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(54) **Device for multiple regulation having sliding members, and intake manifold comprising a device of this type**

Vorrichtung zur Steuerung mehrerer Schiebeelemente und Ansaugkrümmer mit einer solchen Vorrichtung

Dispositif de régulation multiple à organes coulissants et collecteur d'admission comprenant un tel dispositif

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**EP 1 724 456 B1**

## Description

**[0001]** The present invention relates to the field of the regulation of gas streams, more precisely the regulation of the gas stream injected into the cylinders of an internal-combustion engine.

**[0002]** The invention relates, more particularly, to a device for multiple regulation of the gas stream delivered by the various pipes of an intake manifold, and also to a manifold comprising a device of this type.

**[0003]** The gas stream in a conduit may be regulated in various ways and by means of various members, in particular rotary members.

**[0004]** In the case of regulation in the region of a multiple fluid communication interface, such as, for example, between the outlets of the pipes and the inlets in the cylinder head of the engine, a known solution, which is advantageous in terms of the overall size and simplicity of the construction, consists in using a sliding shutter-type regulating member.

**[0005]** Generally, at most only partial closure of the outlet of the pipes is desirable.

**[0006]** One cost-effective solution consists in making the movable regulating members from a thermoplastic material.

**[0007]** Nevertheless, a plurality of problems appear during the implementation of such a solution.

**[0008]** Thus, placing regulating members of this type in the region of the interface between the pipes and the cylinder head causes direct sliding contact of components made of thermoplastic material(s) with a metal surface (the cylinder head), and this produces the problems that are well known in this type of situation.

**[0009]** Moreover, owing to the accumulated production tolerances of the mounting plate of the pipes and regulating members, which are both made of thermoplastic materials, numerous planimetric defects occur; these defects cause substantial clearance, and therefore a lack of tightness, between pipes, even with the exterior in the region of the interface between the pipes and the cylinder head.

**[0010]** In order to overcome these defects, it may be proposed to provide the sliding member or the contacting plate part with seals and/or to reduce the clearances between components.

**[0011]** However, these solutions are not satisfactory, since they are not reliable over time (wear to the seals caused by friction) and may cause locking of the regulating device (insufficient clearances, which may cause the members to become stuck).

**[0012]** US-A-5 778 851 discloses a device in accordance with the preamble of claim 1.

**[0013]** The aim of the present invention is to provide a further improved device which overcomes at least some of the abovementioned problems.

**[0014]** This aim is attained by a device as claimed in claim 1.

**[0015]** A better understanding of the invention will be

facilitated by the following description, which relates to a preferred embodiment, given by way of a nonlimiting example and explained with reference to the accompanying schematic drawings, in which:

Figure 1 is a perspective view of an intake manifold provided with a mounting plate equipped with a regulating device according to the invention, the support and guide structure being formed in one piece with said plate;

Figures 2A and 2B are a front elevation and perspective view, respectively, of the side that is applied to the cylinder head of the body of the mounting plate forming part of the manifold of figure 1, during the mounting of the shutters;

Figure 3 is a schematic sectional view illustrating the principle of the guiding and sealing implemented by the invention;

Figure 4 is a perspective and sectional view of a regulating device according to the invention, integrated into the mounting plate;

Figure 5 is an exploded perspective view showing the various components of the regulating device according to the invention illustrated in figure 1;

Figures 6 and 7 are a perspective and front elevation view, respectively, of the regulating device integrated into a mounting plate as illustrated in figure 1, the shutters or diaphragms being in the closure end position;

Figure 8 is a perspective view of an intake manifold provided with a mounting plate equipped with a regulating device according to one variation of the invention, the support and guide structure of the shutters being a separate element attached within said plate;

Figure 9 is a perspective view of the support and guide structure attached within the plate of figure 1; and

Figure 10 is a detailed sectional view illustrating the tightness around a tubular eyelet intended to receive a fixing screw.

**[0016]** Figures 1, 4 to 7 and 8 show a device for multiple regulation of the gas stream passing through the pipes 1' of an intake manifold 1 into or toward the inlets in the cylinder head 2' of an internal-combustion engine, the manifold being joined to said cylinder head 2' by a mounting plate 2 having a substantially planar structure, at least in the region of its side that is intended to enter into contact with said cylinder head 2', extending in the region of

the ends of said pipes 1' and mechanically interconnecting said pipes.

**[0017]** According to the invention, this regulating device comprises, for each pipe 1', on the one hand, a conduit portion 3 extending in a leak proof manner said pipe 1' in the region of its outlet through the thickness of said mounting plate 2 and connecting fluidly this pipe 1' to the corresponding inlet in the cylinder head 2' and, on the other hand, a sliding shutter or diaphragm 5, which is capable of being displaced between a first end position, in which it partially closes the passage in the conduit portion 3 associated with the pipe 1' in question, and a second end position, in which it completely clears the passage in said conduit portion 3. Furthermore, said shutters or diaphragms 5 are mounted and guided, each with a predetermined clearance, in a support and guide structure provided or attached in said plate 2 and comprising two opposing guide rails or guide rail portions 6 and 7.

**[0018]** The mounting plate 2, which has, for example, an elongate rectangular shape, preferably has a predetermined thickness defined by a circumferential or lateral delimitation wall 4, defining an edge 4' that is intimately applied against the face of the cylinder head 2' having the inlets, and said shutters or diaphragms 5 are located in the thickness of said plate 2, extending and sliding substantially in the plane thereof, and are set sliding by a common control rod 8. Moreover, said shutters or diaphragms 5 are guided in translation by pairs of guide rail segments 6 and 7, all of which define a single direction of sliding by translation.

**[0019]** As a result of these provisions, each of the shutters or diaphragms 5 is guided independently, over the entire length of its displacement course, within the mounting plate itself, without entering into contact with the cylinder head 2'. Moreover, since said shutters or diaphragms 5 are mounted inside the plate 2, any problems of tightness between the environment for mounting said shutters and the external environment are overcome by the confinement chamber provided by the wall 4, said plate 2 being, of course, closed on its face opposing the edge 4' (around outlets in the pipes 1' and fixing eyelets 13).

**[0020]** In order to achieve a relatively simple structure, with simultaneous and synchronous operation of the various regulating members, said shutters or diaphragms 5 all extend and slide in a single plane perpendicular to the direction of circulation of the gas streams into the conduit portions 3, and are driven in translation by a common control rod 8 in the form of a control rod or bar mechanically coupled to said shutters 5 and displaced in translation in its longitudinal direction by an operating member 9 such as, for example, a rotary shaft connected to said control rod by a rotating slider crank system.

**[0021]** According to an advantageous embodiment of the invention, each shutter or diaphragm 5 has a planar and one-piece general structure, consisting mainly of a first part 5' having an external shape and a surface extension enabling it to close a part 3' of the passage of

the conduit portion 3 associated therewith, and of a second part 5" forming an interface for coupling to the common control rod 8, each of said shutter parts 5' and 5" comprising a wall edge segment 10, 11, for example in the form of a profiled wing or shoulder, cooperating by mutual engagement with a respective profiled guide rail segment 6, 7 over the entire length of the limited sliding course of said shutter 5, thus providing a sliding contact guided in the direction of sliding, the wall edge segments 10 and 11 of the first and second shutter parts 5' and 5", like the rail portions 6 and 7 respectively cooperating with these parts, being mutually parallel.

**[0022]** The exact shape of the first part 5', in particular, of each shutter 5 will depend on the surface area of the section of the passage part 3' of the conduit portion 3 to be closed and on the space available for its mounting and its displacement between its two sliding end positions.

**[0023]** Nevertheless, in order for it to have a sufficiently rigid structure to resist the deformation under pressure (gas stream/suction), each shutter 5 exhibits a, preferably solid, plate-like structure and large longitudinal dimensions in the region of the wall edges comprising the segments 10 and 11, in order to provide precise and resistant linear guidance over a substantial length.

**[0024]** The shutters may be of various shapes, depending on the overall size requirements, though efforts will nevertheless be made to standardise their shape (streamlined production).

**[0025]** The rail portions 6 and 7, like the lateral segments 10 and 11 of the shutters 5 guided in these rail portions, may or may not be coplanar.

**[0026]** The rail portions 7 may, in particular, extend laterally along the groove portions 18, either in proximity to the base of said groove portions (figure 4) or in proximity to, or in the region of, the longitudinal opening in said groove portions (figures 2 and 5 to 7).

**[0027]** In the former case, the segments 11 may be in the form of ribs and, in the second case, in the form of shoulders.

**[0028]** As the figures of the accompanying drawings show, the shutters or diaphragms 5 are located in the region of the ends of the conduit portions 3 that are intended to face the inlets in the cylinder head 2', said shutters or diaphragms 5 being located in part between these ends and said inlets in the closed position of said device for multiple regulation.

**[0029]** The plate 2 is advantageously produced by injection-moulding thermoplastic material.

**[0030]** According to a first variation, emerging from figures 1 to 7, the conduit portions 3 are formed in one piece with the circumferential or lateral delimitation wall 4 of the mounting plate 2 and are connected to this circumferential wall 4 by connection wall portions 12, some of which may advantageously help to guide the sliding shutters or diaphragms 5, said mounting plate 4 also incorporating tubular eyelets 13 for receiving sleeves 13' and/or for the passage of fixing screws or the like, which

eyelets are also formed in one piece with the wall 4.

**[0031]** The support and guide structure assembly may thus be formed in one piece with the plate 2.

**[0032]** According to a second variation, emerging from figures 8 to 10, the support and guide structure, which incorporates, in particular, the guide rail portions 6 and 7, consists of a separate component 26 attached within the thickness of the mounting plate 2, this component 26 also incorporating the conduit portions 3 that are intended to connect the pipes 1' to the corresponding inlets in the cylinder head 2' and having the general form of a perforated plate of suitable configuration, accommodated within the thickness of the mounting plate 2 and sandwiched with pinching between said plate and the cylinder head 2' after the assembly thereof (in the manner of an insert).

**[0033]** According to one embodiment of the invention, the edge of the end of each conduit portion 3 that is intended to face an inlet in the cylinder head 2' consists, viewed circumferentially or along the periphery of said edge, of two adjacent edge parts 14, 14', i.e., on the one hand, a first, protruding part 14, which is intended to enter into contact with the edge of the corresponding inlet in the cylinder head 2' and preferably ends in the plane that also contains the end or the edge 4' of the circumferential or lateral delimitation wall 4 of the mounting plate 2 that enters into contact with the cylinder head 2', and, on the other hand, a second, recessed part 14', which circumferentially delimits the part 3' of the passage of the conduit portion 3 that is locked by the associated shutter or diaphragm 5 in the end closure position thereof and is extended by a planar wall portion 15 defining a surface 15' that is swept at least by the first part 5' of the shutter or diaphragm 5 during its displacement between its two end positions, the thickness of this first part 5' of the shutter or diaphragm 5 being substantially equal to, preferably slightly less than, the height of the recess between the first and second parts 14 and 14' of said end edge of the conduit portion 3 in question.

**[0034]** In order to reinforce the tightness between pipes, the surface 15' that is swept by the first part 5' of the shutter or diaphragm 5, and optionally by a portion of the second part 5'' thereof, is laterally delimited, in the region of its outer contour, by a rib or a similar protruding wall portion 16 that is connected to the protruding part 14 of the edge of the end of the conduit portion 3 in question, so as to define a confined space in the region of the interface between this conduit portion 3 and the corresponding inlet in the cylinder head 2' when the mounting plate 2 is attached to said cylinder head, said space being nevertheless open in places, on the side facing the control rod 8, for the passage of a portion for connecting to the second part 5'' of the shutter or diaphragm 5, the confinement rib 16 preferably ending in the plane containing the edge 4' of the circumferential wall 4 of the plate 2.

**[0035]** The ribs 16, which may in part be formed by connection wall portions 12 and which also impart rigidity

to the plate 2, thus form baffles around the interface zones for fluid communication between pipes 1' and inlets in the cylinder head 2', also including the spaces occupied and swept by the shutters 5. Relatively gastight pockets are thus obtained around each contact and communication zone in the region of a tubular frame 1'/corresponding inlet in the cylinder head 1', the slot forming the passage opening in the second part 5'' not being in direct communication, in any of the positions of the shutter 5 in question, with the conduit portion 3 in question, one or other of the first and second parts 5' and 5'' forming an obstacle or obstacles (see figures 6, 7 and 8).

