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(54) **Discharge structure for closed gas appliances**

Abfuhraufbau für geschlossene Gasheizgeräte

Structure d'évacuation pour appareils étanches à gaz

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GB-A- 1 320 943
US-A- 3 361 051

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EP 0 930 463 B1

Description

[0001] The invention relates to a discharge structure for closed gas appliances. Such discharge structures form the main component of a roof terminal or wall terminal for, for instance, heating boilers and comprise a line for the supply of combustion air and a line for the exhaust of combustion gasses. The discharge structure then further comprises a supply means for combustion air, such as a supply hood, forming the connection between the outside air and the supply line for combustion air, and a flow-promoting exhaust means for combustion gasses, such as a draught hood, forming the connection between the combustion gas exhaust line and the outside air. The exhaust means is situated at a greater distance from the space in which the gas appliance is located than the supply means, that is to say, in a vertical arrangement of the discharge structure, above the supply means.

[0002] Such a discharge structure is also referred to as a wall or roof terminal structure. In this application, the inner end is considered as the end which has to be connected to the combustion air supply and the combustion gas exhaust of the gas appliance itself, whether through the medium of a manifold or not, with which manifold or branch pipe the combustion gas exhaust line and the combustion air supply line in the discharge structure, situated concentrically relative to each other, are transformed into parallel lines.

[0003] A discharge structure as described in the preamble of claim 1 is known from EP-A-0.491.444.

[0004] According to the invention, an improved discharge structure for closed gas appliances is provided, as described in claim 1

[0005] The venting passage forms a direct connection for combustion air between the main passage, formed by the air supply means, and the outside air. Too high a pressure built-up inside the air supply means, in particular the air supply hood, which could form a disturbance for the burner or, as a consequence of air streams caused thereby, for the efficiency of the appliance due to losses during standstill, are hereby controlled.

[0006] If the combustion air supply means is embodied as a supply hood, reaching on its inner end over the outer end of the casing and defining an entrance of the main passage therewith, then preferably the venting passage is provided in or at the outer end of the hood, in particular in the shape of one or more holes.

[0007] Advantageous embodiments hereof are described in the accompanying subclaims -incorporated herein by reference- and shown in the drawings.

[0008] It is remarked that US-A-3.361.051 discloses a discharge structure having an air supply hood which has a main passage having radially extending portions bounded by projections spaced in the circumferential direction.

[0009] The combustion gas exhaust means can be formed by an outer end of the inner pipe itself, but is preferably formed by a combustion gas exhaust hood, especially in vertical discharge structures.

[0010] The invention will now be explained by means of a discussion of a number of embodiments of a discharge structure according to the invention, shown in the accompanying drawings. The following is shown in:

figure 1: a vertical embodiment of the discharge structure according to the invention, a view on the discharge structure being shown on the left hand side and a cross section of the discharge structure being shown in the right hand side,

figure 1A: a detail on the bottom side of the discharge structure of figure 1,

figure 1B: a detail of the air supply hood of the discharge structure of figure 1,

figure 1C: a detail of the air supply hood / draught hood of the discharge structure of figure 1,

figure 2: an alternative embodiment of the discharge structure according to the invention; and

figure 2A: a detail of the connection of the air supply hood and the combustion gas exhaust hood of the discharge structure of figure 2.

[0011] The discharge structure 1 of figure 1 comprises an inner pipe 20 for discharge of combustion gasses in the direction B, towards the outside, an outer pipe 30, for the supply of combustion air in the direction A, from the outside to a boiler (not shown), an air supply hood 40, a combustion gas exhaust hood 50, an insulating sleeve 60, a retaining ring 70 and a clamping ring 80. The discharge structure can either connect directly with its bottom end to the connecting pieces of the boiler, or to concentric line components connected thereto, or can be connected thereto via a so-called manifold and parallel line components. If the circumstances render it possible, it could be considered to include the parts 70 and 80 into the manifold. The inner pipe 20 passes on its outer end, in this case its upper end, via an annular shoulder 22 into a portion having a larger diameter 21. What is especially important here is the shoulder 22, of which the function will be further discussed below. In the drawing, the outer pipe 30 consists of two parts 30a and 30b. The pipe part 30a herein has a length, corresponding to the regulations concerned. The outer pipe 30b can simply be adapted in length to the situation in situ. At its bottom side, pipe part 30a is provided with a storm collar 39', and also with a retaining ring 39'' situated therein, and active in radial direction for keeping the pipe part 30b in position relative to pipe part 30a. The storm collar 39' furthermore serves to accommodate the upper end of a so-called adhering plate (i.e. flat roof adaptor for bitumen) 90, for sealing the passage through the roof

