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(54) **Ice-free discharge structure**

Eisbildungsfreier Abfuhraufbau

Structure d'évacuation sans formation de givre

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Description

[0001] The invention relates to a discharge structure for an outlet structure of a gas discharge apparatus, such as a heating system, in particular a heating boiler. The invention further relates to a so-called outlet structure for a closed gas appliance, comprising an air supply structure and a discharge structure according to the invention.

[0002] Outlet structures for open or closed gas appliances are known from patent literature. For this purpose reference can be made i.a. to European patent application 0.654.638 and European patent 0.418.976, both in the applicant's name.

[0003] Whenever damp discharge gasses, such as combustion gasses from a so-called high-efficiency boiler, or damp air, reach the outlet of the gas discharge pipe and beyond, condensate will occur on parts of the discharge structure located there, which parts, as a result of the ambient temperature, are colder than the discharged gas. As long as there is a question of condensate this does not necessarily constitute a problem. This can, however, be the case if the ambient temperature is so low, that the condensate freezes and ice accumulates or icicles are formed. These ice formations can prevent the discharge structure from operating properly, especially if they form an uninterrupted plate of ice. When it starts thawing and they loosen from the discharge structure they can damage the roof structure or constitute a hazard for people or objects below or nearby.

[0004] The screening means comprise a cover plate located downstream or above the outlet of the gas discharge pipe, which cover plate is arranged substantially perpendicular to the centre line of the discharge pipe. A suchlike cover plate is there to prevent a (fall) wind blowing directly into the gas discharge pipe and thus obstructing the discharge. Besides, the cover plate prevents birds from entering and too much rain coming in as well. Condensate takes place against the lower side of the cover plate. It will be possible for condensate drops to collect on the lower side and drip down. To aid this the lower side is often formed having a central lowest portion, to where the drops can flow along the lower side.

[0005] An outlet structure with a provision for collecting and returning condensate to inside ,parts of the outlet structure as described in the preamble of claim 1 is known from the Dutch patent application 94.00659. In one embodiment the discharge structure in that outlet structure is provided with a collecting dish, which has a circumference such that condensate drops from parts located therabove, especially the cover plate, are collected and which connects at its lower end in a water drop discharging fashion to the combustion gas discharge pipe. In this known discharge structure the intention is, among other things, to collect the water drops that have thus been led into the gas discharge pipe at

the bottom of the discharge gas pipe, so that from there they are conveyed to the sewer system, for example.

[0006] It can happen that the discharge structure is inclined such that the intended lowest portion of the plate is in fact no longer the lowest portion thereof, but instead edge areas of the plate, as a result of which the drops will collect there and fall downwards past the collecting dish, and consequently icicles will form on lower parts such as an air inlet hood or a roof tile, with all the adverse consequences that that entails.

[0007] The invention now aims at providing a discharge structure or an outlet structure of the kind described in the opening paragraph, with which an improved and thus safer removal and collection of condensate is possible, so that ice formation is virtually ruled out. To this end the invention provides a discharge structure as described in claim 1. Preferably the condensate guiding means comprise a number of circumferentially arranged bars or strips that surround the outlet and a downstream area thereof in radially outward direction and extend with a component in the pipe direction and that are in discharging liquid communication with the collecting means.

[0008] The condensate guiding means, in particular bars or strips, ensure interception, adhesion and guiding of the drops to the collecting means, irrespective of the shape of the cover plate, also if the discharge structure is inclined. As a result of adhesion forces the condensate drops will remain on the bars and will flow down along them to the collecting means, across through the gas flow. The bars can make even a lowest portion on the cover plate superfluous. So the plate can be formed in several different ways, for instance even with a concave lower side. The bars or strips moreover provide for guidance of the discharge gasses and also for wind interruption, so that in the case of hard wind drops are, to a large extent, prevented from being swept along and then landing at places outside the collecting means where ice formation then occurs.

[0009] Preferably the bars or strips are substantially vertically oriented. In addition it is preferable if the bars connect at their downstream end to a ring or dish, which may be integral with the cover plate so that they, too, form an integral part with the latter.

[0010] It is then especially advantageous if the said ring or dish is provided with radially inward notches or recesses between the bars connections. Thus it is realized that the connection of a bar with the ring, dish or plate will almost certainly, even if in an extremely slanting position, will form a lowest point for the plate, so that drops of condensate formed on the plate will flow off via the bars to the collecting means. Alternatively, or additionally, near the connection to the bars or strips the cover plate or ring can be provided on the lower side with discharge guiding formations, such as ridges.

