



(11) **EP 2 536 856 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
02.04.2014 Bulletin 2014/14

(51) Int Cl.:
C21B 7/20 (2006.01) **F27D 3/10** (2006.01)
F27D 99/00 (2010.01) **F27B 1/20** (2006.01)

(21) Application number: **11705671.3**

(86) International application number:
PCT/GB2011/050287

(22) Date of filing: **15.02.2011**

(87) International publication number:
WO 2011/098841 (18.08.2011 Gazette 2011/33)

(54) **PROTECTION SHIELD FOR CHARGING SYSTEM**

SCHUTZSCHILD FÜR EIN LADESYSTEM

BLINDAGE DE PROTECTION POUR SYSTÈME DE CHARGEMENT

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **15.02.2010 GB 201002432**

(43) Date of publication of application:
26.12.2012 Bulletin 2012/52

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Description

[0001] This invention is directed to devices for distributing charging material into an enclosure, and in particular to shielding devices for furnace charging systems.

[0002] Systems for charging reaction enclosures, such as blast furnaces, are known. It is known that, when charging such enclosures, it is desirable to distribute the charging material evenly or according to a chosen pattern. To this end, charging arrangements are known in which material is directed into the blast furnace via a movable spout. Figure 1 illustrates such a previously considered system, a movable charging spout mounted on a gimbal suspension system. The movable spout allows distribution of material evenly inside the enclosure, such as a blast furnace or similar reactor.

[0003] Such charging systems are required to function in an extremely arduous environment, with, for example, high concentrations of extremely erosive dust, constant high temperatures, and/or regular extreme temperature excursions. The nature of such a charging system requires that moving parts of the system have to be exposed to these conditions. In cases of high operating temperature and regular rapid temperature increases, distortion of metallic structures is very problematic.

[0004] Other previously considered distribution methods operating in a different way to the gimbal-top system above have relied on traditional refractory type coverings, attempting to minimise exposed machinery, and grease purging systems. However, these can be inefficient regarding the prevention of heat or dust excursions. Moreover, as these work in a different way from the gimbal-top system, they do not afford the advantages of a simple, compact and easily controlled distribution system which provides an even distribution of material into the enclosure.

[0005] Aspects and embodiments of the invention are set out in the accompanying claims.

[0006] In general terms, one embodiment of a first aspect of the invention can provide a device for distributing charging material into a furnace or reactor enclosure, comprising: a charging chute for directing material into the enclosure, said chute being movable relative to the enclosure throughout a distribution trajectory; a housing defining an aperture, the aperture receiving the chute, and the chute and the housing defining at least one excursion channel from the enclosure; and a chute shielding means, wherein the chute shielding means comprises a plurality of shielding elements arranged to block the excursion channel such that at any given point in the trajectory of the chute, at least one of said elements spans a portion of the excursion channel; wherein said elements are configured such that, on movement of the chute throughout the distribution trajectory, outer edges of the elements trace the outline of a shielding volume, wherein said elements are configured such that said shielding volume abuts an inner edge of the aperture in the housing, wherein the chute is moveable in at least

two dimensions relative to the enclosure, wherein said elements are configured such that said shielding volume is spheroid, and wherein the shielding elements are configured to minimise the distance between a diameter of a shielding element through the chute between outer edges of the element; and a diameter of the aperture.

[0007] Such a device can provide protection against excursion of heat and/or dust from a furnace or reactor, whilst allowing the chute to function throughout a distribution path or trajectory. The system can therefore maintain reliable function of an even distribution charging system despite the demanding environment.

[0008] Preferably, the chute is moveable in three dimensions relative to the enclosure.

[0009] Suitably, the shielding elements comprise shielding blades. Preferably, the blades are mounted on the charging chute.

[0010] This allows a minimal annular gap between the shield parts to be maintained during operation. This configuration of elements for the shielding means provides the advantage that distortion of the elements has a minimal effect on the operation of the shield.

[0011] Preferably, the elements are flexible. This allows distortion of the elements without impeding the movement of the chute.

[0012] Suitably, a single blade of the plurality of shielding elements comprises an annular ring around the chute. In one embodiment, the blade is aligned with a plane perpendicular to an axis of the chute.

[0013] In one embodiment, the device comprises barrier means for preventing excursion between the elements of the shielding means, such as ceramic wool infill disposed between the elements.

[0014] In another embodiment, the device further comprises means for supplying a fluid coolant between the elements and the housing opposing excursion from the enclosure. This provides cooling, purges dust, and maintains a positive pressure of cool gas in the housing.

[0015] One embodiment of a second aspect of the invention can provide a shielding device for a furnace or reactor enclosure charging system, the system comprising a charging chute for directing material into the enclosure, said chute being movable relative to the enclosure throughout a distribution trajectory, and a housing defining an aperture, the aperture receiving the chute, and the chute and the housing defining at least one excursion channel from the enclosure, the shielding device comprising a plurality of shielding elements, said elements configured to block the excursion channel of the charging system such that at any given point in the trajectory of the chute, at least one of said elements spans a portion of the excursion channel.