10. The adhering plate 90 sealingly connects to the roof covering (not shown). At its upper end, the pipe part 30a is provided with a number of radial partitions 31 distributed in circumferential direction, which partitions are provided on their outer upper end with a recess 32. Below these small partitions 31, immediately adjacent thereto, are situated radially projecting spacing fingers 34 which are also evenly distributed over the circumference. Furthermore, below these, there are located two roundgoing pressure increasing rings 35 and 36, and below these there are located roundgoing fastening ribs 37 and 38. These ribs can receive a sealing ring between them, in case an adhering plate 90' is placed at that location. Such an arrangement, in which the discharge structure extends less far above the roof than is shown on the right hand side of figure 1, is admissible in some countries.

[0012] At its bottom side, the air supply hood 40 is provided with an annular supply opening for ambient air and starts, considered from the bottom upwards, with an edge 42, a first essentially cylindrical portion 41, which passes via a first radial step into a second, essentially cylindrical portion 43 having a reduced diameter, which portion 43 passes via a tapering portion 45 into a second, essentially radial step, which finally ends in a third essentially cylindrical portion 46. A raised roundgoing collar 47 is situated radially outside the portion 46, while between both parts 46 and 47, in the second radial step, a number of air passages 48 are present, evenly distributed in circumferential direction, which air passages form a short circuit between the passage from the outside to the annular line and the ambient air so as to vent the surplus of air.

[0013] The gas exhaust hood 50 comprises, considered from the bottom upwards, an annular bottom portion 55, provided on its radial inner side with a raised ring 54, situated more outwardly with a depending ring or series of projections 56 and even more outwardly with a downwardly extending ring 57. Above the annular bottom 55, a roundgoing, slightly tapering screen 58 or wind shield band is situated, connected to the bottom by means of raised portions 51' and to the roundgoing lid support 53 via legs 51''. In this way, draught openings 59' are left clear below the screen 58 and exhaust holes 59'' are left clear above the screen 58. The lid 52 is situated on top of the exhaust hood, by which means it is prevented that rains comes in or that objects fall into the exhaust hood and that otherwise the functioning of the exhaust hood is improved by deflecting fall wind.

[0014] The collar 47, the annular bottom portion 55 and the ring 57 form a labyrinth-shaped screen for the air openings 48, so that rain can be prevented from entering and a gust of wind can also not impair the air pressure surplus-reducing action of the openings 48.

[0015] An insulating sleeve 60 is placed around the inner pipe 20, which insulating sleeve extends from the lower end of the outer pipe 30 up to the gas exhaust hood.

[0016] Assembling the discharge structure 1 is done as follows. The pipe 20 is kept upside down, with the widened portion 21 pointing downwards. If necessary, this widened portion 21 can be placed on a raising having a fitting, comparable diameter. Then, first, the gas exhaust hood 50 is slid on the inner end or lower end, now the upper end, of the inner pipe, until the ring 54 touches the shoulder 22. The exhaust hood is hereby detained against further direction and moreover centered relative to the inner pipe. Subsequently, the air supply hood 40 is made to slide downwards over the inner pipe, until the axial annular portion 46 touches the annular bottom 55 of the exhaust hood 50. The portion 46 is herein retained in radial direction by the ring or series of cams 56. In the case shown here, in which an insulating sleeve 60 is present, the diameter of the portion 46 of the supply hood 40 is chosen such, that radial space is present for the insulating sleeve. The next step is that the insulating sleeve is slid over the inner pipe until what is then the bottom extremity, also touches the annular bottom 55 of the exhaust hood, and is centered at that location by the portion 46 of the supply hood 40. Next, the outer pipe 30 is lowered over the inner pipe 20 and the insulating sleeve 60, until the upper edge of the recesses 32 of the small partitions 31 touches the inner surface of the area of the wall of the supply hood 40 near the transition from the cylindrical portion 43 and the first step thereof (fig. 1B). Consequently, the outer pipe is detained both in axial direction and in radial direction relative to the preceding parts. The small partitions 31 between them create air flow openings. The fingers 34 also contribute to the centering of the parts 30 and 40 relative to each other and also leave clear flow openings. Air can therefore flow in from the outside, past the edge 42, between the fingers 34 through the space 44 and between the small partitions 31, to the inside so as to enter the annular space between the outer pipe 30 and the insulating sleeve 60 and to flow in the direction A.