[0011] The screening means can, in a manner known per se, comprise a wind shelter strip surrounding the outlet at a radial distance, the downstream edge of

which is located - in a vertical projection - within the outer circumference of the collecting means. A suchlike wind shelter strip can have the shape of a cylindrical band. Condensate that forms on the inside thereof and subsequently runs off will be collected by the collecting means and discharged via the aforementioned passing means to the gas discharge pipe.

[0012] There being present a suchlike wind strip, the bars or strips are radially outwardly spaced from the wind shelter strip. In this way a double discharge of condensate is provided. The run-off of the drops along the bars is not interrupted by horizontal parts such as a wind shelter strip. Moreover, a two-stage wind interruption is provided. In addition, with the same effect, a narrower (less high) wind shelter strip can be selected, whereby the condensate forming surface thereof will be reduced and the structure height can be restricted.

[0013] The invention will now be explained on the basis of an exemplary embodiment shown in the accompanying drawings in which:

figure 1 shows a part of the outlet structure including an exemplary embodiment of the discharge structure, shown in exploded view;

figure 2 shows the part of the outlet structure of figure 1, in assembled condition;

figure 3 shows a perspective view of the discharge structure of figure 1; and

figure 4 shows a cross section of the discharge structure of figure 1.

[0014] In figure 1 is shown an air supply hood 2, which is provided on its lower side with a main air supply to an air supply pipe 5 located therebelow for a closed gas appliance, also located therebelow, and is provided on the upper end with a surrounding wind shelter ring 3, which screens a secondary air pressure relief opening.

[0015] A gas discharge pipe 4, which also comes from the gas appliance and is concentrically located within the air supply pipe 5, reaches above the air supply hood 2.

[0016] Above the air supply hood 2 there is a condensate collection dish 6 with positioning ring 13 and outside that an inclined radially outwardly ascending and surrounding collection surface 11 and a surrounding upright outer edge 12. The dish 6 is further provided with a discharge pipe stub 21, which is coaxial with the ring 13 and has the same diameter. The pipe stub 21 is formed integrally with connecting webs 24 regularly spaced from each other in circumferential direction (fig. 4), which in this case are themselves formed integrally with the rest of the dish 6. The discharge pipe stub 21, the webs 24 and the collection surface 11 determine radial passages 26 for condensed water to the inside of the discharge pipe 4, which passages are aligned with

that surface 11.

[0017] Above that a discharge hood 7 is shown (vide also fig. 3), which is formed in one part and comprises as it were a horizontal and a vertical screen structure, the vertical screen structure being formed by vertical bars 18, which are separated from each other by vertical passages 19 and are connected to each other at the top by means of plate 8, which substantially serves as fall wind screen, and are connected to each other at the bottom by means of a surrounding flange 17, which is provided on the outside with a sharp clamping edge 23. The horizontal screen structure is formed by a wind shelter strip 20, which is at a radially inward distance from the bars 18 and located about and at a distance from the upper end of the discharge pipe stub 21 and the area located directly above there. The wind shelter strip 20 and the discharge pipe stub 21 define between them an axial annular space 10 (fig. 4). The wind shelter strip 20 is held in position by means of a number of vertical connecting webs 22 spaced from each other in circumferential direction, which are in this case formed integrally with the wind shelter strip 20 and the plate 8. In between the webs 22 there are gas discharge openings 25.

[0018] In figure 1 it can be seen the gas discharge pipe 4 is provided at its top end with an edge 9 with an enlarged diameter, in which the positioning ring 13 of dish 6 is received with a press fit. The inner surface of the positioning ring 13 will therefore be in line with the inner surface of the gas discharge pipe 4 (fig. 4).

[0019] The other parts of the outlet structure 1 according to the invention can also be positioned from above.

[0020] In doing that the hood 7 is positioned on top of the collecting dish 6. Fixing the hood 7 to the dish 6 takes place with the help of a press fit or by clamping (fig. 4), to which end the surrounding flange 17 with the downwardly inclined and outwardly extending clamping edge 23 engages in the inner surface of the upright edge 12 of collecting dish 6.

[0021] The outlet structure is thus assembled and takes on the appearance of figure 2 or 4. Upon assembly no screws are needed, nor is riveting necessary. The division in the various parts has the added advantage that the parts can be manufactured from the material most suited to their function, taking among other things the temperature load into consideration. It is important that the collecting dish 6 is made of condensate and temperature resistant material. Attention should be paid that the material used for the hood 7 is resistant to high temperatures, as well as being resistant to condensate and UV proof. Materials filled with glass can be dispensed with, whereby the hygroscopic effects linked to that will be absent.

