(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 660 402 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
03.06.2020 Bulletin 2020/23

(21) Application number: **18792414.7**

(22) Date of filing: **23.07.2018**

(51) Int Cl.:
F24C 3/08 *(2006.01)* ***F24C 3/10*** *(2006.01)*
F23D 14/06 *(2006.01)* ***F23D 14/64*** *(2006.01)*

(86) International application number:
PCT/ES2018/070525

(87) International publication number:
WO 2019/020855 (31.01.2019 Gazette 2019/05)

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **26.07.2017 ES 201730971**

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(54) GAS BURNER ASSEMBLY FOR A GAS COOKING APPLIANCE, AND GAS COOKING APPLIANCE COMPRISING SAID GAS BURNER ASSEMBLY

(57) Gas burner assembly comprising a gas burner (110) comprising a burner body (111), an injector (130) oriented towards the gas burner (110), a gas conduit (120) fluidically communicated with the injector (130), and a burner holder (10) comprising a burner base (12) coupled to the burner body (111), the burner base (12) comprising a hole (16) fluidically communicating the burner body (111) with the injector (130), and an injector base (11) arranged below the burner base (12), the injector base (11) comprising the injector (130). The burner holder (10) is formed by two independent parts (10a, 10b) attached together to form the burner holder (10), a first part (10a) comprising the injector base (11) and a second part (10b) comprising the burner base (12).

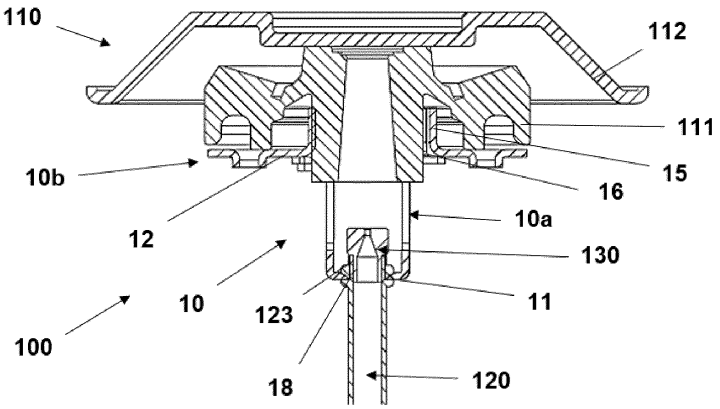


FIG. 4

EP 3 660 402 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to gas burner assemblies for gas cooking appliances, and gas cooking appliances incorporating said gas burner assemblies.

PRIOR ART

[0002] Gas burner assemblies for gas cooking appliances are known comprising a burner body positioned above a cooking surface of a gas cooking appliance, in which air is mixed with gas and flame is produced. This burner body is coupled to or supported on a burner holder which is arranged such that it is attached to the cooking surface and below said cooking surface, the burner holder and the burner body being fluidically communicated. In turn, this burner holder supports a gas injector injecting gas into the burner body.

[0003] US2017/0038061A1 describes a gas burner assembly for a gas cooking appliance, comprising a gas burner comprising a burner body, an injector oriented towards the gas burner, a gas conduit fluidically communicated with the injector, and a burner holder comprising a burner base coupled to the burner body, the burner base comprising a hole fluidically communicating the burner body with the injector, and an injector base arranged below the burner base, the injector base comprising the injector.

DISCLOSURE OF THE INVENTION

[0004] The object of the invention is to provide a gas burner assembly for a gas cooking appliance and a gas cooking appliance incorporating said gas burner assembly as defined in the claims.

[0005] The gas burner assembly of the invention comprises a gas burner comprising a burner body, an injector oriented towards the gas burner, a gas conduit fluidically communicated with the injector, and a burner holder comprising a burner base coupled to the burner body, the burner base comprising a hole fluidically communicating the burner body with the injector, and an injector base arranged below the burner base, the injector base comprising the injector.

[0006] The burner holder is formed by two independent parts attached together to form the burner holder, a first part comprising the injector base and a second part comprising the burner base.

[0007] In the prior art, the burner holder is formed by a single part, this part usually being manufactured from brass, aluminum, cast iron, ceramic, heat-resistant plastic, etc. Adaptation of the burner holder to the different gas burners according to different heat powers of a gas cooking appliance means that a burner holder must be designed and manufactured for every different gas burner. At the same time, specific modifications performed in the gas burners can lead to the need to replace the burner holder in its entirety.

[0008] In the gas burner assembly of the invention, since the burner holder is formed by two parts, one of the parts, i.e., the first part comprising the injector base, can be a standard part for all the gas burners, and the other part, i.e., the second part comprising the burner base, can be specific for each gas burner. Since one of the parts is a standard part for all the gas burners, the same part can therefore be used for different types of burner holders, and in the event that modifications are made on the gas burners or the burner holders have to be modified, replacing only one of the parts will suffice in many cases. A significant improvement of the manufacturing costs is thus obtained.

[0009] These and other advantages and features of the invention will become evident in view of the drawings and detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

[0010]

Figure 1 shows a partial, exploded, top perspective view of a gas cooking appliance with an embodiment of the gas burner assembly of the invention.