[0017] When the outer pipe has been installed, the retaining ring 70 is installed, which retaining ring is provided with two rings 71 and 73, placed concentrically relative to each other and being connected to each other by means of small radial partitions 72. These small radial partitions between them leave clear sufficient flow openings for the combustion air supplied to a manifold, not shown in more detail, which is connected to the inner end of the annular space in an almost sealing manner, and which connects on its other side to the air supply and the gas exhaust of the gas appliance. On its upper end, seen in figure 1, the inner ring 73 is provided with a locating edge 74, with which the insulating sleeve 60 is positioned relative to the inner pipe 20. The ring 71 is formed such that it connects smoothly onto the outer pipe 30b. Finally, a ring 80, closely fitting onto the inner pipe 20, is slid on until it abuts retaining ring 70 and then secured by means of tipped screws 81 on the inner pipe 20. The result then is that the exhaust hood 50, the sup-

ply hood 40, the outer pipe 30 and the insulating sleeve 60 are retained between the shoulder 22 and the clamping ring 80. After this has happened, the discharge structure is turned over and the lid 52 is secured onto the exhaust hood 50. This can for instance be done by means of screws or by means of a snap connection.

[0018] The various components of the discharge structure according to the invention can be manufactured from aluminium, highgrade or not, stainless steel, steel, galvanized according to the Sendzimir process. Due to the chosen method of composition, however, most components can be made of a synthetic material. This applies to the gas exhaust hood (PBT), the air supply hood, which is not subjected to high temperatures and can for instance be made from PVC, the part of the outer pipe 30a projecting above the roof, and the part of the outer pipe 30b below the roof, which can both also be manufactured from synthetic material, such as PVC or PE, the retaining ring and the clamping ring.

[0019] Figure 2 shows an alternative discharge structure 101, built up substantially from an inner pipe 120, a casing 130 an air supply hood 140, a combustion gas exhaust hood 150. The discharge structure 101 is essentially similar to the discharge structure shown in figure 1. The combustion gas exhaust hood 150 is however more tapering than the combustion gas exhaust hood 50. Compared to usual circular-cylindrical combustion gas exhaust hoods, a calm flow pulse is obtained, while maintaining the guiding and wind screening function. Moreover, the combustion gas exhaust hood 150, of which the lid 152 is removable, can be nested, so that during transportation from for instance the manufacturer to the next link in the supply chain, less space will be required. The chosen shape also offers advantages for the manufacturing process, because of its self-releasing shape.

[0020] Another special feature of the discharge structure of figure 2 is shown in figure 2A. Especially when the combustion gas exhaust hood is made of another material than the air supply hood 140, for instance when the former is made of injection aluminium and the latter is made of a synthetic material, it can be desirable to install a temperature buffer in the shape of a ring 200 which is concentrical to the centre line of the discharge structure and is made from, for instance, PBT synthetic, which has a high temperature resistance.

[0021] When temperature causes no problems regarding the connection of the types of material for combustion gas exhaust hood and air supply hood, the ring 200 can also be applied as a optional component on the previously mentioned short circuit between the passage from the outside to the annular line and the ambient air to vent the surplus of air, if desired. For this purpose, the ring 200 is provided with depending projections 202 which are spaced from each other in circumferential direction, and between them leave clear radial passages 203, through which a surplus of air can flow from within the air supply hood towards the outside, around the downwardly extending ring 157.

[0022] It will be clear that in figures 1 and 2, corresponding parts have similar reference numerals, increased by 100 for figure 2.

Claims

1. Discharge structure (1;101) for closed gas appliances having an inner end and an outer end, comprising: an outer tubular casing (30;130) having an outer end and an inner end; an inner gas exhaust pipe (20;120) for the exhaust of combustion gasses having an outer end and an inner end, the inner pipe being placed inside the casing to define an annular supply line for combustion air therewith; a combustion air supply means, such as an air supply hood (40;140), forming a connection between the ambient air and the annular supply line, near the outer end thereof; a combustion gas exhaust means, such as a hood (50;150), forming a connection between the ambient air and the gas exhaust pipe, near the outer end thereof, and which is placed further from the inner end of the discharge structure than the combustion air supply means, the combustion air supply means forming a main passage extending between the ambient air and the annular supply line, and also being provided with a venting passage (48;203) **characterized in that** said venting passage (48;203), forms a short circuit between the main passage and the ambient air.