[0022] As a consequence of the ambient temperature outside the hood the surfaces which are struck by the discharge gasses will be relatively cold and will thus form potential condensate surfaces. The most important of these are the inner surface of the wind shelter strip 20 and the lower surface of the plate 8. Condensate

formed and collected on the plate 8 will be able to drop down in the direction C under the influence of gravity. The condensate formed on the inner surface of the wind shelter strip 20 will flow downwards in the direction E and will then continue to drop downwards (direction K) through the annular gap between the wind shelter strip 20 and the discharge pipe stub 21 to land on the collecting surface 11. From there the condensate can then flow off in radially inward direction F and subsequently pass through the passages 26 and then drop or flow downwards in the pipe 4 in the direction J.

[0023] If the outlet structure is slanted the plate 8 will also be inclined, whereby the condensate drops will move outward along the lower surface to the lowest point (G), from where they would drop down outside the collecting dish 6 to then contribute to undesirable formation of ice on lower parts of the roof or of the outlet structure. In accordance with the invention, the hood 7 is provided on the outer circumference with vertical webs or bars 18. Condensate which runs down along the plate 8 in outward direction will arrive at the surface of a bar 18 via the lower surface of the plate 8, be deflected downward (H) under the influence of adhesion and gravitational force and then run off in the direction D, to finally fall from the lower end 14 thereof on the collection surface 11 and to be further drained off (F) in the manner described above. Transferring the condensate drops to the bars 18 is promoted further by the curved course or the extension with a radially outward component of the bars 18 near the connection to the plate 8, whereby in the vicinity of the connecting area between a bar 18 and the plate 8 a lowest point of the top end of the hood 7 is almost always formed. A usually used cover plate with a lowered centre is then no longer needed.

[0024] If condensate arrives on the outside of the bars 18 as a result of hard gusts of wind, it will be able to flow downwards along that outside and be collected in the surrounding, bowl-shaped space formed between the lower end 14 of the bars 18, the retaining edge 12 located at some radial outward distance therefrom and the flange 17. At the location of the openings 19 the bowl drains to the inside through the lower portion of these openings 19 (arrow I), so that the condensate too can fall on the collecting surface 11 and can be further drained in the manner described above.

Claims

1. Discharge structure for an outlet structure of a gas discharge apparatus, such as a heating system, in particular a heating boiler, comprising a gas discharge pipe (4), means (7) for screening the outlet of the gas discharge pipe (4) and means (6) for collecting condensation from the screening means, in which at least near the outlet of the gas discharge pipe means (9) are provided for guiding and passing

condensation from the collecting means (6) to the inside of the gas discharge pipe, the screening means (7) comprising a cover plate (8) placed above the outlet of the gas discharge pipe (4), and means (18) for guiding condensation from the cover plate (8) towards the collecting means (6), **characterized in that** said condensation guiding means (18) extending to the circumferential edge of the cover plate (8) and being directly connected to the circumferential edge of the cover plate.

2. Discharge structure according to claim 1, wherein said condensation guiding means (18) are formed integrally with said circumferential edge of the cover plate (8).
3. Discharge structure according to claim 1 or 2, wherein the condensation guiding means (18) comprise a number of circumferentially arranged, preferably substantially vertically oriented bars or strips (18) that surround the outlet and a downstream area thereof in radially outward direction and extend with a component in the pipe direction and that are in discharging liquid communication with the collecting means (6).
4. Discharge structure according to claim 3, wherein the bars or strips (18) form a basket structure (7) with the cover plate (8).
5. Discharge structure according to any one of the claims 1-4, wherein the condensation guiding means, in particular bars (18) connect at a downstream end to an end ring or end disk (8), which can be part of the cover plate.
6. Discharge structure according to claim 5, wherein the cover plate (8) or ring and the bars (18) form radially inward notches or recesses in the connecting area thereof or in the vicinity, wherein the guide means extend near the cover plate with at least a component in radial outward direction.
7. Discharge structure according to claim 5 or 6, wherein the bars or strips (18) are with their upstream end spaced from and located above the collecting means (6).
8. Discharge structure according to claim 5, 6 or 7, wherein near the connection to the bars or strips (18) the cover plate (8) or ring is provided on the lower side with discharge guiding formations, such as ridges.
9. Discharge structure according to any one of the preceding claims, wherein the screening means (7) comprise a wind shelter strip (20) surrounding the outlet at a radial distance, the downstream edge of

which is located in a vertical projection within the outer circumference of the collecting means (6), the condensation guiding means, in particular bars or strips (18) being radially outwardly spaced from the wind shelter strip (20).