Figure 2 shows a bottom perspective view of the gas burner assembly of Figure 1.

Figure 3 shows a side elevational view of the gas burner assembly of Figure 1.

Figure 4 shows a partial section view of the gas burner assembly according to line IV-IV of Figure 3.

Figure 5 shows a perspective view of the burner holder of the gas burner assembly of Figure 1.

Figure 6 shows a bottom view of the burner holder of Figure 5.

Figure 7 shows a perspective view of the second part of the burner holder of Figure 5.

Figure 8 shows a front elevational view of the second part of the burner holder of Figure 5.

Figure 9 shows a perspective view of the first part of the burner holder of Figure 5.

Figure 10 shows a bottom view of the first part of the burner holder of Figure 5.

DETAILED DISCLOSURE OF THE INVENTION

[0011] The gas cooking appliance 200 of Figure 1 shows four positions of the gas burner assemblies having

different heat powers, arranged on a cooking surface 210, in one of which an embodiment of the gas burner assembly 100 of the invention having a specific heat power is shown. In this embodiment, the gas burner assembly 100 comprises a gas burner 110 in which gas combustion takes place, this gas burner 110 comprising a burner body 111 and a burner cap 112 partially covering the burner body 111, a combustion chamber being formed between the burner cap 112 and the burner body 111. The gas burner assembly 100 also comprises an injector 130 oriented towards the gas burner 110, a gas conduit 120 fluidically communicated with the injector 130, and a burner holder 10 comprising a burner base 12, and an injector base 11 arranged below the burner base 12. The burner base 12 is coupled to the burner body 111 and comprises a hole 16 fluidically communicating the burner body 111 with the injector 130. The injector base 11 is arranged below the burner base 12 and comprises the injector 130.

[0012] The gas cooking appliance 200 comprises a gas inlet connected with an external gas supply, a gas duct distributing external gas flow from the gas inlet to four gas taps 220 corresponding to each of the four gas burner assemblies of the gas cooking appliance, said elements not being shown in the drawings, with the exception of gas taps 220. These gas taps 220 allow regulating gas flow to the gas burner assemblies. The outlet of the gas tap 220 corresponding to the gas burner assembly 100 is connected to an end 121 of the gas conduit 120, the other end 122 of the gas conduit 120 being coupled to the injector base 11 of the burner holder 10. This end 122 of the gas conduit 120 is introduced into a hole 18 of the injector base 11, the coupling of said end 122 with the injector base 11 being performed with any of the techniques known in the prior art. The end 122, which comprises a mouth 123, projects from the injector base 11, and the injector 130 is coupled in said mouth 123 by means of one of the known techniques, i.e., by means of friction, by means of threading, by coupling means, etc. In this manner, the injector 130 is fluidically communicated with the gas conduit 120, and therefore with the gas flow coming from the gas inlet of the gas cooking appliance 200. In this embodiment, the direction in which the gas flow leaves the injector 130 is therefore orthogonal to the injector base 11.

[0013] As shown in Figures 5 and 6, the burner holder 10 is formed by two independent parts 10a and 10b attached together to form the burner holder 10. A first part 10a, shown in Figures 9 and 10, comprises the injector base 11 having a rectangular shape, and a second part 10b, shown in Figures 7 and 8, comprises the burner base 12. In this embodiment of the gas burner assembly 100, the first part 10a comprises two attachment arms 19 which project orthogonally upwards from two opposite sides of the injector base 11 and allow attaching said injector base 11 with the burner base 12. Each of these attachment arms 19 comprises two branches, although in other embodiments it can comprise a single branch or can comprise more than two branches.

[0014] In this embodiment of the gas burner assembly 100, the first part 10a and the second part 10b of the burner holder 10 are manufactured from a thin sheet, this thin sheet being a sheet metal transformed by stamping. However, in other embodiments of the gas burner assembly 100, one of the parts, for example, the first part 10a can be manufactured with a material and technique known in the manufacturing of burner holders, such as brass, aluminum, cast iron, ceramic, heat-resistant plastic, etc., and the second part 10b can be manufactured from a sheet metal and transformed by stamping. However, contrary to the foregoing the first part 10a can be manufactured from a sheet metal and transformed by stamping, and the second part 10b can be manufactured with a material and technique known in the manufacturing of burner holders. The burner holder 10 being formed by two parts 10a and 10b makes it possible for both parts 10a and 10, or for one of them, to be manufactured from a sheet metal transformed by stamping.

[0015] In this embodiment of the gas burner assembly 100, the first part 10a comprises, as seen in Figures 9 and 10, four support flanges 13 arranged at the ends of each of the branches corresponding to the attachment arms 19, said support flanges 13 being bent in an orthogonal direction with respect to the direction of the attachment arms 19, and therefore being parallel to the injector base 11. One of the two support flanges 13 corresponding to each attachment arm 19 is smooth, and the other one comprises a protuberance on its surface which allows welding with another surface on which it is supported. The arrangement and the number of support flanges 13 with a smooth surface or with a protuberance can obviously vary, and the number of protuberances to perform welding also can vary.

