HEAT-EXCHANGER DEVICE AND METHOD FOR CONDITIONING A WORKING MEDIUM

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ABSTRACT
The invention relates to a heat-exchanger device (99), in which a working medium (13) is conditioned by means of a heat-transfer medium (21). The conditioning process, which creates a desired working point, is achieved by an exchange of heat between the working medium (13) and the heat-transfer medium (21). Heat-transfer surfaces are configured in the heat-exchanger device (99), said surfaces enabling the exchange of heat in such a way that the two media (13, 21) remain separate from one another. According to the invention, said device is equipped with a chamber (10), into which the working medium (13) flows. The chamber (10) is penetrated or delimited by at least one conduit (20), which is traversed by the heat-transfer medium (21).
HEAT-EXCHANGER DEVICE AND METHOD FOR CONDITIONING A WORKING MEDIUM

[0001] The present invention relates to a heat exchange device and to a method for conditioning a working medium, in particular having a heat exchange device of this type.

[0002] A wide variety of heat exchange devices in which a working medium, with a view to producing a desired working point, exchanges heat with a heat exchange medium via heat exchange surfaces, are known. Heat exchange devices of this type include, for example, vehicle radiators, in which the working medium is the engine coolant and the heat exchange medium is the ambient air flowing through the radiator. However, heat exchange devices are also required for other working media in an engine, such as an internal combustion engine. For example, it is known for combustion exhaust gases from an internal combustion engine to be recirculated into the combustion chamber, before which they are cooled by means of a heat exchanger. It is also known to cool compressed air for operation of a brake or an engine brake of a vehicle.

[0003] Known heat exchangers are separate components which are accommodated in separate housings and can only be partially integrated in the overall cooling system of an engine.

[0004] One drawback of heat exchangers of this type, in which the working medium is forced to flow through a region through which a heat exchange medium also flows is the need for a correspondingly adapted housing which is able to withstand very high pressures. Another drawback is that it is necessary to produce a forced flow of the working medium. Therefore, it is an object of the invention to configure a heat exchange device in such a way that the working medium can be conditioned in the simplest possible way.

[0005] According to the present invention, this object is achieved by a heat exchange device according to the invention. Methods for conditioning a working medium in accordance with the invention are also suitable for achieving the object of the invention in an advantageous way.

[0006] In a heat exchange device, a working medium is conditioned by means of a heat exchange medium. The conditioning, with a view to producing a desired working point, is realized by heat exchange between the working medium and the heat exchange medium. For this purpose, heat exchange surfaces are formed in the heat exchange device, via which the heat exchange can take place, in such a manner that the two media are separate from one another. According to the invention, a chamber is formed, with the working medium flowing into the chamber. At least one line through which the heat exchange medium flows passes through the chamber.

[0007] On account of the fact that in this configuration the working medium does not have to actively flow past the heat exchange surfaces, the heat exchange can take place through free convection with only partial forced flow or even with no forced flow whatsoever. In this case, the conditioning of the working medium may consist in particular in cooling of the working medium.

[0008] According to a preferred configuration of the invention, at least one line passes through the chamber in the direction of its greatest longitudinal extent. Orienting the line in the direction of the greatest longitudinal extent of the chamber offers the possibility of making the surface area of the line in the chamber as large as possible, and thereby forming the largest possible heat exchange surface. This achieves favorable heat exchange in particular if this heat exchange takes place predominantly or almost exclusively through free convection.

[0009] According to an advantageous configuration of the invention, it is provided that at least one line has heat exchange fins, such as cooling fins. The heat exchange fins serve to increase the surface area of the line and therefore to increase the size of the heat exchange surfaces and therefore to ramp up the heat exchange between the two media overall. According to a preferred refinement, the heat exchange fins are arranged on the outer side of the line and project into the chamber from the line. This in particular increases the surface area of the heat exchange surfaces, formed by the heat exchange fins, which comes into contact with the working medium. The use of a suitable material of good thermal conductivity, such as for example a metal, increases the heat conduction in the material. The increase in the surface area works even if the heat exchange medium does not flow through the inside of the heat exchange fins. In this case, depending on the conditions and particular requirements imposed on the inflow and outflow of the working medium into and out of the chamber, it is possible and indeed advantageous with a view to achieving good heat exchange for the direction in which the heat exchange fins run to be formed perpendicular to the direction in which the line runs within the chamber. In this case, in particular fins arranged parallel to the direction of the force of gravity are advantageous.

