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EUROPEAN PATENT SPECIFICATION

④⑤ Date of publication of patent specification :
07.08.91 Bulletin 91/32

⑤① Int. Cl.⁵ : **A62C 4/02**

②① Application number : **89309449.0**

②② Date of filing : **18.09.89**

⑤④ **Flame trap.**

③⑩ Priority : **04.11.88 GB 8825823**

④③ Date of publication of application :
09.05.90 Bulletin 90/19

④⑤ Publication of the grant of the patent :
07.08.91 Bulletin 91/32

⑧④ Designated Contracting States :
AT BE CH DE ES FR GB GR IT LI LU NL SE

⑤⑥ References cited :
GB-A- 1 058 004
GB-A- 2 183 020
US-A- 4 307 673

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EP 0 367 394 B1

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Description

The present invention relates to flame traps and particularly to self cleaning flame traps.

A flame trap generally consists of a plurality of closely spaced and rigidly fixed plates which together act as a barrier for flame while nevertheless allowing the passage of gas. They may typically be positioned in pipes or ducts along which it is important that a flame cannot propagate. A typical example is in the exhaust line of a diesel engine operating in a hazardous or potentially hazardous atmosphere.

The front edges of the plates between which the gas passes tend quickly to become coated with, for example, carbon deposits and other products of combustion. These deposits can very quickly build up and in severe cases entirely block the spaces between adjacent plates. Accordingly, some means has to be provided whereby these deposits can be removed. Traditionally, this has been done by dismantling the flame trap periodically or cleaning the assembly. In either case it is always necessary to shut down the system to which the trap is attached. More recently, however, self cleaning flame traps have been devised in which the deposits are continuously removed by means of rotating or reciprocating cleaner blades positioned between the plates. An example of a flame trap of this type is shown in GB patent application 2183020. A somewhat similar arrangement, applied to a spark arrester, is shown in US patent 4307673.

A known flame trap comprises a housing, a plurality of generally parallel spaced plates, defining passageways for gases in the housing, and wiper means arranged to remove deposits from between the plates.

One difficulty with these known devices is that the rotating or oscillating blades have to be made undesirably thick and strong to avoid jamming and/or bending as they sweep round. This limits the extent to which the flame stopping plates can be closely spaced which encroaches on the flame trapping ability of the device.

A further disadvantage is that since the deposits tend to build up only on the leading edge of the plates, (that is, on the edge of the plates facing upstream with respect to the flow of gas) the plates tend to become disproportionately quickly coated along this edge and therefore need to be cleaned relatively more frequently.

GB 1058004 discloses a fly ash arrester for an incinerator in which a rotatable perforated drum is located in the path of a flue gas. The gas passes through the perforations while a proportion of the ash is deposited on the periphery of the drum. Scraper blades are positioned to remove the ash deposits from the side of the drum as it is rotated.

It is an object of the present invention to provide a self cleaning flame trap which at least alleviates the

difficulties associated with flame traps described above.

It is a further object of the invention to provide a robust, reliable, self cleaning flame trap, the plates of which do not need to be so frequently replaced.

It is yet another object of the present invention to provide a self cleaning flame trap of a construction that allows more flexibility in the choice of plate spacing for a particular application.

The present invention is characterised in that the plates are arranged for rotation about an axis to move relative to the wiper means to remove the deposits.

The wiper means are preferably fixed against rotation, and may be mounted on a fixed housing or on a support post. They may, however, be adjustable or self-adjusting.

The projection of the wipers may be offset with respect to the axis of rotation of the plates.

The plates are desirably circular and are keyed to a rotatable axle by which they may be driven. The axle may have a non circular, for example a square, cross section. The plates are thus arranged to rotate together as a unit. They may be spaced apart by intermediate spacers, separate from the plates, or by bosses on or secured to each plate. The bosses may be stamped or embossed into the surface of each plate. Each plate preferably has a pair of bosses diametrically spaced. The adjacent plates may have their bosses angularly staggered.