[0016] On the other hand, the second part 10b comprising the burner base 12 has a substantially oval shape, with a substantially rectangular central body. The burner base 12 comprises a flat horizontal surface arranged in the central body and comprises a circular perimetral wall 15 projecting upwards from said flat surface, and defining within its perimeter the hole 16 in the burner base 12, such that said hole 16 and the injector 130 which is arranged below the hole 16 in the injector base 11, are in fluid communication. In other embodiments, this perimetral wall 15 can have another shape which is not completely circular, or can even have another geometric shape, as long as it defines within its perimeter the hole 16.

[0017] In this embodiment of the gas burner assembly 100, the perimetral wall 15 comprises three vertical positioning grooves 17 on its surface, which are arranged at 120° each. At the same time, the burner body 111 of the gas burner 110 is a cylindrical part from which a projection, also cylindrical and hollow, projects downwards, which projection allows communicating the outside of the burner body 111 with the inside which forms the combustion chamber together with the burner cap 112. This

projection comprises on its outer surface positioning grooves (not shown in the drawings) also positioned at 120° each, such that when the gas burner assembly 100 is assembled, the positioning grooves of the projection of the burner body 111 are coupled to the positioning grooves 17 of the perimetral wall 15. The burner body 111, and therefore the combustion chamber, is thereby in fluid communication with the injector 130.

[0018] This positioning of the grooves 17 of the perimetral wall 15 of the burner holder 10, and of the complementary grooves of the burner body 111, can be different for each of the gas burners having different heat power of the gas cooking appliance. This thereby prevents the interlocking of the burner bodies and the burner holder of different gas burners of the gas cooking appliance, and therefore prevents assembly errors, and subsequent poor combustion of the gas burners. It is a type of simple poka-yoke which improves assembly quality and saves costs. This assembly system to prevent errors can be obtained with different angular positions of the positioning grooves, but it can also be obtained by causing the positioning grooves to have different dimensions, or causing the number of positioning grooves to be different, depending on the corresponding gas burner.

[0019] In this embodiment, the second part 10b comprises, as seen in Figures 7 and 8, two engagement flanges 14, each arranged on the opposite side edges of the burner base 12, in a diagonal which goes through the center of the hole 16. These engagement flanges 14 are projections of the burner base 12 bent 180° and leaving a space therein for engaging another part. When the two parts 10a and 10b of the burner holder 10 are attached together, the support flanges 13 of the first part 10a having a protuberance on its surface are supported on the lower surface of the burner base 12, and the support flanges 13 with a smooth surface are introduced into the engagement flanges 14 of the second part 10b, engaging same. This way of attaching the first part 10a and the second part 10b can be different, where the first part 10a comprises the engagement flanges 14 and the second part 10b comprises the support flanges 13.

[0020] Furthermore, the number of support flanges 13, both with a smooth surface and with a surface with a protuberance, and the number of engagement flanges 14, can be different. The first part 10a and the second part 10b can therefore be attached together without having to use welding, the support flanges 13 with the smooth surface engaging the engagement flanges 14.

[0021] Once the two parts 10a and 10b have been coupled to one another, the support flanges 13 with a protuberance on their surface are welded to the surface on which they are supported, i.e., the burner base 12 or a surface of the first part 10a. The engagement flanges 14 can remain in engagement with the support flanges 13 with a smooth surface as they are coupled, or both coupled flanges can even be tightened using mechanical means to strengthen the engagement.

[0022] The burner holder 10 being formed by the parts 10a and 10b makes it possible for the first part 10a to be standard for all the gas burners, and the second part 10b to be specific for each gas burner. Since the first part 10a is a standard part for all the gas burners, the same part 10a can therefore be used for different types of burner holders 10, and in the event that modifications are made on the gas burners or the burner holders 10 have to be modified, replacing only the second part 10b will suffice in many cases. A significant improvement of the manufacturing costs is thus obtained.

[0023] In the embodiment of the gas burner assembly 100 shown in the drawings, the hole 18 of the injector base 11 in which the injector 130 is coupled is centered on the surface of said injector base 11. At the same time, the hole 16 defined within the perimetral wall 15 of the burner base 12 is centered on the surface of said burner base 12, such that when the first part 10a and the second part 10b are attached together, said hole 16 is centered with respect to the hole 18 of the injector base 11. In this manner, when the gas burner assembly 100 is assembled, the gas flow injected from the injector 130 is centered and in fluid communication with the burner body 111.

[0024] The first part 10a, shown in Figures 9 and 10, comprises a support arm 20 which projects and extends axially from the injector base 11, and is provided for supporting a spark electrode (not shown in the drawings). This support arm 20 comprises a first extension extending orthogonally from the injector base 11 to about mid-height between the injector base 11 and the burner base 12. Contiguous to the first extension, the support arm 20 comprises a support surface 21 extending parallel to the injector base 11. The support surface 21 is therefore arranged orthogonally with respect to the axis in which the burner body 111 is coupled with the burner base 12, which in this embodiment of the gas burner assembly 100, is the axis that goes through the center of hole 18, the center of hole 16, and coincides with the axis of the projection of the burner body 111.