[0010] In this case, according to a preferred refinement of the invention, the heat exchange fins are designed to correspond to the inflow direction and/or the outflow direction of the working medium into or out of the chamber.

[0011] According to a further advantageous configuration of the invention, at least one line is formed in the region of at least one inflow opening of the chamber. Forming a line in the region of an inflow opening results in a forced flow around the line and therefore, in addition to purely free convective heat exchange, also a proportion of forced convective heat exchange. In this context, according to a further configuration, it is possible for a plurality of inflow openings into the chamber to be provided, in which case a line runs in the region of each inflow opening. In this case, it is also possible for in each case one common line to be assigned to a plurality of inflow openings. In particular, it is also possible to provide only a small number of lines, with each of the lines being positioned in the region of a plurality of inflow openings. On the other hand, it is likewise conceivable for each inflow opening to be assigned a different line assigned to that inflow opening only. In this case, the number of lines is at least equal to the number of inflow openings.

[0012] Likewise, as an alternative or in addition, it is possible to provide for at least one line to be formed in the region of at least one outflow opening. In this case too, the flow around the line when the working medium is flowing out of the chamber leads to forced convection which supplements the free convection. In this case, it is in particular possible to provide a plurality of outflow open-
ings, with a line running in the region of each outflow opening. However, it is also quite possible for a single line to be assigned to a plurality of outflow openings. However, it is also possible to provide for each outflow opening to be assigned a different line. Inflow and outflow openings may be identical, i.e., an opening can also be used cyclically as an inflow opening and then as an outflow opening.

In this context, it is possible in particular to provide configurations according to which each line is assigned at least one and preferably precisely one inflow opening and at least one outflow opening, preferably at least precisely one outflow opening. In particular, it is possible to provide that one line is assigned a plurality of inflow openings but just one outflow opening.

Particularly good flow through a region provided with heat exchange fins is advantageous achieved if the working medium flows directly through such a region on the flow path from the inflow opening or to the outflow opening. This leads to particularly good forced circulation of the working medium flowing in or out and to an increased efficiency of the forced convection.

According to a preferred configuration of the invention, the chamber forms a reservoir for the working medium. This measure means that any reservoir which may be required at the same time becomes a heat exchange device. There is no need for a separate housing for the heat exchange device. This is advantageous in particular because the design requirements imposed on the housing of a heat exchange device are at least substantially similar to those imposed on a reservoir. The demand for leak tightness, ability to withstand high pressures and thermal loads substantially coincide with one another.

In a further configuration of the invention, the chamber may also form a pressurized reservoir. The pressurized reservoir, in particular in conjunction with a gaseous working medium, has the advantage that the pressurized working medium allows better heat exchange with the heat exchange medium than a working medium at atmospheric pressure.

According to a further configuration of the invention, the chamber is an integral part of an engine component or compressor component, in particular in the exhaust gas recirculation in an engine, an exhaust gas recirculation device or a brake device. The structural layout entailed by the heat exchange device is greatly reduced by making the heat exchange device, whether with or without a reservoir function, part of a functional component. Aiming to an advantageous configuration, the chamber which is required for the heat exchange device can be formed in the immediate vicinity of the engine block or may form part of the engine block. This allows particularly simple production of the chamber.

A method according to the invention for conditioning a working medium by means of a heat exchange medium provides for the working medium to flow into a chamber and for the heat exchange medium to flow through this chamber, during which process it is guided within a line passing through the chamber. This procedure allows heat exchange which is independent of forced flow of the working medium through the heat exchanger. According to an advantageous embodiment, the conditioning of the working medium in the chamber is at least partially effected by free convection. This type of heat exchange can be produced in a particularly simple and advantageous way. According to an advantageous configuration of a method, the working medium is passed through a region provided with heat exchange fins at least as it flows into or out of the chamber. Its passage through this region provided with heat exchange fins leads to forced convection, which increases the efficiency of the heat exchanger but does not require the separate generation of forced flow of the working medium through the heat exchange device. Only the flow of the working medium which is already present in any case is employed. This flow is produced in particular by means of pressure gradients and/or by means of circulation or discharge of the working medium from the chamber which is required in any case, generally in the form of a medium flow profile which is automatically established. According to a preferred configuration, the heat exchange fins are oriented in the inflow and/or outflow direction of the working medium, so that the working medium can flow through between the fins in a particularly expedient way. This type of orientation leads to a low flow resistance and at the same time to a good flow through the spaces between the heat exchange fins.