10. Discharge structure according to any one of the claims 5-9, wherein the bars (18) merge at their upstream end in a flange (17), which is provided, with means for entering into a connection with the collecting means (6). 10
11. Discharge structure according to any one of the preceding claims wherein at the upstream end of the condensation guiding means, in particular bars or strips (18), on the radial outward side thereof, retaining means (12) are provided for collecting and discharging condensation which flows down along the outside of the bars or strips to the collecting means. 15
12. Discharge structure according to claims 11, wherein the retaining means being shaped as a retaining edge (12) surrounding the bars or strips at a radially outward distance. 25
13. Discharge structure according to any one of the preceding claims, wherein the gas discharge pipe (4), the collecting means (6) and the screening means (7) are connected to each other by means of press fits. 30
14. Outlet structure for closed gas appliances, comprising an air inlet structure (2) and a discharge structure (1) according to any one of the preceding claims. 35

Patentansprüche

1. Abfuhraufbau für einen Auslaßaufbau eines Gasabfuhrgeräts, wie eines Heizkörpers, insbesondere eines Heizboilers, umfassend ein Gasabfuhrrohr (4), Mittel (7) zur Abschirmung des Auslasses des Gasabfuhrrohrs (4) und Mittel (6) zum Auffangen von Kondenswasser von den Abschirmungsmitteln, wobei zumindest nahe dem Auslaß des Gasabfuhrrohrs Mittel (9) vorgesehen sind zur Führung und Durchführung von Kondenswasser von den Auffangmitteln (6) zum Inneren des Gasabfuhrrohrs, wobei die Abschirmungsmittel (7) eine über den Auslaß des Gasabfuhrrohrs (4) angeordnete Deckplatte (8) und Mittel (18) zum Führen von Kondenswasser von der Deckplatte (8) zu den Auffangmitteln (6) umfassen, **dadurch gekennzeichnet, daß** die Kondenswasserführungsmittel (18) sich bis zu dem umlaufenden Rand der Deckplatte (8) erstrecken und direkt mit dem umlaufenden Rand der 40 45 50 55

Deckplatte verbunden sind.

2. Abfuhraufbau nach Anspruch 1, wobei die Kondenswasserführungsmittel (18) integral mit dem umlaufenden Rand der Deckplatte (8) gebildet sind. 5
3. Abfuhraufbau nach Anspruch 1 oder 2, wobei die Kondenswasserführungsmittel (18) eine Anzahl umlaufend angeordnete, vorzugsweise hauptsächlich vertikal orientierte Stangen oder Streifen (18) umfassen, die den Auslaß und einen stromabwärts gelegenen Gebiet davon in radial auswärtse Richtung umgeben und sich mit einem Komponent in Rohrrichtung erstrecken und die in abführender Flüssigkeitsverbindung mit den Auffangmitteln (6) stehen. 10
4. Abfuhraufbau nach Anspruch 3, wobei die Stangen oder Streifen (18) mit der Deckplatte (8) einen Korbaufbau (7) bilden. 20
5. Abfuhraufbau nach einem der Ansprüche 1 - 4, wobei die Kondenswasserführungsmittel, insbesondere Stangen (18), an einem Stromabwärtsende an einen eventuell zu der Deckplatte gehörenden Endring oder -Scheibe anschließen. 25
6. Abfuhraufbau nach Anspruch 5, wobei die Deckplatte (8) oder Ring und die Stangen (18) in dessen Anschlußbereich oder in der Nähe radial einwärtse Einkerbungen oder Einbuchtungen bilden, wobei die Führungsmittel sich nahe der Deckplatte mit zumindest einem Komponent in radial auswärtse Richtung erstrecken. 30
7. Abfuhraufbau nach Anspruch 5 oder 6, wobei die Stangen oder Streifen (18) mit ihrem Stromaufwärtsende in Entfernung von und über den Auffangmitteln (6) gelegen sind. 35
8. Abfuhraufbau nach Anspruch 5, 6 oder 7, wobei die Deckplatte (8) oder Ring nahe der Verbindung mit den Stangen oder Streifen (18) an der Unterseite mit Abfuhrführungsformationen, wie Rücken, versehen ist. 40
9. Abfuhraufbau nach einem der vorhergehenden Ansprüche, wobei die Abschirmungsmittel (7) einen in radialer Entfernung um die Ausmündung umlaufenden Windschattenband (20) umfassen, dessen stromabwärtse Rand in einer vertikalen Projektion innerhalb von dem Außenumfang der Auffangmittel (6) gelegen ist, wobei die Kondenswasserführungsmittel, insbesondere die Stangen oder Streifen (18), in radialer auswärtser Entfernung von dem Windschattenband (20) gelegen sind. 45 50 55
10. Abfuhraufbau nach einem der Ansprüche 5-9, wo-

