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(54) **Oven or grill burner**

OFEN- ODER GRILLBRENNER

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Description

[0001] The present invention relates to an oven or grill burner, i.e. a burner that can be used either for an oven or a grill, comprising a flat box body delimiting an inner chamber, having fastening protrusions and according to the preamble of claim 1.

[0002] These type of burners are known and belong to the so called flat type. These can be composed of two half shells and have the advantageous characteristic of having an integrated pilot burner, which is made of one piece therewith by bending the peripheral edges when the two half shells are joined. Therefore, any drawback associated to proper positioning is obviated. The main gas outlet holes and the holes for supplying gas to the pilot burner are obtained by perforation of one of the two half shells. In another type of flat burner, each half shell has a corrugated edge opposite to that of its respective opposite half shell and the gas/air mixture outlet holes are generated by coupling those edges. Although in this second case the perforation step is avoided, the holes still have a rather large size, which is further subjected to changes in the heating step, and sealing problems may also occur between the two half shells. Flat burners typically have advantages that cannot be found in tubular burners, which consist in that all connections, and particularly those for the thermocouple and the igniter, are prearranged in an optimized manner, and there is no need to position them. Also, unlike tubular burners, flat burners may have inner walls for modulating gas distribution among the various holes, and the lack of these walls might cause unevenness problems, especially at low flame levels. Obviously, flat burners do not have the problem of the end-side closing member.

[0003] The present invention aims at providing a flat burner that can be used either for an oven or a grill and having improvements intended to rationalize and make faster its manufacturing, limiting and making easier assembling actions, above all limiting operations for fastening additional members like connections fastening the burner, thermocouples and igniters and limiting also operations for proper positioning. At the same time the invention aims at improving a burner of the above type such to limit the total size in favour of the size of the active part actually generating the flame.

[0004] Moreover by means of a proper profile the invention aims at improving the distribution of gas and air mixture inside the burner in order to obtain a more even distribution of the flame.

[0005] A further aim is to limit material waste allowing to use thinner metal sheets and therefore more easy to be treated without reducing the strenght of the burner.

[0006] The invention reaches the above aims by providing an oven or grill burner, according to the combination of features of the preamble of claim 1 and of the characterising part of claim 1, in particular an oven or a grill burner composed of a flat body delimiting an inner chamber and having a reflecting shield that can be se-

cured to one of the two upper or lower walls of said flat body, the flat body being provided with a plurality of through apertures tightly passing the upper wall and the lower wall and the shield being provided with a central part shaped in a way corresponding to the shape of the upper and/or lower wall and being provided with fastening tabs each one coinciding with a corresponding through aperture, which tabs have such a length to project outwardly beyond the wall of the side opposite to the one adhering to the central part of the reflecting shield, forming a fastening end that can be bent against said wall.

[0007] Said through apertures are provided at an intermediate area of recesses contacting the upper wall with the lower wall, the upper wall and the lower wall of the box flat body being tightly connected along edges delimiting said through apertures.

[0008] These contacting areas also form spacing members stiffening larger walls of the burner allowing to limit the thickness of the metal sheet without compromising stability and strength of the burner.

[0009] These features can be provided in combination with further improvements. For example in a further embodiment the above one can be combined with a burner of the above type wherein at least fastening members are composed of at least a tab made of one piece with flat body wall or walls.

[0010] Advantageously the fastening tab is provided in a position coinciding with at least a part of two opposite walls of the flat body.

[0011] Moreover the fastening tab is provided coincident with a through aperture made in the burner body.

[0012] According to a preferred embodiment, the fastening tab is provided coinciding with a through aperture made in the burner body and it is positioned inside the plant size of the burner.

[0013] Said fastening tab has an inclined portion spacing an ending fastening portion from a burner wall, which inclined portion is substantially parallel to said burner wall and/or to the median plane of the burner and/or to a fastening wall of the burner.

[0014] According to a further advantageous feature, the burner has a fuel and comburent mixture inlet end, which end is made like a venturi tube and it is integrated as one piece in the burner body.

[0015] Advantageously the burner is composed of two half shells separated according to a plane substantially parallel to the upper and/or lower wall of the burner the two half shells being tightly secured one with the other by mechanically bending and pressing perimetral continuous flanges along outer perimetral edges of the two half shells and along perimetral edges of the aperture coinciding with the fastening tab.

[0016] According to a further advantageous feature that can be provided even individually with respect to above ones, the invention provides

[0017] Further characteristics and improvements will form the subject of the dependent claims.

[0018] The characteristics of the invention and the ad-

vantages derived therefrom will be more apparent from the following detailed description of the annexed drawings, in which:

Fig. 1 is a first perspective view of a burner according to the present invention.

Fig. 2 is a second perspective view of the burner according to figure 1.

Fig. 3 is a further perspective view of the burner according to preceding figures but at the side opposite to the one of the preceding figures.

Fig. 4 is a plant view of the burner at the upper side thereof.

Fig. 5 is a top plant view at the lower side of the burner.

Fig. 6 is a view similar to figure 5 with the reflecting shield omitted.

Fig. 7 is a perspective view similar to fig. 2 with the reflecting shield omitted.

Fig. 8 is a side view of the burner according to figures 1 to 5.

Fig. 9 is a front view of the burner according to figures 1 to 5 at the head side opposite to the fuel/comburent mixture inlet one.

Fig. 10 is a front view of the burner according to figures 1 to 5 at the fuel/comburent mixture inlet end side.

Fig. 11 is a perspective view of the burner sectioned along a median longitudinal plane perpendicular to upper and lower walls.

Fig. 12 is a cross-section perspective view of the burner along a transverse plane perpendicular to the upper and lower walls and passing by apertures fitting fastening tabs of the reflecting shield.

Fig. 13 is a cross-section view of the burner according to a plane perpendicular to the upper and lower wall thereof, intersecting side arms supporting the flame detecting thermocouple and the igniter.

Fig. 14 is a front cross-section view of the burner along a plane perpendicular to the upper and lower wall and coinciding with a pair of through apertures for engaging fastening tabs of the reflecting shield and with said shield omitted.

Fig. 15 is a cross-section view of the burner similar to the one of figure 14 and with said reflecting shield engaging tabs in through apertures and immediately before bending projecting ends thereof against the burner wall opposite to the wall to which said reflecting shield adheres.

[0019] Referring to figures, the preferred shown embodiment is of a burner composed of two half shells mechanically tightly connected together by means of mutual bending and pressing flanges such as it is common in making box bodies made of metal material.

[0020] As already said in the introduction, such preferred embodiment is not limitative of features of the burner which can be provided in burners made by other tech-

niques.

[0021] With reference to figures the preferred embodiment of the burner according to the present invention comprises a first upper half shell and a second lower half shell indicated by 1 and 2 respectively. In this regard, it shall be noted that the words upper and lower are used herein in relation to a burner fitted inside the oven on the bottom wall or immediately beneath the top wall thereof (grill). The two half shells 1, 2 are elongated and respectively have an upper face 101 and a lower face 102 and peripheral outer edges that can be mechanically and tightly connected to form a flat, box body which also has an elongated but substantially flat shape, and integrates, even in the exterior generic aspect, the two typical characteristics of tubular and flat burners respectively. Two corresponding ends 201, 202 of the upper half shell 1 and of the lower half shell 2 respectively are conformed in such a manner that, when the two half shells 1, 2 are joined together, they automatically form a flame arc forming head. The opposite corresponding ends 301, 302 of the shells 1, 2 are truncated and are conformed in such a manner as to form a venturi tube so that said head end is intended to form the inlet for supplying fuel and mixing it with comburent that is air in this case. Venturi tube extends beyond said head end of the burner with an end housing the fuel supplying nozzle (not shown in details) provided substantially at one or two combustion air inlet apertures. The junction plane between the two half shells 1, 2 is substantially parallel both to the bottom and/or the underside and/or the top of the oven and to the outer faces 101, 102 of the two half shells 1, 2, the latter being therefore parallel. So the separator plane is practically oriented in the direction of the fuel/comburent mixture inlet and parallel to the two larger walls of the box flat body of the burner that is walls defined as the upper and lower walls indicated by 101 and 102. The two half shells 1, 2 are tightly joined together by bending continuous peripheral flanges that are subsequently riveted or drawn in order to form a channel whose outer side wall is opposite to the side wall of the half shell 1, which side wall has a row of aligned holes 501 for supplying the gas/air mixture to the channel, that forms the pilot burner. Therefore, the pilot burner is made of one piece with the burner body, whereby there is no need to provide a separate part to be attached to the tubular body, with all problems associated thereto. The pilot burner and the row of holes 501 have a substantially U-shaped extension, whose arched portion extends along the flame arc forming head and whose stems end substantially at the truncated ends 301, 302 of the two half shells particularly at a certain distance from said gas/air mixture inlet ends, considering the extension of the burner and so of the two half shells with the ending portion on the gas and air mixture inlet end intended to form the integrated venturi tube that will be described below. Each side wall of the upper half shell 1 has an additional row of holes 601 with a larger diameter, which are provided at the flame arc forming head area and form the main gas/air mixture outlet holes.

[0022] The two half shells are shaped at the air/gas mixture inlet end area in such a way to form the venturi tube wherein said mixture is produced. Therefore, in this case the half shells of the venturi tube are made of one piece as axial extensions of the half shells 1, 2 which form the box burner body, whereby, in the assembled condition, the venturi tube indicated by 5 is coaxial to the box burner body. The tubular body of the venturi tube, composed of the extensions of the two half shells 1, 2, has a substantially funnel-like shape, tapering in a direction opposite to the gas/air mixture inflow, and it extends beyond the corresponding end of the burner with an end 105 supporting the gas supplying nozzle (not shown in details) which has a pair of primary combustion air intake apertures 205. The venturi tube further has a tubular sleeve (not shown) which can slide axially along the venturi tube from a position in which it substantially completely closes said intake apertures 205 to a position in which it substantially completely opens them, thereby providing adjustment of the stoichiometric gas/air ratio. Said sleeve has a screw for axially locking it in the proper position.