[0025] The support surface 21 of the support arm 20 comprises three holes 22 arranged in a row in the axial direction from the injector base 11 and centered on the support surface 21. Each of the holes 22 comprises a side opening coinciding with the edge of the support surface 21, and allowing access from outside the spark electrode with its corresponding electric connection cable, thereby making the assembly thereof in the burner holder 10 easier. The support arm 20 thereby allows positioning the spark electrode with respect to the burner body 111 in a position in which the spark coincides with the exit of the combustible gas of the gas burner 110 outwards.

[0026] Since each gas burner 110 having a different heat power has a burner body 111 with a different dimension, each hole 22 of the support surface 21 corresponds to a gas burner 110 having a different heat power. The number of holes 22 of the burner holder 10 can be different depending on the type of gas cooking appliance 200 in which said burner holder 10 is assembled.

[0027] The gas cooking appliance 200 comprises a hole 25 on its cooking surface 210 in the position of each gas burner assembly 100. Upon assembling the gas burner assembly 100, the perimetral wall 15 of the burner base 12 of the burner holder 10 projects into the hole 25 of the cooking surface 210. The burner body 111 of the gas burner 110 is assembled, being coupled in the perimetral wall 15 of the burner holder 10, and the lower portion of the burner body 111 is located slightly above the cooking surface 210, allowing the passage of air.

[0028] In this embodiment of the gas burner assembly 100, the burner base 12 of the second part 10b further comprises two primary air holes 23 arranged on the sides of the perimetral wall 15 and diagonally with respect to the axial axis of the first part 10a. When the gas burner assembly 100 is assembled, these primary air holes 23 are in fluid communication with the hole 25 of the cooking surface 210, such that they allow the passage of air from outside the gas cooking appliance 200 to the inside, below the cooking surface 210. This air is mixed with the gas injected by the injector 130, and reaches the combustion chamber of the gas burner 110 through the hole 16 of the burner base 12. The number of primary air holes 23 can be different depending on the gas burner assembly 100 and/or on the gas cooking appliance 200.

[0029] In this embodiment of the gas burner assembly 100, the second part 10b of the burner holder 10 comprises two holes 26 on the sides of the burner base 12, and the cooking surface 210 of the gas cooking appliance 200 comprises two holes 27 on the sides of hole 25. When the gas burner assembly 100 is assembled, the holes 26 of the second part 10b and the holes 27 of the cooking surface 210 coincide and are attached together by fixing means (not shown in the drawings), such that the gas burner assembly 100 is attached to the cooking surface 210 of the gas cooking appliance 200. The number of holes 26 and 27 can be different depending on the gas burner assembly 100 and/or on the gas cooking appliance 200 in which said gas burner assembly 100 is assembled.

Claims

1. Gas burner assembly for a gas cooking appliance, comprising a gas burner (110) comprising a burner body (111), an injector (130) oriented towards the gas burner (110), a gas conduit (120) fluidically communicated with the injector (130), and a burner holder (10) comprising a burner base (12) coupled to the burner body (111), the burner base (12) comprising a hole (16) fluidically communicating the burner body (111) with the injector (130), and an injector base (11) arranged below the burner base (12), the injector base (11) comprising the injector (130), **characterised in that** the burner holder (10) is formed by two independent parts (10a, 10b) attached together to form the burner holder (10), a first part (10a) comprising the injector base (11) and a second part (10b) comprising the burner base (12).

2. Gas burner assembly according to claim 1, wherein the first part (10a) and/or the second part (10b) are manufactured from a thin sheet.

3. Gas burner assembly according to claim 2, wherein the thin sheet is a sheet metal transformed by stamping.

4. Gas burner assembly according to any of the preceding claims, wherein the parts (10a, 10b) of the burner holder (10) comprise at least one support flange (13) and/or at least one engagement flange (14), the at least one support flange (13) of one part (10a, 10b) being supported on the other part (10a, 10b), and the at least one engagement flange (14) of one part (10a, 10b) engaging the other part (10a, 10b).

5. Gas burner assembly according to claim 4, wherein the support flange (13) of one part (10a, 10b) and of the other part (10a, 10b) are attached by welding.

6. Gas burner assembly according to any of the preceding claims, wherein the burner base (12) comprises a flat horizontal surface and a perimetral wall (15) projecting upwards from said flat surface and defining within its perimeter the hole (16) in the burner base (12), the burner body (111) being coupled to said perimetral wall (15).

7. Gas burner assembly according to claim 6, wherein the perimetral wall (15) comprises at least one positioning groove (17), such that depending on the position and/or the dimensions and/or the number of positioning grooves (17), the burner holder (10) interlocks with a burner body (111) having a different heat power.

8. Gas burner assembly according to any of the preceding claims, wherein the injector base (11) comprises a hole (18) in which the injector (130) is coupled, the hole (16) of the burner base (12) being centered with respect to the hole (18) of the injector base (11).