[0016] The above aspects and embodiments may be combined to provide further aspects and embodiments of the invention.

[0017] The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a diagram illustrating a previously considered movable chute system; and

Figures 2 to 5 are diagrams illustrating a movable chute and shield according to an embodiment of the invention.

Figure 2 illustrates a section through a device (100) for distributing charging material, such as coal, into a furnace or reactor enclosure. The charging material may be any such fuel material, or material to take part in or aid the reaction or melting to occur in the enclosure. The enclosure may be any type of furnace of reactor, such as a shaft or metallurgical aggregate reactor, a blast furnace, a melter gasifier, or a reduction shaft, or similar.

[0018] The device (100) has a chute (104) for directing the charging material into the enclosure. In this embodiment, the chute is of a frusto-conical profile in two sections, the lower of the two having a greater gradient and thus imparting a greater angular change to the momentum of charging material falling through the chute. In alternative embodiments, the chute may be in a single section, with a different shape, for example straight-sided, or a continuous curve again imparting an angular change.

[0019] As shown in Figure 3, the chute (104) can be moved relative to the enclosure, in order to direct the charging material to a different section of the enclosure. The chute can be moved throughout a trajectory or path which can provide a comprehensive coverage of the inside of the enclosure. For example, using a gimbal-top system such as that illustrated in Figure 1, or as described in EP 1662009, the tip of the chute can be moved to any point within a circular area target range limited by the furthest extent of movement of the two tilting concentric rings. The tilted movement shown between Figures 2 and 3 can thus be repeated in any direction around the chute (104). Note that the Figures omit the upper parts of the housing for clarity; the portion of the aperture 110A which appears to be left open at the extreme angle of the chute shown in Figures 3 and 5, is actually blocked by parts of the upper housing, indicated for example by dotted line 110B.

[0020] The device includes a housing (102) for the chute (104), within which the chute is allowed to move. The housing, which can be mounted on the furnace or reactor, provides at a lower end an aperture (110), for example a circular aperture as shown in Figures 2 to 5, through which the chute (104) protrudes, thus providing access for charging material through the upper housing (not shown), through the chute (inside the aperture) and into the enclosure.

[0021] The housing (102) and the chute (104) therefore define between them an excursion channel (112) from the enclosure. In the embodiment shown in Figures 2 and 3, the gap between the housing 102 (defining the circular aperture 110) and the outside of the chute 104

is the excursion channel, that is, a channel through which dust and heat could be released from the enclosure, into the housing or mounting above. In this embodiment, the excursion channel is therefore a cylindrical path around the chute, between the chute and the housing.

[0022] The device provides a chute shielding means (106, 108) to prevent such heat and dust excursions. In this embodiment, the shield has a plurality of shielding elements (108), formed as blades mounted on a shield (106) encircling the upper part of the chute 104.

[0023] As can be seen in the embodiment illustrated in Figures 4 and 5, the shield (106) itself has a frusto-conical profile, enveloping the upper portion of the chute 104. This upper portion of the chute having the shield, is that portion of the chute which moves within, and into and out of the housing during movement of the chute through the distribution trajectory, as can be seen from Figures 2 to 5.

[0024] This shield 106 provides some protection for the housing, narrowing the excursion channel 112 to protect against heat and dust exiting the enclosure. However, the shield is limited in this extent, as it must still allow the full range of movement of the chute (104) throughout its trajectory. In order to further narrow or block the excursion channel, the shield 106 would have to have a near perfect spheroid profile, in order to be as close as possible to the inside edge of the housing 102 at each position of the chute, whilst still permitting movement of the chute into and out of the aperture (as in Figure 3).

[0025] Such a shield would be extremely difficult, and thus expensive, to produce, and any slight distortion of the shield under the arduous conditions of the furnace or reactor would cause a reduction in performance and likely damage to itself and surrounding parts, requiring an expensive and lengthy shutdown for repair.

[0026] The shielding means therefore provides a number of shielding elements, in this embodiment in the form of blades (108) mounted on the shield 106, the blades arranged such that at any given point in the trajectory of the chute 104, at least one of the blades spans a portion of the excursion channel 112.

[0027] As shown in Figures 2 to 5, the blades 108 in this embodiment are mounted on the shield 106, and protrude outwardly from the shield, at an angle roughly perpendicular to the axis of the chute 104. The blades are arranged in parallel at intervals along the vertical extent of the shield, and are formed as annular rings around the shield. In the neutral position shown in Figure 2 (with the chute pointing straight down), the blade rings are aligned with planes perpendicular to the axis of the chute.