bei die Stangen (18) an ihrem Stomaufwärtssende in einen Flansch (17) übergehen, welcher mit Mitteln zum Herstellen einer Verbindung mit den Aufnahmmitteln (6) versehen ist.

11. Abfuhr Aufbau nach einem der vorhergehenden Ansprüche, wobei an dem Stomaufwärtssende der Kondenswasserführungsmittel, insbesondere Stangen oder Streifen (18), an ihrem radialen Auswärtssende, Stauungsmittel vorgesehen sind zum Auffang und Abfuhr von entlang der Außenseite der Stangen oder Streifen abfließendem Kondenswasser zu den Aufnahmmitteln.
12. Abfuhr Aufbau nach Anspruch 11, wobei die Stauungsmittel als ein in radialer auswärtser Entfernung um die Stangen oder Streifen umlaufender Stauraum gebildet sind.
13. Abfuhr Aufbau nach einem der vorhergehenden Ansprüche, wobei das Gasabfuhrrohr (4), die Aufnahmmittel (6) und die Abschirmungsmittel (7) durch Presspassungen miteinander verbunden sind.
14. Ausmündungsaufbau für geschlossene Gasgeräte, umfassend einen Luftzufuhr Aufbau (2) und einen Abfuhr Aufbau (1) nach einem der vorhergehenden Ansprüche.

Revendications

1. Structure d'évacuation pour une structure de sortie d'un dispositif d'évacuation de gaz, tel qu'un système de chauffage, en particulier une chaudière, comportant un tuyau d'évacuation de gaz (4), des moyens (7) pour protéger la sortie du tuyau d'évacuation de gaz (4) et des moyens (6) pour recueillir la condensation provenant des moyens de protection, dans lequel au moins à proximité de la sortie du tuyau d'évacuation de gaz des moyens (9) sont agencés pour guider et faire passer la condensation depuis les moyens de recueil (6) vers l'intérieur du tuyau d'évacuation de gaz, les moyens de protection (7) comportant une plaque de couvercle (8) placée au-dessus de la sortie du tuyau d'évacuation de gaz (4), et des moyens (18) pour guider la condensation provenant de la plaque de couvercle (8) en direction des moyens de recueil (6), **caractérisée en ce que** lesdits moyens de guidage de condensation (18) s'étendent vers le bord circonférentiel de la plaque de couvercle (8) et sont directement reliés au bord circonférentiel de la plaque de couvercle.
2. Structure d'évacuation selon la revendication 1, dans laquelle lesdits moyens de guidage de condensation (18) sont formés en un seul bloc avec le-

dit bord circonférentiel de la plaque de couvercle (8).

3. Structure d'évacuation selon la revendication 1 ou 2, dans laquelle les moyens de guidage de condensation (18) comportent plusieurs barres ou bandes (18) agencées circonférentiellement, de préférence orientées sensiblement verticalement, qui entourent la sortie et une surface en aval de celle-ci dans une direction radialement vers l'extérieur et s'étendent en ayant une composante dans la direction du tuyau et qui sont en communication de liquide s'évacuant avec les moyens de recueil (6).
4. Structure d'évacuation selon la revendication 3, dans laquelle les barres ou bandes (18) forment une structure de panier (7) avec la plaque de couvercle (8).
5. Structure d'évacuation selon l'une quelconque des revendications 1 à 4, dans laquelle les moyens de guidage de condensation, en particulier les barres (18), sont reliés à une extrémité aval à un anneau d'extrémité ou disque d'extrémité (8) qui peut être une partie de la plaque de couvercle.
6. Structure d'évacuation selon la revendication 5, dans laquelle la plaque de couvercle (8) ou l'anneau et les barres (18) forment des encoches ou évidements radialement vers l'intérieur dans leur zone de liaison ou au voisinage de celle-ci, les moyens de guidage s'étendant à proximité de la plaque de couvercle en ayant au moins une composante dans la direction radiale vers l'extérieur.
7. Structure d'évacuation selon la revendication 5 ou 6, dans laquelle les barres ou bandes (18) ont leur extrémité amont espacée des moyens de recueil (6) et positionnée au-dessus de ceux-ci.
8. Structure d'évacuation selon la revendication 5, 6 ou 7, dans laquelle à proximité de la liaison aux barres ou bandes (18), la plaque de couvercle (8), ou l'anneau, est munie sur le côté inférieur de formations de guidage d'évacuation, telles que des arêtes.
9. Structure d'évacuation selon l'une quelconque des revendications précédentes, dans laquelle les moyens de protection (7) comportent une bande pare-vent (20) entourant la sortie à une distance radiale, dont le bord aval est positionné dans une saillie verticale existant dans la circonférence extérieure des moyens de recueil (6), les moyens de guidage de condensation, en particulier les barres ou bandes (18), étant espacés radialement vers l'extérieur à partir de la bande pare-vent (20).