The wipers may comprise elongate blades, interleaved between the plates, and preferably extending outside the circumference of the plates. The blades may be secured together outside the edge of the rotating plates, for example by means of a plurality of intermediate spacers and a securing spindle passing through the blades and spacers. Each of the blades may further be provided with an aperture at an end between the rotating plates, with the axle to which the plates are keyed passing through this aperture. However, the blades need not be themselves spaced on their own shaft. In this case, their positions are maintained by the fact that they are interleaved between the moving plates. They are self adjustably free to move on the shaft.

Preferably the blades are positioned downstream of the axle (and of course of the leading edges of the plates) so that any deposits removed from the plates will be free to blow away.

The air flow through the flame trap may be between the plates and perpendicular to the axis of rotation. Sealing means may be provided on opposing sides of the axis to provide a conduit along which the air flow must pass to ensure that substantially all of the air flow passes between the parallel plates.

Where the rotating plates are circular, the sealing means may comprise a barrier having a part-cylindrical inner surface which fits sufficiently closely against the peripheral edges of the plates to prevent any

flames from passing. Alternatively, the sealing means could be instead a plurality of stacked packers, with alternate packers extending into the space between adjacent plates. These packers could conveniently be constructed out of a stack of alternately larger and smaller rectangular flat packing plates or alternatively radiused plates sealing against the edge of an adjacent plate and large rectangular stacking plates extending between the rotating plates.

A further possibility would be to use a single slotted plate, placed generally parallel to the axis of rotation, and having fingers (in a manner of a comb) extending into the spaces between adjacent plates.

Another possibility is to pass wires through the plates at the periphery and to thread these into the side wall of the flame trap housing to close gaps at the edges.

It would also be possible to provide additional fixed wipers or fingers extending into the spaces between adjacent plates at one or more locations around the circumference. Once again, these fingers could either be separate or formed from a single slotted plate, in the manner of a comb.

In an alternative arrangement the rotating plates could be annular with the air flow being arranged to pass first between the plates and then along a central conduit, axially of the stack of plates; or instead the air flow could be in the opposite direction, axially and then outwardly between adjacent plates. In the latter case, it would be desirable to provide wiper means which extend over the inner circumferential edge of the plates. One could also provide a central conduit, axially of the stack, with the inner circumferential edges of the plate being sufficiently closely spaced to the conduit to prevent the passage of flames.

In a specific embodiment the plates are approximately 1.26 millimetres thick, and are spaced apart by about 0.5 millimetres. The wiper blades have a thickness of about 0.4 millimetres or even less in some circumstances.

The invention may be carried into practice in a number of ways and some specific flame traps embodying the invention will now be described, by way of example, with reference to the drawings, in which:

Figure 1 is a section of a flame trap along the line B-B of Figure 2;

Figure 2 is a plan view of the flame trap of Figure 1;

Figure 3 is a section of the flame trap of Figures 1 and 2 along the line A-A of Figure 2; and

Figure 4 is a plan view of another plate and blade arrangement for a flame trap.

The flame trap shown in Figure 1 to 3 comprises a stack of closely spaced stainless steel plates 10 mounted for rotation as a unit about a common vertical axis. The plates may either be interleaved with a plurality of spacers 12 on a common central axle 14,

or they may alternatively each carry an integral embossed or welded boss in place of the spacer 12 to provide for the appropriate spacing. The axle 14 is desirably of a square cross section to allow the blades to be positively rotated by means of a motor or other means (not shown) arranged to cause rotation of the axle.

It will be appreciated that the number of plates in a flame arrestor is likely to be considerably more than is shown in Figures 1 and 3. However, the basic principle of operation is the same for any number of plates.