[0028] As can be seen from Figure 2, in this neutral position, there is at least one blade blocking the excursion channel 112; at least one of the annular blades spans the distance between the chute and the housing. In this position, one blade can provide the entire blocking effect, as the annulus of the blade is aligned with the annular opening of the housing, thus blocking the cylindrical excursion channel. In fact, in this position, several of the

blades may provide the same or similar blocking effect.

[0029] As the chute is moved, for example to a position such as shown in Figure 3, the outer edges of the blades trace a spheroid profile, following the inside edges of the housing 102, such that at each position there is always at least one blade blocking the excursion channel. For example, in Figure 3, the lowest sets of blades on the left hand side of the chute (the side moved up into the aperture by the swing to the left) are providing the blocking effect, moving along or close to the housing 102. The upper blades on the left in Figure 3 are now inside the housing, and away from the inner edge of the aperture 110 in the housing.

[0030] It can be seen that when the chute 104 is angled (as opposed to in the neutral position in Figure 2), on one side more of the upper shield is exposed to the enclosure, and the higher blades provide the blocking effect; on the other side the lower part is exposed, and the lower blades provide the blocking effect. In between these two sides, either of these and/or the intermediate blades provide the blocking effect.

[0031] This arrangement has the advantage that any distortion of the blades should not result in the shield/chute system being impeded during movement. This is because any warping of the blades will be unlikely to result in a blade protruding beyond the spheroid profile which traces the inner edges of the housing 102. This in turn is due in part to the blades having as little surface area as possible tracing that arc or profile; only the tip of each blade comes close to contacting the housing. It is also due to the blades being essentially perpendicular to the imagined line of the spheroid trajectory.

[0032] In contrast, a perfectly spherical shield as described above, would likely distort in a fashion producing a bend in the material which would protrude beyond this imagined spheroid path. This would in part be due to the shield effectively having all of its surface area along the spheroid path.

[0033] One aim of the device according to this embodiment is to minimise the gap between any one shielding element and the housing aperture. This is done by plotting the distribution trajectory spheroid, fitting this as closely as possible inside the housing aperture (the cylindrical excursion channel), and sizing and placing the blades on the shielding means so as to define this spheroid fitting inside the aperture. Typically, the clearance between blade tips and housing can be initially set between 10 and 15mm.

[0034] The shielding elements may also be of a sufficiently flexible material that if a particular element does contact the housing 102, rather than impeding the chute, the element will flex, or pivot on its mounting on the shield, to allow passage of that portion of the shielding means past the housing. This allows for any differences in tolerance in manufacture, or any distortion in the system caused by heat, permitting the chute to move freely despite any flaws, and helping to ensure maintenance requirements are kept to a minimum. The material can be

a different grade of metal as compared to the shield, or a composite material.

[0035] The shielding elements may be of any type providing the advantages described; for example, rather than a set of single ring blades, the elements could be formed of a corrugation of rings along the vertical extent of the shield 106, the outer edges of the corrugations forming blades. The elements can also be formed of a series of ribs of generally semi-circular section, along the vertical extent of the shield.

[0036] The formation of the elements themselves can be altered, for example a single spiral blade can be used instead of a series of annular rings of blades. The shield (106) could also be replaced, for example by a corrugated, undulating or ribbed sheet, providing the shield and shielding elements/blades in one piece of material. For this of course, the sheet would have to be attached to the chute.

[0037] In the specific embodiment, the blades 108 can be set at different angles from those shown in Figures 2 to 5. For example, rather than the annular blades being essentially parallel to a plane, the blades can be set to fan out in a more radial fashion from the shield, the relevant angles preserving the spheroid profile to be traced by the edges of the blades. Some of the blades would thus be of a more skirt-like profile, than a flat blade essentially in a single plane. In this formation, each blade can be set to be strictly perpendicular to the particular portion of the chute shielding means that blade is mounted on.

[0038] In an alternative embodiment, the shielding elements can be mounted on the housing instead of the chute itself. The elements would essentially follow the same configuration, but would be slightly larger in overall diameter, and have an outer edge mounted on the housing, rather than an inner edge mounted on the chute. This embodiment would provide the same advantages of any distortion of the element not resulting in the chute being impeded.

[0039] The shielding system could be applied equally well to more limited distribution systems. For example, with a chute restricted only to a swinging movement in one plane (for example, only the range of movements indicated by Figures 2 and 3, in one plane), the shield blades could be mounted on either side of a chute, rather than as full rings or skirts. The blades would nevertheless block any excursion channel either side of the chute, as the chute moved through the simple arc trajectory.

[0040] The shield and shielding elements can be formed from any appropriate material, such as a metal or composite. The material may be chosen to allow a particular degree of flexibility for the elements, as described above.