[0023] An half shell 1 may have an outer peripheral flange 401 intended to form the outer, side wall of the channel which form the pilot supplying gas/air mixture acting for spreading the flame triggering the ignition which is generated by an igniter 16, whose end producing the spark is provided at the initial area of said channel on one side of the burner and in the end area thereof associated to gas/air mixture inlet. The flange 401 extends without interruptions about the outer burner perimeter from said initial end at the igniter 16 to a point which is diametrically opposite on the other side of the burner passing along the head end opposite to gas/air mixture inlet one and at which final end there is provided the sensible point of the flame detecting thermocouple 15. The flange 401 cooperates with a flange of the half shell 2 connected thereto by riveting and bending such to form a tight closing.

[0024] In the end area opposite to the gas and air mixture inlet area and at a certain distance from said end, the burner has a tab 3 for fastening it. The fastening tab 3 is made of one piece with the box burner body and it is provided at an aperture 4 of the box burner body passing through it. Such aperture 4 allows to easily reach the fastening tab 3 in order to tighten it by a screw or the like cooperating with an hole 103 in said fastening tab 3. The fastening tab 3 has an initial section 203 oriented transverse to the plane of the corresponding burner wall and it ends with a fastening section 303 oriented substantially parallel to the burner wall 101 and/or to the separator plane between the two half shells 1, 2. It shall be noted that the fastening tab overlaps the plant of the burner and it extends by its fastening section 303 at a certain distance from the burner wall to which it is overlapped. In the shown arrangement, wherein the burner is composed of two half shells 1, 2 the fastening tab 3 is composed of two shaped tongues that are obtained from the material

of the aperture 4 of each of the two half shells respectively. The two tongues 701, 702 are pressed together and are correspondingly shaped to form the fastening tab, moreover perimetral edges of said tongues 701, 702 have perimetral flanges that tightly close the perimetral edges of the tongue by bending one upon the other and by pressing and/or by drawing. Moreover said flanges are provided also along edges delimiting apertures in the wall of the two half shells 1, 2 forming the through aperture 4 coinciding with said fastening tab and by means of which the two half shells are tightly joined together along said edge delimiting said through aperture 4.

[0025] According to a further feature, when the two tongues 701, 702 are joined together the fastening tab 3 achieves a U shape that aids in stiffening it. Moreover flanges bent and pressed together along edges aid in stiffening since they generate a sort of peripheral rib or tabs.

[0026] Edges delimiting the through aperture 4 coinciding with the fastening tab 3 also generate a line abutting the two half shells acting like a spacing member strengthening the flat box body of the burner in the intermediate area of its plant extension.

[0027] From figures still another advantageous feature of the burner of the present invention is clear. The half shell 1 is shaped such to have a central depression at the outer side thereof corresponding to an inner projection in the direction of the opposite half shell 1. The central depression extends such to leave a perimetral band like a swelling extending without interruption along longitudinal sides and along the head end of the burner box body opposite to the gas and air mixture inlet end forming an U-shaped perimetral chamber supplying gas. At the head end associated to the gas/air mixture inlet and to the venturi tube 5, said perimetral chamber distributing the gas/air mixture indicated by 802 ends at a certain distance from said head end projecting also beyond the final end of the venturi tube 5 on the side inside the box burner body, so the venturi tube enters to such an extent by its final gas/air mixture outlet end between ending sections of said U-shaped perimetral chamber 802.

[0028] The rows of holes 502, and 602 are arranged substantially along the outer wall of the half shell 1 in the part thereof externally delimiting the U-shaped chamber 802 supplying gas/air mixture.

[0029] A narrowed area is formed in the inner space of the box burner body at the central recess/projection of the half shell 1 since the corresponding wall of the half shell 1 does not follow the shape of said recess/projection of the half shell 2 except for a central shape composed of a central swelling of said half shell 1 provided in the wall 101 substantially coinciding with the outer recess and inner projection of the half shell 2 which has a depth that is smaller than the one of said outer recess and inner projection of the half shell 2. Therefore as shall be noted in section views the stems of the U-shaped perimetral chamber 602 communicate one with the other by an intermediate narrowing chamber that helps in balancing

and making even the gas/air mixture pressure inside said U-shaped chamber 602. The venturi tube 5 provided coaxial to the central median axis of the burner particularly leads at said narrowing chamber at a certain distance from the head end thereof on the side faced towards the gas/air mixture inlet and in a central position of the burner. Opposite to the gas/air mixture outlet end from the venturi tube 5 in the central narrowing chamber and at a certain distance therefrom there is provided the transverse edge of the through aperture 4 coinciding with the fastening tab thus forming a transverse deviation wall for the gas/air mixture flow towards the two opposite longitudinal stems of the perimetral U-shaped chamber for supplying the gas/air mixture. Even this feature helps in improving the even spreading of gas/air mixture flow inside the burner and along outlet holes intended to form the flame in order to obtain an even flame through all the extension of the burner and particularly through longitudinal sides and through the flame arc forming head opposite to the gas/air mixture inlet end.

[0030] Still according to a further feature along peripheral edges of the venturi tube 5, the two opposite walls 1 and 2 suitably shaped in order to form said venturi tube, i.e. the two half shells thereof are in contact one with the other in order to avoid gas/air mixture flow to escape sideways while in the ending portion of the venturi tube entering inside the burner area corresponding to the central narrowing chamber T, the venturi tube is open sideways. Therefore such ending portion is made like a spout and side apertures along opposite side edges allow the gas/air mixture to pass towards ending portions of longitudinal stems of the perimetral U-shaped chamber 602.

[0031] It shall be noted that the burner has substantially the same transverse extension in the ending portion extending along the venturi tube 5 beyond the end of the narrowing chamber T and that sideways of the venturi tube the two walls 101 and 102 are pressed one against the other in order to make stiffening side tabs 11.

[0032] Since the burner has a quite large plant shape in order to avoid larger burner walls to be deformed i.e. the upper and lower walls 101 and 102 there are provided spacing members 8 among them helping in strengthening the box body structure. Said spacers are advantageously composed of recesses of walls 101 and 102 or only one of these having a limited extension with respect to the total surface of said walls and forming mutual contacting areas inside the box body. The amount and distribution as well as the extension of these contacting areas or contacting islands 8 is determined by the plant size of the burner and that is width and length and it is selected such not to compromise the function of the central narrowing chamber indicated by T in section views.

[0033] Advantageously said contacting areas are provided coinciding with through holes 9 for fastening a reflecting shield or parabola 10. When the burner is composed of two separate half shells 1 and 2 as in the shown example the edges of said holes 9 are tightly closed according to the already previously described technique

consisting in bending flanges along edges delimiting the holes and bend one upon the other. The parabola or reflecting shield 10 has a central area 110 adhering with one of the largest walls 101 or 102 of the box burner body at said holes 9 having fastening tabs 210 each fitting in a corresponding hole 9 and projecting beyond the opposite wall of the burner with a fastening end bend against said wall 101 thus causing the coupling between the parabola 10 and the burner. As can be clearly seen in figures, the central part of the parabola is adherent preferably to the burner wall having the central recess and perimetral swelling forming the perimetral U-shaped chamber 602, said central part of the parabola 10 being shaped complementary to said wall 102. All that produces a shape fit allowing to immediately, easily and quickly position the parabola and in addition it strengthens its fastening in position to the burner. Advantageously the central part of the parabola intended to adhere to the burner wall 102 has also an aperture 410 coinciding with the through aperture 4 of the box burner body and associated to the fastening tab 3.

[0034] On each one of the two opposite sides and in an intermediate area of the venturi tube 5 the burner further may include a mounting 14 for supporting in a predetermined position a flame detecting thermocouple 15 and an igniter 16 of the burner. Mountings 14 are made as one piece with the burner and are composed of arm-like projections of the stiffening tabs 11 sideways of the intermediate portion of the venturi tube 5. Each mounting 14 ends with a pair of transverse tabs 114 wherein a hole 214 is provided which holes are coaxial one with respect to the other according to an axis having a direction inclined towards the central axis of the burner and towards the row of main gas/air mixture outlet holes 601. The igniter 16 and the thermocouple 15 are designed to be introduced axially to length in each of the coaxial holes 214. Position locking means for example an elastic clip 17 are provided for axially securing the thermocouple 15 and the igniter 16. Mountings 14 have a position and arrangement such that the thermocouple and igniter automatically have the proper arrangement with respect to the burner, while when assembling the thermocouple and the igniter only the axial position has to be adjusted, that is the distance of thermocouple and igniter ends from the burner in order to perfectly operate. By means of this arrangement it is easier to assemble the burner.

[0035] As it can be seen in figures, the two arms composing the mountings 4 are provided with stiffening means. In the shown embodiment wherein the burner is composed of two half shells, mountings 14 are composed of extensions of both the half shells intended to overlap one with the other and are joined together by pressing and by drawing and/or bending flanges along perimetral edges of said extensions. Moreover, extensions of half shells 1, 2 forming mountings 14 are shaped such to form mutual spacing areas thus forming stiffenings as shown in figures by I.

[0036] As regards the construction of the burner ac-

cording to the present invention, the embodiment shown and wherein the burner is composed of only two half shells mechanically and tightly joined together by common techniques for mechanically tightly joining metal half shells is particularly advantageous even if construction advantages of the burner there can be also with burners made by different manufacturing techniques.

[0037] Each half shell is obtained by cutting and molding a sheet metal blank. Particularly the fastening tab is obtained as one piece by cutting the material intended to be removed in order to make apertures forming the through aperture 4 of the burner coinciding therewith. In this case the cutting is made only along two longitudinal edges of the aperture and along only one of the transverse edges. The two half shells as already described above are made such to have coinciding tabs in the area of one aperture intended to be overlapped one with the other forming the through aperture 4 and the fastening tab 3 of the burner, coinciding half shells of the venturi tube intended to form a venturi tube member 5, coinciding side extensions each one intended to form at least a mounting supporting an igniter and/or a thermocouple when they are mounted. Mutual intermediate contacting areas intended to form spacers and at which holes for forming through holes of the burner are provided for engaging fastening means of a parabola or a reflecting shield and along perimetral outer edges and/or along edges of holes engaging fastening means of the parabola as well as along tabs forming the fastening tab of the mechanical tight connection. Moreover in this case one of the two half shells 2 is provided with the two rows of holes 501 and 601 and/or in case with the shaping for generating the perimetral U-shaped chamber distributing the gas/air mixture.