**[0036]** The rib 16 that laterally delimits the surface 15' that is swept by at least the first part 5' of the shutter or diaphragm 5 in question advantageously comprises, in the region of a rectilinear segment that is oriented in the direction of sliding of the shutters or diaphragms 5 and is located facing a rectilinear wall edge segment 10 of the first part 5' of said shutter or diaphragm 5, a lateral shoulder or wing 17 defining for said wall edge segment 10 of said shutter or diaphragm 5 a guide rail portion 6, if necessary in cooperation with the wall portion 15, the rib 16 optionally providing opposing stops for the shutter or diaphragm 5 in question in its two sliding end positions.

**[0037]** The guide rail portion 6 may be in the form of a groove 6 that is offset relative to the surface 15', i.e. in the form of a groove formed between the wall portion 15 and the shoulder or wing 17.

**[0038]** According to another characteristic of the invention, allowing precise guidance and a reliable and rigid drive coupling, the rectangularly-shaped mounting plate 2 comprises, along the inner face of a longitudinal part 4'' of its circumferential wall 4, a groove, or preferably a plurality of aligned groove segments 18. Furthermore, the second part 5'' of each shutter or diaphragm 5 comprises a runner-type profiled formation 19 that is capable of sliding in a guided manner in the groove or groove segment 18 associated with the shutter or diaphragm in question and has a site 20 for receiving the control rod 8, with partial mutual engagement and locking in the direction of translation. Finally, said longitudinal part 4'' of the circumferential wall 4 comprises, in the region of its inner face and along said groove or each of said groove segments 18, a lateral shoulder or wing 21 defining a guide rail portion 7, which cooperates with a wall edge segment 11 of the profiled formation 19 of the second part 5'' of the shutter or diaphragm 5 in question.

**[0039]** The reception site 20 may, for example, consist of a groove portion provided longitudinally in the profiled runner 19, with a section corresponding to the rod 8.

**[0040]** The mechanical translation coupling may, for example, be obtained by the provision of lugs on said rod, which lugs are capable of being introduced into orifices provided in the runners 19 (see figure 5).

**[0041]** Moreover, in order to guide the rod 8 between two successive groove segments 18, guide bearings 18'' may be provided in the plate body.

**[0042]** As figures 8 and 9 show, in relation to figure 5,

and in order to allow simple mounting and reliable assembly of the shutters 5 in the plate 2, without tools and without additional fixing means, the lateral shoulder or wing 17 of the rectilinear segment of the rib 16 laterally delimiting the surface 15' that is swept by at least the first part 5' of a shutter or diaphragm 5, which forms a guide rail portion 6 for this first part 5', comprises an incision 22. Moreover, the groove segment 18 forming a guide rail portion 7 comprises a part 18' that is inclined relative to the direction of sliding, such that the shutter or diaphragm 5 in question may be mounted in the guide rail portions 6 and 7 by being suitably inclined relative to said direction of sliding or direction of extension of said guide rail portions 6 and 7.

[0043] Incisions 22' may optionally also be provided in the shoulder or wing 21, as a function of the shape of the second part 5" of the shutters 5.

[0044] According to a preferred variation of the invention, each conduit portion 3 is subdivided, in the direction of flow of the stream, substantially into two passages 3' and 3" by a wing or a similar partition portion 23 having a free end, only one 3' of the two passages 3', 3" being closed by the corresponding shutter or diaphragm 5 in the first end position thereof, said wall or wing 23 comprising a recess in the region of the outlet in the conduit portion 3 in question, which recess is defined by a first zone 23', which is adjacent to and level with the first, protruding part 14 of the edge of the end in question of said conduit portion 3, and by a second zone 23", which is adjacent to the second, recessed part 14' of said end edge, the first part 5' of the shutter or diaphragm 5 in question preferably entering into abutment in the region of said recess 23', 23" in the end closure position.

[0045] Opposite the free end of the wing 23, the wall of the conduit portion 3 may exhibit a local deformation toward the exterior so as to create an additional passage section that is capable of receiving an injector.

[0046] In order to prevent any locking caused by jamming, whilst at the same time limiting leakages, the shutters or diaphragms 5 are guided with at least a minimum clearance, preferably a clearance between a lower value and an upper value, on the one hand, in the plane perpendicular to the direction of sliding, in particular in the direction perpendicular to the plane of the mounting plate 2, and, on the other hand, in the direction perpendicular both to this last direction and to the direction of sliding.

[0047] In order to optimise tightness with respect to the exterior, it may advantageously be provided that the circumferential or lateral delimitation wall 4 of the mounting plate 2 comprises, in the region of its edge 4' that is intended to be applied against the face of the cylinder head 2', a double-walled structure, thus forming a groove 24 receiving a continuous circumferential seal 24', said seal extending, optionally in one piece, into the openings in the tubular eyelets 13 in the form of annular seals 24" (figures 5 to 7).

[0048] These annular seals 24" will thus provide, for example, tightness between the sleeves 13' and the face

of the cylinder head 2' to which the mounting plate 2 is attached, in particular if the support and guide structure of the shutters 5 is formed in one piece in the plate 2.

[0049] If said support and guide structure is in the form of an attached component 26, tightness between this component 26 and the plate 2, on the one hand, and between this component 26 and the cylinder head 2', on the other hand, may be obtained by the provision of suitable compression seals 27 and 27' on the two opposing faces of said structure, in addition to the continuous circumferential seal 24' of the plate 2.

[0050] The clearance in the direction perpendicular to the plane of the plate 2 and the shutters 5 will preferably be, after mounting of the plate 2 on the cylinder head 2', between approximately 0.2 mm and 0.8 mm, preferably between 0.3 mm and 0.6 mm, in the first part 5' and the surface 15', on the one hand, and between this first part 5' and the face of the cylinder head 2', on the other hand.

[0051] The material from which the shutters 5 are made may, for example, be PA66GF50Mo and the material from which the plate 2, in particular the guide rails 6 and 5, is made, for example PA6GF35.

[0052] The present invention also relates to an intake manifold 1 having a plurality of pipes 1' for an internal-combustion engine, which manifold is intended to be fixed to the cylinder head 2' of said engine by means of a suitable mounting plate 2, manifold characterised in that it comprises a regulating device as described above, integrated into said fixing plate 2 (figures 1 and 8).

[0053] According to a first variation, the body of the mounting plate 2 is formed in one piece with a part of the manifold and/or the pipes, the sliding shutters or diaphragms 5, the control rod 8 of said shutters and optionally also the operating member 9 actuating this rod being joined to said body of said plate by simple assembly.

[0054] According to a second variation, the mounting plate 2 consists of a component attached to the pipes 1', for example by vibration welding.

[0055] The invention is not, of course, limited to the embodiment described and illustrated in the accompanying drawings. Modifications are possible, in particular with regard to the constitution of the various elements or by substitution of technical equivalents, without thereby departing from the scope of protection of the invention.

## Claims

1. Device for multiple regulation of the gas stream passing through pipes (1') of an intake manifold (1) in the inlets of the cylinder head of an internal-combustion engine, the manifold (1) being joined to said cylinder head by a mounting plate (2) having a substantially planar structure, at least in the region of its side that is intended to enter into contact with said cylinder head, extending in the region of the ends of said pipes (1') and mechanically interconnecting said pipes (1'), the device including for each pipe (1'), on

the one hand, a conduit portion (3) extending in a leak proof manner said pipe (1') in the region of its outlet through the thickness of said mounting plate (2) and connecting fluidly this pipe (1') to the corresponding inlet in the cylinder head (2') and, on the other hand, a sliding shutter or diaphragm (5), which is capable of being displaced between a first end position, in which it partially closes the passage in the conduit portion (3) associated with the pipe (1') in question, and a second end position, in which it completely clears the passage in said conduit portion (3), and in that said shutters or diaphragms (5) are mounted and guided, each with a predetermined clearance, in a support and guide structure provided or attached in said plate (2) and comprising two opposing guide rails or guide rail portions (6 and 7), **characterised in that** each shutter or diaphragm (5) has a planar and one-piece general structure, consisting mainly of a first part (5') having an external shape and a surface extension enabling it to close a part (3') of the passage of the conduit portion (3) associated therewith, and of a second part (5'') forming an interface for coupling to a common control rod (8), each of said shutter parts (5' and 5'') comprising a wall edge segment (10, 11), for example in the form of a profiled wing or shoulder, cooperating by mutual engagement with a respective profiled guide rail segment (6, 7) over the entire length of the limited sliding course of said shutter (5), thus providing a sliding contact guided in the direction of sliding, the wall edge segments (10 and 11) of the first and second shutter parts (5' and 5''), like the rail portions (6 and 7) respectively cooperating with these parts, being mutually parallel.

2. Device according to claim 1, **characterised in that** the mounting plate (2), which has, for example, an elongate rectangular shape, has a predetermined thickness defined by a circumferential or lateral delimitation wall (4), defining an edge (4') that is intimately applied against the face of the cylinder head (2') having the inlets, **in that** said shutters or diaphragms (5) are located in the thickness of said plate (2), extending and sliding substantially in the plane thereof, and are set sliding by a common control rod (8), and **in that** said shutters or diaphragms (5) are guided in translation by pairs of guide rail segments (6 and 7), all of which define a single direction of sliding by translation.
3. Device according to claim 1 or 2, **characterised in that** the shutters or diaphragms (5) all extend and slide in a single plane perpendicular to the direction of circulation of the gas streams into the conduit portions (3) and **in that** said shutters or diaphragms are driven in translation by a common control rod (8) in the form of a control rod or bar mechanically coupled to said shutters (5) and displaced in translation in its

longitudinal direction by an operating member (9) such as, for example, a rotary shaft connected to said control rod by a rotating slider crank system.

4. Device according to any one of claims 1 to 3, **characterised in that** the shutters or diaphragms (5) are located in the region of the ends of the conduit portions (3) that are intended to face the inlets in the cylinder head (2'), said shutters or diaphragms (5) being located in part between these ends and said inlets in the closed position of said device for multiple regulation.
5. Device according to any one of claims 1 to 4, **characterised in that** said conduit portions (3) are formed in one piece with the circumferential or lateral delimitation wall (4) of the mounting plate (2) and are connected to this circumferential wall (4) by connection wall portions (12), some of which help to guide the sliding shutters or diaphragms (5), said mounting plate (2) also incorporating tubular eyelets (13) for receiving sleeves (13') and/or for the passage of fixing screws or the like, which eyelets are also formed in one piece with the wall (4).
6. Device according to any one of claims 1 to 4, **characterised in that** the support and guide structure, which incorporates, in particular, the guide rail portions (6 and 7), consists of a separate component (26) attached within the thickness of the mounting plate (2), this component (26) also incorporating the conduit portions (3) that are intended to connect the pipes (1') to the corresponding inlets in the cylinder head (2') and having the general form of a perforated plate of suitable configuration.
7. Device according to claim 5 or 6, when appended to claim 4, **characterised in that** the edge of the end of each conduit portion (3) that is intended to face an inlet in the cylinder head (2') consists, viewed circumferentially or along the periphery of said edge, of two adjacent edge parts (14, 14'), i.e., on the one hand, a first, protruding part (14), which is intended to enter into contact with the edge of the corresponding inlet in the cylinder head (2') and preferably ends in the plane that also contains the end or the edge (4') of the circumferential or lateral delimitation wall (4) of the mounting plate (2) that enters into contact with the cylinder head (2'), and, on the other hand, a second, recessed part (14'), which circumferentially delimits the part (3') of the passage of the conduit portion (3) that is locked by the associated shutter or diaphragm (5) in the end closure position thereof and is extended by a planar wall portion (15) defining a surface (15') that is swept at least by the first part (5') of the shutter or diaphragm (5) during its displacement between its two end positions, the thickness of this first part (5') of the shutter or diaphragm

(5) being substantially equal to, preferably slightly less than, the height of the recess between the first and second parts (14 and 14') of said end edge of the conduit portion (3) in question.