[0041] The shield 106 may also incorporate vertical ribs (not shown) in order to further block any excursion from the enclosure. For example, when in the specific embodiment the chute 104 is at an angle, the blades (108) will also be angled, and some heat or dust may be

permitted along the underside of the blade which is currently providing the blocking effect, and up towards the upper housing. A rib positioned vertically connecting the blades therefore prevents this excursion.

[0042] In order to further protect the upper housing, heat resistant packing (not shown) can be disposed on the shield 106 interspaced between or complimentary to the shield elements 108. This heat resistant infill can be of any known type, such as ceramic wool. In the embodiment, the infill closes any further gap between the blades which might allow excursion of heat or dust into the upper housing, whilst still being flexible enough to allow the blades to flex if necessary. The infill can be used in combination with, or instead of the vertical ribs described above.

[0043] For further heat or dust protection, a nitrogen cooling system (not shown) using a 'curtain' effect over the shield 106 and moving parts provides cooling, purges dust, and maintains a positive pressure of cool gas in the housing.

[0044] The shielding system described above may be retrofitted, for example to a chute already employed in a furnace or reactor. In this embodiment, the shield 106 with blades 108 would be mounted on the chute. In the case of a shield 106 already present, the blades 108 could simply be mounted on the shield 106.

[0045] It will be appreciated by those skilled in the art that the invention has been described by way of example only, and that a variety of alternative approaches may be adopted without departing from the scope of the invention, as defined by the appended claims.

Claims

1. A device (100) for distributing charging material into a furnace or reactor enclosure, comprising:

a charging chute (104) for directing material into the enclosure, said chute being movable relative to the enclosure throughout a distribution trajectory;

a housing (102) defining an aperture (110), the aperture receiving the chute, and the chute and the housing defining at least one excursion channel (112) from the enclosure; and

a chute shielding means (106, 108), wherein the chute shielding means comprises a plurality of shielding elements arranged to block the excursion channel (112) such that at any given point in the trajectory of the chute, at least one of said elements spans a portion of the excursion channel,

wherein said elements are configured such that, on movement of the chute throughout the distribution trajectory, outer edges of the elements trace the outline of a shielding volume, wherein said elements are configured such that

said shielding volume abuts an inner edge of the aperture in the housing,

wherein the chute (104) is moveable in at least two dimensions relative to the enclosure, wherein said elements are configured such that said shielding volume is spheroid, and wherein the shielding elements are configured to minimise the distance between a diameter of a shielding element through the chute (104) between outer edges of the element; and a diameter of the aperture (110).

2. A device according to Claim 1, wherein the shielding elements comprise shielding blades.

3. A device according to Claim 2, wherein the blades are mounted on the charging chute (104).

4. A device according to any preceding claim, wherein the elements are flexible.

5. A device according to any of the Claims 2 to 4, wherein a single blade of the plurality of shielding elements comprises an annular ring around the chute (104).

6. A device according to Claim 5, wherein the blade is aligned with a plane perpendicular to an axis of the chute (104).

7. A device according to any preceding claim, further comprising barrier means for preventing excursion between the elements of the shielding means (106, 108).

8. A device according to Claim 7, wherein the barrier means comprises a ceramic wool infill disposed between the elements.

9. A device according to any preceding claim, further comprising means for supplying a gas coolant between the elements and the housing (102) opposing excursion from the enclosure.

10. A shielding device (100) for a furnace or reactor enclosure charging system, the system comprising a charging chute (104) for directing material into the enclosure, said chute being movable relative to the enclosure throughout a distribution trajectory, and a housing (102) defining an aperture, the aperture receiving the chute, and the chute and the housing defining at least one excursion channel (112) from the enclosure, the shielding device comprising:

a plurality of shielding elements (106, 108), said elements configured to block the excursion channel of the charging system such that at any given point in the trajectory of the chute, at least

one of said elements spans a portion of the excursion channel (112),
 wherein said elements are configured such that, on movement of the chute (104) throughout the distribution trajectory, outer edges of the elements trace the outline of a shielding volume, and wherein said elements are configured such that said shielding volume abuts an inner edge of the aperture in the housing (102).