2. Discharge structure according to claim 1, the combustion air supply means comprising an air supply hood (48;203), which on its inner end extends over the outer end of the casing (30;130) and defines an entrance of the main passage therewith, the venting passage (48;203) being provided at the outer end of the air supply hood, for surplus air of the main passage venting to the ambient air.

3. Discharge structure according to claim 2, wherein the venting passage is formed by radial passages (203) provided between the outer end of the air sypply hood (140) and the combustion gas exhaust means (150).

4. Discharge structure according to claim 3, wherein said radial passages (203) are circumferentially bounded by -preferably hanging projections (202) spaced in circumferential direction.

5. Discharge structure according to claim 4, said projections being provided on a ring (200) interpositioned between the air supply hood (140) and the gas exhaust means (150), wherein preferably the ring (200) is made of a material having a relatively high temperature resistance so as to form a tem-

perature buffer.

6. Discharge structure according to claim 2, the venting passage (48) being arranged in the shape of one or more holes.

7. Discharge structure according to any one of the preceding claims, the combustion gas exhaust means comprising a hood (50;150), of which the inner end is provided with a rain and/or wind screen such as a collar (57;157), for screening the opening of the venting passage (48;203) in the combustion air supply hood.

8. Discharge structure according to any one of the preceding claims, the outer end of the combustion air supply hood (40) being provided with a rain and/or wind screen, such as a collar (47), for screening the opening of the venting passage (48).

9. Discharge structure according to claim 8, when dependent of claim 7, the rain and/or wind screen (57) on the gas exhaust hood (50) and the rain and/or wind screen (47) on the air supply hood (40) forming a labyrinth.

10. Discharge structure according to claim 9, the rain and/or wind screen (57) on the gas exhaust hood (50) projecting over the rain and/or wind screen (47) on the air supply hood (40).

11. Discharge structure according (1;10) to any one of the claims 1-10, adapted for use and designed as vertical roof terminal structure.

Patentansprüche

1. Ausmündungskonstruktion (1; 101) für geschlossene Gasgeräte mit einem Innenende und einem Außenende, umfassend: einen äußeren rohrförmigen Mantel (30; 130) mit einem Außenende und einem Innenende; ein inneres Gasabfuhrrohr (20; 102) für die Abfuhr von Verbrennungsgasen mit einem Außenende und einem Innenende, wobei das innere Rohr innerhalb dem Mantel aufgestellt ist, um damit eine ringförmige Zufuhrleitung für Verbrennungsluft zu bestimmen; ein Verbrennungsluftzufuhrmittel, wie eine Luftzufuhrhaube (40; 140), das eine Verbindung zwischen der Außenluft und der ringförmigen Zufuhrleitung, nahe ihrem Außenende, bildet; ein Verbrennungsgasabfuhrmittel, wie eine Haube (50; 150), das eine Verbindung zwischen der Außenluft und dem Gasabfuhrrohr, nahe seinem Außenende, bildet und das weiter als das Verbrennungsluftzufuhrmittel von dem Innenende der Ausmündungskonstruktion aufgestellt ist; wobei das Verbrennungsluftzufuhrmittel einen sich zwischen der Außenluft und der ringförmigen Zufuhrleitung erstreckenden Hauptdurchlaß bildet, und zugleich mit einem Lüftungsdurchlaß (48; 203) versehen ist, **dadurch gekennzeichnet, daß** der Lüftungsdurchlaß (48; 203) einen Kurzschluß zwischen dem Hauptdurchlaß und der Außenluft bildet.

2. Ausmündungskonstruktion nach Anspruch 1, wobei das Verbrennungsluftzufuhrmittel eine Luftzufuhrhaube (48; 203) umfaßt, welche sich auf ihrem Innenende über das Außenende des Mantels (30; 130) erstreckt und damit einen Eingang des Hauptdurchlasses bestimmt, wobei der Lüftungsdurchlaß (48; 203) zum Lüften von Überluft des Hauptdurchlasses zu der Außenluft an dem Außenende der Luftzufuhrhaube vorgesehen ist.

3. Ausmündungskonstruktion nach Anspruch 2, wobei der Lüftungsdurchlaß durch zwischen dem Außenende der Luftzufuhrhaube (140) und dem Verbrennungsgasabfuhrmittel vorgesehene Radialdurchlässe (203) gebildet wird.

