HEAT EXCHANGER FOR INTERNAL COMBUSTION ENGINES

Inventors: Claus Beck, Esslingen (DE); Jurgen Rosin, Remshalden (DE); Herve Palanchon, Etobicoke (CA)

Correspondence Address:
FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007 (US)

Assignee: BEHR GmbH & Co. KG, Stuttgart (DE)

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ABSTRACT

The invention relates to a heat exchanger for internal combustion engines, which comprises a first, elongate flow channel for the exhaust gases of the internal combustion engine to pass through a secured flow channel, adjacent to the first flow channel, for the exhaust gases to pass through, and a pipe separate from the second flow chamber, for a medium, especially a cooling agent, to pass through, whereby heat can be exchanged between the exhaust gas of the second flow channel and the medium in the pipe and heat can be exhausted at least to a sustained degree between the exhaust gas in the first flow channel and the medium in the pipe. The heat exchanger also comprises a valve channel with an adjustable valve element the distribution of the exhaust gases to the first flow channel and the second flow channel being adjustable by a position of the valve element. The aim of the invention is to provide a heat exchange which requires little space and which can be produced at low cost. For this purpose, the valve channel comprises a valve channel housing which can be assembled from a first housing element and at least one second housing element.
HEAT EXCHANGER FOR INTERNAL COMBUSTION ENGINES

[0001] The invention relates to a heat exchanger for internal combustion engines according to the preamble of claims 1, 7, 21 and 24.

[0002] In modern construction of motor vehicles having internal combustion engines, heat exchangers are being increasingly used, by means of which the heat of the vehicle exhaust gases is delivered to a coolant. This may be desired for the purposes of rapidly heating the coolant or for the purposes of cooling the exhaust gas, for example in combination with exhaust gas recirculation. In this case, problems occur with regard to the exhaust gas conduction and also the construction space, in particular in combination with other components and units.

[0003] DE 102 03 003 A1 describes a heat exchanger for exhaust gases in which a first and a second flow channel for exhaust gases are arranged in parallel in a common housing, a valve channel arranged upstream of the flow channels having the same direction of flow as the flow channels, that is to say it is arranged linearly with respect to the flow channels.

[0004] DE 100 25 877 A1 describes a heat exchanger for exhaust gases in a plurality of embodiments in which a respective valve channel arranged upstream of the flow channels has on the entry side an identical direction of flow as the flow channels, that is to say it is arranged linearly with respect to the flow channels.

[0005] The object of the invention is to specify a heat exchanger mentioned at the beginning which is especially advantageous with regard to the exhaust gas conduction.

[0006] According to the invention, this object is achieved for a heat exchanger mentioned at the beginning by the characterizing features of claim 1.

[0007] This advantageously achieves the effect that the heat exchanger can be arranged in a flexible manner even in a limited construction space, for instance in the engine compartment of a motor vehicle. In addition, it is advantageous that the valve element is not located in the same flow axis as the flow channels, since the speed-dependent stationary waves formed by the pulsating exhaust gases of internal combustion engines therefore have less of an effect on the mechanism of the valve element. Likewise, longitudinally or transversely directed vibrations of the heat exchanger housing in the region of the valve channel are reduced, which is likewise favorable for the functioning and service life of the valve mechanism.

[0008] In a preferred embodiment of a heat exchanger according to the invention, the valve channel is arranged upstream of the flow channels and an inlet channel is arranged upstream of the valve channel in the direction of flow of the exhaust gases, wherein, in an especially preferred manner, a flow axis of the inlet channel has a different direction from the flow axis of the valve channel and from the flow axes of the flow channels. This makes possible gradual bending of the exhaust gas conduction, such that an unhindered exhaust gas flow can be ensured in a smaller type of construction overall. In this case, an angle between the flow axis of the valve channel and the flow axis of the inlet channel is in particular preferably greater than 30 degrees in order to achieve sufficiently large deflection of the exhaust gas flow.

[0009] An angle between the flow axis of the valve channel and the flow axis of the flow channel is likewise preferably greater than 30 degrees, in particular preferably greater than 40 degrees. In this case, the angles between flow channel and valve channel and between valve channel and inlet channel can add up with regard to the exhaust gas conduction in order to achieve a particular a large deflection of the exhaust gas flow overall without having to tolerate associated disadvantages to an appreciable degree. In particular exhaust gas conduction which is unfavorable with regard to swirling and flow resistance and which forces a deflection of the exhaust gas flow of 90 degrees in the smallest space is effectively avoided.