Patentansprüche

1. Vorrichtung (100) zum Verteilen von Beschickungsmaterial in einer Ofen- oder Reaktoreinhausung, welche umfasst:

eine Beschickungsrinne (104) zum Lenken von Material in die Einhausung, wobei diese Rinne entlang einer Verteilungstrajektorie relativ zu der Einhausung beweglich ist;
 ein Gehäuse (102), das eine Öffnung (110) definiert, wobei die Öffnung die Rinne aufnimmt und die Rinne und das Gehäuse mindestens einen Austrittskanal (112) aus der Einhausung definieren; und
 ein Rinnenabschirmmittel (106, 108), wobei das Rinnenabschirmmittel mehrere Abschirmelemente umfasst, die dafür eingerichtet sind, den Austrittskanal (112) zu versperren, derart, dass an einem beliebigen gegebenen Punkt der Trajektorie der Rinne mindestens eines von diesen Elementen einen Abschnitt des Austrittskanals überspannt, wobei diese Elemente derart gestaltet sind, dass bei einer Bewegung der Rinne entlang der Verteilungstrajektorie äußere Ränder der Elemente die Umrisslinie eines Abschirmvolumens beschreiben, wobei diese Elemente derart gestaltet sind, dass das Abschirmvolumen an einen Innenrand der Öffnung in dem Gehäuse anstößt, wobei die Rinne (104) in mindestens zwei Dimensionen relativ zu der Einhausung beweglich ist, wobei die Elemente derart gestaltet sind, dass das Abschirmvolumen kugelförmig ist, und wobei die Abschirmelemente derart gestaltet sind, dass der Abstand zwischen einem Durchmesser eines Abschirmelements durch die Rinne (104) hindurch zwischen Außenrändern des Elements und einem Durchmesser der Öffnung (110) minimiert wird.

2. Vorrichtung nach Anspruch 1, wobei die Abschirmelemente Abschirmblätter umfassen.

3. Vorrichtung nach Anspruch 2, wobei die Blätter an

der Beschickungsrinne (104) angebracht sind.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die Elemente flexibel sind.

5. Vorrichtung nach einem der Ansprüche 2 bis 4, wobei ein einzelnes Blatt der mehreren Abschirmelemente einen kreisförmigen Ring um die Rinne (104) herum umfasst.

6. Vorrichtung nach Anspruch 5, wobei das Blatt in einer Ebene ausgerichtet ist, die zu einer Achse der Rinne (104) senkrecht ist.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, welche ferner Barrieremittel zum Verhindern eines Austritts zwischen den Elementen der Abschirmmittel (106, 108) umfasst.

8. Vorrichtung nach Anspruch 7, wobei die Barrieremittel eine Keramikwolle-Einfüllung umfassen, die zwischen den Elementen angeordnet ist.

9. Vorrichtung nach einem der vorhergehenden Ansprüche, welche ferner Mittel zum Zuführen eines Kühlgases zwischen den Elementen und dem Gehäuse (102) umfasst, das einem Austritt aus der Einhausung entgegenwirkt.

10. Abschirmvorrichtung (100) für ein Ofen- oder Reaktoreinhausungs-Beschickungssystem, wobei das System eine Beschickungsrinne (104) zum Lenken von Material in die Einhausung, wobei diese Rinne entlang einer Verteilungstrajektorie relativ zu der Einhausung beweglich ist, und ein Gehäuse (102), das eine Öffnung definiert, wobei die Öffnung die Rinne aufnimmt und die Rinne und das Gehäuse mindestens einen Austrittskanal (112) aus der Einhausung definieren, umfasst, wobei die Abschirmvorrichtung umfasst:

mehrere Abschirmelemente (106, 108), wobei diese Elemente so gestaltet sind, dass sie den Austrittskanal des Beschickungssystems versperren, derart, dass an einem beliebigen gegebenen Punkt der Trajektorie der Rinne mindestens eines von diesen Elementen einen Abschnitt des Austrittskanals (112) überspannt, wobei diese Elemente derart gestaltet sind, dass bei einer Bewegung der Rinne (104) entlang der Verteilungstrajektorie äußere Ränder der Elemente die Umrisslinie eines Abschirmvolumens beschreiben, und wobei diese Elemente derart gestaltet sind, dass das Abschirmvolumen an einen Innenrand der Öffnung in dem Gehäuse (102) anstößt.

Revendications

1. Dispositif (100) permettant de distribuer un matériau de chargement dans l'enceinte d'un four ou d'un réacteur, comprenant :

une goulotte de chargement (104) pour diriger un matériau dans l'enceinte, ladite goulotte étant mobile par rapport à l'enceinte sur toute une trajectoire de distribution ;
un bâti (102) définissant une ouverture (110), l'ouverture recevant la goulotte, et la goulotte et le bâti définissant au moins une voie d'échappement (112) à partir de l'enceinte, et
un moyen de blindage de goulotte (106, 108), étant entendu que le moyen de blindage de goulotte comprend une pluralité d'éléments de blindage agencés pour obturer la voie d'échappement (112) de telle sorte qu'en un point donné quelconque de la trajectoire de la goulotte, au moins l'un desdits éléments s'étend sur une partie de la voie d'échappement, étant entendu que lesdits éléments sont configurés de telle sorte que, quand la goulotte se déplace sur toute la trajectoire de distribution, les bords externes des éléments tracent le contour d'un volume de blindage, étant entendu que lesdits éléments sont configurés de telle sorte que ledit volume de blindage s'aboute contre un bord interne de l'ouverture du bâti, étant entendu que la goulotte (104) est mobile dans au moins deux dimensions par rapport à l'enceinte, étant entendu que lesdits éléments sont configurés de telle sorte que ledit volume de blindage est sphéroïde, et étant entendu que les éléments de blindage sont configurés pour ramener à un minimum la distance entre un diamètre d'un élément de blindage, mesuré en travers de la goulotte (104) entre les bords externes de l'élément, et un diamètre de l'ouverture (110).