4. Ausmündungskonstruktion nach Anspruch 3, wobei die Radialdurchlässe (203) umlaufend durch - vorzugsweise hängende - in umlaufende Richtung voneinander angeordnete Herausragungen (202) begrenzt werden.

5. Ausmündungskonstruktion nach Anspruch 4, wobei die Herausragungen auf einem zwischen der Luftzufuhrhaube (140) und dem Gasabfuhrmittel (150) eingefügten Ring (200) vorgesehen sind, wobei der Ring (200) vorzugsweise aus einem Material mit einem relativ hohen Temperaturwiderstand hergestellt is, um so ein Temperaturpuffer zu bilden.

6. Ausmündungskonstruktion nach Anspruch 2, wobei der Lüftungsdurchlaß (48) in der Form von einem oder mehreren Löchern angeordnet ist.

7. Ausmündungskonstruktion nach einem der vorhergehenden Ansprüche, wobei das Verbrennungsgasabfuhrmittel eine Haube (50; 150) umfaßt, deren innere Ende mit einem Regen- und/oder Windschirm, wie einem Kragen (15; 157), zum Abschirmen der Öffung des Lüftungsdurchlasses (48; 203) in der Verbrennungsluftzufuhrhaube, versehen ist.

8. Ausmündungskonstruktion nach einem der vorhergehenden Ansprüche, wobei das Außenende der Verbrennungsluftzufuhrhaube (40) mit einem Regen- und/oder Windschirm, wie einem Kragen (47), zum Abschirmen der Öffnung des Lüftungsdurchlasses (48), versehen ist.

9. Ausmündungskonstruktion nach Anspruch 8, wenn abhängig von Anspruch 7, wobei der Regen- und/

oder Windschirm (57) auf der Gasabfuhrhaube (50) und der Regen- und/oder Windschirm (47) auf der Luftzufuhrhaube (40) ein Labyrinth bilden.

10. Ausmündungskonstruktion nach Anspruch 9, wobei der Regenund/oder Windschirm (57) auf der Gasabfuhrhaube (50) über den Regenund/oder Windschirm (47) auf der Luftzufuhrhaube (40) vorragen.

11. Abfurhaufbau nach einem der Ansprüche 1-10, dem Gebrauch als vertikale Dachterminalstruktur angepasst und entworfen.

Revendications

1. Structure de décharge (1 ; 101) pour appareil d'utilisation du gaz fermé comportant une extrémité intérieure et une extrémité extérieure, comprenant : un boîtier tubulaire extérieur (30 ; 130) comportant une extrémité extérieure et une extrémité intérieure ; un tuyau d'échappement du gaz intérieur (20 ; 120) pour l'évacuation des gaz de combustion comportant une extrémité extérieure et une extrémité intérieure, le tuyau intérieur étant placé à l'intérieur du boîtier pour définir une chaîne d'approvisionnement annulaire pour l'air de combustion avec celui-ci, des moyens d'approvisionnement en air de combustion, comme une hotte d'approvisionnement en air (40 ; 140), formant une connexion entre l'air ambiant et la chaîne d'approvisionnement annulaire, proche de l'extrémité extérieure de ceux-ci ; des moyens d'évacuation du gaz de combustion, comme une hotte (50 ; 150) formant une connexion entre l'air ambiant et le tuyau d'échappement de gaz, proche de l'extrémité extérieure de ceux-ci, et qui est placé plus loin de l'extrémité intérieure de la structure de décharge que les moyens d'approvisionnement en air de combustion, les moyens d'approvisionnement en air de combustion formant un passage principal s'étendant entre l'air ambiant et la chaîne d'approvisionnement annulaire et étant également prévus avec un passage de ventilation (48 ; 203), **caractérisé en ce que** ledit passage de ventilation (48 ; 203) forme un court circuit entre le passage principal et l'air ambiant.

2. Structure de décharge selon la revendication 1, les moyens d'approvisionnement en air de combustion comprenant une hotte d'approvisionnement en air (48 ; 203), qui sur son extrémité intérieure s'étend sur l'extrémité extérieure du boîtier (30 ; 130) et définit une entrée du passage principal avec celle-ci, le passage de ventilation (48 ; 203) étant prévu à l'extrémité extérieure de la hotte d'approvisionnement en air, pour l'air en excédent du passage principal s'évacuant dans l'air ambiant.