Interleaved between the rotating plates 10 there are a plurality of fixed elongate wiper blades 18. In Figure 2 the blades have one tapered end 20, having a tapered leading edge 23 confronting the plates as they rotate, and a generally rectangular other end 22 which extends beyond the circumference of the plates 10. For additional rigidity the rectangular ends 22 may be secured together, by means of a square section retaining post 26 which passes through the interdigitated blades and spacers. The blades are self-adjusting, being free to move along the post. Their respective positions being determined by being spaced by the plates 10.

In Figure 1, the blades, together with intermediate spacers 25, are pinned together by means of a spindle 26A. In an alternative embodiment, the axis of the spindle 26A or post 26 is offset with respect to the axis of the axle 14, i.e. shifted normally with respect to the direction of flow indicated by the arrows 24.

Also in Figure 1, an alternate form of blade shape is illustrated. In this form the blade 18A extends across the axle 14. The end 20A is rounded and is formed with an opening 21 to accommodate the axle 14. Indeed, the opening 21 is larger than the spacer 12, so that the plate can rotate relative to the wiper blade. In this case, since the opening in the blades 18 fits over but is not attached to the spacer 12 (or alternatively the boss), the stack of plates on the axle 14 can be tightened up without at the same time substantially increasing the friction between the rotating plates and the stationary blades. To ensure that there is no seizure, of course, the thickness of the blades will be slightly less than the spacing between the plates. However, these spacers 12 are not essential. The relative positions of the blades can otherwise be maintained by being supported by the plates as mentioned previously.

On opposite sides of the stack of plates, sealing means are provided so as to provide a defined air flow passage, in the direction of the air flow 24, generally parallel to the wiper blades 18 and between the plates. The plates and blades are mounted on a housing constituted in part by the sealing means.

This is illustrated in Figure 3. The sealing means comprise an interleaved stack of alternately radiused plates 27 shaped to the circumference of an adjacent

plate 10 and rectangular plates 27A extending between the plates 27. The radiused plates 27 are a close tolerance match to the rotating plates 10 to provide a seal. The rectangular plates 27A create an additional flame barrier to enhance the flame sealing of the radiused plates 27.

Alternatively, the sealing means may take the form shown on the right of Figure 3 : which is a cylindrical housing 28. In the cylindrical housing 28, edge sealing is provided by a part-cylindrical member 36, the surface of which, as may be seen in figure 2, fits closely to the edge of the plates 10. The spacing between the surface and the edges of the plates are sufficiently small to prevent the passage of flames. Additional stops 38 are provided above the uppermost plate, and below the lowermost plate. The blades are preferably made of stainless steel or a copper based alloy, such as beryllium/copper, brass or cupro-nickel. The plates are preferably made of stainless steel.

Accordingly, a flame travelling in the direction of the arrows cannot circumvent the stack of plates around its edge ; it must instead pass through the stack, where it will be extinguished.

In use, the plates 10 are slowly rotated continuously or intermittently on the axle 14 at a rate of about one revolution per minute. Deposits building up on the edge of the plate will tend to be broken up at the point X (Figure 2), and the broken up deposits blown downstream and away from the flame trap. Since the plates are rotating the deposits will tend to build up equally around all points of the circumference, thus prolonging plate life.

In flame traps where the edge sealing is provided by means of a cylindrical housing 28 there may be a need to provide a plurality of fingers 40, extending into the gap between the plates, to assist in initially breaking up the deposits. For the sake of simplicity in the drawings, these fingers 40 are shown at their preferred location for an anticlockwise rotation of the plates. It will be appreciated, of course, that they could also be positioned elsewhere about the circumference, and that it may be desirable in certain circumstances to provide these fingers at more than one location. The fingers could either be individual or, more conveniently, they could be formed by cutting a plurality of slots out of the plate, in the manner of a comb.