8. Device according to claim 7, **characterised in that** the surface (15') that is swept by the first part (5') of the shutter or diaphragm (5), and optionally by a portion of the second part (5'') thereof, is laterally delimited, in the region of its outer contour, by a rib or a similar protruding wall portion (16) that is connected to the protruding part (14) of the edge of the end of the conduit portion (3) in question, so as to define a confined space in the region of the interface between this conduit portion (3) and the corresponding inlet in the cylinder head (2') when the mounting plate (2) is attached to said cylinder head, said space being nevertheless open in places, on the side facing the control rod (8), for the passage of a portion for connecting to the second part (5'') of the shutter or diaphragm (5), the confinement rib (16) preferably ending in the plane containing the edge (4') of the circumferential wall (4) of the plate (2).
9. Device according to claim 8, **characterised in that** the rib (16) that laterally delimits the surface (15') that is swept by at least the first part (5') of the shutter or diaphragm (5) in question comprises, in the region of a rectilinear segment that is oriented in the direction of sliding of the shutters or diaphragms (5) and is located facing a rectilinear wall edge segment (10) of the first part (5') of said shutter or diaphragm (5), a lateral shoulder or wing (17) defining for said wall edge segment (10) of said shutter or diaphragm (5) a guide rail portion (6), if necessary in cooperation with the wall portion (15), the rib (16) optionally providing opposing stops for the shutter or diaphragm (5) in question in its two sliding end positions.
10. Device according to claim 2, **characterised in that** the rectangularly-shaped mounting plate (2) comprises, along the inner face of a longitudinal part (4'') of its circumferential wall (4), a groove, or preferably a plurality of aligned groove segments (18), **in that** the second part (5'') of each shutter or diaphragm (5) comprises a runner-type profiled formation (19) that is capable of sliding in a guided manner in the groove or groove segment (18) associated with the shutter or diaphragm in question and has a site (20) for receiving the control rod (8), with partial mutual engagement and locking in the direction of translation, and **in that** said longitudinal part (4'') of the circumferential wall (4) comprises, in the region of its inner face and along said groove or each of said groove segments (18), a lateral shoulder or wing (21) defining a guide rail portion (7), which cooperates with a wall edge segment (11) of the profiled formation (19) of the second part (5'') of the shutter or di-

aphragm (5) in question.

11. Device according to claims 8 and 9, **characterised in that** the lateral shoulder or wing (17) of the rectilinear segment of the rib (16) laterally delimiting the surface (15') that is swept by at least the first part (5') of a shutter or diaphragm (5), which forms a guide rail portion (6) for this first part (5'), comprises an incision (22), and **in that** the groove segment (18) forming a guide rail portion (7) comprises a part (18') that is inclined relative to the direction of sliding, such that the shutter or diaphragm (5) in question may be mounted in the guide rail portions (6 and 7) by being suitably inclined relative to said direction of sliding or direction of extension of said guide rail portions (6 and 7).
12. Device according to claim 7 or 8, **characterised in that** each conduit portion (3) is subdivided, in the direction of flow of the stream, substantially into two passages (3' and 3'') by a wing or a similar partition portion (23) having a free end, only one (3') of the two passages (3', 3'') being closed by the corresponding shutter or diaphragm (5) in the first end position thereof, said wall or wing (23) comprising a recess in the region of the outlet in the conduit portion (3) in question, which recess is defined by a first zone (23'), which is adjacent to and level with the first, protruding part (14) of the edge of the end in question of said conduit portion (3), and by a second zone (23''), which is adjacent to the second, recessed part (14') of said end edge, the first part (5') of the shutter or diaphragm (5) in question preferably entering into abutment in the region of said recess (23', 23'') in the end closure position.
13. Device according to any one of claims 1 to 12, **characterised in that** the shutters or diaphragms (5) are guided with at least a minimum clearance, preferably a clearance between a lower value and an upper value, on the one hand, in the plane perpendicular to the direction of sliding, in particular in the direction perpendicular to the plane of the mounting plate (2), and, on the other hand, in the direction perpendicular both to this last direction and to the direction of sliding.
14. Device according to claim 5 or to any one of claims 6 to 13 when appended to claim 5, **characterised in that** the circumferential or lateral delimitation wall (4) of the mounting plate (2) comprises, in the region of its edge (4') that is intended to be applied against the face of the cylinder head (2'), a double-walled structure, thus forming a groove (24) receiving a continuous circumferential seal (24'), said seal extending, optionally in one piece, into the openings in the tubular eyelets (13) in the form of annular seals (24'').

15. Intake manifold having a plurality of pipes for an internal-combustion engine, which engine is intended to be fixed to the cylinder head of said engine by means of a suitable mounting plate, **characterised in that** it comprises a regulating device according to any one of claims 1 to 14, integrated into said mounting plate (2). 5
16. Manifold according to claim 15, **characterised in that** the body of the mounting plate (2) is formed in one piece with a part of the manifold and/or the pipes, the sliding shutters or diaphragms (5), the control rod (8) of said shutters and optionally also the operating member (9) actuating this rod being joined to said body of said plate by simple assembly. 10 15
17. Manifold according to claim 15, **characterised in that** the mounting plate (2) consists of a component attached to the pipes (1'), for example by vibration welding. 20

#### Patentansprüche

1. Vorrichtung zur Mehrfachregelung des Gasstroms, der durch Rohre (1') eines Ansaugkrümmers (I) in die Einlässe des Zylinderkopfes einer Brennkraftmaschine geht, wobei der Krümmer (I) durch eine Befestigungsplatte (2) mit dem Zylinderkopf verbunden ist, die wenigstens in dem Bereich ihrer Seite, die vorgesehen ist, um Kontakt mit dem Zylinderkopf einzugehen, die sich in dem Bereich der Enden der Rohre (1') erstreckt und die Rohre (1') mechanisch verbindet, eine im Wesentlichen plane Struktur aufweist, wobei die Vorrichtung für jedes Rohr (1) einerseits einen Leitungsbereich (3), der die Leitung (1') auf eine lecksichere Weise in dem Bereich ihres Auslasses durch die Dicke der Befestigungsplatte (2) verlängert und dieses Rohr (1') in Fluidkommunikation mit dem entsprechenden Einlass in dem Zylinderkopf (2') verbindet, und andererseits einen gleitenden Schieber oder eine gleitende Membrane (5) enthält, der bzw. die fähig ist, zwischen einer ersten Endstellung, in der er bzw. sie den Durchgang in dem Leitungsbereich (3), der dem betreffenden Rohr (1') zugehörig ist, teilweise verschließt, und einer zweiten Endstellung, in der er bzw. sie den Durchgang in dem Leitungsbereich (3) vollständig freigibt, verschoben werden kann, und wobei die Schieber oder Membranen (5), jeder bzw. jede mit einem vorgegebenen Spiel, in einer Lager- und Führungsstruktur, die in der Platte (2) vorhanden oder an dieser angebracht ist und die zwei gegenüberliegende Führungsschienen oder Führungsschienenbereiche (6 und 7) umfasst, montiert sind und geführt werden, und **dadurch gekennzeichnet, dass** jeder Schieber oder jede Membrane (5) eine plane und einteilige allgemeine Struktur hat, die hauptsächlich

aus einem ersten Teil (5') mit einer äußeren Form und einer Oberflächenausdehnung, die ihm ermöglicht, einen Teil (3') des Durchgangs des Leitungsbereichs (3), der damit verbunden ist, zu verschließen und aus einem zweiten Teil (5'') besteht, der eine Anschlussstelle zum Koppeln mit einer gemeinsamen Regelstange (8) bildet, wobei jedes der Schieberteile (5' und 5'') ein Wandrandsegment (10, 11) umfasst, beispielsweise in Form einer profilierten Auskragung oder Schulter, die durch wechselseitigen Eingriff mit einem entsprechenden profilierten Führungsschienenensegment (6, 7) über die gesamte Länge der begrenzten Gleitbahn des Schiebers (5) zusammenwirkt, infolgedessen einen Gleitkontakt in die Gleitrichtung bereitstellend, wobei die Wandrandsegmente (10 und 11) des ersten und des zweiten Schieberteils (5' und 5''), ebenso wie die Schienenbereiche (6 und 7), jeweils mit diesen Teilen zusammenwirken, die wechselseitig parallel sind.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Befestigungsplatte (2), die beispielsweise eine längliche Rechteckform hat, eine vorgegebene Dicke hat, die durch eine umlaufende oder laterale Begrenzungswand (4) definiert wird, die einen Rand (4') bildet, der eng an der Fläche des Zylinderkopfes (2'), der die Einlässe aufweist, angebracht ist, dass die Schieber oder Membranen (5) sich in der Dicke der Platte (2) befinden und sich im Wesentlichen in der Ebene davon erstrecken und gleiten und durch eine gemeinsame Regelstange (8) gleitend geregelt werden, und dass die Schieber oder Membranen (5) bei der Translation mittels Paaren von Führungsschienenensegmenten (6 und 7) geführt werden, von denen alle eine einzelne Gleitrichtung durch Translation definieren. 25 30 35 40
3. Vorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Schieber oder Membranen (5) sich alle in einer einzelnen Ebene senkrecht zu der Richtung der Zirkulation der Gasströme in den Leitungsbereichen (3) erstrecken und gleiten, und dass die Schieber oder Membranen bei Translation mittels einer gemeinsamen Regelstange (8) in Form einer Steuerstange oder einer Steuerschiene, die mechanisch mit den Schiebern (5) gekoppelt ist, angetrieben werden und bei Translation in ihre Längsrichtung durch ein Betätigungselement (9) verschoben werden, wie beispielsweise eine Welle, die durch ein rotierendes Schieberkurbelsystem mit der Steuerstange verbunden ist. 45 50
4. Vorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Schieber oder Membranen (5) in dem Bereich der Enden der Leitungsbereiche (3) angeordnet sind, die vorgesehen sind, um den Einlässen in den Zylinderkopf (2') zu-



gewandt zu sein, wobei sich die Schieber oder Membranen (5) in der geschlossenen Stellung der Vorrichtung zur Mehrfachregelung teilweise zwischen diesen Enden und den Einlässen befinden.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Leitungsbereiche (3) in einem Stück mit der umlaufenden oder lateralen Begrenzungswand (4) der Befestigungsplatte (2) ausgebildet sind und mit dieser umlaufenden Wand (4) durch Verbindungswandbereiche (12) verbunden sind, von denen einige das Führen der gleitenden Schieber oder Membranen (5) unterstützen, wobei die Befestigungsplatte (2) außerdem röhrenförmige Ösen (13) zum Aufnehmen von Muffen (13') und/oder für den Durchgang von Befestigungsschrauben oder dergleichen umfasst, wobei die Ösen ebenso in einem Stück mit der Wand (4) ausgebildet sind.
6. Vorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Lager- und Führungsstruktur, die insbesondere die Führungsschienenbereiche (6 und 7) umfasst, aus einem separaten Bauteil (26) besteht, das innerhalb der Dicke der Befestigungsplatte (2) angebracht ist, wobei dieses Bauteil (26) ebenso die Leitungsbereiche (3) umfasst, die vorgesehen sind, um die Röhren (1') mit den entsprechenden Einlässen in dem Zylinderkopf (2) zu verbinden, und allgemein die Form einer Lochplatte geeigneter Konfiguration aufweist.
7. Vorrichtung nach Anspruch 5 oder 6, wenn Anspruch 4 hinzugefügt, **dadurch gekennzeichnet, dass** der Rand des Endes jedes Leitungsbereichs (3), der vorgesehen ist, um einem Einlass in dem Zylinderkopf (2) gegenüberzustehen, wenn umlaufend oder entlang der Peripherie des Randes gesehen, aus zwei benachbarten Randteilen (14, 14') besteht, d. h. einerseits einem ersten vorstehendem Teil (14), der vorgesehen ist, um Kontakt mit dem Rand des entsprechenden Einlasses in den Zylinderkopf (2') einzugehen, und bevorzugt in der Ebene endet, die ebenso das Ende oder den Rand (4') der umlaufenden oder lateralen Begrenzungswand (4) der Befestigungsplatte (2) enthält, die Kontakt mit dem Zylinderkopf (2') eingeht, und andererseits einem zweiten, ausgesparten Teil (14'), der umlaufend den Teil (3') des Durchgangs des Leitungsbereichs (3), der durch den zugehörigen Schieber oder die zugehörige Membrane (5) in der Endverschlussstellung davon verschlossen ist, begrenzt und durch einen planen Wandbereich (15) verlängert wird, der eine Fläche (15') bildet, die wenigstens durch den ersten Teil (5') des Schiebers oder der Membrane (5) während seiner bzw. ihrer Verschiebung zwischen seinen bzw. ihren zwei Endstellungen bestrichen wird, wobei die Dicke dieses ersten Teils (5') des Schiebers

oder der Membrane (5) im Wesentlichen gleich der oder bevorzugt geringfügig kleiner als die Höhe der Vertiefung zwischen dem ersten und dem zweiten Teil (14 und 14') des Abschlussrandes des betreffenden Leitungsbereichs (3) ist.