10. Structure d'évacuation selon l'une quelconque des revendications 5 à 9, dans laquelle les barres (18) rejoignent à leur extrémité amont un rebord (17), qui est muni de moyens pour entrer en liaison avec les moyens de recueil (6). 5
11. Structure d'évacuation selon l'une quelconque des revendications précédentes, dans laquelle à l'extrémité amont des moyens de guidage de condensation, en particulier les barres et bandes (18), sur leur côté radial extérieur, des moyens de retenue (12) sont agencés pour recueillir et évacuer la condensation qui s'écoule vers le bas le long de l'extérieur des barres ou bandes vers les moyens de recueil. 10
15
12. Structure d'évacuation selon la revendication 11, dans laquelle les moyens de retenue sont en forme de bord de retenue (12) entourant les barres ou bandes à distance radialement vers l'extérieur. 20
13. Structure d'évacuation selon l'une quelconque des revendications précédentes, dans laquelle le tuyau d'évacuation de gaz (4), les moyens de recueil (6) et les moyens de protection (7) sont reliés les uns aux autres par l'intermédiaire d'agencements serrés. 25
14. Structure de sortie pour des accessoires à gaz fermés, comportant une structure d'entrée d'air (2) et une structure d'évacuation (1) selon l'une quelconque des revendications précédentes. 30