In an alternative arrangement (shown in Figure 4) the air flow may pass not straight across the plates, as indicated by the arrows 24, but instead first into the space between the plates from all sides of the housing 41 and then out along a conduit defined by a large central aperture 42 in each plate 10, the end of this aperture communicates with a fixed central conduit 44 at one end. It would also be possible for the gas flow to pass in the opposite direction : that is, first along the conduit and then out between the rotating plates. In either case, however, the wiper blades may overlap to some extent the edge of the plate 10 which is first

encountered by the gas flow, so that the deposits forming on that edge may be efficiently removed. However, in this particular embodiment the blades 46 are truncated short of the circumference of the plates. This is to allow the plates to be pinned together by studs 48 which may also serve to space them relative to one another. However, it is preferred that the plates "float" on the pins, being spaced by the blades. Clearly, this will leave a portion of the plates defining the spaces untraversed by the wiper blade, as depicted by the circular broken line in Figure 4. This arrangement is particularly suited to the flow of gas entering via the central aperture 42.

The moving gases will tend to permit only a small build up of deposits on the outer edge of the plates before the erosive effects of the particle laden gases limit the build up to a tolerable level.

The top plate, opposite the central conduit 44, is blanked off and secured to a central drive shaft (not shown) by which the plates are rotated. Thus, the central aperture 42 is free of obstructions.

If the blade is extended to the circumference of the plates, the plates may alternatively be pinned using short webs 50 formed on the plates through which pins 52 hold them together in their angular relationship.

As a further alternative, the plates are pinned together through webs extending radially inwardly, into the central aperture 42. In this case the blades have to be mounted on the outside of the plates as previously described. However, it is important that the flame arrestor does not increase the back pressure in the exhaust any more than is absolutely necessary. Thus, for this reason the use of radially out pinning is preferred.

This annular form of flame trap is found to be particularly efficient as it avoids the sealing problems in defining the flow path previously described as the flow is simply directed to or from the entire periphery of the plates.

In a preferred embodiment the plates 10 are about 1.25 millimetres thick, and are spaced apart by about 0.5 millimetres. The wiper blades 18 are about 0.4 millimetres thick.

It is found that suitable materials for the wiper blades are copper-based alloys, such as, beryllium-copper, brass or cupro-nickel. Alternatively stainless steel can be used.

It is found to be very important to rotate the plates relative to the blades either continuously or at least on a regular basis. Otherwise, the apertures can become so clogged that the apparatus seizes. Certainly, the tendency towards a build-up of deposits means that it is impracticable for the plates to be moved manually. Thus, a constant or intermittent drive is required.

One example of the use to which such a flame trap may be put is in the axial exit duct of the transverse heat exchanger described in our co-pending

British patent application 8823229.3.

The drive shaft of the flame trap can be connected by a belt to the fan drive at the front of an engine to provide continuous movement. Alternatively, other sources of motive power can be exploited.

The discharge pressure of the lubricating oil pump or, on vehicles employing hydraulic power, an intermittent hydraulic drive can be used. The purpose of the drive can be to achieve a reciprocating motion which can be connected up to the axle 14 of the flame trap in a conventional manner to provide an intermittent drive or "inching" motion.

To achieve intermittent rotary motion from a continually rotating source, such as a fan drive, the flame trap requires a device for converting the rotary motion to a reciprocating motion that can be used to move a ratchet arrangement. The reciprocating motion can be derived from an eccentric, as will be known to the skilled person. The inching intermittent motion can be derived using a oneway roller or Sprague clutch. For example as manufactured by Torrington Company Limited of Grovelands Industrial Estate, Longford Road, Exhall, Coventry, England under the serial number FCB 30.

Claims

1. A flame trap comprising a housing (41), a plurality of generally parallel spaced plates (10) defining passageways for gas in the housing, and wiper means (18) arranged to remove deposits from between the plates, characterised in that the plates are arranged for rotation about an axis (14) to move relative to the wiper means to remove the deposits.

2. A flame trap as claimed in claim 1, wherein the wiper means are fixed against rotation.

3. A flame trap as claimed in claim 1 or 2, wherein the wiper means are constituted by a plurality of blades (18) interdigitated between the plates.