8. Vorrichtung nach Anspruch 7, **dadurch gekennzeichnet, dass** die Fläche (15'), die durch den ersten Teil (5') des Schiebers oder der Membrane (5) und optional durch den zweiten Teil (5') davon bestrichen wird, lateral, in dem Bereich ihrer Außenkontur, durch eine Rippe oder einen gleichartig vorstehenden Wandbereich (16), die bzw. der mit dem vorstehenden Teil (14) des Randes des Endes des betreffenden Leitungsbereichs (3) verbunden ist, begrenzt ist, um so einen begrenzten Raum in dem Bereich der Anschlussstelle zwischen diesem Leitungsbereich (3) und dem entsprechenden Einlass in den Zylinderkopf (2') zu bilden, sobald die Befestigungsplatte (2) an dem Zylinderkopf angebracht ist, wobei der Raum dennoch an Stellen auf der Seite, die der Regelstange (8) zugewandt ist, für den Durchgang eines Bereichs zum Verbinden des zweiten Teils (5'') des Schiebers oder der Membrane (5) offen ist, wobei die Begrenzungsrippe (16) bevorzugt in der Ebene endet, die den Rand (4') der Umfangswand (4) der Platte (2) enthält.
9. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** die Rippe (16), die lateral die Fläche (15') begrenzt, die von wenigstens dem ersten Teil (5') des betreffenden Schiebers oder der betreffenden Membrane (5) bestrichen wird, in dem Bereich eines geradlinigen Segmentes, das in der Gleitrichtung der Schieber oder Membranen (5) ausgerichtet ist, und einem geradlinigen Wandrandsegment (10) des ersten Teils (5') des Schiebers oder der Membrane (5) gegenüberliegend angeordnet ist, eine laterale Schulter oder Auskrugung (17) umfasst, die für das Wandrandsegment (10) des Schiebers bzw. der Membrane (5) einen Führungsschienenbereich (6), falls erforderlich, zusammenwirkend mit dem Wandbereich (15), bildet, wobei die Rippe (16) optional gegenüberliegende Anschläge für den betreffenden Schieber oder die entsprechende Membrane (5) an ihren zwei Gleit-Endpositionen bereitstellt.
10. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** die rechteckig geformte Befestigungsplatte (2) entlang der Innenfläche eines Längsteils (4'') ihrer Umfangswand (4) eine Nut oder bevorzugt eine Vielzahl von ausgerichteten Nut-Segmenten (18) umfasst, dass der zweite Teil (5'') jedes Schiebers oder jeder Membrane (5) eine läuferartig profilierte Ausbildung (19) umfasst, die fähig ist, in einer geführten Art und Weise in der Nut oder dem Nut-Segment (18), das dem betreffenden Schieber oder der betreffenden Membrane zugehö-

rig ist, und eine Stelle (20) für Aufnahme der Regelstange (8) aufweist, mit teilweise wechselseitigem Eingriff und Verriegeln in der Richtung der Translation zu gleiten, und dass der Längsteil (4'') der Umfangswand (4) in dem Bereich seiner Innenfläche und entlang der Nut oder jedem der Nut-Segmente (18) eine laterale Schulter oder Auskragung (21) umfasst, die einen Führungsschienenbereich (7) bildet, der mit dem Wandrandsegment (11) der profilierten Ausbildung (19) des zweiten Teils (5'') des betreffenden Schiebers oder der betreffenden Membrane (5) zusammenwirkt.

11. Vorrichtung nach Anspruch 8 und 9, **dadurch gekennzeichnet, dass** die laterale Schulter oder laterale Auskragung (17) des geradlinigen Segments der Rippe (16), das lateral die Fläche (15') begrenzt, die von wenigstens dem ersten Teil (5') eines Schiebers oder einer Membrane (5) bestrichen wird, die einen Führungsschienenbereich (6) für diesen Teil (5') bildet, einen Einschnitt (22) umfasst und dass das Nut-Segment (18), das einen Führungsschienenbereich (7) formt, einen Teil (18') umfasst, der relativ zu der Gleitrichtung geneigt ist, so dass der betreffende Schieber oder die betreffende Membrane (5) in den Führungsschienenbereichen (6 und 7) angebracht werden kann, indem er bzw. sie relativ zu der Gleitrichtung oder der Verlängerungsrichtung der Führungsschienenbereiche (6 und 7) angemessen geneigt wird.
12. Vorrichtung Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** jeder Leitungsbereich (3) in der Strömungsrichtung des Stroms durch eine Auskragung oder einen gleichartigen Trennbereich (23), die bzw. der ein freies Ende aufweist, im Wesentlichen in zwei Durchgänge (3' und 3'') unterteilt ist, wobei nur einer (3') der zwei Durchgänge (3', 3'') durch den entsprechenden Schieber oder die entsprechende Membrane (5) in der ersten Endstellung davon verschlossen wird, wobei die Wand oder Auskragung (23) in dem Bereich des Auslasses in dem betreffenden Leitungsbereich (3) eine Aussparung umfasst, wobei die Aussparung durch eine erste Zone (23'), die angrenzend an den und auf gleicher Höhe mit dem ersten vorstehenden Teil (14) des Randes des betreffenden Endes des Leitungsbereiches (3) ist, und durch eine zweite Zone (23'') gebildet wird, die angrenzend an den zweiten zurückgesetzten Teil (14'') der Abschlusskante ist, gebildet wird, und wobei der erste Teil (5') des betreffenden Schiebers oder der betreffenden Membrane (5) bevorzugt in dem Bereich der Aussparung (23', 23'') in der Endverschlussstellung anschlägt.
13. Vorrichtung nach einem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** die Schieber oder Membranen (5) mit wenigstens einem Mindestspiel,

bevorzugt einem Spiel zwischen einem unteren Wert und einem oberen Wert, einerseits in der Richtung senkrecht zu der Gleitrichtung, insbesondere in der Richtung senkrecht zu der Ebene der Befestigungsplatte (2), und andererseits in der Richtung senkrecht sowohl zu dieser vorigen Richtung als auch zu der Gleitrichtung geführt werden.

14. Vorrichtung nach Anspruch 5 oder einem der Ansprüche 6 bis 13, wenn angefügt an Anspruch 5, **dadurch gekennzeichnet, dass** die umlaufende oder laterale Begrenzungswand (4) der Befestigungsplatte (2) in dem Bereich Ihres Randes (4'), der vorgesehen ist, um an der Fläche des Zylinderkopfes (2') angebracht zu werden, eine doppelwandige Struktur umfasst und infolgedessen eine Nut (24) ausbildet, die eine kontinuierliche Umfangsabdichtung (24') aufnimmt, wobei sich die Abdichtung, optional in einem Stück, in Form von kreisförmigen Abdichtungen (24'') in die Öffnungen der röhrenförmigen Ösen (13) erstreckt.
15. Ansaugkrümmer mit einer Vielzahl von Rohren für einen Verbrennungsmotor, wobei der Motor vorgesehen ist, um an dem Zylinderkopf des Motors mittels einer geeigneten Befestigungsplatte befestigt zu werden, **dadurch gekennzeichnet, dass** er eine Regelvorrichtung nach einem der Ansprüche 1 bis 14 umfasst, die in die Befestigungsplatte (2) integriert ist.
16. Krümmer nach Anspruch 15, **dadurch gekennzeichnet, dass** der Körper der Befestigungsplatte (2) in einem Stück mit einem Teil des Krümmers und/oder den Rohren, den gleitenden Schiebern oder Membranen (5) ausgebildet ist, wobei die Regelstange (8) der Schieber und optional ebenso das Betätigungselement (9), das diese Stange betätigt, durch eine unkomplizierte Anordnung mit dem Körper dieser Platte verbunden sind.
17. Krümmer nach Anspruch 15, **dadurch gekennzeichnet, dass** die Befestigungsplatte (2) aus einer Komponente besteht, die beispielsweise durch Vibrationsschweißen an den Rohren (1') angebracht ist.

## Revendications

1. Dispositif de régulation multiple du flux gazeux transitant des tubulures (1') d'un collecteur d'admission (1) dans les orifices d'entrée de la culasse d'un moteur à combustion interne, le collecteur (1) étant solidarisé sur ladite culasse par une platine de fixation (2) à structure sensiblement plane, au moins au niveau de son côté destiné à venir en contact avec ladite culasse, s'étendant au niveau des extrémités

- desdites tubulures (1') et reliant mécaniquement lesdites tubulures (1') entre elles, le dispositif comprenant, pour chaque tubulure (1'), d'une part, une portion de conduit (3) prolongeant de manière étanche ladite tubulure (1') au niveau de son ouverture de sortie à travers l'épaisseur de ladite platine de fixation (2) et reliant fluidiquement cette tubulure (1') à l'ouverture d'entrée correspondant de la culasse (2') et, d'autre part, un volet ou diaphragme (5) coulissant, pouvant être déplacé entre une première position extrême dans laquelle il obture partiellement le passage dans la portion de conduit (3) associée à la tubulure (1') concernée et une seconde position extrême dans laquelle il libère totalement le passage dans ladite portion de conduit (3), lesdits volets ou diaphragmes (5) étant montés et guidés, chacun avec un jeu déterminé, dans une structure de support et de guidage ménagée ou rapportée dans ladite platine (2) et comprenant deux rails ou portions de rails de guidage (6 et 7) opposé(e)s,
- dispositif de régulation **caractérisé en ce que** chaque volet ou diaphragme (5) présente une structure générale plane et d'un seul tenant, principalement composée d'une première partie (5') avec une forme extérieure et une extension surfacique la rendant apte à obturer une partie (3') du passage de la portion de conduit (3) qui lui est associée et d'une seconde partie (5'') formant interface d'accouplement avec une tringle de commande commune (8), chacune desdites parties de volet (5' et 5'') comprenant un segment de bord de paroi (10, 11), par exemple sous la forme d'une aile ou d'un épaulement profilé(e), coopérant, par complémentarité de formes, avec un segment de rail de guidage profilé respectif (6, 7) sur toute la longueur de la course de coulissement limitée dudit volet (5) en fournissant ainsi un contact glissant guidé dans la direction de coulissement, les segments de bord de paroi (10 et 11) des première et seconde parties de volet (5' et 5'') étant parallèles entre eux, de même que les portions de rails (6 et 7) coopérant respectivement avec ces parties.
2. Dispositif selon la revendication 1, **caractérisé en ce que** la platine de fixation (2), par exemple de forme rectangulaire allongée, présente une épaisseur déterminée définie par une paroi (4) circonférentielle ou de délimitation latérale, définissant un bord (4') venant en application intime contre la face de la culasse (2') présentant les ouvertures d'entrée, **en ce que** lesdits volets ou diaphragmes (5) sont situés dans l'épaisseur de ladite platine (2), s'étendent et coulisent sensiblement dans le plan de celle-ci et sont entraînés en coulissement par une tringle de commande (8) commune et **en ce que** lesdits volets ou diaphragmes (5) sont guidés en translation par des paires de segments de rails de guidage (6 et 7) définissant toutes une seule direction de coulissement par translation.
3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** les volets ou diaphragmes (5) s'étendent et coulisent tous dans un seul plan perpendiculaire à la direction de circulation des flux gazeux dans les portions de conduit (3) et **en ce que** leur entraînement en translation est réalisé par une tringle de commande commune (8) sous la forme d'une tige ou barre de commande accouplée mécaniquement auxdits volets (5) et déplacée en translation dans sa direction longitudinale par un organe de manoeuvre (9), tel que par exemple un axe rotatif relié à ladite tige de commande par un système bielle-manivelle.
4. Dispositif selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** les volets ou diaphragmes (5) sont situés au niveau des extrémités des portions de conduit (3) destinées à venir en regard des ouvertures d'entrée de la culasse (2'), lesdits volets ou diaphragmes (5) étant situés partiellement entre ces extrémités et lesdites ouvertures d'entrée, en position d'obturation dudit dispositif de régulation multiple.
5. Dispositif selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** lesdites portions de conduit (3) sont formées d'un seul tenant avec la paroi (4) circonférentielle ou de délimitation latérale de la platine de fixation (2) et sont reliées à cette paroi circonférentielle (4) par des portions de paroi de liaison (12), dont certaines participent au guidage des volets ou diaphragmes (5) coulissants, ladite platine de fixation (2) intégrant en outre des oeilletons tubulaires (13) de réception de douilles (13') et/ou de passage de vis de fixation ou analogues, également formés d'un seul tenant avec la paroi (4).
6. Dispositif selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la structure de support et de guidage, intégrant notamment les portions de rails de guidage (6 et 7), consiste en une pièce (26) séparée et rapportée dans l'épaisseur de la platine de fixation (2), cette pièce (26) intégrant également les portions de conduit (3) destinées à relier les tubulures (1') aux ouvertures d'entrée correspondantes de la culasse (2') et présentant une forme générale de plaque ajourée à configuration adaptée.
7. Dispositif selon la revendication 5 ou 6, pour autant qu'elle se rattache à la revendication 4, **caractérisé en ce que** le bord de l'extrémité de chaque portion de conduit (3) destinée à venir en regard d'une ouverture d'entrée de la culasse (2') est formé, vue circonférentiellement ou en suivant le pourtour dudit bord, de deux parties de bord contiguës (14, 14'), à savoir, d'une part, une première partie proéminente (14), destinée à venir en contact avec le bord de l'ouverture d'entrée correspondante de la culasse (2') et se terminant préférentiellement dans le plan