[0010] In order to avoid the abovementioned disadvantages to a special extent, an angle between the flow axis of the valve channel and the flow axis of the flow channel is in particular preferably less than 60 degrees. This does not conflict with the abovementioned two-stage deflection of the exhaust gas flow at a total angle of up to about 90 degrees.

[0011] In a preferred embodiment of the invention, an average flow length of one of the flow channels is greater than an average flow length of the valve channel by at least a factor of two, in particular preferably by a factor of 2.5. Here, the expression “flow length” refers to the average path length of the exhaust gases, that is to say approximately the path along an axis of symmetry of an exhaust gas channel. In this way, taking the dimensioning of the flow channels which results from the predetermined heat exchanger capacity as a basis, an especially space-saving type of construction of a heat exchanger according to the invention is achieved.

[0012] Furthermore, the valve element preferably has just one adjustable flap element, and therefore only a small number of components are required. With regard to a correspondingly simple and effective mechanism of the valve element, the flap element is accommodated on a shaft which can be rotated in a powered manner.

[0013] The valve channel in particular preferably has a dividing wall adjoining the flap element, at least sections of the valve channel being divided into two valve channel halves by the dividing wall. This permits both a simple type of construction and low-swirl exhaust gas conduction.

[0014] In a preferred embodiment of the invention, the second flow channel is arranged essentially parallel to the first flow channel, and the first flow channel and the second flow channel are in particular preferably accommodated in a common housing. This in each case promotes a compact type of construction of the heat exchanger.

[0015] In addition, the object of the invention is achieved by the characterizing features of claim 15. Due to the contact between the valve element and the shaped portion, it is advantageously possible that one of the flow channels in each case be sealed off in an especially effective manner against the throughput of exhaust gases. In addition, premature material wear in the region of contact between valve element and valve channel can be avoided in a simple manner.
The valve channel in this case advantageously has a circular cross section, and the shaped portion can be formed by deforming a wall of the valve channel, in particular by embossing. As a result, the shaped portion can be produced in a simple and cost-effective manner.

Furthermore, the object of the invention is achieved by the characterizing features of claim 18. The double wall of the second flow channel makes possible especially good insulation of the exhaust gas, flowing through this channel, against heat exchange.

The second flow channel in this case advantageously comprises an inner tube which is accommodated in a housing, an outer surface of the inner tube being at a distance from the housing. This enables the construction of the heat exchanger to be kept small overall, wherein in particular a further combination of the housing with the first flow channel to form a construction unit is advantageous.

The distance of the housing from the inner tube can advantageously be fixed by means of spacers. The latter may comprise a plurality of studs arranged on the outer surface of the inner tube, as a result of which a double wall of the second flow channel with good thermal insulation can be realized by simple means.

Furthermore, provision is advantageously made for the inner tube to be directly connected to a baffle plate, the baffle plate being arranged in the valve channel. In a particularly advantageous manner, the valve element in this case is movably arranged on the baffle plate and the valve channel is directly connected to the housing. This results in a reliable and simple sequence during the production of the heat exchanger according to the invention by virtue of the fact that first of all the baffle plate, inner tube and housing are oriented with respect to one another and are connected to one another. After that, the valve channel can be put over the baffle plate and oriented with respect to the latter and connected to the housing. The respective connection may be effected by welding or brazing, other types of fixing not being ruled out.

Depending on requirements, the valve element of a device according to the invention may be rotatably mounted on the valve channel at a single bearing point. Alternatively, mounting on the valve channel at two spaced-apart bearing points may also be provided.

In addition, the object of the invention is achieved by the characterizing features of claim 27. Due to the at least two-piece design of the valve channel housing, it is advantageously possible to produce complicated shaping of the valve channel in a simple manner with regard to optimized exhaust gas conduction.

 Provision is preferably made in this case for the valve element to be accommodated between the first and the second housing part, wherein, in an especially advantageous manner, it is movably mounted on at least one of the housing halves. This makes possible simple assembly of the heat exchanger even with complex shaping of the parts and also enables, by appropriate monitoring during the assembly, functionally reliable mounting of the valve element even when dimensional tolerances of the components occur.