[0038] The two half shells thus formed are fastened together and/or in case are also further partially shaped for example as regards intermediate spacers and/or fastening tab 3 and/or supporting arms 14 of the igniter and/or the shaping of the U-shaped perimetral chamber distributing the gas/air mixture and of the thermocouple by drawing and/or molding and/or bending peripheral flanges, while an outer peripheral flange of one of the two half shell is intended to form the outer side wall delimiting a channel spreading the ignition spark.

[0039] From what said above advantages of the burner of the present invention are clear. First the particular shape of the box body allows to obtain an optimum distribution of the gas/air mixture inside the burner in order to have optimum performances during the ignition and to generate an optimum and substantially even flow of the output gas/air mixture from main holes 601. Moreover the insertion of the venturi tube 5 as one piece inside the burner allows to limit the size of the burner, keeping the size of the flame unchanged relative to its distribution in the longitudinal direction of the burner. The manufacturing as one piece of the fastening tab and/or of the mountings of the thermocouple and/or igniter allow to limit costs and size and to make easier the fitting of the burner. The

fact that said mountings have such housings for the igniter and/or the thermocouple to determine an automatic optimum positioning of the thermocouple and of the igniter leaving only a degree of freedom in the axial sliding direction of these members makes more easier the fitting of the burner.

[0040] The fact of arranging the fastening tab in an intermediate position of the plant surface of the burner avoid useless projections and allows to increase the amount of flames and the length of the active part with respect to predetermined dimensions of the oven chamber.

[0041] The through aperture at said tab allow to make two types of the burner to be applied one to the bottom of the oven and the other one to the top of it in order to act as a grill. In this case during manufacturing step the fastening tab 3 may be deformed in a way symmetrically opposite to the one shown in figures and that is in order to project outwardly on the burner side opposite with respect to the shown one. Depending on the fact that an oven burner or a grill burner is manufactured, the substantial change is to vary the position of the fastening tab from a position offset with respect to the median plane to a position symmetrically opposite with respect to said median plane of the burner box body.

[0042] Further characteristics such as intermediate contact areas, and shaping of the two half shells give more stiffening and strengthening thereto allowing to use thinner metal sheets and so more easy to be shaped and to be treated, with less weight, less costs and less wear of manufacturing tools.

[0043] Obviously, the invention is not limited to the embodiments described and illustrated herein but may be greatly varied, especially as regards construction without departing from the scope of the invention as defined in the appended claims.

Claims

1. Oven or grill burner composed of a box flat body delimiting an inner chamber and having a reflecting shield (10).
the said reflecting shield can be fastened to one of the two upper or lower walls (1) (2) of said box flat body, the flat body being provided with a plurality of through apertures (9) tightly passing the upper wall and the lower wall and the shield being provided with a central portion shaped correspondingly to the shape of the upper and/or lower wall and **characterized in that** the reflecting shield is provided with fastening tabs (210) each one coinciding with a corresponding through aperture, which tabs have such a length to project outwardly beyond the wall of the side opposite to the one adhering to the central part of the reflecting shield, forming a fastening end that can be bent against said wall.

2. Burner according to claim 1, **characterized in that** the through apertures are provided at an intermediate area of recesses contacting the upper wall with the lower wall, the upper wall and the lower wall of the box flat body being tightly connected along edges delimiting said through apertures. 5
3. Burner according to claim 2, **characterized in that** edges delimiting through apertures in the upper wall and in the lower wall of the burner flat body are provided with flanges for tight connection by bending and by pressing. 10
4. Burner according to claims 2 or 3, **characterized in that** recesses contacting the upper wall with the lower wall form spacers for said two walls. 15
5. Burner according to one or more of the preceeding claims, **characterized in that** the reflecting shield adheres against the burner wall having a central recess and in a position coinciding with said recess it has a correspondingly shaped projection intended to engage in said recess of said burner wall by a shape fit. 20
6. Burner according to one or more of the preceeding claim, **characterized in that** the said flat body has fastening protrusions, constituted by fastening members that are composed of at least a tab (3) made of one piece with the wall or walls of the flat body, which fastening tab is provided in a position coinciding with at least a part of two opposite walls of the flat body, in particular coinciding with a through apertures (4) made in the burner body which through aperture is closed along all perimetral edges. 25 30
7. Burner according to one or more of the preceding claims, **characterized in that** is has a fuel and comburent inlet end (105), which end is made like a venturi tube (5) and it is integrated as one piece in the burner body, wherein the fastening tab is provided at least in the area of the burner end opposite to the fuel and comburent mixture inlet end. 35 40
8. Burner according to one or more of the preceding claims, **characterized in that** the said flat body is composed of two half shells separated along a plane substantially parallel to the upper and/or lower wall of the burner the two half shells being tightly secured together by mechanically bending and pressing perimetral continuous flanges along outer perimetral edges of the two half shells and along perimetral edges of the aperture. 45 50
9. Burner according to claim 8, **characterized in that** each one of the two half shells has an aperture coinciding with a tab, the apertures and tabs of the two half shells being coincident and the two tabs of the two half shells being tightly secured by pressing and/or bending perimetral flanges, and in the mutual fastening state making the fastening tab (3) of the burner. 55
10. Burner according to claims 7 and 8 or 9, **characterized in that** the outer perimetral flange (401) of a first half shell of the two half shells makes the outer side and bottom wall of a perimetral channel that extends without interruption along the two longitudinal sides of the burner and at the end opposite to the fuel/comburent mixture inlet end, while the second half shell has a first row of fuel/comburent mixture outlet holes (501) provided along the perimetral band of said second half shell delimiting the channel on the inner side, which said first row of holes extends also along the head end of the burner opposite to the fuel/comburent mixture inlet end.
11. Burner according to claim 10, **characterized in that** it has a row of fuel/comburent mixture outlet holes (601) generating the flame, which said row of fuel/comburent mixture outlet holes is provided along the side wall of the second half shell beside the first row of holes and at such an height that holes come out above the free upper edge of the perimetral channel, wherein the holes of the first row have a diameter smaller with respect to fuel/comburent mixture outlet holes for generating the flame.
12. Burner according to claim 7 and any of claims 8 to 11, **characterized in that** at the fuel/comburent mixture inlet end the first and the second half shells are shaped such to form each one an half of a venturi tube (5) according to a diametral plane of said venturi tube, side edges of the two halves of the venturi tube being shaped in each half shell such to be tightly in contact.
13. Burner according to any one of claims 7, 10, 11, 12, **characterized in that** the box body of the burner is shaped such to make a perimetral U-shaped chamber (602) extending for a certain length of longitudinal sides and along the head side opposite to the fuel/comburent mixture inlet one and which chamber delimits an intermediate chamber for communication of stems of the perimetral U-shaped chamber having an inner height lower than the height of the perimetral U-shaped chamber.
14. Burner according to claim 13, **characterized in that** the venturi tube (5) ends by its end inside the burner beyond the head end of longitudinal stems of the perimetral U-shaped chamber.

15. Burner according to any one of claims 7, 10 to 14, **characterized in that** one of the two upper and/or lower walls of the burner is substantially a flat one, while the opposite wall has a central depression surrounding by a perimetral swelling along longitudinal sides and along the head edge opposite to the fuel/comburent mixture inlet head end, while the two walls extend towards the head end corresponding to the fuel/comburent inlet each one with a central swelling having the shape of opposing double frustum of cone and with a semicircular cross-section which central swelling forms the corresponding half of the venturi tube.

Patentansprüche

1. Ofen- oder Grillbrenner, der aus einem flachen Kastenkörper besteht, der eine innere Kammer begrenzt und ein reflektierendes Abschirmelement (10) umfasst, wobei das reflektierende Abschirmelement an einer oberen oder unteren Wand (1, 2) des flachen Kastenkörpers befestigt werden kann und der flache Körper mit mehreren Durchgangsöffnungen (9) versehen ist, die eng anliegend die obere Wand und die untere Wand durchqueren, und die Abschirmung mit einem mittigen Abschnitt versehen ist, der entsprechend der Form der oberen und/oder unteren Wand geformt ist, **dadurch gekennzeichnet ist, dass** die reflektierende Abschirmung mit Befestigungsnasen (210) versehen ist, die jeweils mit einer entsprechenden Durchgangsöffnung übereinstimmen, wobei die Nasen eine solche Länge haben, dass sie auswärts über die Wand auf der Seite gegenüber der Seite hinausragen, die an dem mittigen Teil der reflektierenden Abschirmung haftet, so dass ein Befestigungsende gebildet wird, das gegen die Wand gebogen werden kann.
2. Brenner nach Anspruch 1, **dadurch gekennzeichnet, dass** die Durchgangsöffnungen in einem Zwischenbereich von Ausnehmungen angeordnet sind, welche die obere Wand mit der unteren Wand in Kontakt bringen, wobei die obere Wand und die untere Wand des flachen Kastenkörpers fest entlang der Ränder verbunden sind, welche die Durchgangsöffnungen begrenzen.
3. Brenner nach Anspruch 2, **dadurch gekennzeichnet, dass** Ränder, die Durchgangsöffnungen in der oberen Wand und in der unteren Wand des flachen Brennerkörpers begrenzen, mit Flanschen für eine feste Verbindung durch Biegen und durch Pressen versehen sind.
4. Brenner nach den Ansprüchen 2 oder 3, **dadurch gekennzeichnet, dass** Ausnehmungen, welche die obere Wand mit der unteren Wand in Kontakt brin-

gen, Abstandshalter für die zwei Wände bilden.