4. A flame trap as claimed in claim 3, wherein the blades are mounted on a support post (26) secured relative to the housing.

5. A flame trap as claimed in claim 4, wherein the blades are movable along the support post to be self-adjusting within the passageways.

6. A flame trap as claimed in claim 3, 4 or 5, wherein the blades are fixed outside the periphery of the plates.

7. A flame trap as claimed in any of claims 3 to 6, wherein the leading edge (23) of each blade, relative to the rotation of the plates, is adapted to urge wiped deposits radially inwardly or outwardly.

8. A flame trap as claimed in claim 7, wherein the leading edge is arranged extending generally toward the axis of rotation of the plates.

9. A flame trap as claimed in any of claims 3 to 9, wherein the blade is tapered.

10. A flame trap as claimed in any preceding claim, wherein the plates are spaced by embossings on each plate.

11. A flame trap as claimed in claim 10, wherein the embossings are angularly staggered between adjacent plates.

12. A flame trap as claimed in any of the preceding claims, wherein the wiper means are arranged on the downstream side of the axis of rotation of the plates.

13. A flame trap as claimed in any of the preceding claims wherein the housing includes sealing walls (27, 36) co-operating with the edges of the plates to entrain the gas to pass across the plates.

14. A flame trap as claimed in claim 13, wherein the sealing wall comprises a comb structure of teeth (27A) extending between the plates, the wall (27) between the teeth being a close sealing fit with the plates.

15. A flame trap as claimed in claim 14, wherein the sealing walls comprise a plurality of sealing plates each forming a close fit with the periphery of a respective plate and a plurality of interleaving spacing plates extending between the plates.

16. A flame trap as claimed in claim 13, wherein the sealing walls comprise an arcuate wall portion forming a close sealing fit with the peripheries of the plates and a protruding wall portion extending over the outermost plates.

17. A flame trap as claimed in any of claims 1 to 12, wherein the flow of gas is arranged to pass across the plates and along an internal passage defined by apertures in the plates.

18. A flame trap as claimed in claim 17, when dependent on any of claims 3 to 9, wherein the wiper means extend outwardly from the passage between the plates.

19. A flame trap as claimed in claim 17 or 18, wherein the passage is coaxial with the axis of rotation of the plates.

20. A flame trap as claimed in any of claims 17 to 19 wherein the plates are pinned together around their outer periphery, the wiper means being truncated short of the periphery.

21. A flame trap as claimed in claims 17 or 18, wherein the plates are formed with peripheral flanges through which they are pinned together.

22. A flame trap as claimed in any preceding claim, wherein the wiper means are made of stainless steel or a copper based alloy.

23. A flame trap as claimed in any preceding claim, in which the plates are made of stainless steel.

Patentansprüche

1. Feuersperre mit einem Gehäuse (41), einer Mehrzahl von im wesentlichen parallelen, beabstandeten Platten (10), die Gasdurchlässe in dem Gehä-

se definieren, und mit Wischermitteln (18), die so angeordnet sind, daß sie Ablagerungen zwischen den Platten entfernen, dadurch gekennzeichnet, daß die Platten um eine Achse (14) drehbar sind, um sich zum Entfernen der Ablagerungen relativ zu den Wischermitteln zu bewegen.

2. Feuersperre nach Anspruch 1, dadurch gekennzeichnet, daß die Wischermittel drehfest fixiert sind.

3. Feuersperre nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Wischermittel von einer Mehrzahl von Blättern (18) gebildet werden, die fingerartig zwischen die Platten greifen.

4. Feuersperre nach Anspruch 3, dadurch gekennzeichnet, daß die Blätter auf einem Tragbolzen (26) montiert sind, der relativ zum Gehäuse festgelegt ist.

5. Feuersperre nach Anspruch 4, dadurch gekennzeichnet, daß die Blätter entlang des Tragbolzens bewegbar sind, um sich selbsttätig innerhalb der Durchlässe auszurichten.