9. Gas burner assembly according to claim 8, wherein an end (122) of the gas conduit (120) is coupled in the hole (18) of the injector base (11), the injector (130) being coupled to a mouth (123) of the end (122) of the conduit (120) by friction, by means of threading, or by coupling means.

10. Gas burner assembly according to any of the preceding claims, wherein the first part (10a) comprises at least one attachment arm (19) attaching the injec-

tor base (11) with the burner base (12).

11. Gas burner assembly according to any of the preceding claims, wherein the first part (10a) comprises a support arm (20) for a spark electrode extending axially from the injector base (11), and orthogonally with respect to the axis in which the burner body (111) is coupled with the burner base (12), the support arm (20) positioning the spark electrode with respect to the burner body (111).

12. Gas burner assembly according to claim 11, wherein the support arm (20) comprises a support surface (21) comprising a plurality of holes (22) arranged in a row in the axial direction from the injector base (11), each hole (22) corresponding to each gas burner (110) according to its heat power.

13. Gas burner assembly according to any of the preceding claims, wherein the burner base (12) comprises at least one primary air hole (23), the at least one primary air hole (23) being in fluid communication with the hole (16) of the burner base (12).

14. Gas cooking appliance, **characterised in that** it comprises at least one gas burner assembly according to any of the preceding claims.

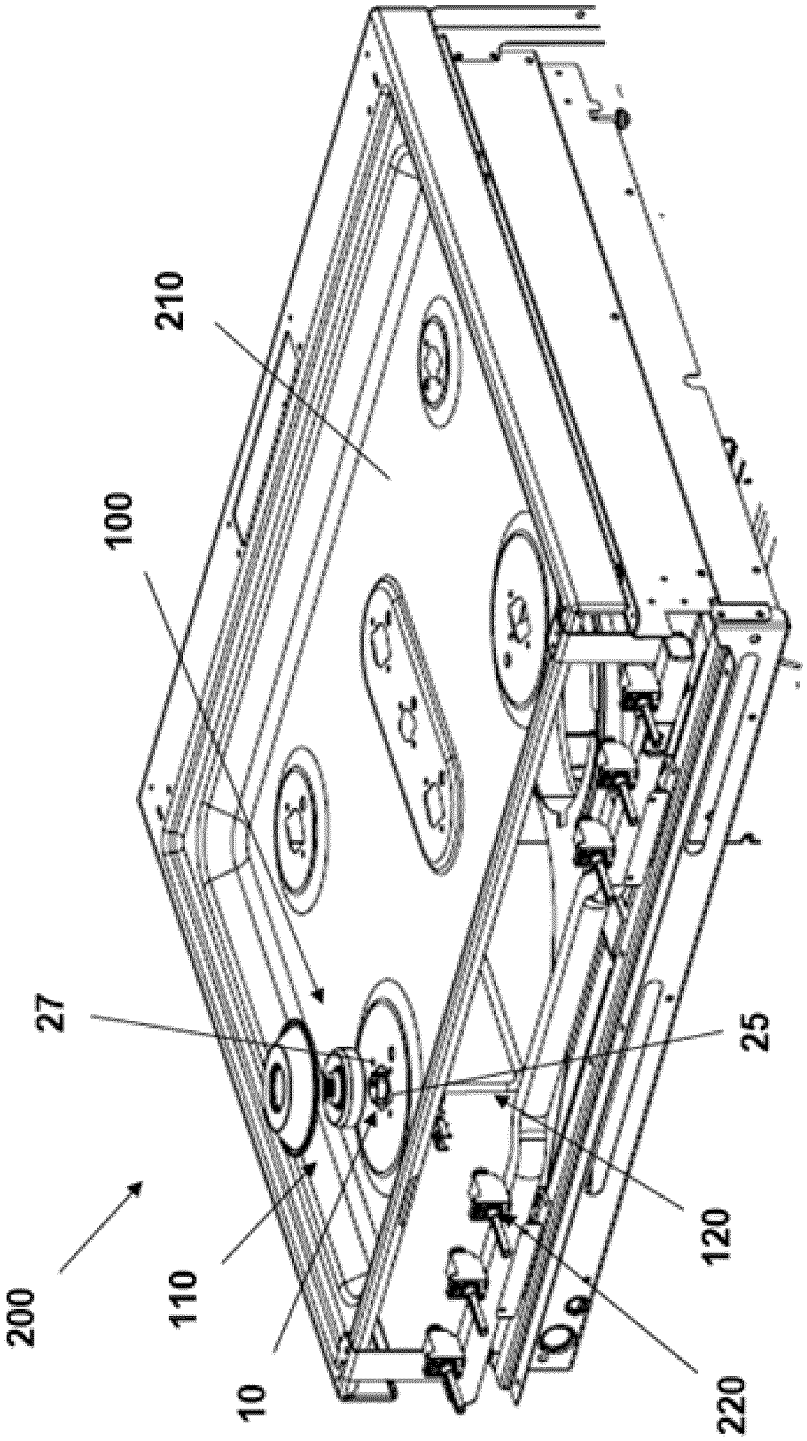
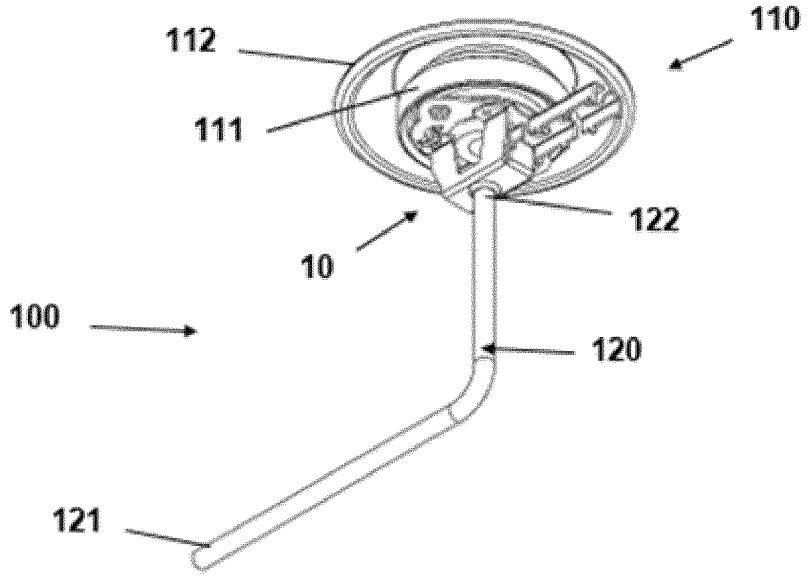