5. Brenner nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die reflektierende Abschirmung an der Brennerwand angebracht ist, die eine mittige Vertiefung aufweist, und in einer Position angebracht ist, die mit der Aussparung übereinstimmt, und dass sie einen entsprechend geformten Vorsprung aufweist, der dafür vorgesehen ist, formschlüssig in die Aussparung der Brennerwand einzugreifen.
6. Brenner nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der flache Körper Befestigungsvorsprünge aufweist, die aus mindestens einer Nase (3) bestehen, die einstückig mit der Wand oder den Wänden des flachen Körpers ausgebildet ist, wobei die Befestigungsnase in einer Position angeordnet ist, die mit mindestens einem Teil von zwei gegenüberliegenden Wänden des flachen Körpers übereinstimmt, insbesondere mit einer Durchgangsöffnung (4) übereinstimmt, die in dem Brennerkörper ausgebildet ist und die Durchgangsöffnung entlang allen Umfangsrändern geschlossen ist.
7. Brenner nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** er ein Brennstoff- und Brennmittel-Einlassende (105) aufweist, wobei das Ende wie ein Venturirohr (5) ausgebildet ist und einstückig in den Brennerkörper integriert ist, wobei die Befestigungsnase mindestens im Bereich des Brennerendes gegenüber dem Brennstoff- und Brennmittelgemisch-Einlassende angeordnet ist.
8. Brenner nach einem oder mehreren der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der flache Körper aus zwei Halbschalen besteht, die entlang einer Ebene getrennt sind, die im Wesentlichen parallel zu oberen und/oder unteren Wand des Brenners verläuft, wobei die zwei Halbschalen fest miteinander verbunden sind, indem durchgehende Umfangsflansche entlang der Außenumfangsränder der zwei Halbschalen und entlang der Umfangsränder der Öffnung mechanisch gebogen und zusammengepresst werden.
9. Brenner nach Anspruch 8, **dadurch gekennzeichnet, dass** jede der zwei Halbschalen eine Öffnung hat, die mit einer Nase übereinstimmt, wobei die Öffnungen und Nasen der zwei Halbschalen miteinander übereinstimmen und die zwei Nasen der zwei Halbschalen fest aneinander befestigt sind, indem Umfangsflansche zusammengepresst und/oder gebogen werden, und im aneinander befestigten Zustand die Befestigungsnase (3) des Brenners bilden.

10. Brenner nach den Ansprüchen 7 und 8 oder 9, **dadurch gekennzeichnet, dass** der Außenumfangsflansch (401) einer ersten Halbschale der zwei Halbschalen die Außenseite und Bodenwand eines Umfangskanals bildet, der sich ohne Unterbrechung entlang der zwei Längsseiten des Brenners und am Ende gegenüber dem Brennstoff- oder Brennmittelgemisch-Einlassende erstreckt, während die zweite Halbschale eine erste Reihe von Brennstoff- oder Brennmittelgemisch-Auslasslöchern (501) aufweist, die entlang des Umfangsbandes der zweiten Halbschale, das den Kanal auf der Innenseite begrenzt, angeordnet sind, wobei sich die erste Reihe von Löchern auch entlang des Kopfendes des Brenners gegenüber dem Brennstoff- oder Brennmittelgemisch-Einlassende erstreckt.
11. Brenner nach Anspruch 10, **dadurch gekennzeichnet, dass** er eine Reihe von Brennstoff- oder Brennmittelgemisch-Auslasslöchern (601) aufweist, welche die Flamme erzeugen, wobei die Reihe von Brennstoff- oder Brennmittelgemisch-Auslasslöchern entlang der Seitenwand der zweiten Halbschale neben der ersten Reihe von Löchern und in einer solchen Höhe angeordnet ist, dass Löcher oberhalb des freien oberen Randes des Umfangskanals austreten, wobei die Löcher der ersten Reihe einen kleineren Durchmesser mit Bezug auf die Brennstoff- oder Brennmittelgemisch-Auslasslöcher zum Erzeugen der Flamme haben.
12. Brenner nach Anspruch 7 und nach einem der Ansprüche 8 bis 11, **dadurch gekennzeichnet, dass** am Brennstoff- oder Brennmittelgemisch-Einlassende die erste und die zweite Halbschale so geformt sind, dass sie jeweils eine Hälfte eines Venturirohres (5) gemäß einer diametralen Ebene des Venturirohres bilden, wobei Seitenränder der zwei Hälften des Venturirohres in jeder Halbschale so geformt sind, dass sie in einem unmittelbaren Kontakt stehen.
13. Brenner nach einem der Ansprüche 7, 10, 11, 12, **dadurch gekennzeichnet, dass** der Kastenkörper des Brenners so geformt ist, dass er eine umfänglich verlaufende U-förmige Kammer (602) bildet, die sich um eine bestimmte Länge von Längsseiten und entlang der Kopfseite gegenüber dem Brennstoff- oder Brennmittelgemisch-Einlassende erstreckt, und wobei die Kammer eine Zwischenkammer für eine Kommunikation von Schäften der umfänglich verlaufenden U-förmigen Kammer begrenzt, die eine innere Höhe haben, die niedriger als die Höhe der umfänglich verlaufenden U-förmigen Kammer ist.
14. Brenner nach Anspruch 13, **dadurch gekennzeichnet, dass** das Venturirohr (5) an seinem Ende im Inneren des Brenners jenseits des Kopfendes von Längsschäften der umfänglich verlaufenden U-för-

migen Kammer endet.

15. Brenner nach einem der Ansprüche 7, 10 bis 14, **dadurch gekennzeichnet, dass** eine der zwei oberen und/oder unteren Wände des Brenners im Wesentlichen flach ist, während die gegenüberliegende Wand eine mittige Vertiefung aufweist, die von einer umfänglich verlaufenden Wulst entlang Längsseiten und entlang des Kopfrands gegenüber dem Brennstoff- oder Brennmittelgemisch-Einlasskopfende umgeben ist, während sich die zwei Wände in Richtung des Kopfendes entsprechend dem Brennstoff- oder Brennmittelgemisch-Einlasskopfende erstrecken und jeweils eine mittige Wulst aufweisen, welche die Form eines gegenüberliegenden doppelten Kegelstumpfes hat, und einen halbkreisförmigen Querschnitt aufweisen, wobei die mittige Wulst die entsprechende Hälfte des Venturirohres bildet.

Revendications

- Brûleur de four ou de grill composé d'un corps plat en forme de boîte, délimitant une chambre interne et présentant un écran de réflexion (10), ledit écran de réflexion peut être fixé à l'une des deux parois supérieure ou inférieure (1) ou (2) dudit corps plat en forme de boîte, le corps plat étant muni d'une pluralité d'ouvertures débouchantes (9), traversant la paroi supérieure et la paroi inférieure de façon étanche, et l'écran étant muni d'une partie centrale façonnée de manière correspondante à la forme de la (des) paroi(s) supérieure et/ou inférieure, et **caractérisé en ce que** l'écran de réflexion comporte des ailettes de fixation (210) chacune coïncidant avec une ouverture débouchante correspondante (9), lesdites ailettes ayant une telle longueur qu'elle font saillie vers l'extérieur au delà de la paroi du côté opposé au côté adhérent à la partie centrale de l'écran de réflexion, formant une extrémité de fixation qui peut être pliée contre ladite paroi.
- Brûleur selon la revendication 1, **caractérisé en ce que** les ouvertures débouchantes sont formées sur une zone intermédiaire d'enfoncements de contact de la paroi supérieure contre la paroi inférieure, la paroi supérieure et la paroi inférieure du corps plat en forme de boîte étant reliées de façon étanche le long de bords délimitant lesdites ouvertures débouchantes.
- Brûleur selon la revendication 2, **caractérisé en ce que** les bords délimitant les ouvertures débouchantes dans la paroi supérieure et la paroi inférieure du corps plat du brûleur sont munis de brides, pour assurer une liaison étanche par pliage et pression.
- Brûleur selon la revendication 2 ou 3, **caractérisé**

en ce que les enfoncements de contact de la paroi supérieure contre la paroi inférieure forment des écarteurs pour lesdites deux parois.

5. Brûleur selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** l'écran de réflexion adhère contre la paroi du brûleur ayant un enfoncement central, et comporte, dans une position coïncidant avec ledit enfoncement, une saillie de forme correspondante, destinée à s'engager dans ledit enfoncement de ladite paroi de brûleur par verrouillage de forme. 5 10
6. Brûleur selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit corps plat comporte des saillies de fixation, constituées d'organes de fixation composés d'au moins une languette (3) fabriquée d'une seule pièce avec la ou les paroi(s) du corps plat, laquelle languette de fixation est placée dans une position coïncidant avec au moins une partie de deux parois opposées du corps plat, notamment coïncidant avec une ouverture débouchante (4), formée dans le corps de brûleur, laquelle ouverture débouchante est fermée sur tous ses bords périmétraux. 15 20 25
7. Brûleur selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comporte une extrémité d'entrée de combustible et de comburant (105), ladite extrémité étant réalisée en forme de tube de Venturi et étant intégrée en une seule pièce dans le corps de brûleur, dans lequel la languette de fixation est placée au moins dans la zone de l'extrémité de brûleur opposée à l'extrémité d'entrée du mélange combustible-comburant. 30 35
8. Brûleur selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit corps plat est composé de deux demi-coques, séparés le long d'un plan sensiblement parallèle à la (aux) paroi(s) supérieure et/ou inférieure du brûleur, les deux demi-coques étant serrées entre elles de façon étanche par pliage mécanique et pression de brides périmétrales continues le long des bords périmétraux extérieurs des deux demi-coques et le long des bords périmétraux de l'ouverture. 40 45
9. Brûleur selon la revendication 8, **caractérisé en ce que** chacune des deux demi-coques présente une ouverture coïncidant avec une languette, les ouvertures et les languettes des deux demi-coques coïncidant entre elles, et les deux languettes des deux demi-coques étant serrées entre elles de façon étanche par pression et/ou pliage de brides périmétrales et formant, en condition de fixation réciproque, la languette de fixation du brûleur. 50 55