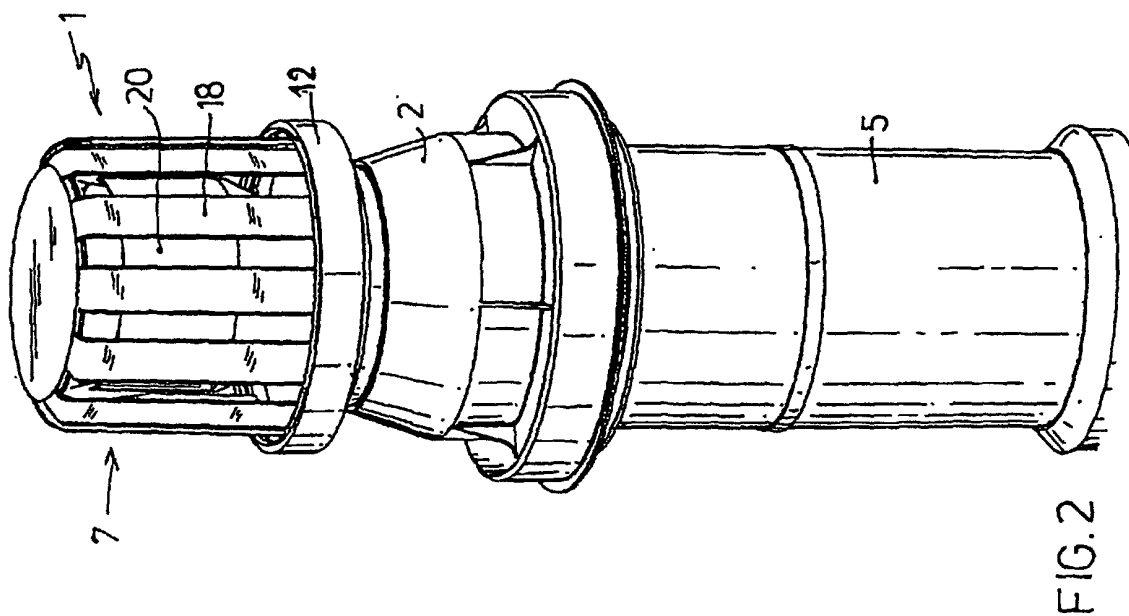
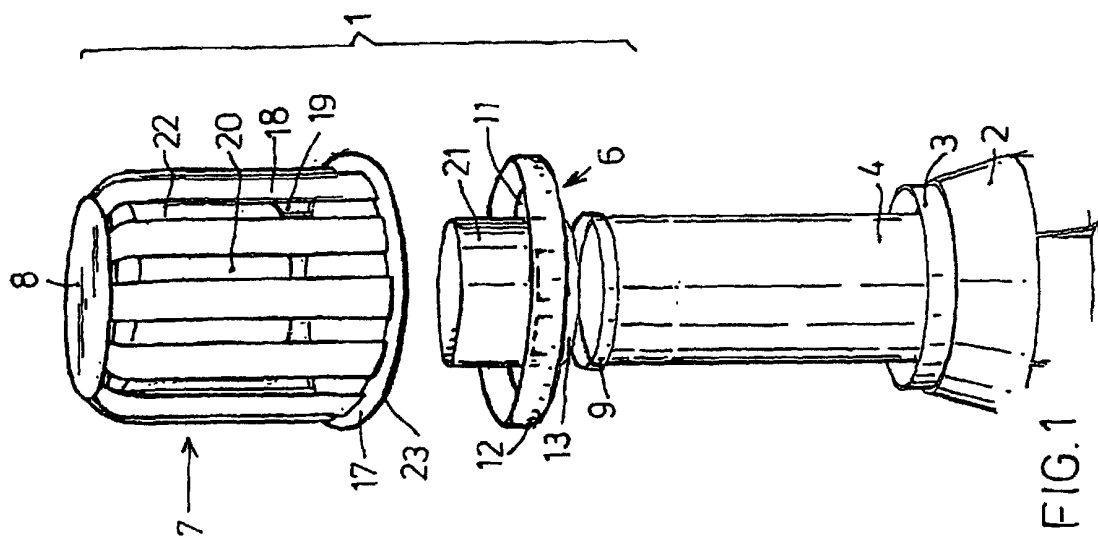
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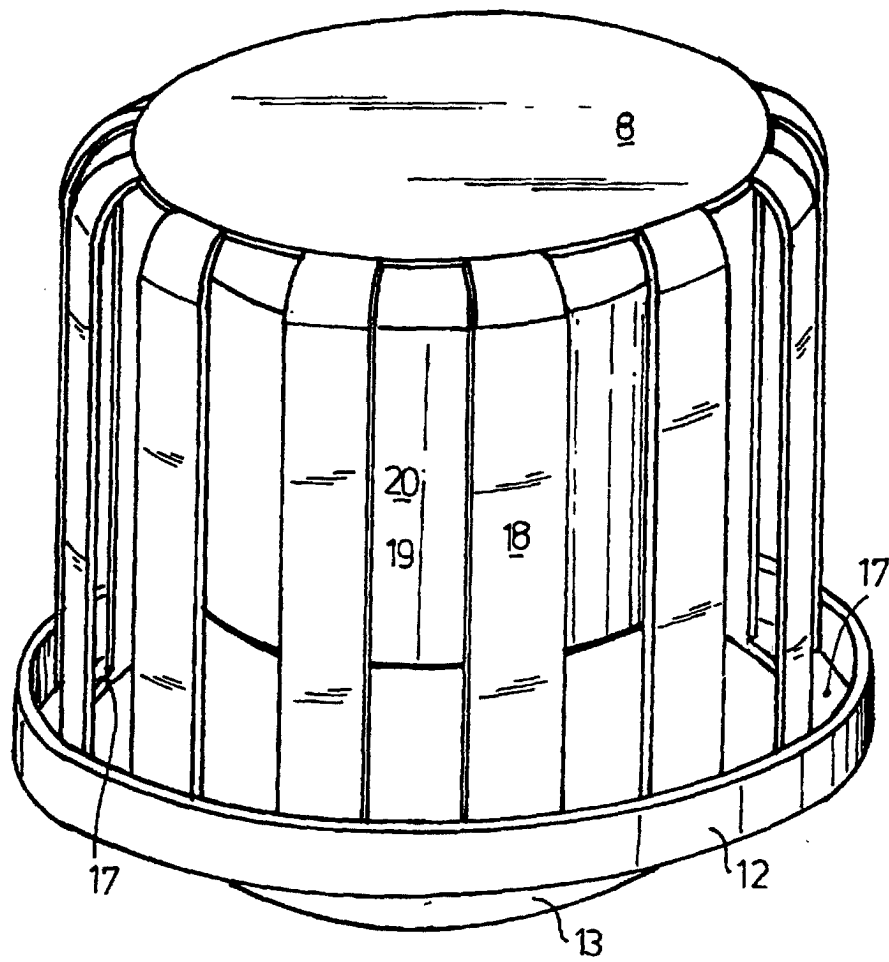