FIG. 1


112
110
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122
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100
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121

FIG. 2

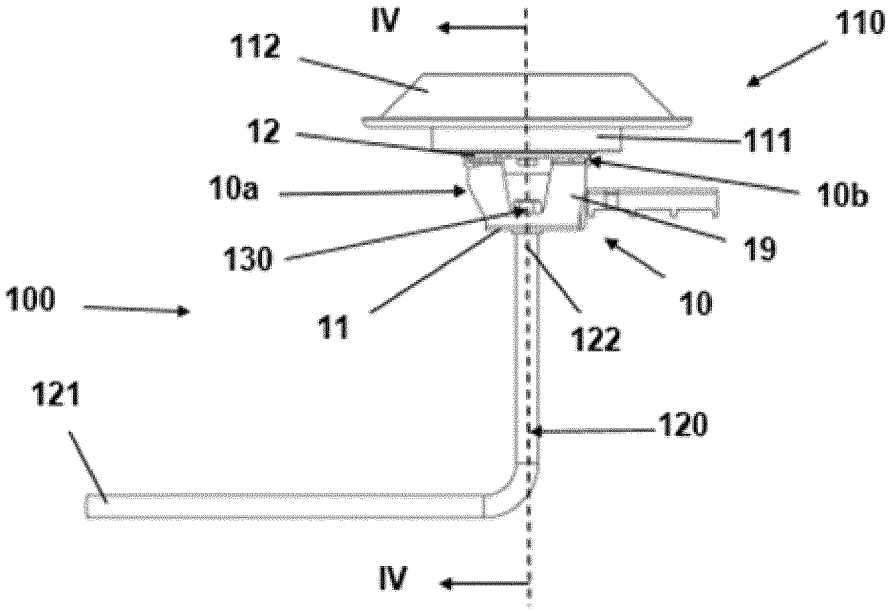
IV
110
112
12
111
10a
10b
19
130
100
10
11
122
121
120
IV

FIG. 3

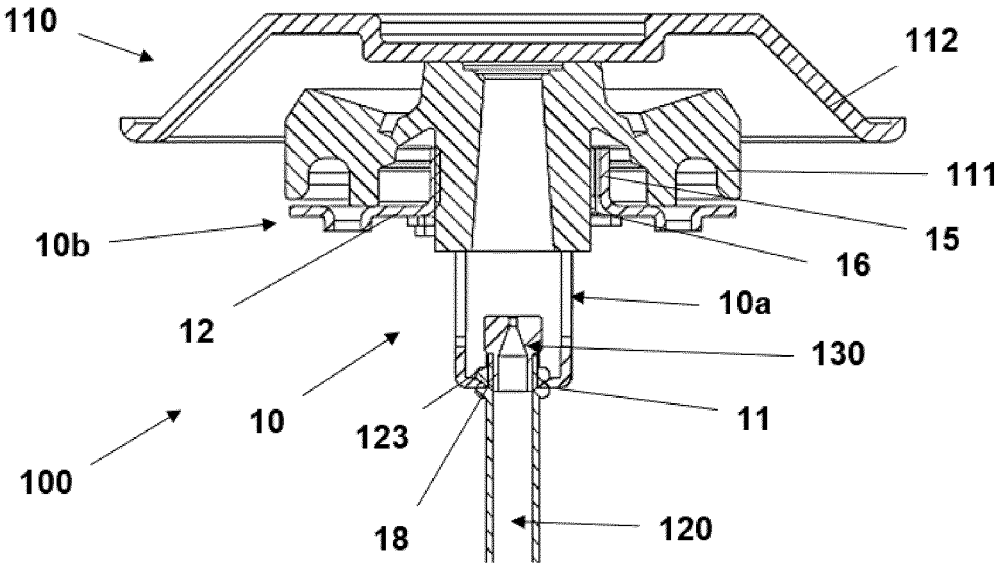
110
112
111
15
16
10b
12
10a
130
10
123
11
100
18
120