3. Structure de décharge selon la revendication 2, dans laquelle le passage de ventilation est formé de passages radiaux (203) prévus entre l'extrémité extérieure de la hotte d'approvisionnement en air (140) et les moyens d'évacuation du gaz de combustion (150).

4. Structure de décharge selon la revendication 3, dans laquelle lesdits passages radiaux (203) sont limités de manière circonférentielle par des projections (202), de préférence suspendues, espacées dans une direction circonférentielle.

5. Structure de décharge selon la revendication 4, lesdites projections étant prévues sur un anneau (200) interpositionné entre la hotte d'approvisionnement en air (140) et les moyens d'évacuation du gaz (150), dans laquelle l'anneau (200) est de préférence fabriqué avec un matériau comportant une résistance à température relativement élevée afin de former un tampon de température.

6. Structure de décharge selon la revendication 2, le passage de ventilation (48) étant agencé sous la forme d'un ou plusieurs trous.

7. Structure de décharge selon l'une quelconque des revendications précédentes, les moyens d'évacuation du gaz de combustion comprenant une hotte (50 ; 150), dont l'extrémité intérieure est prévue avec un écran pare-pluie et/ou un écran anti-vent comme un collier (57 ; 157) pour séparer l'ouverture du passage de ventilation (48 ; 203) dans la hotte d'approvisionnement en air de combustion.

8. Structure de décharge selon l'une quelconque des revendications précédentes, l'extrémité extérieure de la hotte d'approvisionnement en air de combustion (40) étant prévue avec un écran pare-pluie et/ou un écran anti-vent, comme un collier (47), pour séparer l'ouverture du passage de ventilation (48).

9. Structure de décharge selon la revendication 8, lorsqu'elle dépend de la revendication 7, l'écran pare-pluie et/ou l'écran anti-vent (57) sur la hotte d'évacuation du gaz (50) et l'écran pare-pluie et/ou l'écran anti-vent (47) sur la hotte d'approvisionnement en air (40) formant un labyrinthe.

10. Structure de décharge selon la revendication 9, l'écran pare-pluie et/ou l'écran anti-vent (57) sur la hotte d'évacuation du gaz (50) se projetant sur l'écran pare-pluie et/ou l'écran anti-vent (47) sur la hotte d'approvisionnement en air (40).

11. Structure de décharge (1 ; 101) selon l'une quelconque des revendications 1 à 10, adaptée pour l'utilisation et conçue comme une structure terminale de

voûte verticale.