2. Dispositif selon la revendication 1, dans lequel les éléments de blindage comprennent des lames de blindage.
3. Dispositif selon la revendication 2, dans lequel les lames sont montées sur la goulotte de chargement (104).
4. Dispositif selon l'une quelconque des revendications précédentes, dans lequel les éléments sont flexibles.
5. Dispositif selon l'une quelconque des revendications 2 à 4, dans lequel une lame individuelle de la pluralité

d'éléments consiste en une couronne annulaire entourant la goulotte (104).

6. Dispositif selon la revendication 5, dans lequel la lame est alignée sur un plan perpendiculaire à un axe de la goulotte (104).
7. Dispositif selon l'une quelconque des revendications précédentes, comprenant par ailleurs un moyen faisant écran servant à empêcher un échappement entre les éléments du moyen de blindage (106, 108).
8. Dispositif selon la revendication 7, dans lequel le moyen faisant écran consiste en un élément de remplissage en laine céramique disposé entre les éléments.
9. Dispositif selon l'une quelconque des revendications précédentes, comprenant par ailleurs un moyen pour amener entre les éléments et le bâti (102) un réfrigérant gazeux s'opposant à un échappement depuis l'enceinte.
10. Dispositif de blindage (100) pour le système de chargement d'une enceinte de four ou de réacteur, le système comprenant une goulotte de chargement (104) pour diriger un matériau dans l'enceinte, ladite goulotte étant mobile par rapport à l'enceinte sur toute une trajectoire de distribution, et un bâti (102) définissant une ouverture, l'ouverture recevant la goulotte, et la goulotte et le bâti définissant au moins une voie d'échappement (112) depuis l'enceinte, et le dispositif de blindage comprenant :

une pluralité d'éléments de blindage (106, 108), lesdits éléments étant configurés pour obturer la voie d'échappement du système de chargement de telle sorte qu'en un point donné quelconque de la trajectoire de la goulotte, au moins l'un desdits éléments s'étend sur une partie de la voie d'échappement (112), étant entendu que lesdits éléments sont configurés de telle sorte que, quand la goulotte (104) se déplace sur toute la trajectoire de distribution, les bords externes des éléments tracent le contour d'un volume de blindage, et étant entendu que lesdits éléments sont configurés de telle sorte que ledit volume de blindage s'aboute contre un bord interne de l'ouverture du bâti (102).