FIG. 4

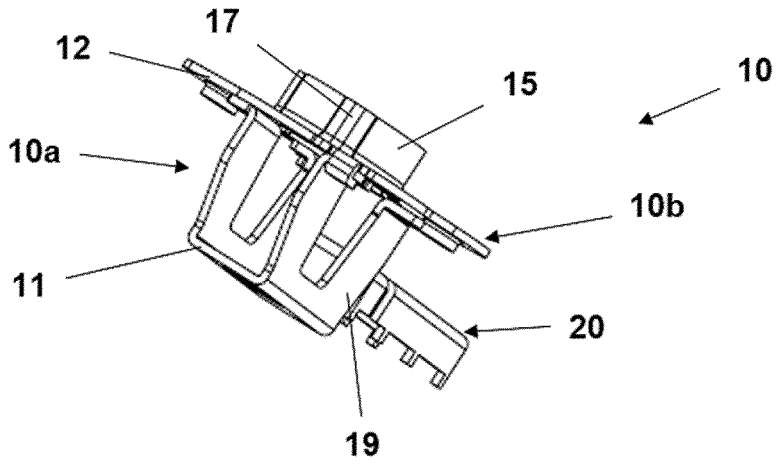
17
12
15
10
10a
10b
11
20
19

FIG. 5

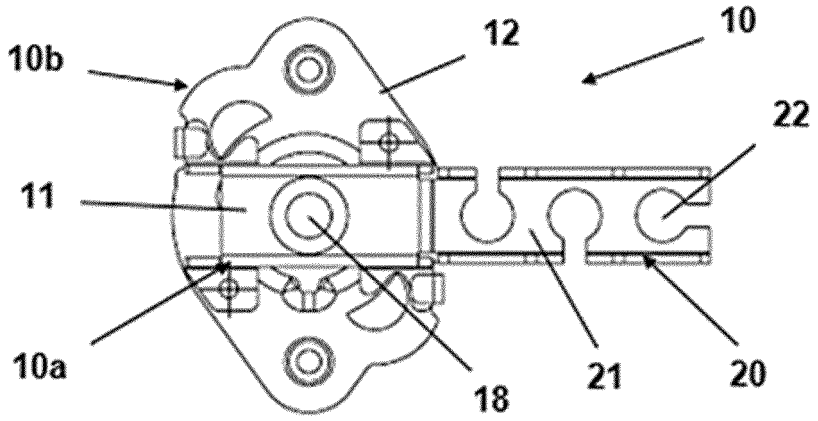

FIG. 6

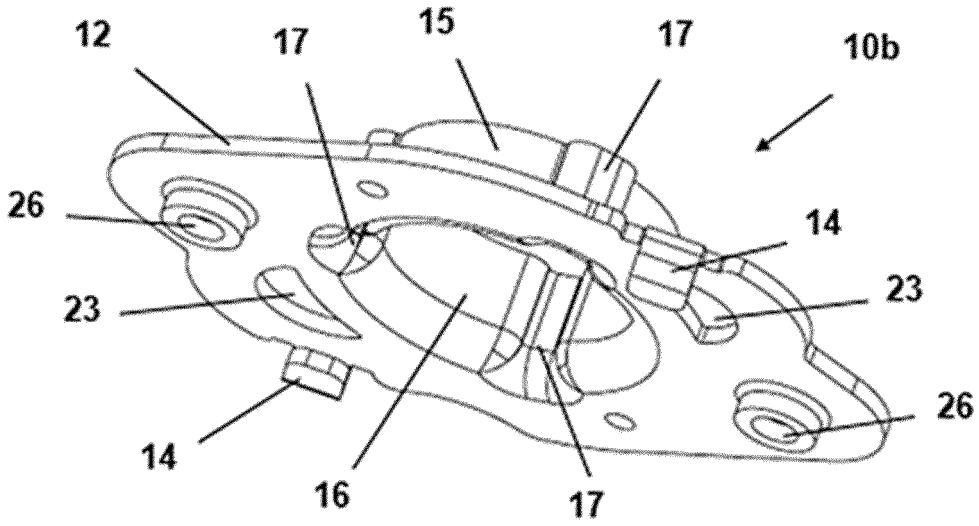

FIG. 7

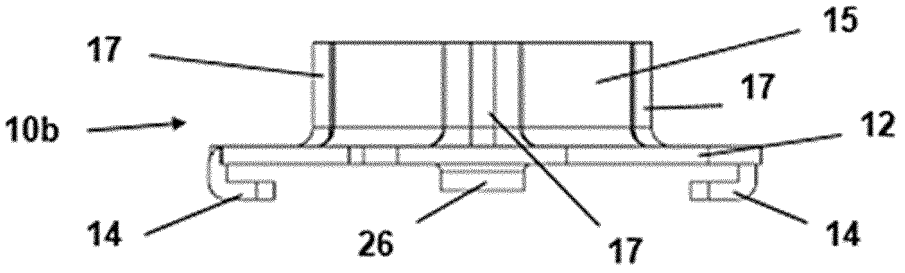

FIG. 8

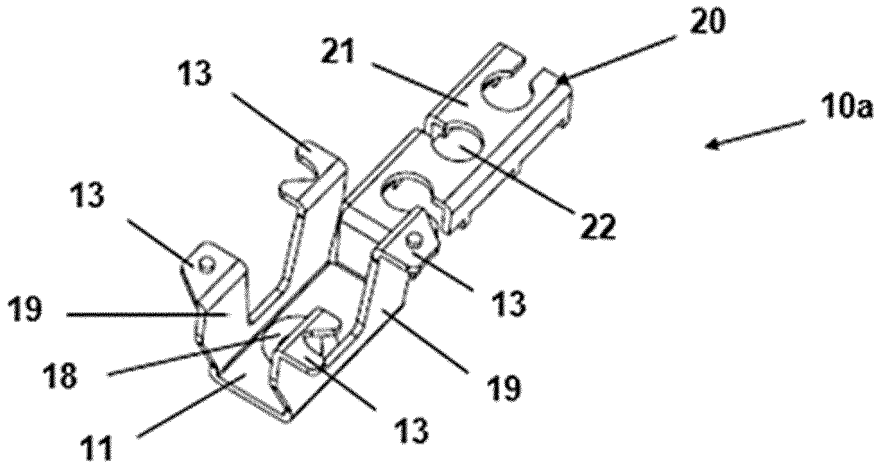

FIG. 9

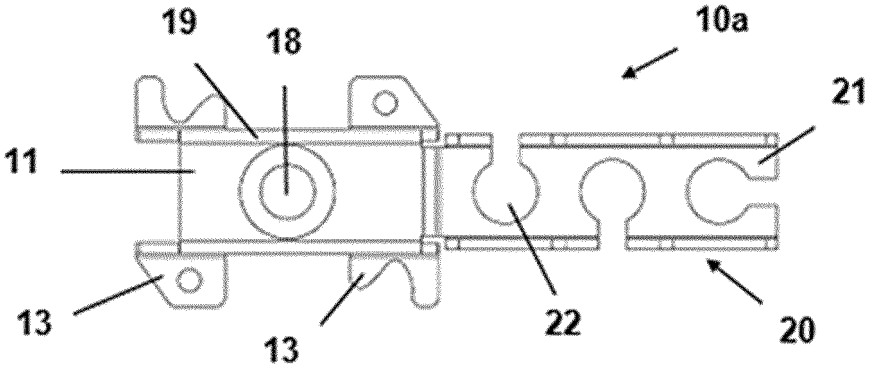

FIG. 10

INFORME DE BÚSQUEDA INTERNACIONAL

Solicitud internacional Nº
PCT/ES2018/070525

A. CLASIFICACIÓN DEL OBJETO DE LA SOLICITUD
INV. F24C3/08 F24C3/10 F23D14/06 F23D14/64
ADD.
De acuerdo con la Clasificación Internacional de Patentes (CIP) o según la clasificación nacional y CIP.

B. SECTORES COMPRENDIDOS POR LA BÚSQUEDA

Documentación mínima buscada (sistema de clasificación seguido de los símbolos de clasificación)
F24C F23D

Otra documentación consultada, además de la documentación mínima, en la medida en que tales documentos formen parte de los sectores comprendidos por la búsqueda

Bases de datos electrónicas consultadas durante la búsqueda internacional (nombre de la base de datos y, si es posible, términos de búsqueda utilizados)
EPO-Internal, WPI Data

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones Nº
X	**US 2013/092149 A1 (LONA SANT0Y0 JOSE ARTURO [MX] ET AL) 18 de abril de 2013 (2013-04-18) página 2, párrafo 66 - página 8, párrafo 123 figures 12-15**	1-6,8-14

X	**US 2015/040887 A1 (ANGUL0 JORGE RICHARD [MX]) 12 de febrero de 2015 (2015-02-12) página 1, párrafo 32 - página 4, párrafo 43 figuras 1-3, 7-10, 21, 22**	1-4, 6-10,13, 14

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[X] En la continuación del Recuadro C se relacionan otros documentos [X] Los documentos de familias de patentes se indican en el Anexo

* Categorías especiales de documentos citados:
"A" documento que define el estado general de la técnica no considerado como particularmente relevante.
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Fecha en que se ha concluido efectivamente la búsqueda internacional.	Fecha de expedición del informe de búsqueda internacional
18 de diciembre de 2018	**7 de enero de 2019**
Nombre y dirección postal de la Administración encargada de la búsqueda internacional European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Funcionario autorizado Rudolf, Andreas
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