The housing parts are advantageously fixedly connected to one another, in particular by welding. As a result, a high degree of gas tightness can be combined with a high heat resistance. Alternatively, other heat-resisting connections, such as brazing for instance, may be provided. Connection of the housing parts by means of screwing or riveting or flanging is also possible, it possibly being necessary for additional sealing means to be provided with regard to the gas tightness, depending on requirements.

In the interests of cost-effective production, at least one of the housing parts is preferably designed as a formed part, in particular a deep-drawn part. In addition, this advantageously permits the use of materials whose production by casting processes is problematical, such as high-grade steel for example.

It goes without saying that the two-piece design of the valve channel does not conflict with any of the above-mentioned features of the invention, and therefore each of the features mentioned can be combined with the two-piece design of the valve channel. In particular, the abovementioned shaped portions for the planar contact of the valve element may be formed on the housing parts of the valve channel. In particular in the design of the housing parts as formed parts, these shaped portions of the valve channel wall may already be advantageously formed in the course of the forming process.

Further features and advantages can be seen from the exemplary embodiment described below and from the dependent claims.

Three preferred exemplary embodiments of a heat exchanger according to the invention are described below and explained in more detail with reference to the attached drawings.

FIG. 1 shows a plan view of a first exemplary embodiment of a heat exchanger according to the invention.

FIG. 2 shows the heat exchanger according to FIG. 1 rotated by 90°.

FIG. 3 shows the heat exchanger according to FIG. 2 rotated by 90°.

FIG. 4 shows an end view of the heat exchanger according to FIG. 1.

FIG. 5 shows a schematic sectional drawing through the valve channel of the heat exchanger in the orientation according to FIG. 2.

FIG. 6 shows a cutaway three-dimensional illustration of a detail of the heat exchanger from FIG. 1.

FIG. 7 shows a three-dimensional illustration of a second exemplary embodiment of a heat exchanger according to the invention.

FIG. 8 shows a detailed view of the heat exchanger from FIG. 7, the interior of the valve channel being shown.

FIG. 9 shows a three-dimensional view of the valve element of the heat exchanger from FIG. 7 and FIG. 8.

FIG. 10 shows a three-dimensional view of a third exemplary embodiment of a heat exchanger according to the invention, inner components of the heat exchanger being partly shown.

FIG. 11 shows a schematic plan view of a detail of the heat exchanger.
FIG. 12 shows a schematic side view of the detail in FIG. 11.

FIG. 13 shows a schematic front view of the detail in FIG. 11.

FIG. 14 shows a schematic plan view of an inner tube of the heat exchanger from FIG. 10 to FIG. 13.

FIG. 15 shows a three-dimensional view of a detail of a heat exchanger according to the invention.

FIG. 16 shows a three-dimensional view of a modification of a valve channel of the second exemplary embodiment of a heat exchanger according to FIG. 7 to FIG. 9.

FIG. 17 shows the valve channel from FIG. 16 from another three-dimensional perspective.

FIG. 18 shows the valve channel from FIG. 16 from another three-dimensional perspective.

The heat exchanger according to the invention according to the first exemplary embodiment comprises a first flow channel 1 and a second flow channel 2, the first flow channel in this case being designed as a plurality of parallel individual channels (see FIG. 6). FIG. 6 shows that the two flow channels are arranged parallel to one another and are accommodated in the same housing 3.

A conduit 4 for conducting a liquid coolant is likewise directed in the housing 3 and comes out of the housing at a respective inlet-side connection 4a and a respective outlet-side connection 4b. Inside the housing, the conduit 4 is in substantial thermal contact only with the first flow channel, such that a relevant heat exchange takes place between exhaust gas and coolant only when exhaust gas flows through the first flow channel 1.

In the direction of flow S of the exhaust gasses, the heat exchanger has at the end an outlet channel 5, which in this case, with respect to the exhaust gas flow, is oriented parallel to the flow channels. For special requirements, however, provision can preferably be made for the outlet channel 5 to run at an angle to the flow channels 1, 2.

Arranged upstream of the flow channels 1, 2 in the direction of flow S is a valve channel 6, which is welded to the housing 3. The valve channel 6 has a circular cross section and is attached to the housing 3 at an angle W1 of approximately 42° to the flow channels 1, 2. This angle is between an entry-side flow axis SV and respective flow axes SK1, SK2 of the first flow channel 1 and the second flow channel 2 (see FIG. 2).