FIG. 3

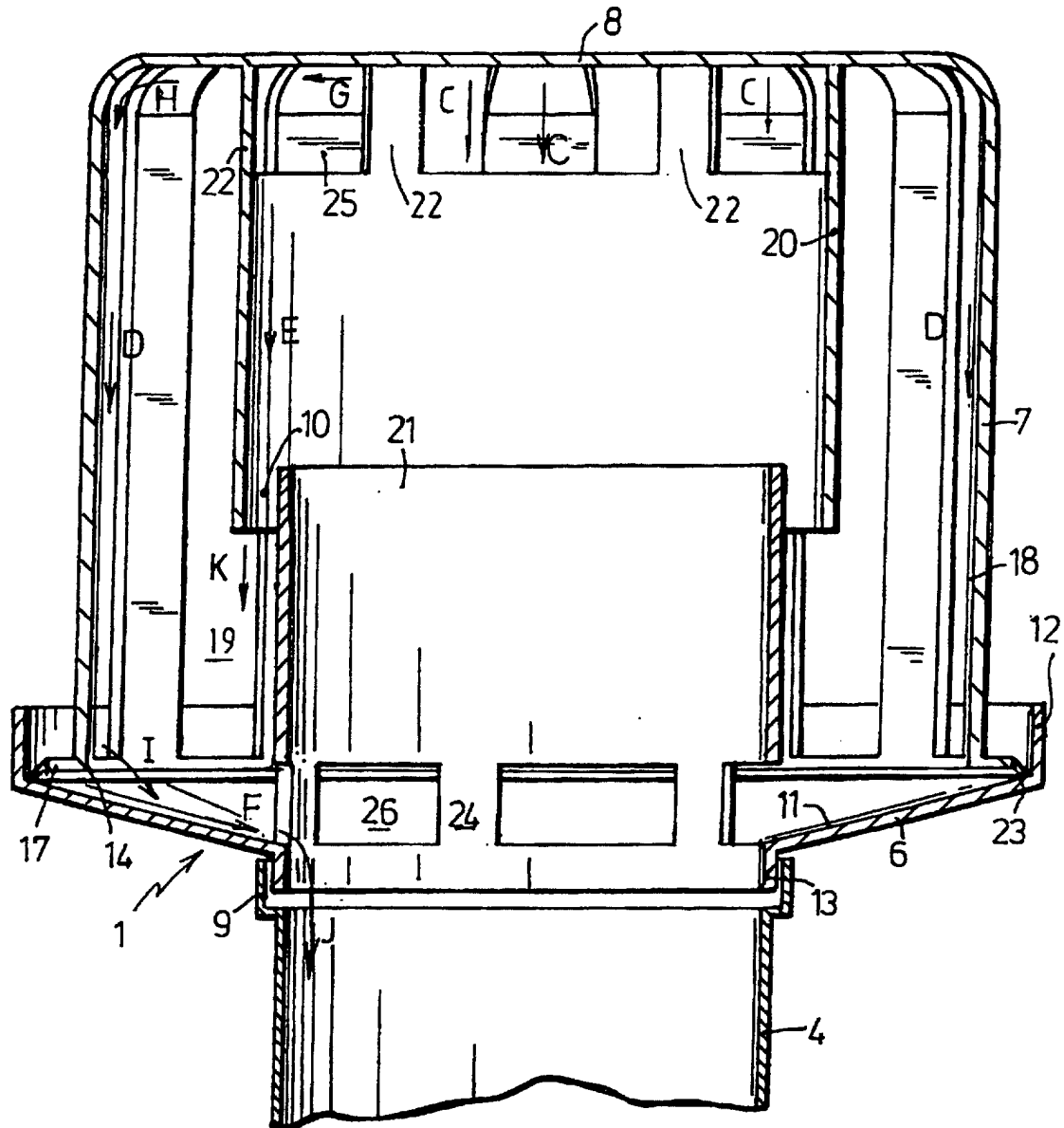


FIG. 4