FIG 1

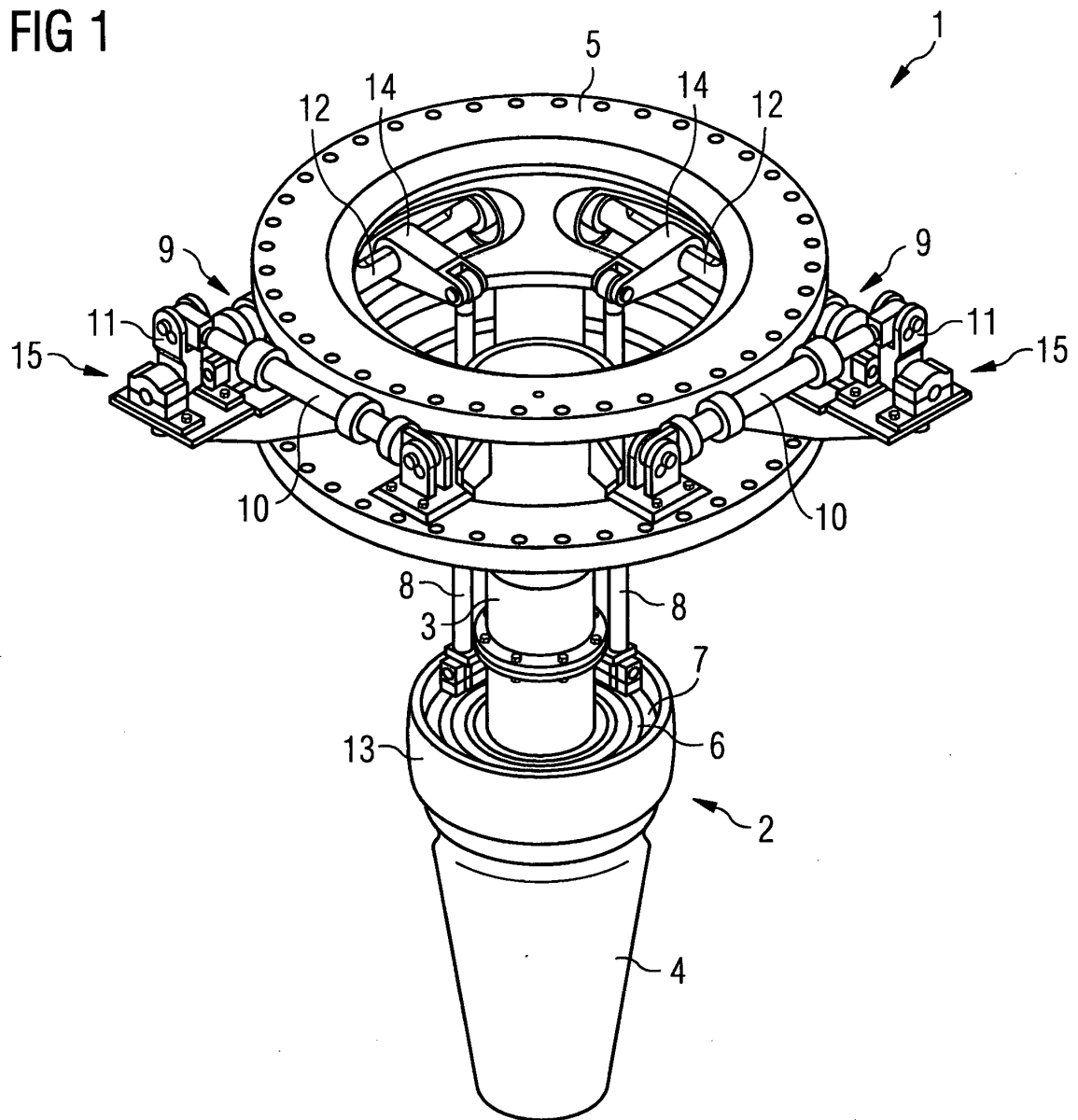


FIG 2

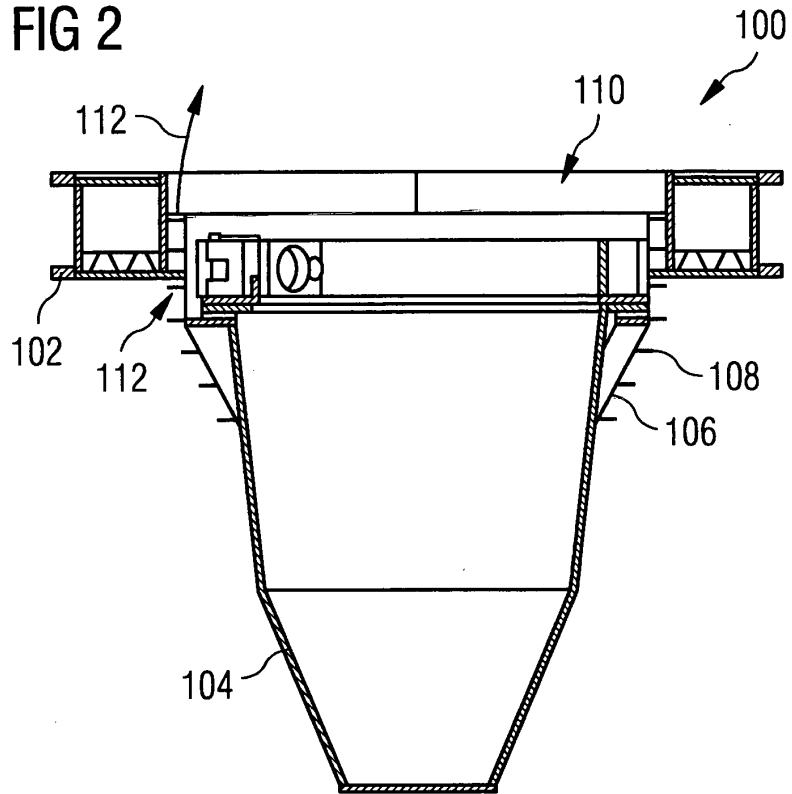


FIG 3

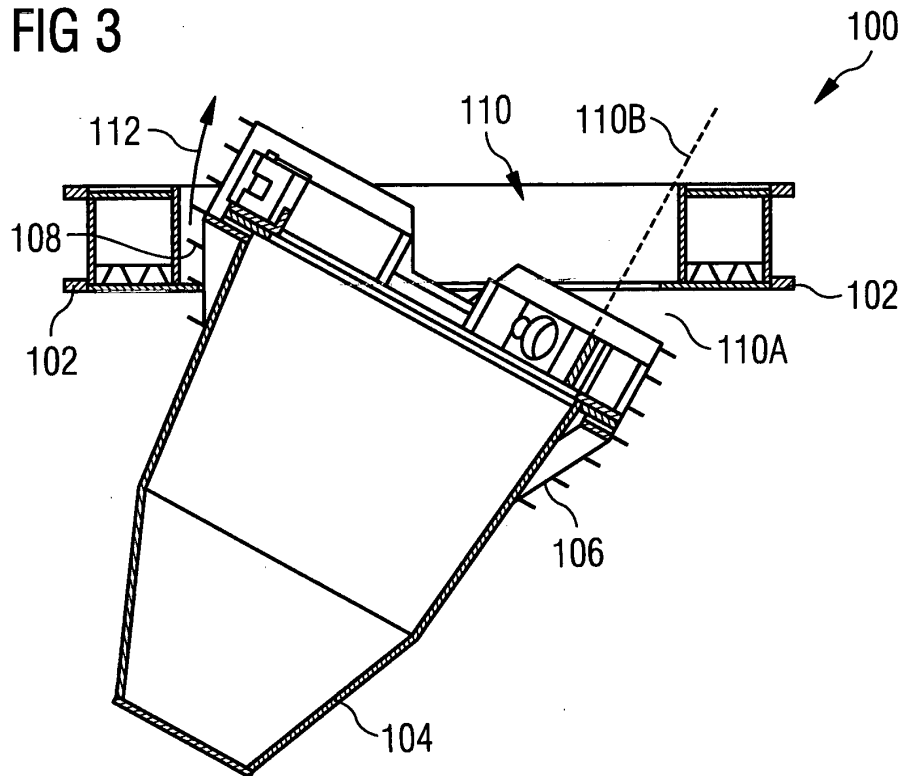


FIG 4

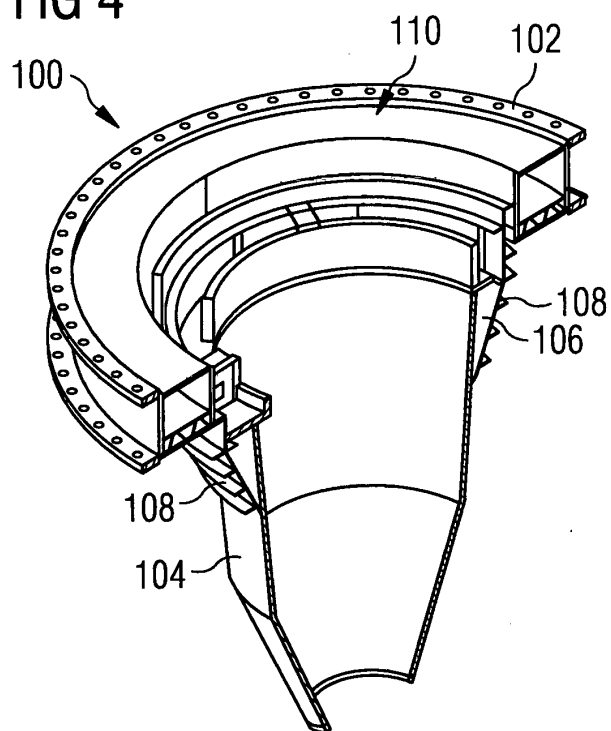