contenant également l'extrémité ou le bord (4') de la paroi (4) circonférentielle ou de délimitation latérale de la platine de fixation (2) venant en contact avec la culasse (2') et, d'autre part, une seconde partie (14') en retrait, délimitant circonférentiellement la partie (3') du passage de la portion de conduit (3) bloquée par le volet ou le diaphragme (5) associé en position extrême d'obturation de ce dernier et se prolongeant par une portion de paroi plane (15) définissant une surface (15') balayée au moins par la première partie (5') du volet ou diaphragme (5) au cours de son déplacement entre ses deux positions extrêmes, l'épaisseur de cette première partie (5') du volet ou diaphragme (5) étant sensiblement égale, préférentiellement légèrement inférieure, à la hauteur du décrochement entre la première et la seconde parties (14 et 14') dudit bord d'extrémité de la portion de conduit (3) considérée.

8. Dispositif selon la revendication 7, **caractérisé en ce que** la surface (15') balayée par la première partie (5') du volet ou diaphragme (5), et éventuellement par une portion de la seconde partie (5'') de ce dernier, est délimitée latéralement, au niveau de son contour extérieur, par une nervure ou une portion de paroi proéminente analogue (16) raccordée à la partie proéminente (14) du bord de l'extrémité de la portion de conduit (3) concernée, de manière à définir un espace confiné au niveau de l'interface entre cette portion de conduit (3) et l'ouverture d'entrée correspondante de la culasse (2'), lorsque la platine de fixation (2) est rapportée sur cette dernière, ledit espace étant toutefois ouvert localement, du côté dirigé vers la tringle de commande (8), pour le passage d'une portion de raccordement à la seconde partie (5'') du volet ou diaphragme (5), la nervure (16) de confinement se terminant préférentiellement dans le plan contenant le bord (4') de la paroi circonférentielle (4) de la platine (2).

9. Dispositif selon la revendication 8, **caractérisé en ce que** la nervure (16) délimitant latéralement la surface (15') balayée par la première partie (5') au moins du volet ou diaphragme (5) concerné comporte, au niveau d'un segment rectiligne orienté dans la direction de coulissement des volets ou diaphragmes (5) et situé en regard d'un segment de bord de paroi rectiligne (10) de la première partie (5') dudit volet ou diaphragme (5), un épaulement ou une aile latérale (17) définissant pour ledit segment de bord de paroi (10) dudit volet ou diaphragme (5) une portion de rail de guidage (6), le cas échéant en coopération avec la portion de paroi (15), la nervure (16) fournissant éventuellement des butées opposées pour le volet ou le diaphragme (5) concerné dans ses deux positions extrêmes de coulissement.

10. Dispositif selon la revendication 2, **caractérisé en**

**ce que** la platine de fixation (2) de forme rectangulaire comporte, le long de la face intérieure d'une partie longitudinale (4'') de sa paroi circonférentielle (4), une gorge, ou préférentiellement plusieurs segments de gorges (18) alignés, **en ce que** la seconde partie (5'') de chaque volet ou diaphragme (5) comporte une formation profilée (19) du type patin apte à coulisser de manière guidée dans la gorge ou le segment de gorge (18) associé au volet ou diaphragme considéré et présentant un site (20) de réception avec coopération de forme partielle et blocage dans la direction de translation de la tringle de commande (8) et **en ce que** ladite partie longitudinale de la paroi circonférentielle (4) comporte, au niveau de sa face interne et le long de ladite gorge ou de chacun desdits segments de gorge (18), un épaulement ou une aile latérale (21) définissant une portion de rail de guidage (7) coopérant avec un segment de bord de paroi (11) de la formation profilée (19) de la seconde partie (5'') du volet ou diaphragme (5) considéré.

11. Dispositif selon les revendications 8 et 9, **caractérisé en ce que** l'épaulement ou l'aile latérale (17) du segment rectiligne de la nervure (16) délimitant latéralement la surface (15') balayée par la première partie (5') au moins d'un volet ou diaphragme (5), qui forme portion de rail de guidage (6) pour cette première partie (5'), comporte une découpe (22) et **en ce que** le segment de gorge (18) formant portion de rail de guidage (7) comporte une partie (18') inclinée par rapport à la direction de coulissement, de telle manière que le volet ou diaphragme (5) considéré peut être monté dans les portions de rail de guidage (6 et 7) en l'inclinant de manière adéquate par rapport à ladite direction de coulissement ou direction d'extension desdites portions de rails de guidage (6 et 7).

12. Dispositif selon la revendication 7 ou 8, **caractérisé en ce que** chaque portion de conduit (3) est subdivisée, dans la direction d'écoulement du flux, sensiblement en deux passages (3' et 3''), ce par une aile ou une portion de paroi de séparation analogue (23) à extrémité libre, seul l'un (3') des deux passages (3', 3'') étant obturé par le volet ou diaphragme (5) correspondant dans la première position extrême de ce dernier, ladite paroi ou aile (23) comportant un décrochement au niveau de l'ouverture de sortie de la portion de conduit (3) considérée définie par une première zone (23') contiguë à la première partie proéminente (14) du bord de l'extrémité concernée de ladite portion de conduit (3) et de niveau avec elle et par une seconde zone (23'') contiguë à la seconde partie (14') en retrait dudit bord d'extrémité, la première partie (5') du volet ou diaphragme (5) concerné venant préférentiellement en butée au niveau dudit décrochement (23', 23'') en position extrême d'obturation.

13. Dispositif selon l'une quelconque des revendications 1 à 12, **caractérisé en ce que** le guidage des volets ou diaphragmes (5) est réalisé avec au moins un jeu minimal, préférentiellement un jeu compris entre une valeur inférieure et une valeur supérieure, d'une part, dans le plan perpendiculaire à la direction de coulissement, en particulier dans la direction perpendiculaire au plan de la platine de fixation (2), et, d'autre part, dans la direction perpendiculairement simultanément à cette dernière direction et à la direction de coulissement. 5 10
14. Dispositif selon la revendication 5 ou l'une quelconque des revendications 6 à 13 pour autant qu'elles se rattachent à la revendication 5, **caractérisé en ce que** la paroi (4) circonférentielle ou de délimitation latérale de la platine de fixation (2) comporte, au niveau de son bord (4') destiné à venir en application contre la face de la culasse (2'), une structure en double paroi avec formation d'une rainure (24) recevant un joint d'étanchéité continu circonférentiel (24'), ce dernier se prolongeant, le cas échéant d'un seul tenant, jusque dans les ouvertures des oeillets tubulaires (13) sous forme de joints annulaires (24''). 15 20 25
15. Collecteur d'admission à plusieurs tubulures pour moteur à combustion interne, destiné à être fixé sur la culasse dudit moteur par une platine de fixation adaptée, **caractérisé en ce qu'il** comporte un dispositif de régulation selon l'une quelconque des revendications 1 à 14, intégré à ladite platine de fixation (2). 30
16. Collecteur selon la revendication 15, **caractérisé en ce que** le corps de la platine de fixation (2) est formé d'un seul tenant avec une partie du collecteur et/ou des tubulures, les volets ou diaphragmes (5) coulissants et la tringle de commande (8) desdits volets, ainsi qu'éventuellement l'organe de manoeuvre (9) actionnant cette tringle, étant assemblés avec ledit corps de ladite platine par simple montage. 35 40
17. Collecteur selon la revendication 15, **caractérisé en ce que** la platine de fixation (2) consiste en une pièce rapportée sur les tubulures (1'), par exemple par sou- 45 dure par vibrations.

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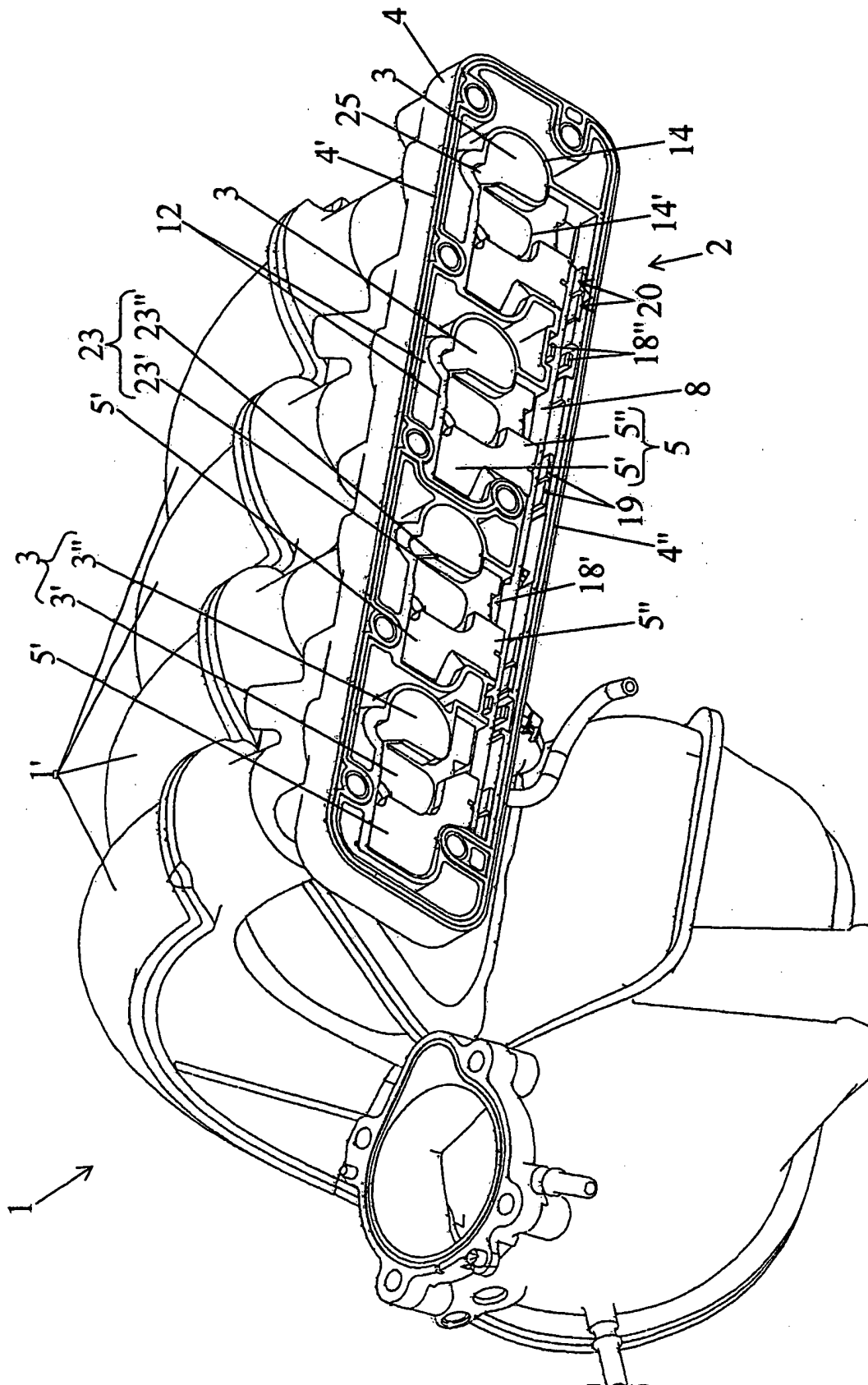