10. Brûleur selon les revendications 7 et 8 ou 9, **caractérisé en ce que** la bride périmétrale extérieure (401) d'une première demi-coque des deux demi-coques forme la paroi latérale extérieure et de fond d'un canal périmétral s'étendant sans interruption le long des deux côtés du brûleur et à l'extrémité opposée à l'extrémité d'entrée du mélange combustible-comburant, alors que la seconde demi-coque comporte une première rangée de trous de sortie pour le mélange combustible-comburant le long de la bande périmétrale de ladite seconde demi-coque délimitant le canal sur le côté intérieur, laquelle première rangée de trous s'étend également le long de l'extrémité tête du brûleur, opposée à l'extrémité d'entrée du mélange combustible-comburant.
11. Brûleur selon la revendication 10, **caractérisé en ce qu'il** comporte une rangée de trous de sortie de mélange combustible-comburant (601), ladite rangée de trous de sortie de mélange combustible-comburant étant formée le long de la paroi latérale de la seconde demi-coque à côté de la première rangée de trous et à une telle hauteur que les trous débouchent au dessus du bord supérieur libre du canal périmétral, dans lequel les trous de la première rangée ont un diamètre plus petit que les trous de sortie de mélange combustible-comburant pour générer la flamme.
12. Brûleur selon la revendication 7 et n'importe laquelle des revendications 8 à 11, **caractérisé en ce qu'à** l'extrémité d'entrée de mélange combustible-comburant, la première et la seconde demi-coques sont façonnées de manière à former chacune une moitié d'un tube de Venturi (5) selon un plan diamétral dudit tube de Venturi, les bords latéraux des deux moitiés du tube de Venturi étant façonnés, dans chaque demi-coque, de manière à se trouver en contact étanche l'un contre l'autre.
13. Brûleur selon n'importe laquelle des revendications 7, 10, 11, 12, **caractérisé en ce que** le corps en forme de boîte du brûleur est façonné de manière à former une chambre périmétrale en U (602) s'étendant sur une longueur donnée des côtés longitudinaux et du côté tête opposé au côté d'entrée de mélange combustible-comburant, ladite chambre délimitant une chambre intermédiaire permettant la communication des branches de la chambre périmétrale en U dont la hauteur intérieure est plus petite que la hauteur de la chambre périmétrale en U.
14. Brûleur selon la revendication 13, **caractérisé en ce que** le tube de Venturi (5) se termine par son extrémité débouchant à l'intérieur du brûleur au delà de l'extrémité tête des branches longitudinales de la chambre périmétrale en U.

15. Brûleur selon n'importe laquelle des revendications 7, et 10 à 14, **caractérisé en ce qu'**une des deux parois supérieure et/ou inférieure du brûleur est sensiblement plate, alors que la paroi opposée comporte une dépression centrale entourée par un renflement périmétral le long des côtés longitudinaux et le bord de tête opposé à l'extrémité d'entrée du mélange combustible-comburant, alors que les deux parois s'étendent vers l'extrémité tête correspondant à l'entrée du combustible-comburant, chacune avec un renflement central ayant la forme d'un double tronc de cône opposé et une coupe transversale semi-circulaire, le renflement central formant la moitié correspondante du tube de Venturi.