6. Feuersperre nach Anspruch 3, 4 oder 5, dadurch gekennzeichnet, daß die Blätter außerhalb des Umfangs der Platten fixiert sind.

7. Feuersperre nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß die Vorderkante (23) jedes Blattes, bezogen auf die Drehrichtung der Platten, dazu dient, abgewischte Ablagerungen radial einwärts oder auswärts zu drängen.

8. Feuersperre nach Anspruch 7, dadurch gekennzeichnet, daß die Vorderkante so angeordnet ist, daß sie sich im wesentlichen gegen die Drehachse der Platten erstreckt.

9. Feuersperre nach einem der Ansprüche 3 bis 9, dadurch gekennzeichnet, daß das Blatt abgesschrägt ist.

10. Feuersperre nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Platten durch auf jeder Platte angeordnete Erhebungen im Abstand zueinander gehalten werden.

11. Feuersperre nach Anspruch 10, dadurch gekennzeichnet, daß die Erhebungen zwischen benachbarten Platten winkelmäßig gestaffelt sind.

12. Feuersperre nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Wischermittel auf der stromab gelegenen Seite der Drehachse der Platten angeordnet sind.

13. Feuersperre nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Gehäuse Dichtwände (27, 36) aufweist, die mit den Kanten der Platten zusammenwirken, um das Gas über die Platten strömen zu lassen.

14. Feuersperre nach Anspruch 13, dadurch gekennzeichnet, daß die Dichtwand eine kammförmige Struktur von Zähnen (27A) aufweist, die sich zwischen die Platten erstrecken, wobei die Wand (27) zwischen den Zähnen eine enge Dichtpassung mit den Platten bildet.

15. Feuersperre nach Anspruch 14, dadurch gekennzeichnet, daß die Dichtwände eine Mehrzahl von Dichtplatten, die je eine enge Passung mit dem Umfang einer zugehörigen Platte bilden, sowie eine Mehrzahl von zwischengeschichteten Abstandsplatten umfassen, die sich zwischen die Platten erstrecken.

16. Feuersperre nach Anspruch 13, dadurch gekennzeichnet, daß die Dichtwände einen bogenförmigen Wandabschnitt, der eine enge Dichtpassung mit den Umfängen der Platten bildet, sowie einen vorspringenden Wandabschnitt umfassen, der sich über die äußersten Platten erstreckt.

17. Feuersperre nach einem der Ansprüche 1 bis 12, dadurch gekennzeichnet, daß der Gasstrom so ausgerichtet ist, daß er über die Platten und entlang eines Innendurchgangs fließt, der durch Öffnungen in den Platten definiert ist.

18. Feuersperre nach Anspruch 17 unter Rückbeziehung auf einen der Ansprüche 3 bis 9, dadurch gekennzeichnet, daß sich die Wischermittel von dem Durchgang zwischen den Platten nach außen erstrecken.

19. Feuersperre nach Anspruch 17 oder 18, dadurch gekennzeichnet, daß der Durchgang koaxial zur Drehachse der Platten angeordnet ist.

20. Feuersperre nach einem der Ansprüche 17 bis 19, dadurch gekennzeichnet, daß die Platten rund um ihren Außenumfang zusammengestiftet sind, wobei die Wischermittel kurz vor dem Umfang abgeschnitten sind.

21. Feuersperre nach Anspruch 17 oder 18, dadurch gekennzeichnet, daß die Platten Umfangsflansche aufweisen, durch die hindurch sie zusammengestiftet sind.

22. Feuersperre nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Wischermittel aus rostfreiem Stahl oder einer Kupferlegierung hergestellt sind.