Welded in place upstream of the valve channel 6 in the direction of flow S is an inlet channel 7, which can be connected on the entry side to the further exhaust gas line via a flange 7a. An inlet-side flow axis SE of the inlet channel encloses an angle W2 of 35° with the entry-side flow axis SV of the valve channel. The angles W1 and W2 lie in one plane, such that the flow axes SE of the inlet channel and the flow axes SK1, SK2 of the flow channels 1, 2 enclose a total angle of 77°. Alternatively, however, the angles may also lie in different planes and may deviate from the present values in order to permit adaptation to given exhaust gas conduction in each case.

A flap element 8 designed as a flap which can be moved in a powered manner is accommodated in the valve channel 6 (see FIG. 5). The flap 8 is firmly connected to a rotatable shaft 9 which extends along an end edge of the flap 8 and perpendicularly through the valve channel 6. In addition, a fixed baffle plate 10 is provided in the valve channel, said baffle plate 10 forming a continuation of the valve flap. Due to the baffle plate 10, an outlet-side end region of the valve channel is subdivided into a first valve channel half 6a and a second valve channel half 6b, each of the valve channel halves 6a, 6b being respectively connected to one of the flow channels 1, 2. A valve element is therefore formed overall by the baffle plate 10, the flap 8 and the shaft 9, by means of which valve element the exhaust gas flow can be optionally directed into at least two different channels.

At its edge opposite the shaft 9, the flap 8 is shaped in a curved or elliptical manner in order to obtain a sealing fit relative to the wall of the valve channel 6, which is of circular cross section. The wall of the valve channel may be appropriately processed in the region of contact of the valve flap.

The flap 8 can be moved via a drive 11 of the shaft 9, the drive 11 in this case comprising a vacuum dashpot 12, by means of which a push rod 14 can be moved. The push rod 14 is connected at the end via a ball joint to a pivot pin 13 fixed to the shaft 9. As a result, a push or pull movement of the push rod 14 leads to a rotation of the shaft 9 and therefore to an adjustment of the flap 8. Depending on the position of the flap, either the exhaust gas cannot be directed at all through the first flow channel 1 serving for the heat exchange or can be directed through said flow channel 1 in any desired proportion or entirely through it.

The heat exchanger is advantageously dimensioned in such a way that it is of small size overall without hindering the exhaust gas flow. Average flow lengths of the two flow channels 1, 2 are each the same and correspond to the geometrical position of the two channels. An average flow length of the valve channel 6 is approximately the geometrical length of a centre line of the valve channel 6. In this case the average flow length of a flow channel 1, 2 is about 2.7 times greater than the average flow length of the valve channel 6. Therefore most of the overall length of the heat exchanger is available for the actual heat exchange while retaining the advantages of the invention.

The heat exchanger according to the second exemplary embodiment (FIG. 7 to FIG. 9) has, as in the first exemplary embodiment, a valve channel 6 which is arranged at an angle to the flow channels 1, 2. The valve element 15 comprises a baffle plate 10, on which a valve flap 8 accommodated on a shaft 9 is arranged.

The valve channel 6 comprises a section having an essentially circular cross section. Provided in the wall of this section are shaped portions, with which a marginal region 8a of the flap 8 is in planar contact when the flap is in an end position. The contact with the first shaped portion 16 is associated with the conduction of the exhaust gas flow through the second flow channel 2 and the contact with the shaped portion 17 is associated with the conduction through the first flow channel 1. FIG. 8 shows the conduction through the second flow channel.

The shaped portions 16, 17 are each produced by pressing a correspondingly shaped punch into the wall of the
valve channel 6, such that they can be seen from outside. Due to the planar contact between the flap 8 and the shaped portions 16, 17, the sealing of the flap is improved and vibratory striking of the flap against the wall of the valve channel 6 is reduced.

[0059] According to FIG. 9, the valve element 15 has a first bearing point 18 and a second bearing point 19 at a distance therefrom. The shaft 9 is mounted with each of the respective bearing points on the valve channel 6, the first bearing point being assigned to an aperture of the valve channel and the second bearing point 19 being assigned to a pocket-like receptacle on the valve channel 6 on the side opposite the aperture. However, provision may also be made for the second bearing point 19 to be dispensed with, such that the shaft is rotatably accommodated on the valve channel 6 merely in the region of a passage through the valve channel 6 at a single bearing point 18.