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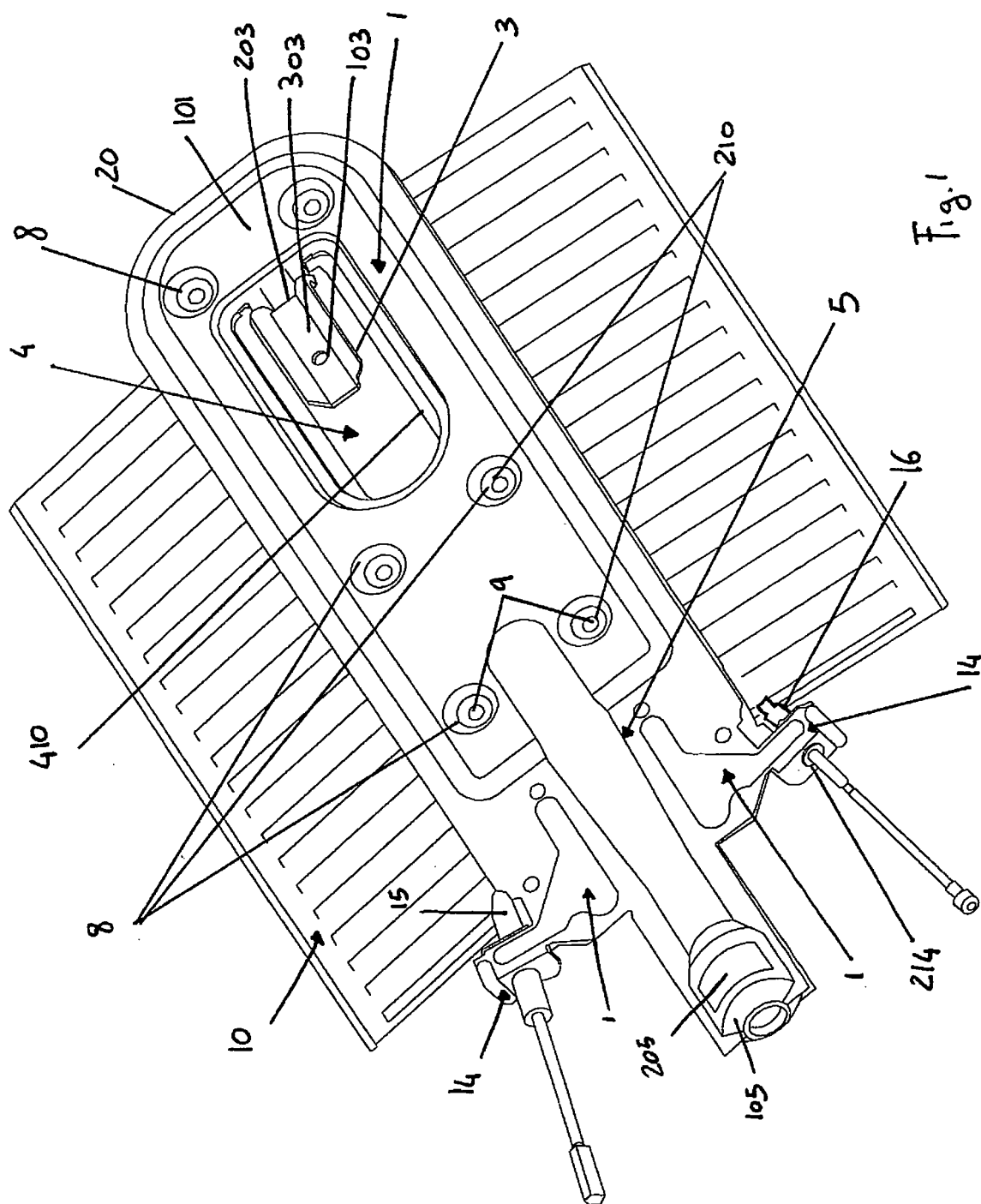
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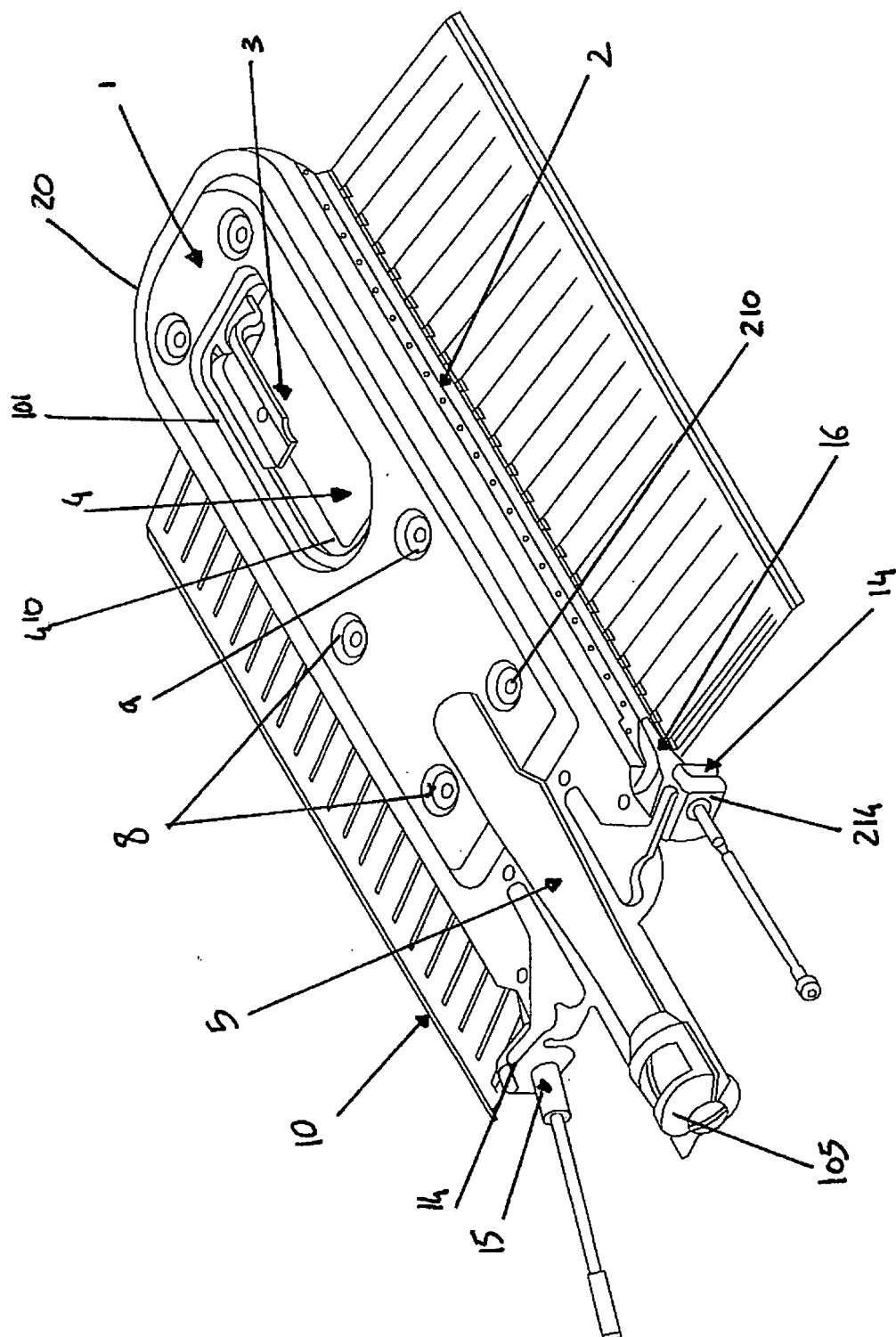