23. Feuersperre nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Platten aus rostfreiem Stahl hergestellt sind.

Revendications

1. Dispositif pare-flamme comprenant un boîtier (41), plusieurs plateaux espacés en substance parallèlement (10) délimitant des passages pour du gaz dans le boîtier, et des moyens de raclage (18) prévus pour enlever des dépôts entre les plateaux, caractérisé en ce que les plateaux sont prévus pour tourner autour d'un axe (14) afin de se déplacer par rapport aux moyens de raclage pour éliminer les dépôts.

2. Dispositif pare-flamme suivant la revendication 1, dans lequel les moyens de raclage sont fixés de manière à ne pas tourner.

3. Dispositif pare-flamme suivant la revendication

1 ou 2, dans lequel les moyens de raclage sont constitués par une pluralité de lames (18) insérées entre les plateaux.

4. Dispositif pare-flamme suivant la revendication 3, dans lequel les lames sont montées sur une colonnette de support (26) fixée par rapport au boîtier.

5. Dispositif pare-flamme suivant la revendication 4, dans lequel les lames sont mobiles le long de la colonnette de support d'une manière autoréglable dans les passages.

6. Dispositif pare-flamme suivant la revendication 3, 4 ou 5, dans lequel les lames sont fixées à l'extérieur de la périphérie des plateaux.

7. Dispositif pare-flamme suivant l'une quelconque des revendications 3 à 6, dans lequel le bord antérieur (23) de chaque lame, par rapport à la rotation des plateaux, est à même de refouler des dépôts raclés radialement vers l'intérieur ou vers l'extérieur.

8. Dispositif pare-flamme suivant la revendication 7, dans lequel le bord antérieur s'étend en substance vers l'axe de rotation des plateaux.

9. Dispositif pare-flamme suivant l'une quelconque des revendications 3 à 9, dans lequel la lame va en s'effilant.

10. Dispositif pare-flamme suivant l'une quelconque des revendications précédentes, dans lequel les plateaux sont espacés par des bossages prévus sur chacun d'eux.

11. Dispositif pare-flamme suivant la revendication 10, dans lequel les bossages sont décalés angulairement en quinconce entre des plateaux adjacents.

12. Dispositif pare-flamme suivant l'une quelconque des revendications précédentes, dans lequel les moyens de raclage sont prévus du côté aval de l'axe de rotation des plateaux.

13. Dispositif pare-flamme suivant l'une quelconque des revendications précédentes, dans lequel le boîtier comprend des parois d'étanchéité (27, 36) coopérant avec les bords des plateaux pour entraîner le gaz en vue de le faire passer sur les plateaux.

14. Dispositif pare-flamme suivant la revendication 13, dans lequel la paroi d'étanchéité comprend des dents (27A) formant une structure de peigne s'étendant entre les plateaux, la paroi (27) entre les dents étant étroitement ajustée de manière étanche avec les plateaux.

15. Dispositif pare-flamme suivant la revendication 14, dans lequel les parois d'étanchéité comprennent plusieurs plaques d'étanchéité, chacune étroitement ajustée à l'égard de la périphérie d'un plateau correspondant et plusieurs plaques d'espacement intercalaires qui s'étendent entre les plateaux.

16. Dispositif pare-flamme suivant la revendication 13, dans lequel les parois d'étanchéité comprennent une partie de paroi courbe étroitement ajustée de manière étanche à l'égard des périphéries des plateaux et une partie de paroi saillante qui s'étend au-dessus des plateaux extérieurs extrêmes.

17. Dispositif pare-flamme suivant l'une quelconque des revendications 1 à 12, dans lequel le flux de gaz passe sur les plateaux le long d'un passage interne défini par des ouvertures dans les plateaux.

18. Dispositif pare-flamme suivant la revendication 17, découlant de l'une quelconque des revendications 3 à 9, dans lequel les moyens de raclage s'étendent vers l'extérieur à partir du passage entre les plateaux.

19. Dispositif pare-flamme suivant la revendication 17 ou 18, dans lequel le passage est coaxial à l'axe de rotation des plateaux.