[0060] In contrast to the previous exemplary embodiments, the heat exchanger according to the third exemplary embodiment (FIG. 10 to FIG. 14) has a valve channel 6' which is oriented parallel to the flow channels 1, 2. The heat exchanger comprises a housing 3 in which a total of fifteen parallel tubes 1a are arranged, which together form the first flow channel 1. The coolant which flows through the housing 3 flows directly around the walls of the tubes 1a.

[0061] The second flow channel 2 is likewise accommodated in the housing 3. The flow channel 2 comprises an inner wall 3a, which is shown as a broken line in FIG. 11 and FIG. 13 and is designed as a tubular passage, open on two sides, through the housing 3. Furthermore, the second flow channel comprises an inner tube 20, which is inserted into the passage. An outer surface of the inner tube 20 comprises a number of spacers 21, which are designed as projecting studs on the outer surface of the inner tube 20. In the state pushed into the passage, only the studs 21 are in contact with the inner wall 3a of the housing 3 (see in particular FIG. 13), such that the thermal contact between the housing passage around which the coolant flows and the inner tube 20 through which the exhaust gas flows is very small. Overall, a double wall of the second flow channel 2 with a first wall (housing passage 3a) and a second wall (inner tube 20) is formed by the arrangement described.

[0062] The inner tube 20 and the housing passage 3a have an elongated cross section and terminate flush with one another at their respective end faces.

[0063] In contrast to FIG. 10, the detailed illustration according to FIG. 15 shows a valve channel with angled orientation, but corresponds to the third exemplary embodiment with regard to the arrangement and fixing of the housing 3, inner tube 20 and valve element 15. The illustration in FIG. 15 shows a preferred sequence for the fitting and fixing of the components: the baffle plate 10 comprises an angled margin 10a with an aperture adapted to the cross section of the inner tube 20. First of all, the baffle plate 10 is welded to an end face of the inner tube 20 around the margin of the aperture. This unit is then pushed into the passage 3a of the housing 3, good frictional retention of the inner tube being obtained in a regular manner on account of the studs 21. The inner tube and/or the baffle plate 10 is subsequently welded to the housing, spot welding possibly being sufficient.

[0064] After that, the valve channel 6 is pushed over the baffle plate 10 and if need be the valve flap 8 and the shaft 9 are fitted. After precise orientation of the valve channel 6 relative to the valve element 15, the valve channel 6 is welded to the housing by a weld which runs around the end face of the housing.

[0065] A modification of the heat exchanger according to the invention according to the second exemplary embodiment which is especially advantageous in particular with regard to the assembly is shown in FIG. 16 to FIG. 18. Here, the reference to the second exemplary embodiment is only by way of example and the modification may likewise be combined with any of the other exemplary embodiments.

[0066] The outer wall of the valve channel is in this case not designed as a one-piece housing, but rather comprises a valve channel housing 30 which can be assembled from a first housing part 31 and a second housing part 32. The two housing parts here are essentially shaped as mirror-symmetrical halves, the plane of symmetry passing perpendicularly through the shaft 9 of the valve element 9, 10, 11. The mirror symmetry is not exact in this case, since the shaft 9 passes through the first housing part 31 and is rotatably mounted on the first housing part 31 in the region in which it passes through the latter. In the example shown, no mounting of the shaft 9 is provided on the second housing part 32. Alternatively, however, the shaft 9 may also be additionally mounted in a corresponding recess of the second housing part 32. Each of the housing parts has one part of a respective shaped portion 16, 17, described already in the second exemplary embodiment, for the planar contact of the valve flap 8. For the sake of clarity, the valve flap 8 is not shown in FIG. 16 to FIG. 18.

[0067] The baffle plate 10, which is shown in FIG. 16 to FIG. 18, runs essentially perpendicularly to said plane of symmetry or section plane of the valve channel housing. Here, the baffle plate 10 has pointed shaped portions 10a at the end, which engage in corresponding marginal shaped portions of the housing parts 31, 32 and by means of which the baffle plate 10 is retained between the assembled housing parts 31, 32. In addition to merely clamping retention, additional welding of baffle plate 10 and housing parts 31, 32 may be provided here. It should be noted that the baffle plate 10 is not fixedly connected to the shaft 9 but rather extends only into its immediate vicinity or bears against the shaft in a sliding manner with appropriately accurate adjustment.

[0068] Each of the housing parts 31, 32 has been produced by forming by means of deep drawing from a corresponding blank. In the completely assembled state of the heat exchanger, the housing parts, which in particular are advantageously made of high-grade steel, are fixed to one another by welding.