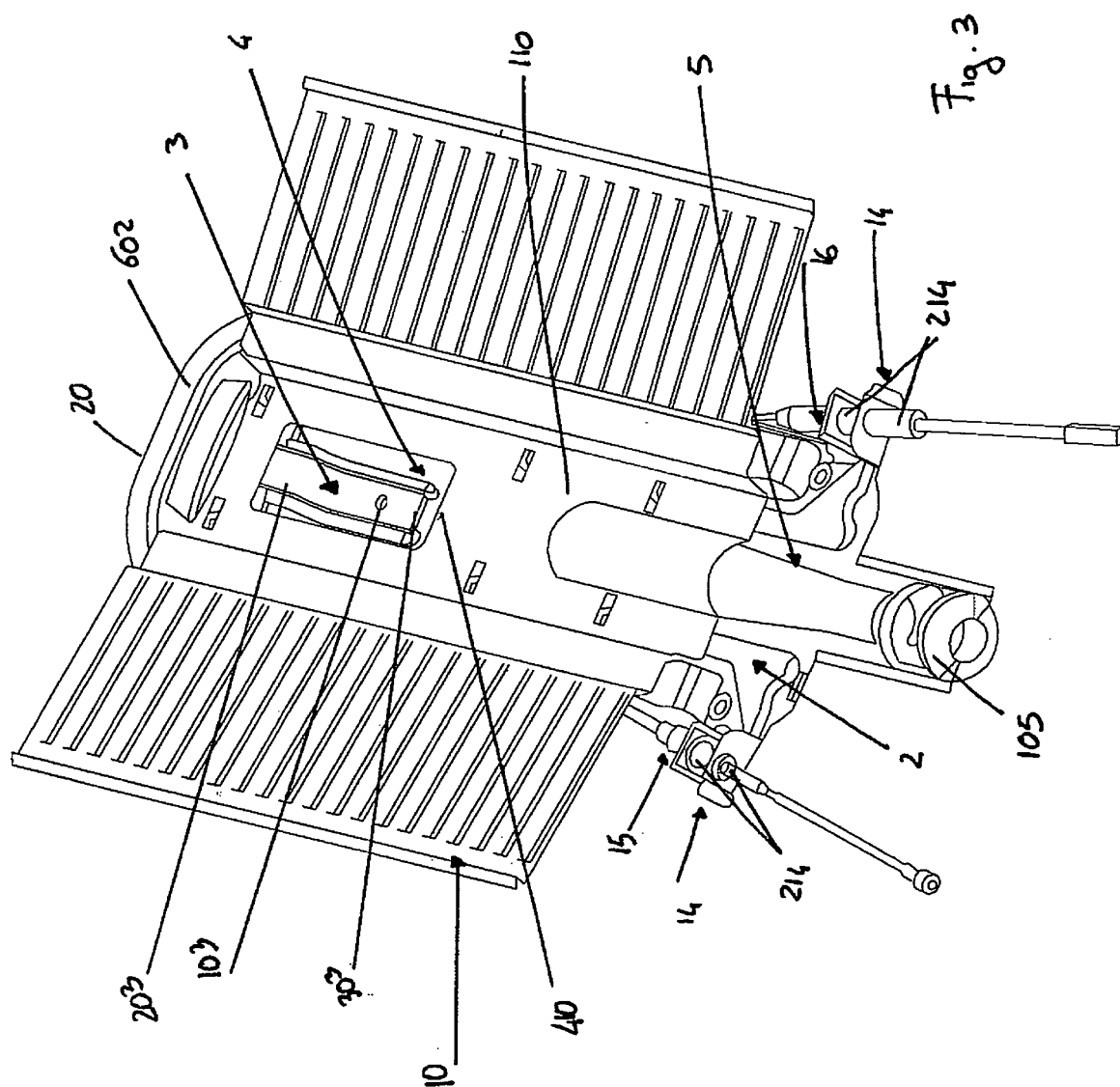
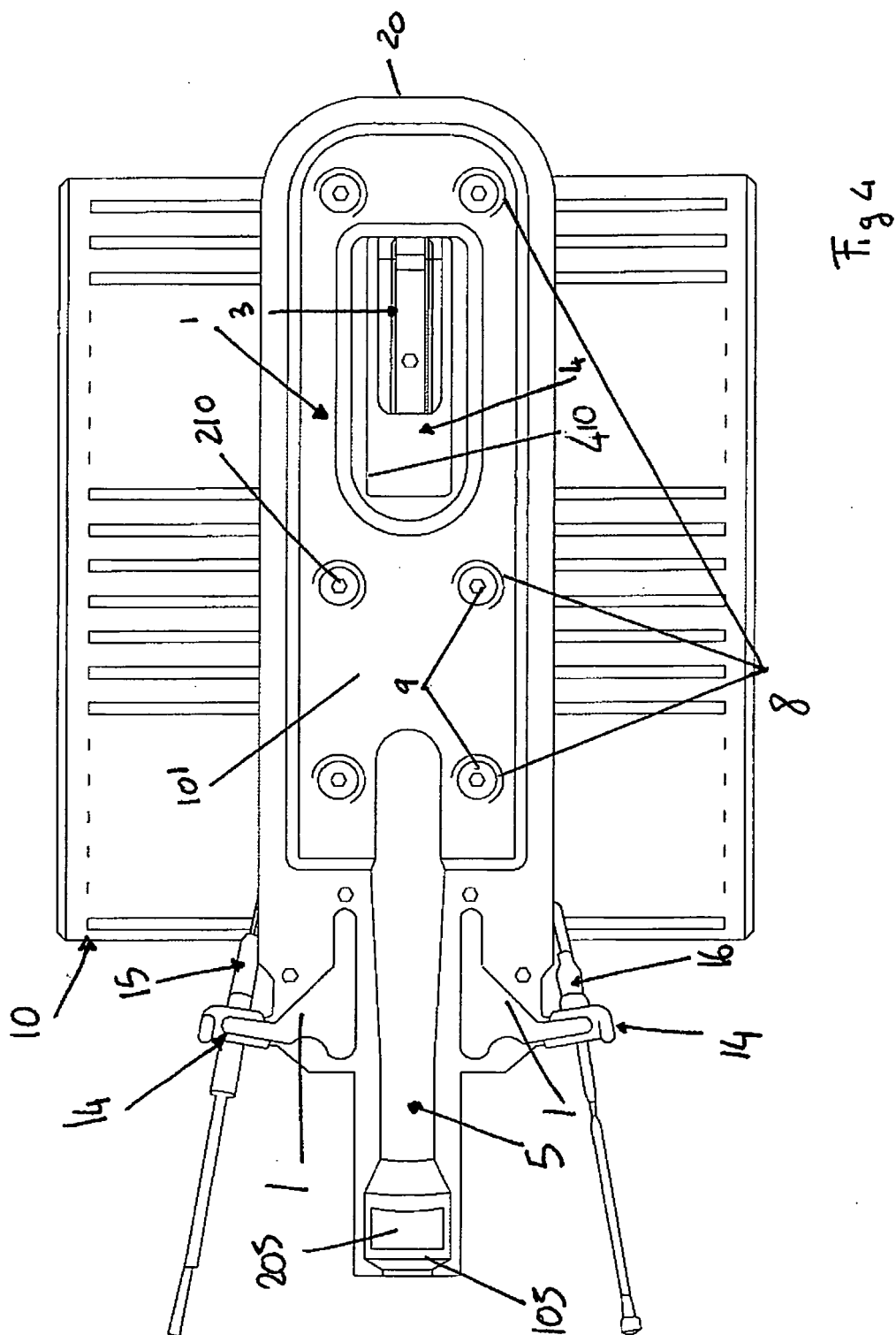
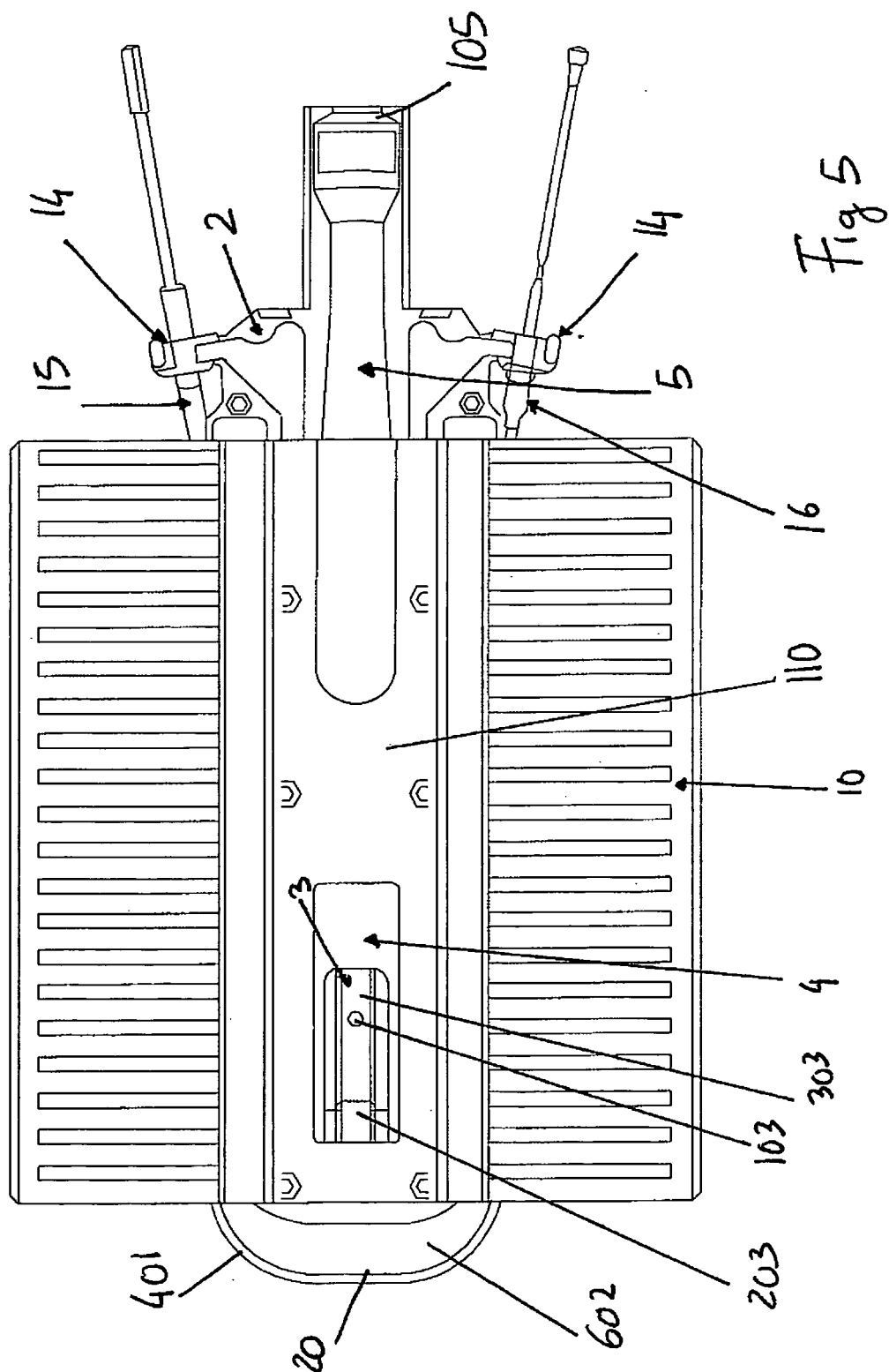
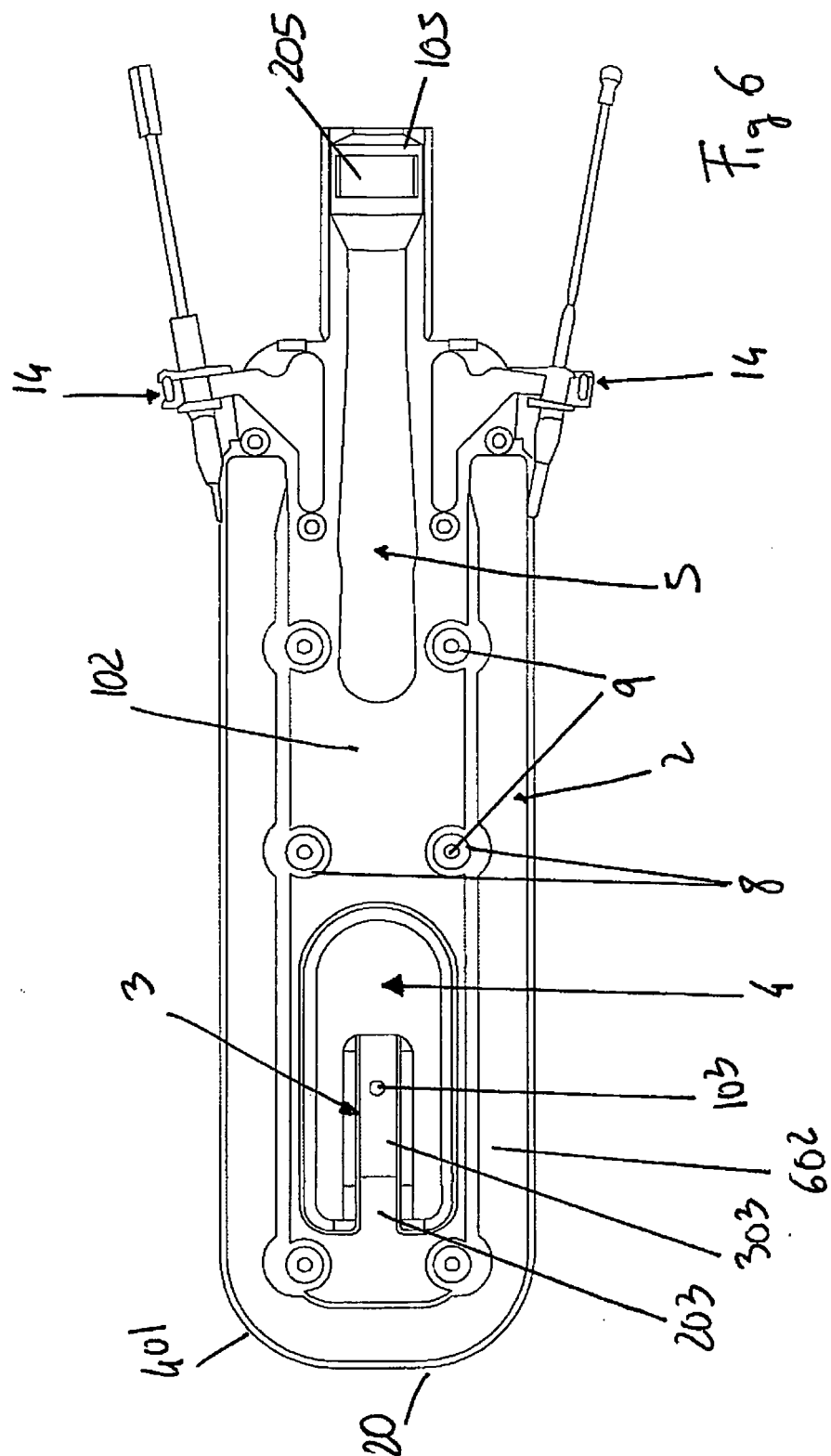