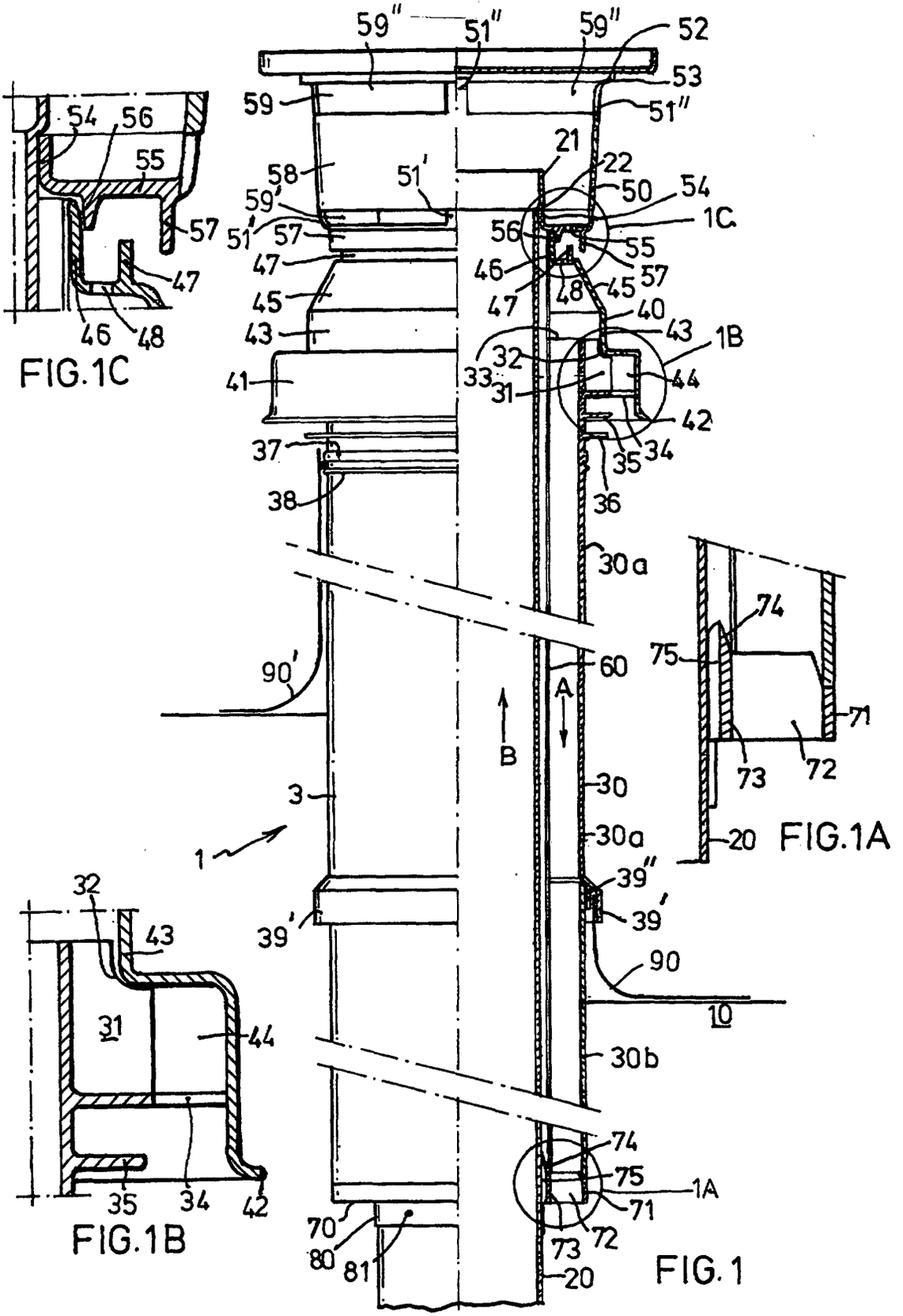

FIG.1C

FIG.1A

FIG.1B

FIG.1

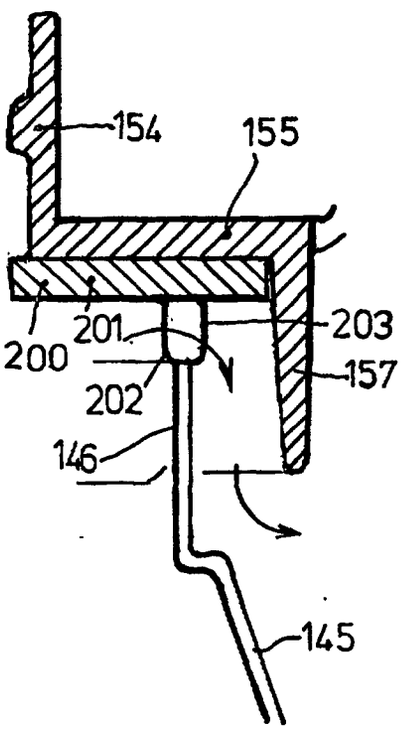
154
155
200
201
203
202
157
146
145

FIG.2A

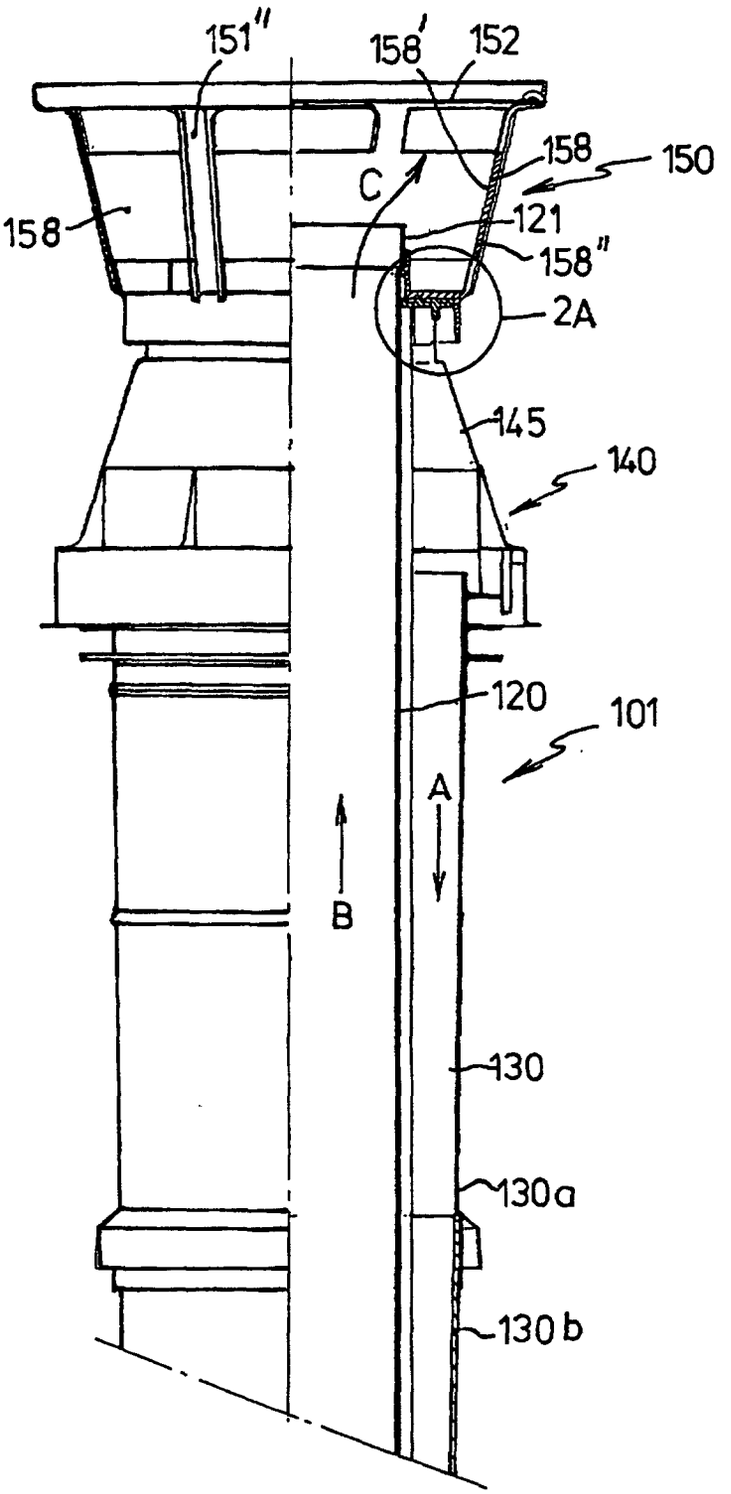