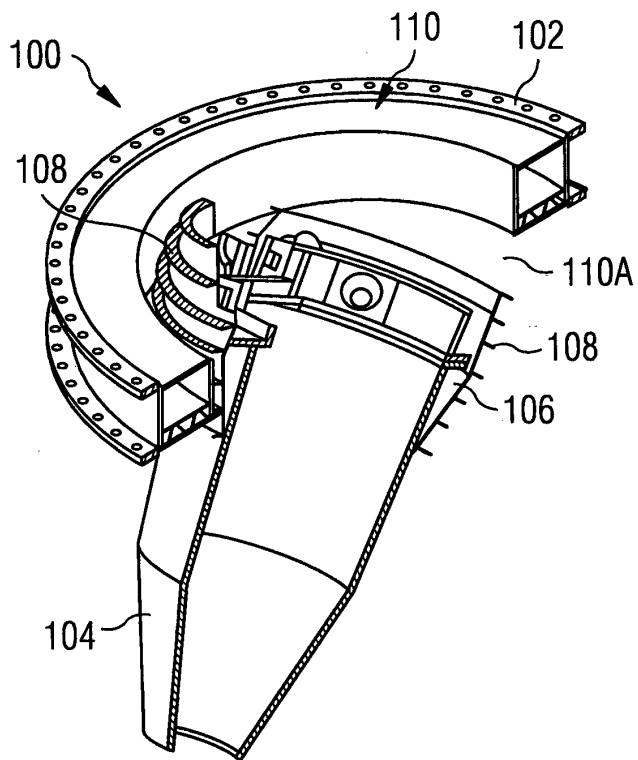


FIG 5



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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