brûleur selon la revendication 5, caractérisé en ce que lesdits orifices (43) sont constitués par des buses remplaçables disposées dans une paroi de ladite tubulure.

7. Brûleur selon l'une quelconque des revendications 1 à 6, caractérisé en ce que ladite tubulure (37) est disposée au contact d'une région périphérique de ladite face d'extrémité (24) dudit corps de brûleur (21).

8. Brûleur selon l'une quelconque des revendications 1 à 7, caractérisé en ce que ladite tubulure (73) comporte une paroi radialement intérieure qui diverge vers l'extérieur à partir de ladite face d'extrémité (63) dudit corps de brûleur (60).

9. Brûleur selon l'une quelconque des revendications 1 à 8, caractérisé en ce que ledit moyen (39) pour assurer l'alimentation en fluide sous pression de ladite tubulure comprend un moyen pour fournir de la vapeur d'eau sous pression.

10. Appareil d'oxydation partielle caractérisé par une chambre réactionnelle (14) permettant la formation d'un produit gazeux par oxydation partielle d'un combustible particulaire, ladite chambre réactionnelle ayant un orifice d'accès (16) et un brûleur (10) selon l'une quelconque des revendications 1 à 9, logé et disposé dans ledit orifice d'accès (16) de manière à diriger les produits de la combustion vers ladite chambre réactionnelle.

11. Appareil selon la revendication 10, dans lequel ledit brûleur (10) est logé de manière amovible dans ledit orifice d'accès (16) et dans lequel ladite tubulure (73) descend d'une paroi de ladite chambre réactionnelle (14) au voisinage dudit orifice d'accès (16) et est au contact, mais est indépendante, de ladite face d'extrémité (24) du brûleur, ladite tubulure comprenant un corps toroïdal définissant une chambre de fluide annulaire (78) à l'intérieur de celui-ci et formant un collier circonférentiel autour dudit orifice d'accès (16) et étant espacé vers l'extérieur dudit bec d'éjection (62).

12. Appareil selon la revendication 11, caractérisé par un moyen de support (80) s'étendant vers l'intérieur depuis ladite parois de ladite chambre réactionnelle, au voisinage dudit orifice d'accès, ladite tubulure (73) dudit brûleur étant soutenue par ledit moyen de support (80).

Fig.1.

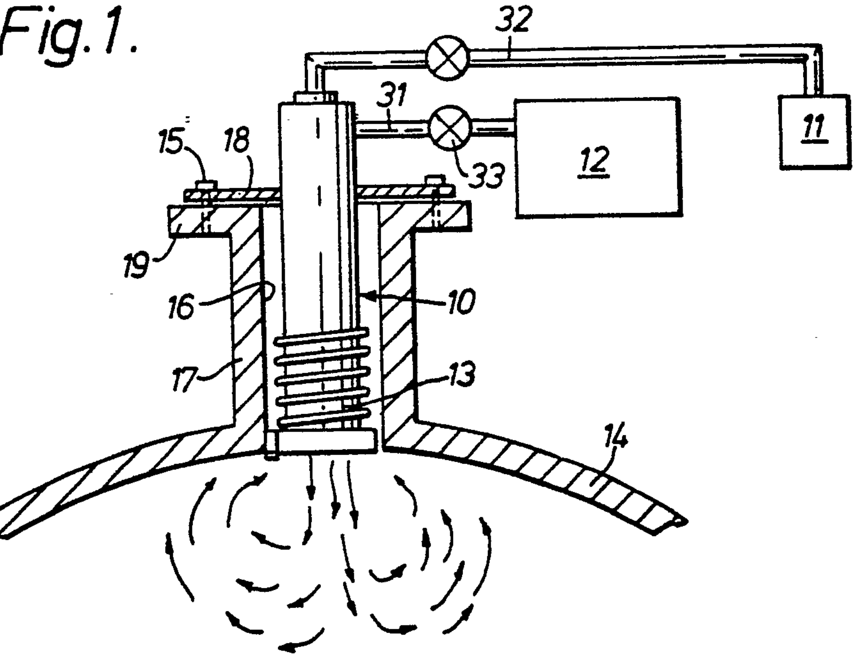
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Fig.2.

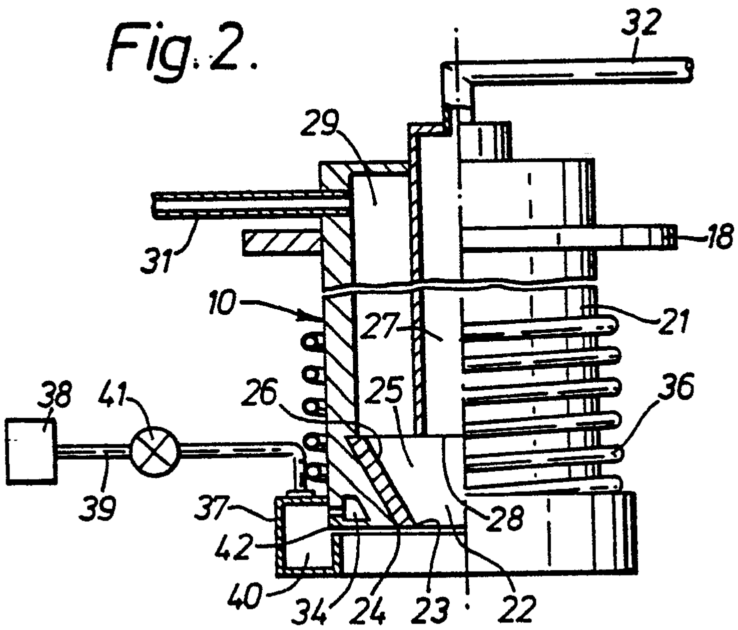
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Fig. 3.