Fig. 1

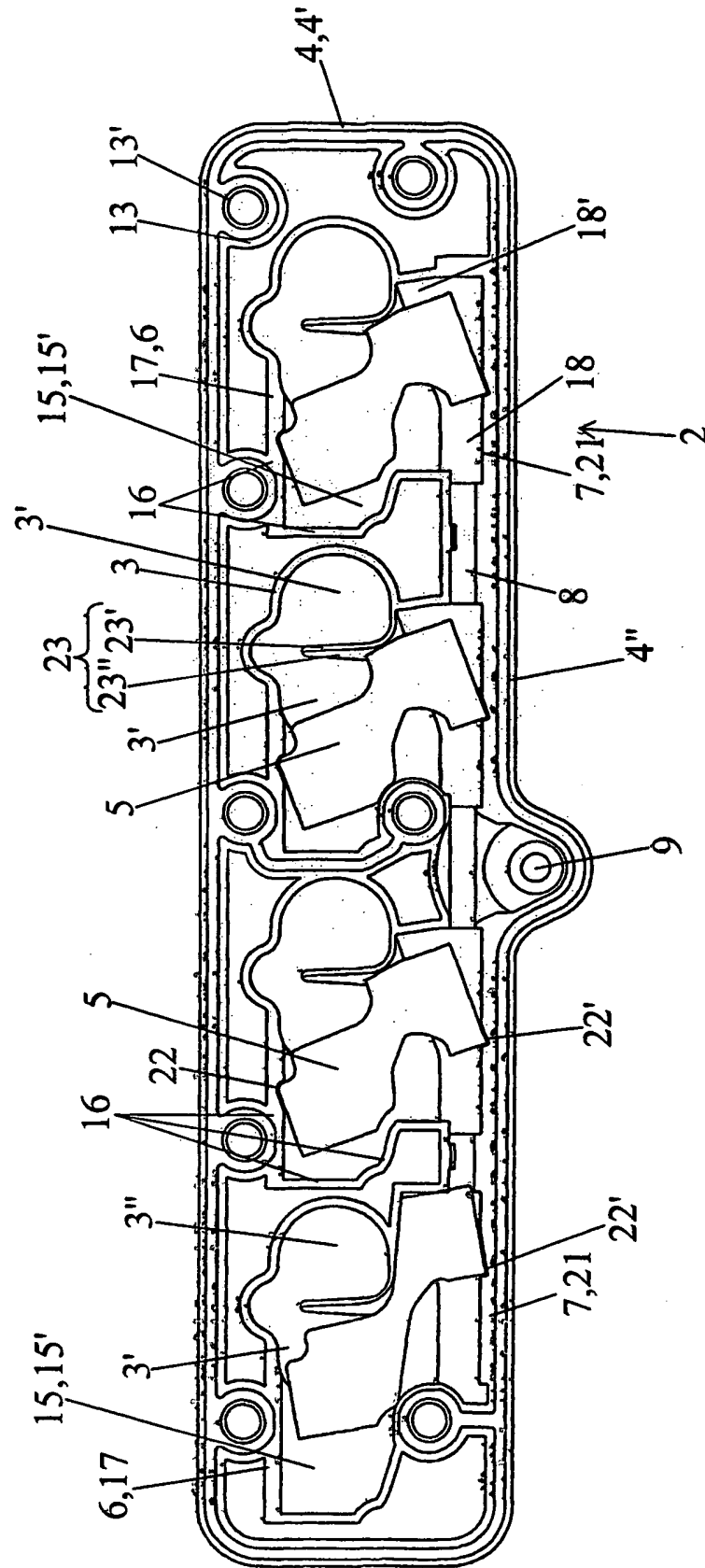


Fig. 2A

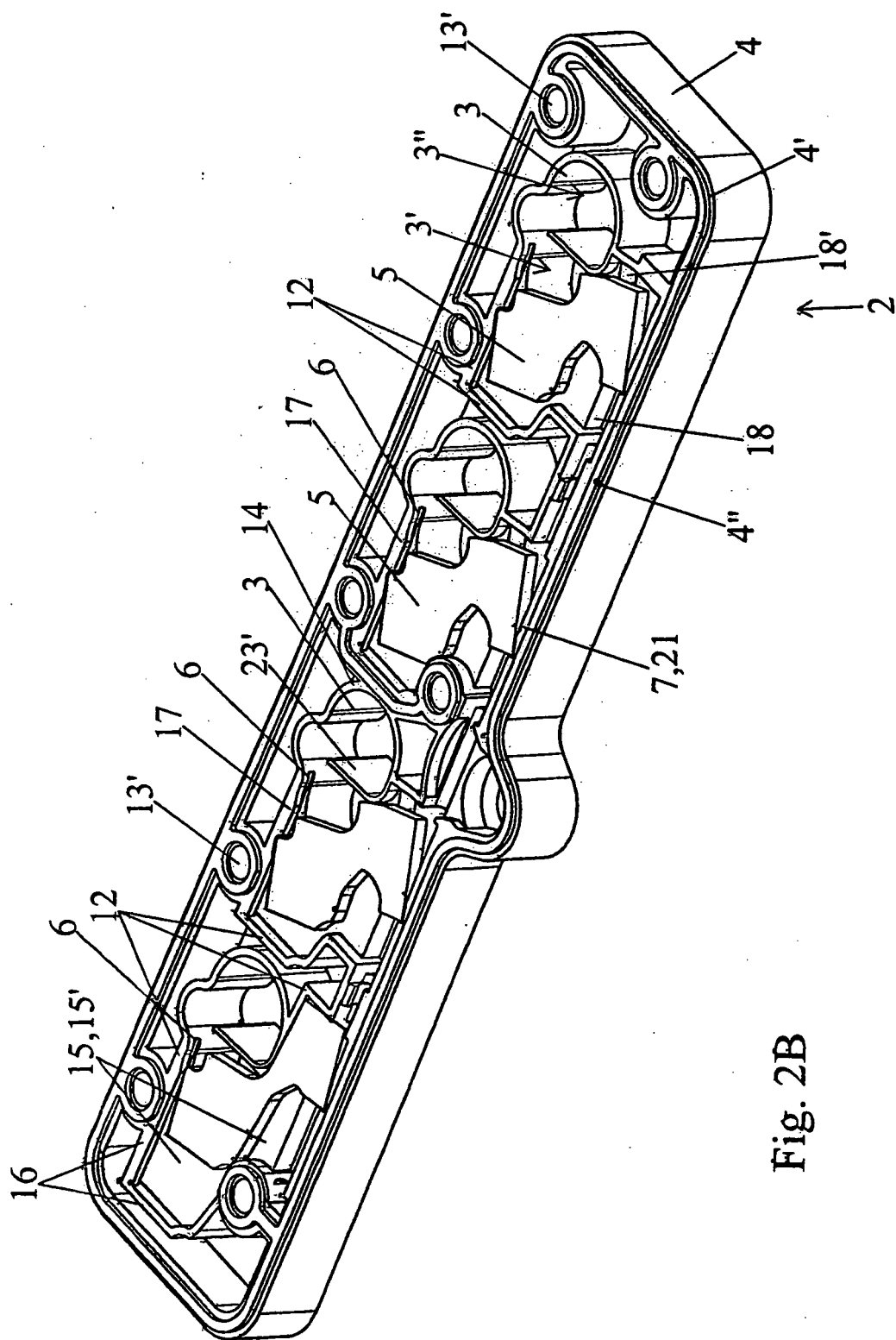


Fig. 2B



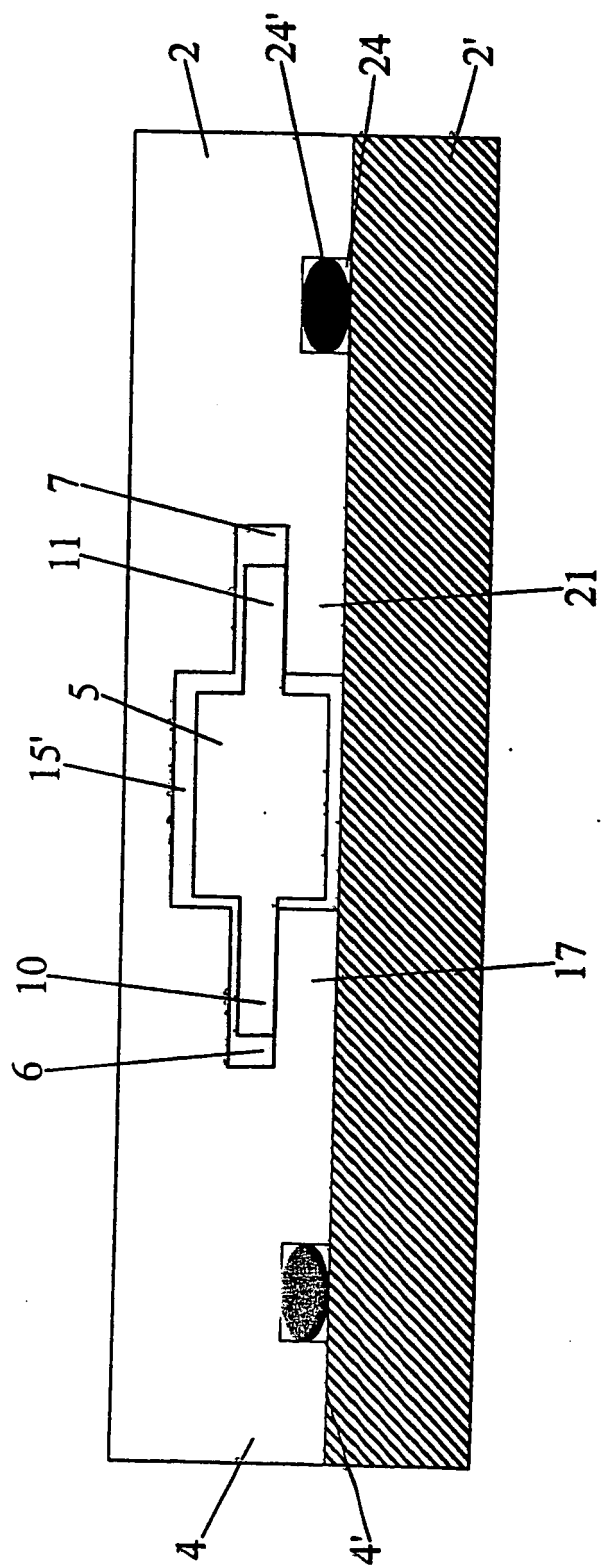


Fig. 3

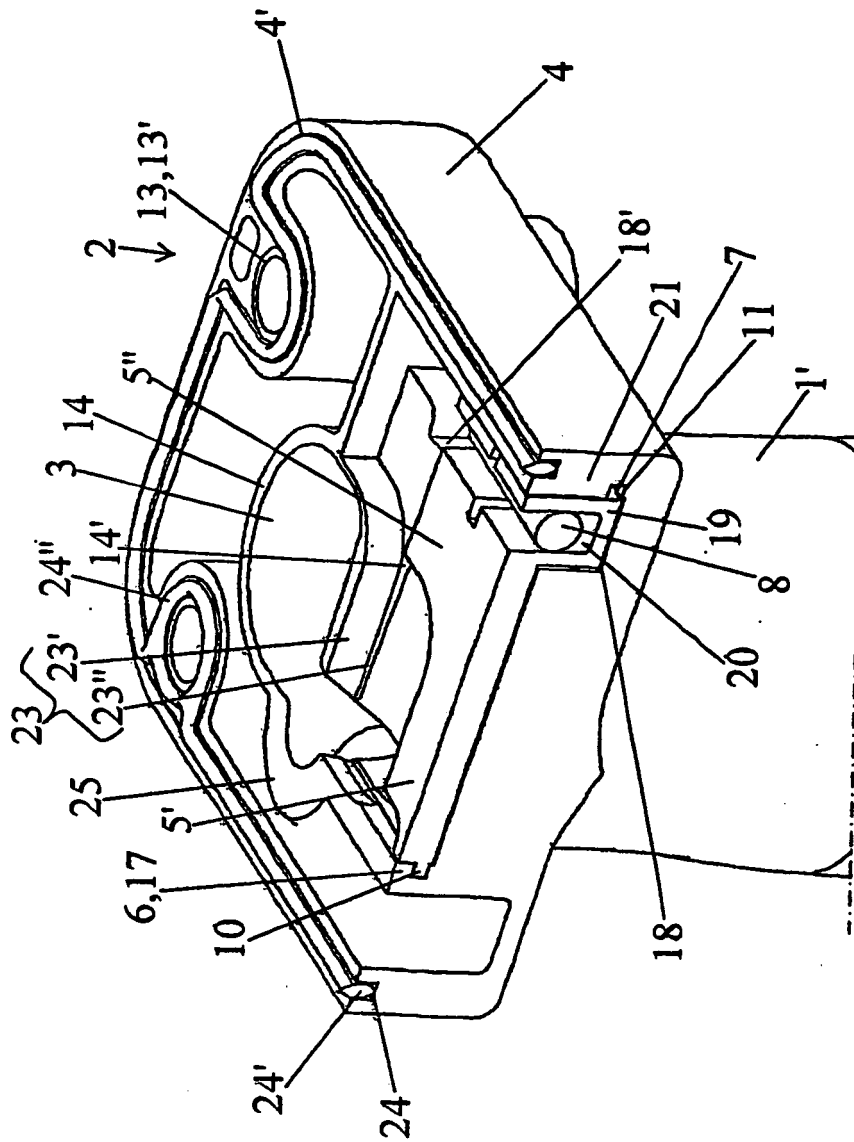