[0069] The assembly of the heat exchanger is advantageously effected in the region of the valve channel as follows:

[0070] First of all the valve flap 8 is connected to its shaft 9 (as a rule by welding) and is rotatably inserted into the first housing part 31. The housing parts 31, 32 are subsequently fixed to one another by welding. Depending on whether the baffle plate 10 is fastened in a clamping manner and/or by welding, it can be fitted and fixed before or after the welding of the housing parts or also partly before and partly after said welding.
[0071] After the baffle plate 10 has been fixed, first of all, when using the inner tube 20 of the third exemplary embodiment, the inner tube 20 can be welded to the baffle plate 10. Appropriately advantageous shaping of the baffle plate 10 for this purpose can be gathered from the description of the third exemplary embodiment.

[0072] Finally, the valve channel 6" profitted in this way, is brought together with the housing 3, possibly while pushing in the inner tube 20, and is welded to the housing 3 in a gastight manner.

[0073] The assembly sequence described above by way of example takes into account the fact that the exhaust gases first of all enter in the region of the valve channel, and therefore the valve channel in particular is exposed to especially high temperatures. Therefore welding, possibly also brazing, of the individual parts is the preferred means for connecting the parts.

[0074] Depending on requirements, the respective special features of the exemplary embodiments described are not restricted to these exemplary embodiments but rather can be freely combined with one another, in which case especially advantageous heat exchangers can be formed if need be by certain combinations. In particular, the shaping, retention and fitting of the inner tube 20 can be applied to the first two exemplary embodiments, and the shaped portions 16, 17 of the valve channel for the contact of the valve flap 8 are not restricted to valve channels having an angular orientation.

1. A heat exchanger for internal combustion engines, comprising

a first, elongated flow channel for the exhaust gases of the internal combustion engine to pass through,

a second flow channel, arranged adjacent to the first flow channel, for the exhaust gases to pass through,

a conduit, separate from the second flow channel, for a medium, in particular a coolant, to pass through,

wherein heat energy can be exchanged between the exhaust gas of the second flow channel and the medium of the conduit, and wherein heat energy at least cannot be exchanged to a substantial degree between the exhaust gas in the first flow channel and the medium in the conduit, and

a valve channel with an adjustable valve element wherein a distribution of the exhaust gases to the first flow channel and the second flow channel can be set by a position of the valve element,

wherein the valve channel comprises a valve channel housing which can be assembled from a first housing part and at least one second housing part.

2. The heat exchanger as claimed in claim 1, wherein the valve element is accommodated between the first housing part and the second housing part.

3. The heat exchanger as claimed in claim 1, wherein the valve element is movably mounted on at least one of the two housing parts.

4. The heat exchanger as claimed in claim 1, wherein the housing parts are fixedly connected to one another, in particular by welding.

5. The heat exchanger as claimed in claim 1, wherein at least one of the housing parts is designed as a formed part, in particular a deep-drawn part.

6. The heat exchanger as claimed in claim 2, wherein the valve element is movably mounted on at least one of the two housing parts.

7. A heat exchanger for internal combustion engines, in particular as claimed in claim 1, comprising

a first, elongated flow channel for the exhaust gases of the internal combustion engine to pass through,

a second flow channel, arranged adjacent to the first flow channel, for the exhaust gases to pass through,

a conduit, separate from the second flow channel, for a medium, in particular a coolant, to pass through,

wherein heat energy can be exchanged between the exhaust gas of the first flow channel and the medium of the conduit, and wherein heat energy at least cannot be exchanged to a substantial degree between the exhaust gas in the second flow channel and the medium in the conduit, and

a valve channel with an adjustable valve element wherein a distribution of the exhaust gases to the first flow channel and the second flow channel can be set by a position of the valve element,

wherein an entry-side flow axis (SV) of the valve channel has a different direction from a flow axis (SK1) of the first flow channel.

8. The heat exchanger as claimed in claim 7, wherein the valve channel is arranged upstream of the flow channels and an inlet channel is arranged upstream of the valve channel in the direction of flow of the exhaust gases.

9. The heat exchanger as claimed in claim 8, wherein a flow axis (SE) of the inlet channel has a different direction from the flow axis (SV) of the valve channel and from the flow axes (SK1, SK2) of the flow channels.

10. The heat exchanger as claimed in claim 9, wherein an angle (W2) between the flow axis of the valve channel and the flow axis (SE) of the inlet channel is greater than 30 degrees.