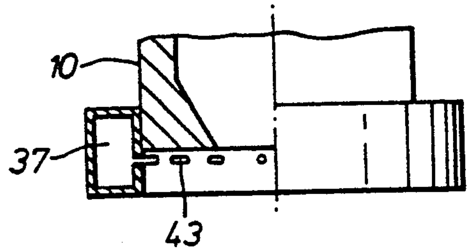
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Fig. 4.

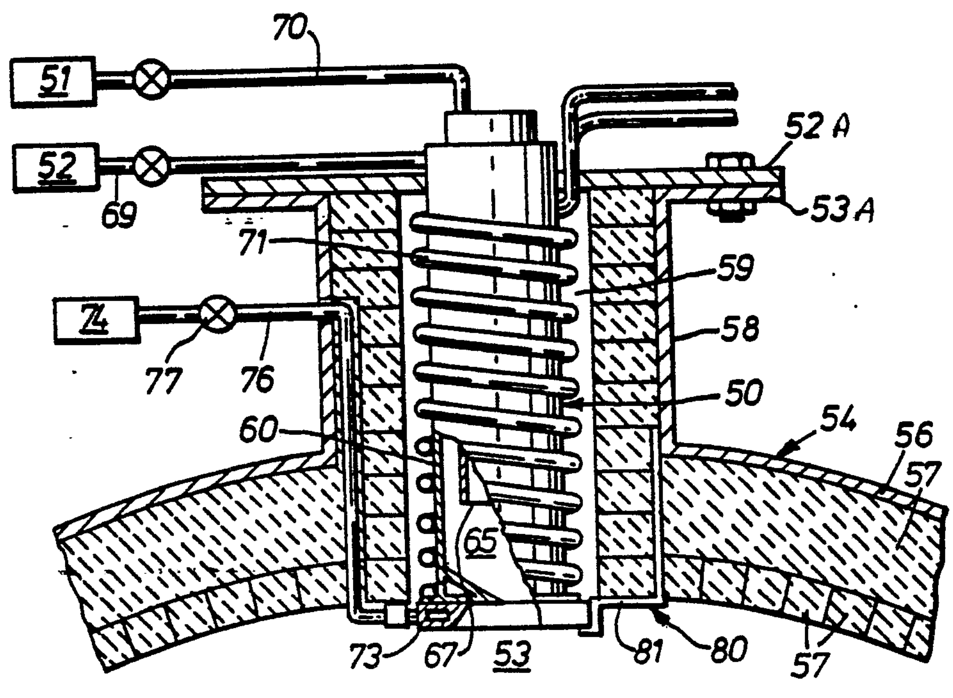
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Fig. 5.

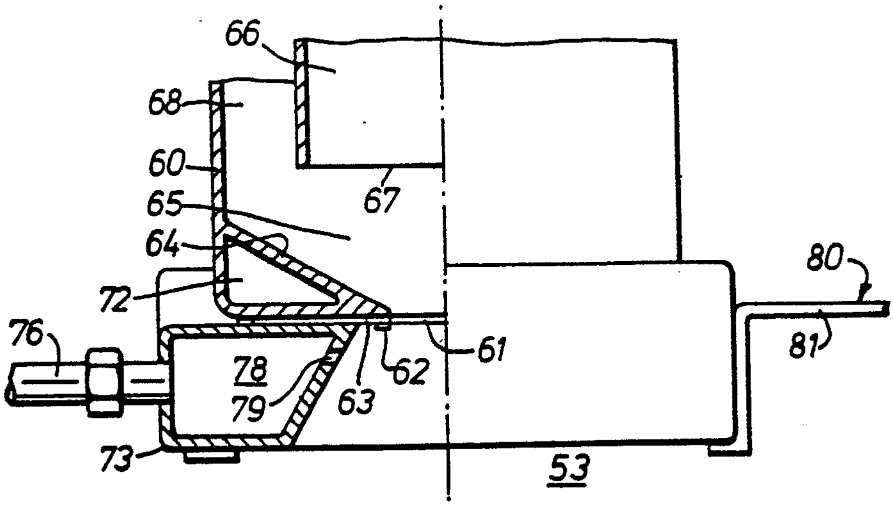


Fig. 6.