151"
158'
152
158
150
C
158
121
158"
2A
145
140
120
101
A
B
130
130a
130b

FIG.2

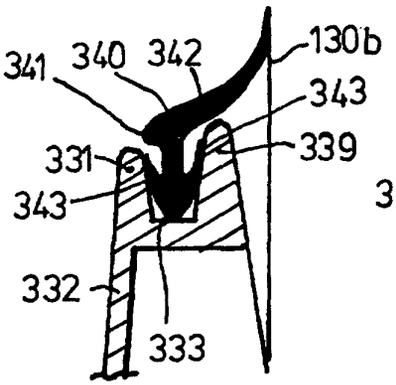

FIG. 3B

FIG. 3

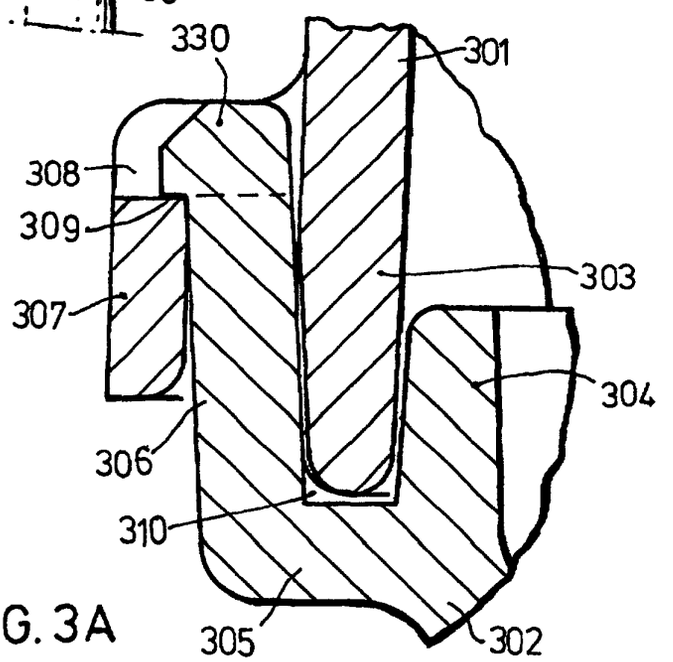

FIG. 3A