11. The heat exchanger as claimed in claim 1, wherein an average flow length of one of the flow channels is greater than an average flow length of the valve channel by at least a factor of two.

12. The heat exchanger as claimed in claim 1, wherein an average flow length of one of the flow channels is greater than an average flow length of the valve channel by at least a factor of 2.5.

13. The heat exchanger as claimed in claim 1, wherein an angle (W1) between the flow axis (SV) of the valve channel and the flow axis (SK1) of the first flow channel is greater than 30 degrees.

14. The heat exchanger as claimed in claim 1, wherein an angle (W1) between the flow axis (SV) of the valve channel and the flow axis (SK1) of the first flow channel is greater than 40 degrees.

15. The heat exchanger as claimed in claim 1, wherein an angle between the flow axis (SV) of the valve channel and the flow axis (SK1) of the first flow channel is less than 60 degrees.

16. The heat exchanger as claimed in claim 1, wherein the valve element has just one adjustable flap element.
17. The heat exchanger as claimed in claim 16, wherein the flap element is accommodated on a shaft which can be rotated in a powered manner.

18. The heat exchanger as claimed in claim 16, wherein the valve channel has a dividing wall adjoining the flap element at least sections of the valve channel being divided into two valve channel halves by the dividing wall.

19. The heat exchanger as claimed in claim 1, wherein the second flow channel is arranged throughout essentially parallel to the first flow channel.

20. The heat exchanger as claimed in claim 1, wherein the first flow channel and the second flow channel are accommodated in a common housing.

21. A heat exchanger for internal combustion engines, in particular as claimed in claim 1, comprising

   a first, elongated flow channel for the exhaust gases of the internal combustion engine to pass through,
   a second flow channel, arranged adjacent to the first flow channel, for the exhaust gases to pass through,
   a conduit, separate from the second flow channel, for a medium, in particular a coolant, to pass through,

   wherein heat energy can be exchanged between the exhaust gas of the second flow channel and the medium of the conduit, and wherein heat energy at least cannot be exchanged to a substantial degree between the exhaust gas in the first flow channel and the medium in the conduit,

   a valve channel with an adjustable valve element wherein a distribution of the exhaust gases to the first flow channel and the second flow channel can be set by a position of the valve element,

   wherein the second flow channel has a double wall.

22. The heat exchanger as claimed in claim 21, wherein the valve channel has an essentially circular cross section.

23. The heat exchanger as claimed in claim 1, wherein the shaped portion can be formed by deforming a wall of the valve channel, in particular by pressing or embossing.

24. A heat exchanger for internal combustion engines, in particular as claimed in claim 1, comprising

   a first, elongated flow channel for the exhaust gases of the internal combustion engine to pass through,
   a second flow channel, arranged adjacent to the first flow channel, for the exhaust gases to pass through,
   a conduit, separate from the second flow channel, for a medium, in particular a coolant, to pass through

   wherein heat energy can be exchanged between the exhaust gas of the second flow channel and the medium of the conduit, and wherein heat energy at least cannot be exchanged to a substantial degree between the exhaust gas in the first flow channel and the medium in the conduit,

   a valve channel with an adjustable valve element wherein a distribution of the exhaust gases to the first flow channel and the second flow channel can be set by a position of the valve element,

   wherein the second flow channel has a double wall.

25. The heat exchanger as claimed in claim 24, wherein the second flow channel comprises an inner tube which is accommodated in a housing an outer surface of the inner tube being at a distance from the housing.

26. The heat exchanger as claimed in claim 25, wherein the inner tube comprises spacers, by means of which the distance of the inner tube from the housing can be fixed.

27. The heat exchanger as claimed in claim 26, wherein the spacers comprise a plurality of studs arranged on the outer surface of the inner tube.

28. The heat exchanger as claimed in claim 1, wherein the inner tube is directly connected to a baffle plate, the baffle plate being arranged in the valve channel.

29. The heat exchanger as claimed in claim 28, wherein a valve flap is movably arranged on the baffle plate.

30. The heat exchanger as claimed in claim 1, wherein the valve channel is directly connected to the housing.

31. The heat exchanger as claimed in claim 1, wherein the valve element is rotatably mounted on the valve channel at only one bearing point.

32. The heat exchanger as claimed in claim 1, wherein the valve element is rotatably mounted on the valve channel at two spaced-apart bearing points.

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