Fig. 4

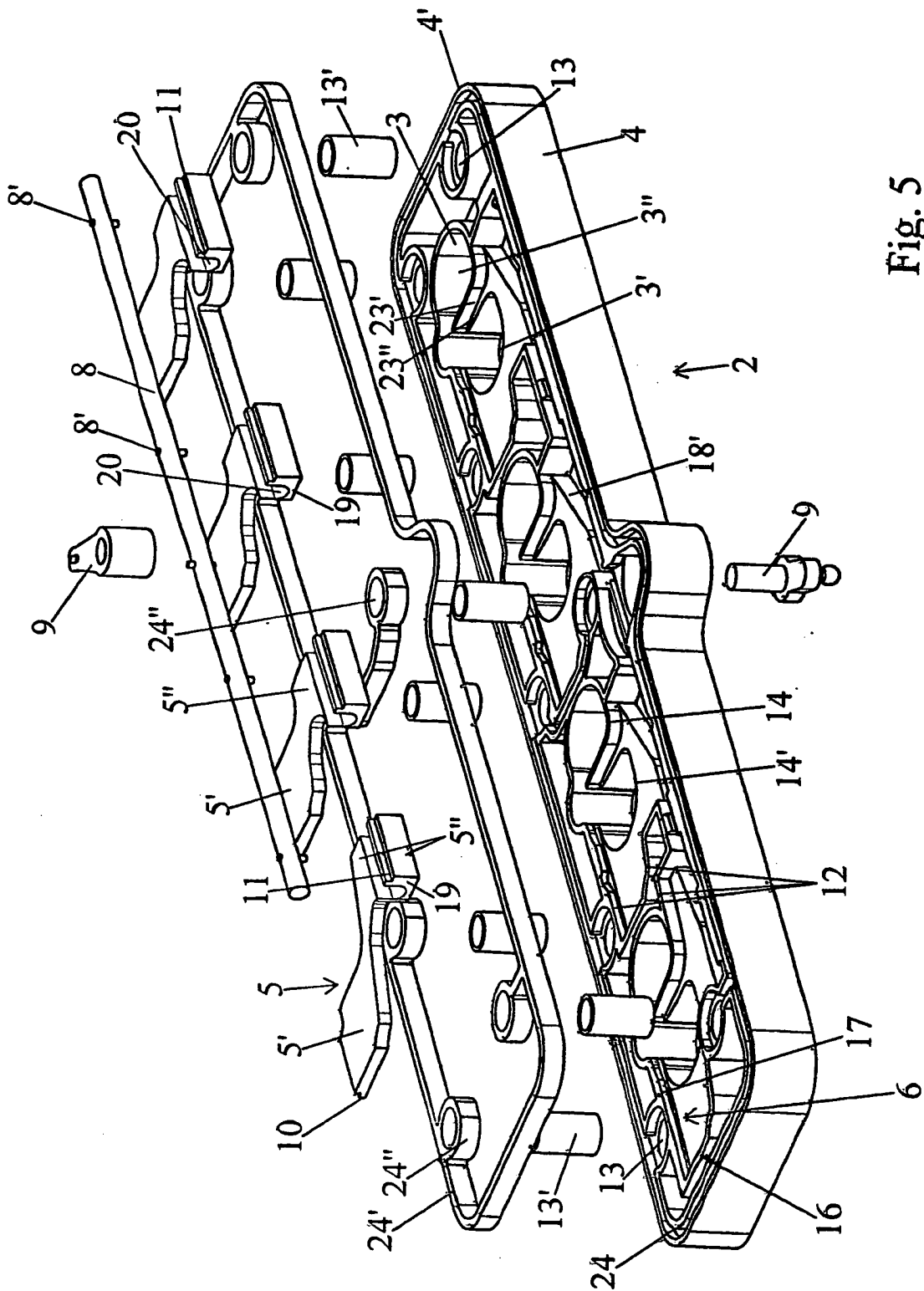


Fig. 5

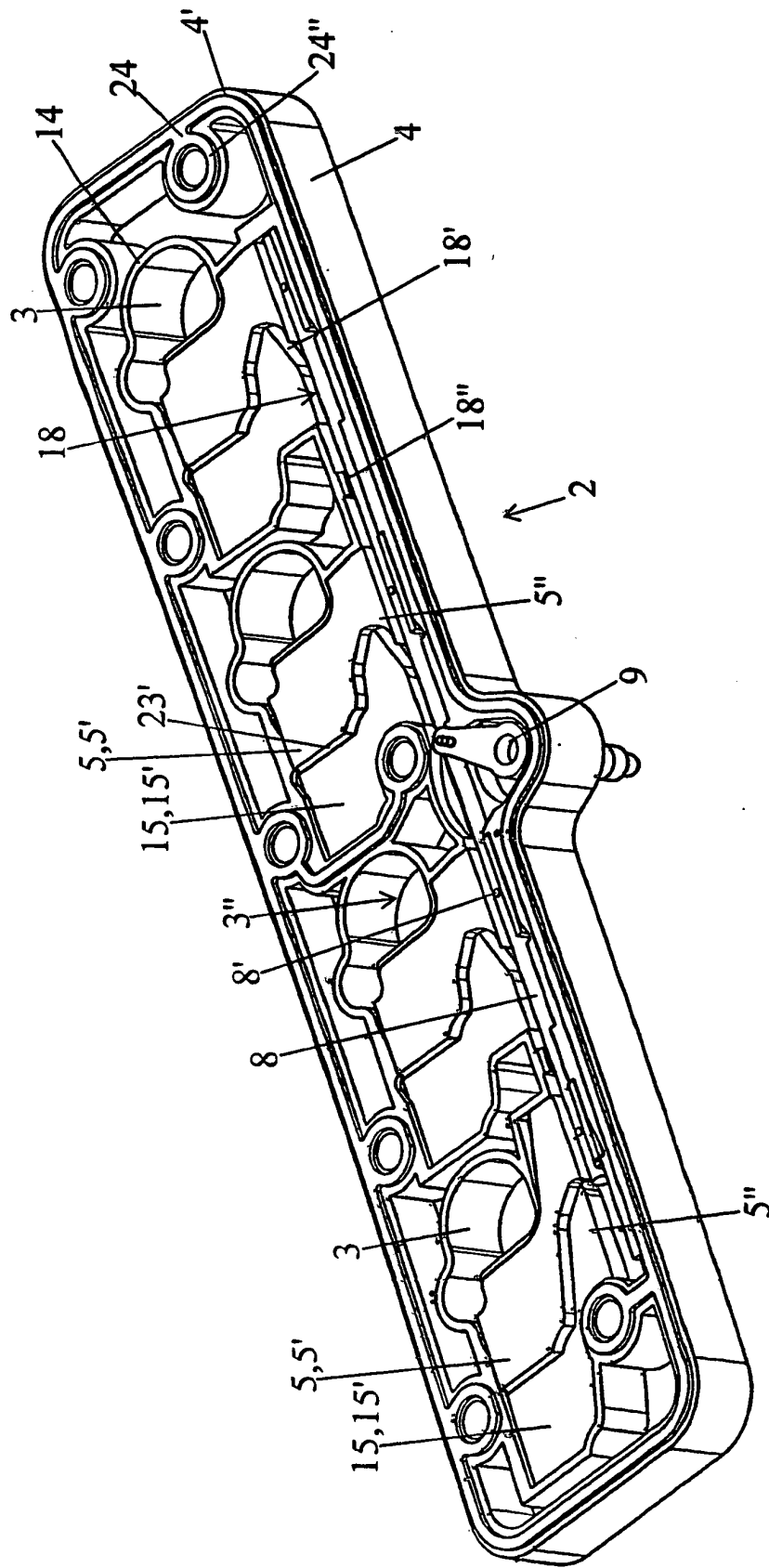


Fig. 6

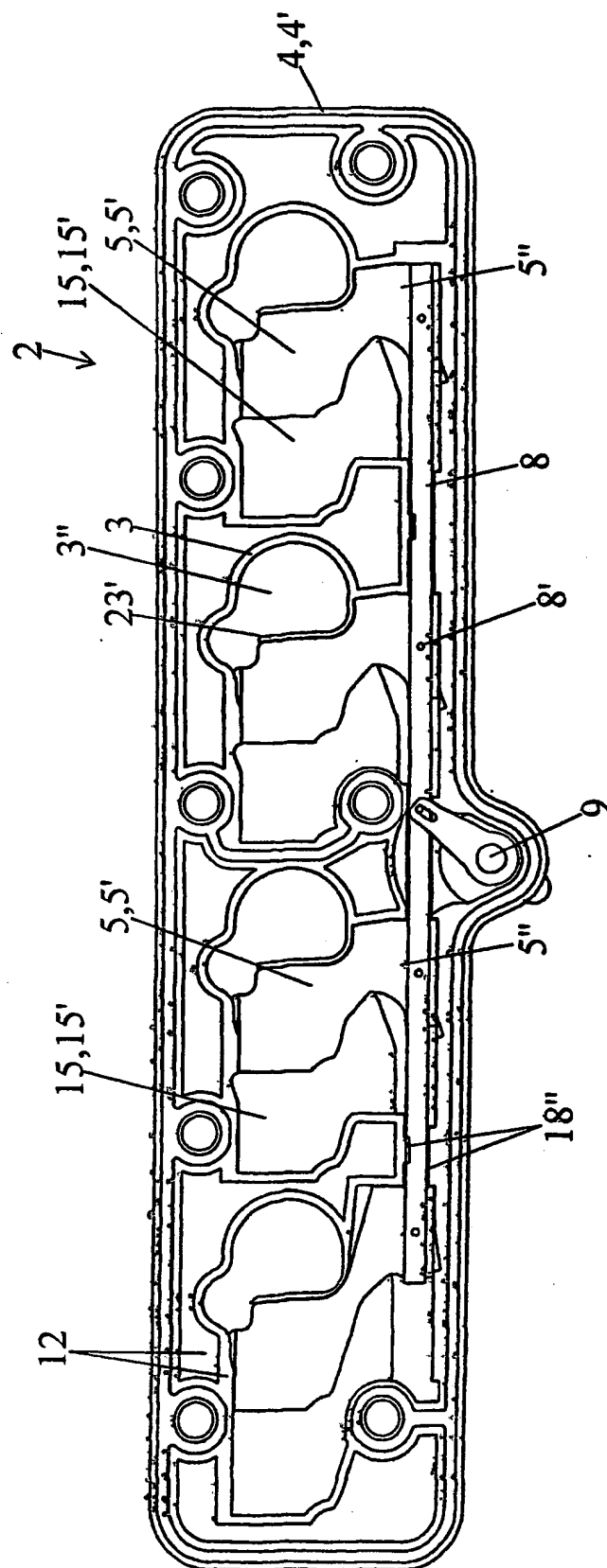


Fig. 7

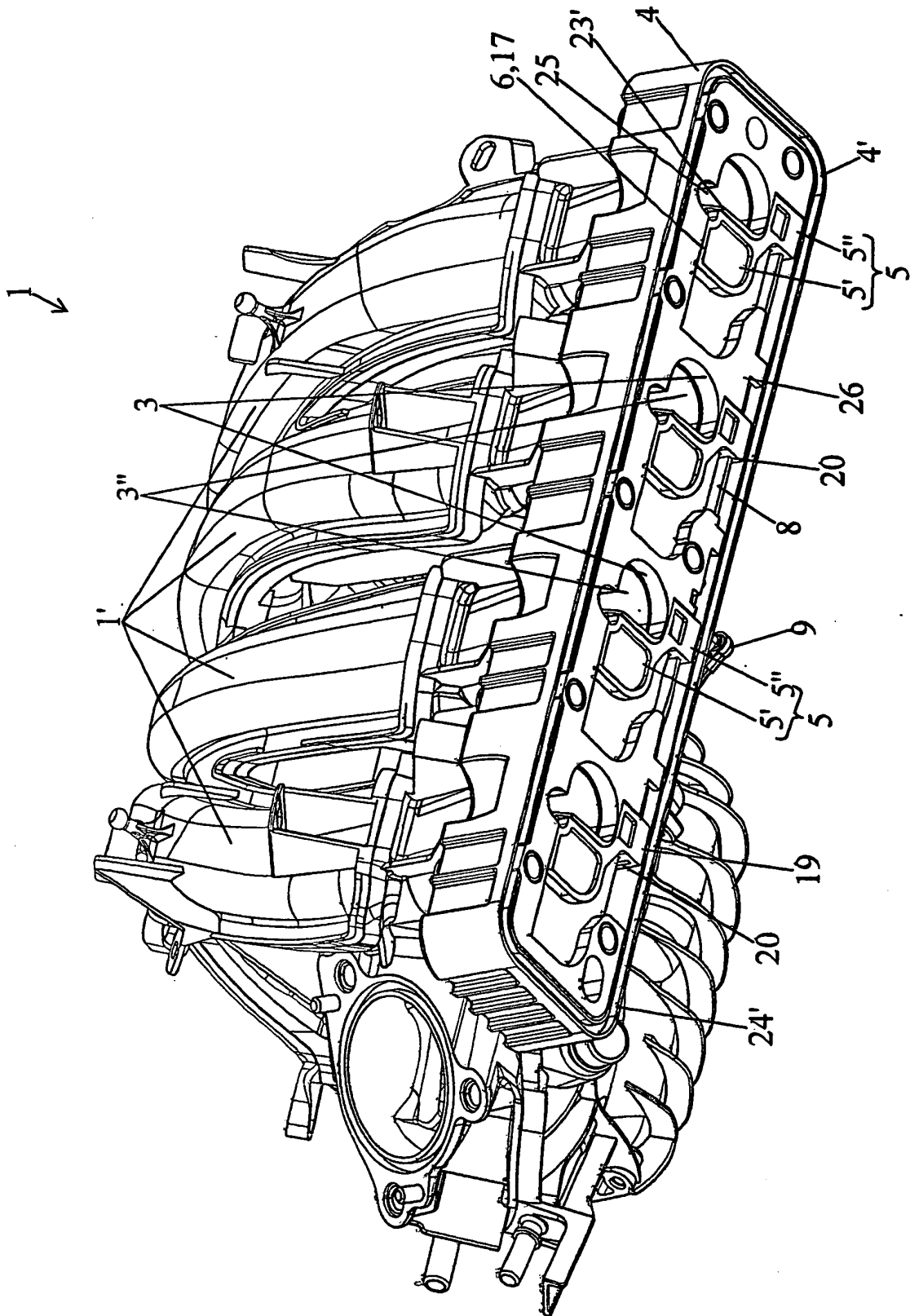


Fig. 8