20. Dispositif pare-flamme suivant l'une quelconque des revendications 17 à 19, dans lequel les plateaux sont chevillés l'un à l'autre autour de leur périphérie extérieure, les moyens de raclage étant tronqués à courte distance de la périphérie.

21. Dispositif pare-flamme suivant la revendication 17 ou 18, dans lequel les plateaux sont pourvus d'ailes périphériques par l'intermédiaire desquels ils sont chevillés l'un à l'autre.

22. Dispositif pare-flamme suivant l'une quelconque des revendications précédentes, dans lequel les moyens de raclage sont en acier inoxydable ou en un alliage à base de cuivre.

23. Dispositif pare-flamme suivant l'une quelconque des revendications précédentes, dans lequel les plateaux sont en acier inoxydable.

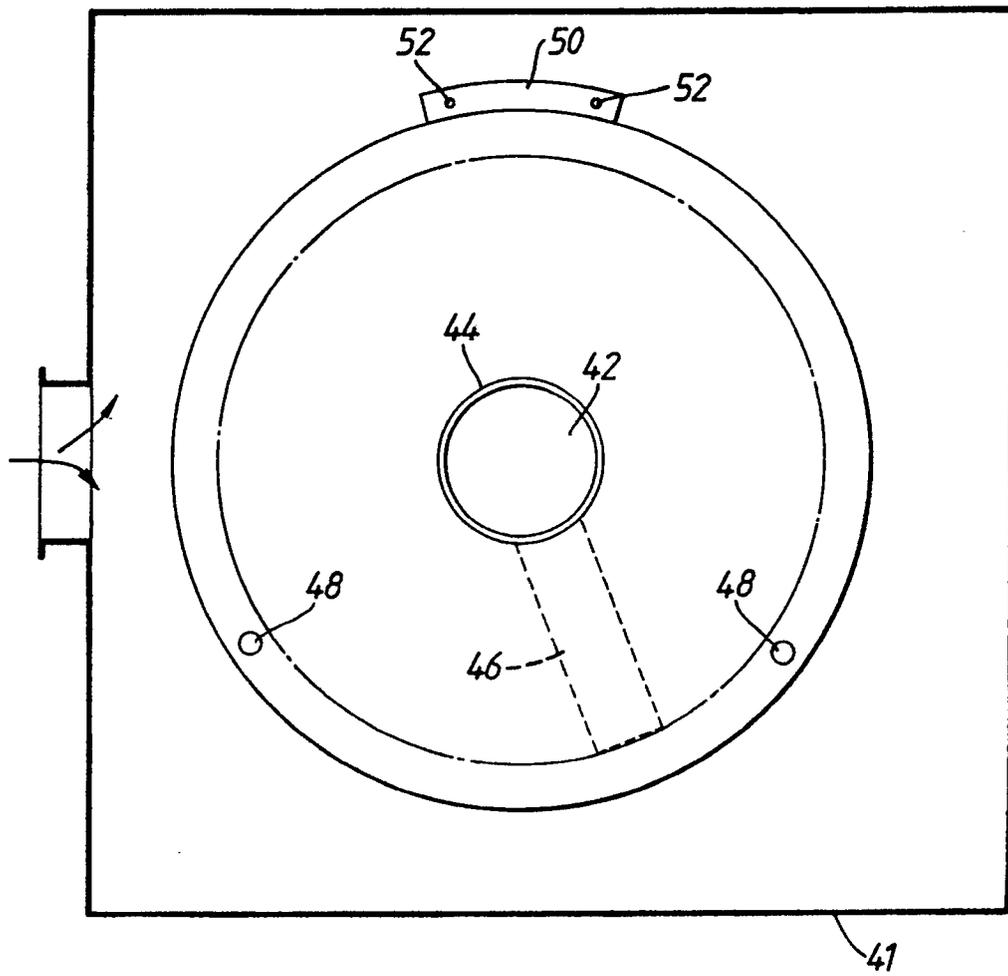


Fig. 4.