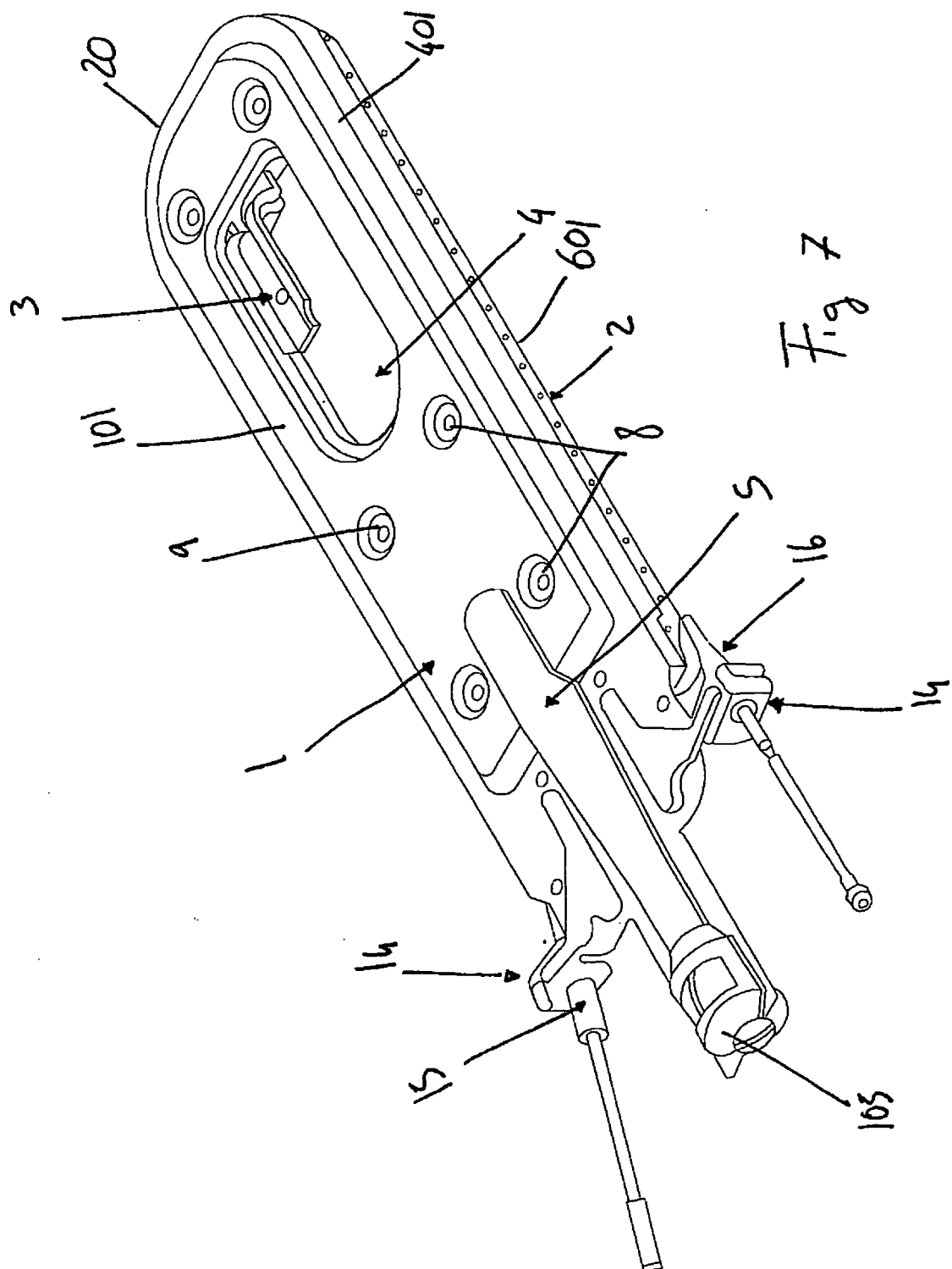
Fig. 2

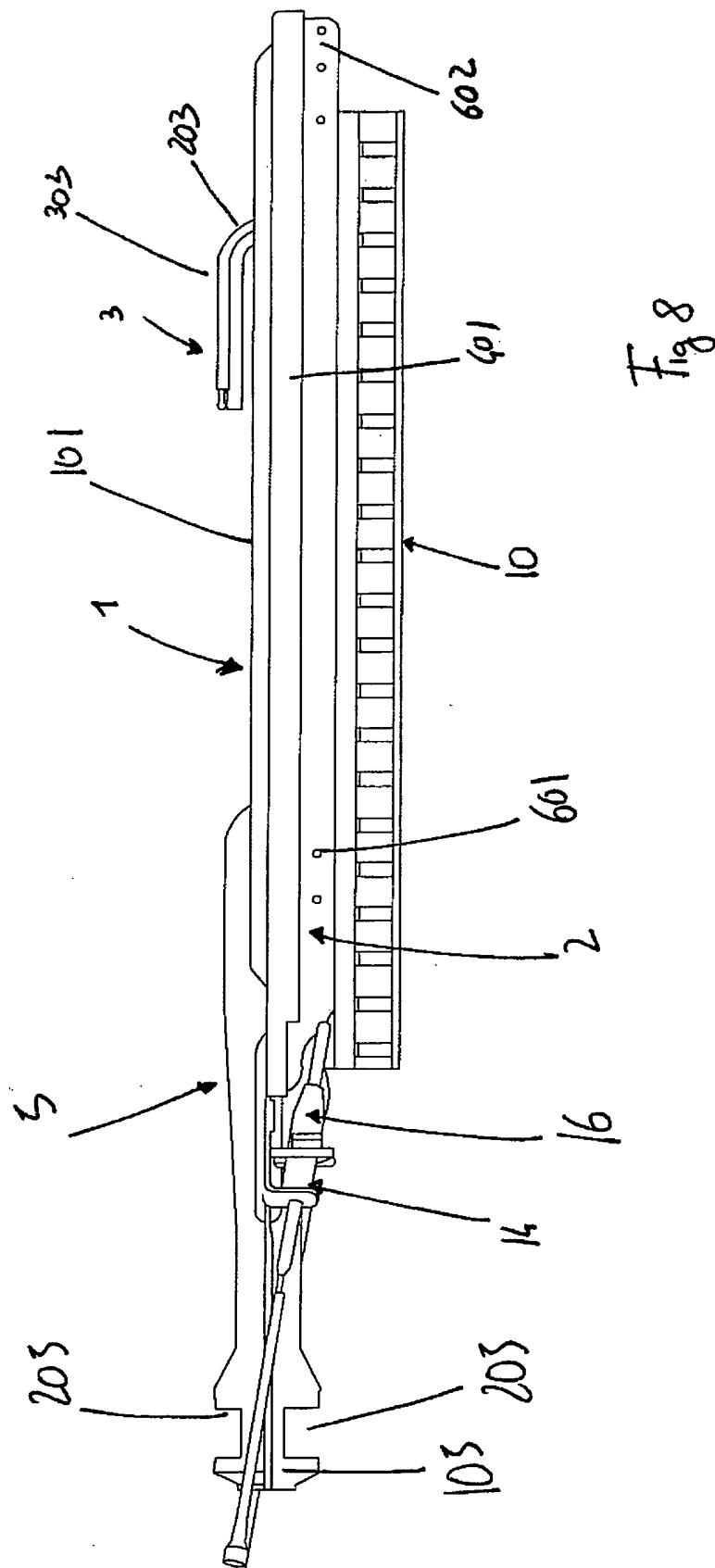












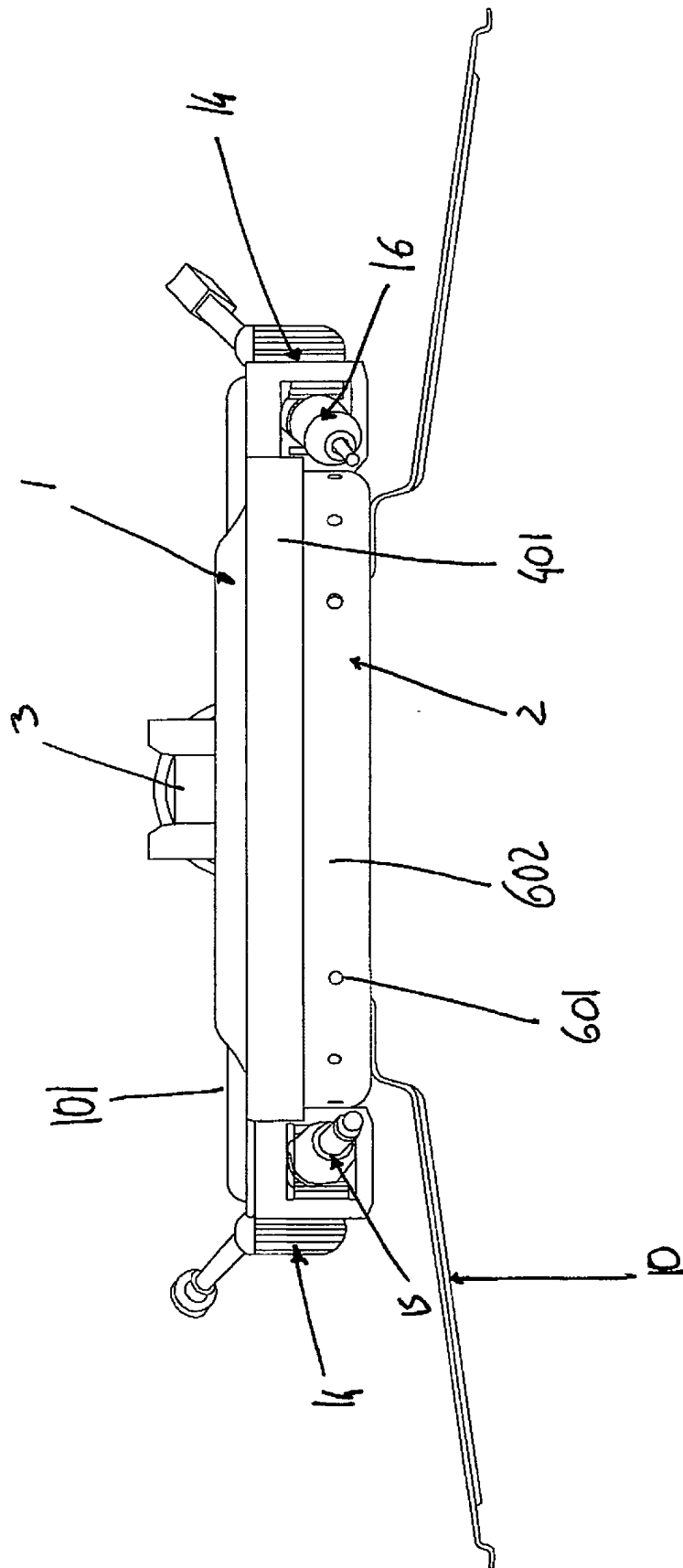


Fig. 9

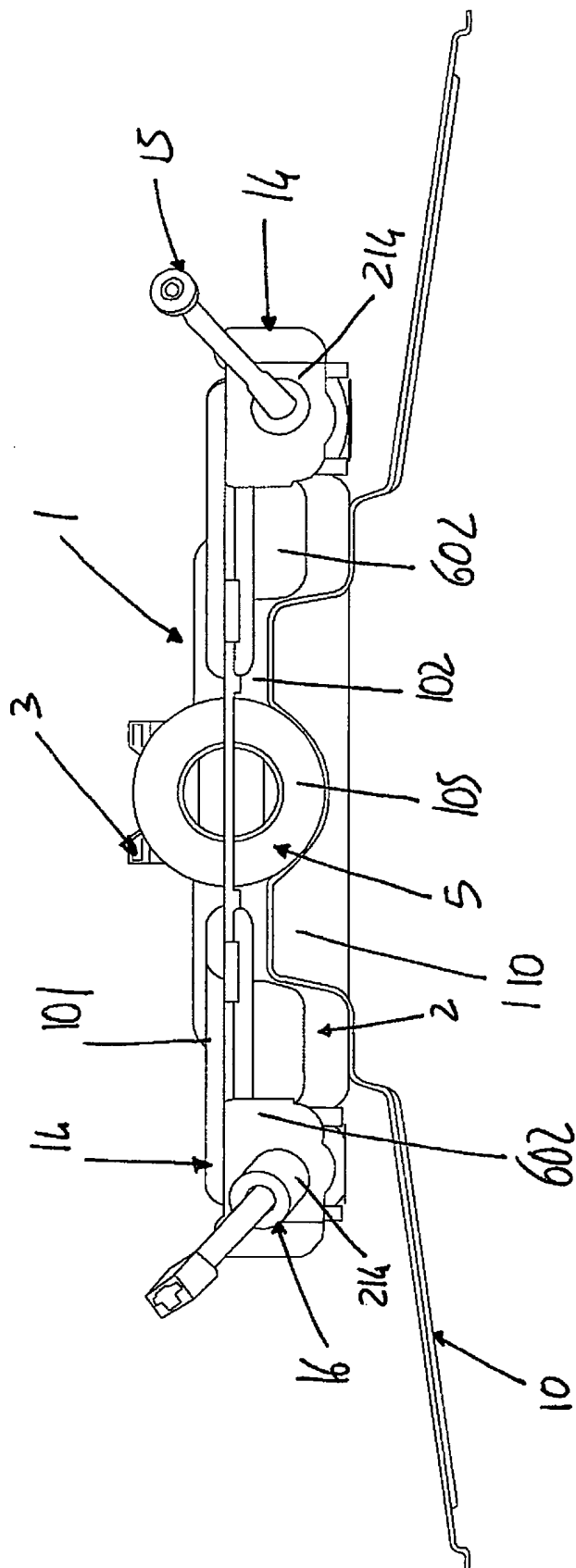


Fig. 10