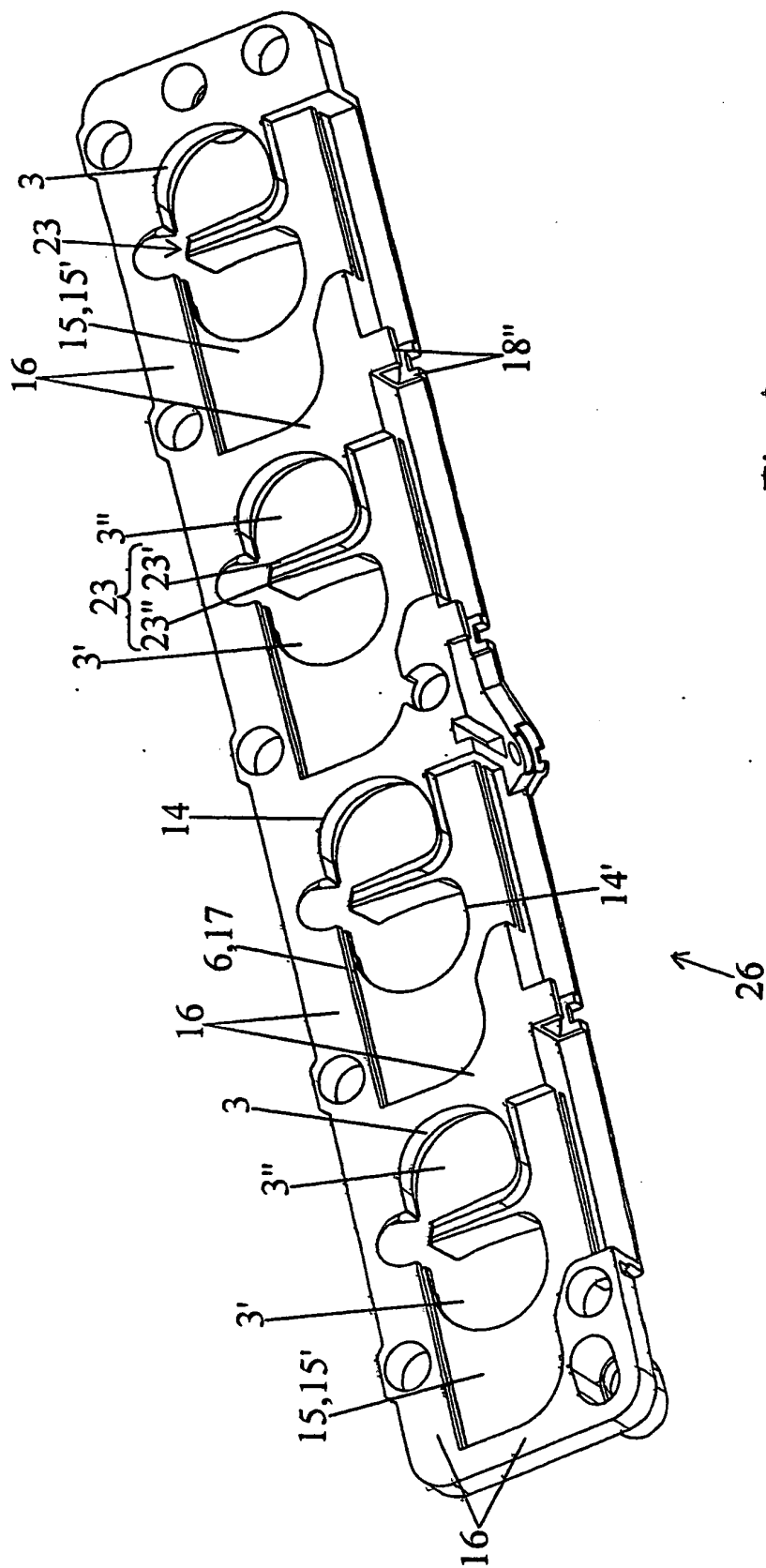


Fig. 9

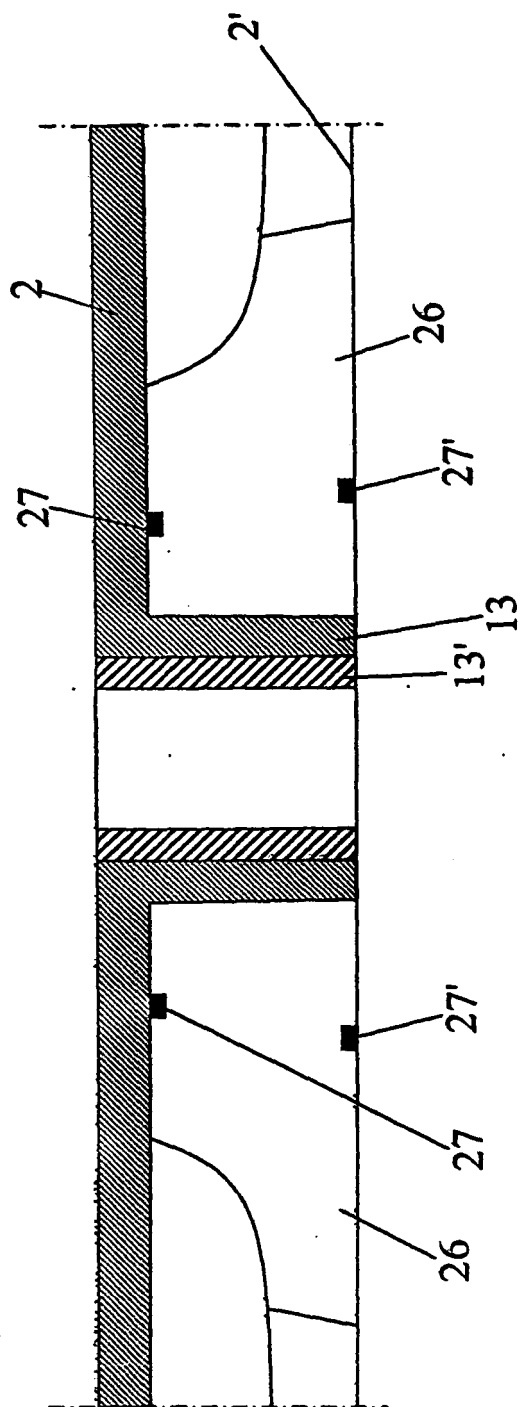


Fig. 10



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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