According to an advantageous configuration of a method according to the invention, the heat exchange fins are oriented in the direction of the profile of a convective flow in the chamber. An orientation of this nature, in particular with relatively long residence times and a configuration of the chamber which promotes a convective flow within the chamber, leads to the formation of a convective flow in the chamber being promoted. A flow of this type, with a low flow resistance and good flow around the heat exchange fins, then boosts the free convection. A convective flow occurs in particular if the proportion of the working medium which flows out is relatively small compared to the volume of the chamber, and the working medium also flows out at a low flow velocity. This type of configuration of the chamber and of the volume of the chamber allows particularly good conditioning of the working medium to be achieved, since the associated high mean residence time of the working medium in the chamber allows very good exchange of thermal energy between working medium and heat exchange medium to be achieved. It is also possible for the inflow and outflow openings to be arranged in such a way that the formation of a convective flow is promoted by the direction of flow through them and their positioning at the chamber.

According to further advantageous configuration of a method, the working medium in the chamber is subject to pressure. The pressurized storage of the working medium in the chamber is advantageous in particular if the working medium is in the gaseous state. The application of pressure then increases the particle density and therefore achieves improved heat exchange through free convection. It is advantageously possible for the working medium to be used for operation of an engine (internal combustion engines), a brake device or a pressurized reservoir of a vehicle.

In a preferred configuration, a method according to the invention is carried out by means of a heat exchange device designed in accordance with the invention.
The invention is diagrammatically depicted on the basis of exemplary embodiments in the drawing and is described extensively below with reference to the drawing, in which:

FIG. 1 shows a diagrammatic cross-sectional illustration through a first embodiment of a heat exchange device according to the invention;

FIG. 2 shows a diagrammatic cross-sectional illustration through a second embodiment of a heat exchange device according to the invention;

FIG. 3 diagrammatically depicts the structure of a third heat exchange device in longitudinal section;

FIG. 4 diagrammatically depicts the structure of a fourth embodiment of a heat exchange device in longitudinal section;

FIG. 5 shows an exemplary embodiment of heat exchange fins in the region of the line of a heat exchange device according to the invention;

FIG. 6 shows a diagrammatic cross-sectional illustration through a fifth heat exchange device;

FIG. 7 shows a diagrammatic cross-sectional illustration through a sixth heat exchange device;

FIG. 8 diagrammatically depicts the longitudinal section through a heat exchange device; and

FIG. 9 diagrammatically depicts the longitudinal section through a modified embodiment of a heat exchange device.

FIGS. 1 to 4 show different embodiments of chambers and arrangements of lines formed therein, with heat exchange fins formed integrally on the lines. The different configurations differ in terms of different designs of the chamber 10, of the at least one inflow and outflow opening and of the positioning of the at least one line within the chamber.

FIG. 1 shows a heat exchange device 99, which has a chamber 10 which is rectangular in cross section. The chamber forms a reservoir for working medium, with the working medium in particular being pressurized.

In the embodiment illustrated, three lines 20 pass through the chamber 10, with the heat exchange medium 21 flowing through the lines 20. Each of the three lines 20 is surrounded by heat exchange fins 22 on the outer side. An inflow opening 11, through which working medium 13 flows into the chamber 10, lies in the plane of the drawing. The three lines 20 are laid in such a way that the working medium 13 flowing in flows directly past the lines 20 and/or flows through the region of the heat exchange fins. In the embodiment illustrated in the figure, therefore, a plurality of lines 20 are assigned to one inflow opening 11. In the longitudinal direction of the heat exchange device 99, however, these lines may be assigned further inflow openings 11, and as an alternative or in addition also one or more outflow openings 12, as will be explained in more detail below in the longitudinal sections shown in FIGS. 3 and 4.

The heat exchange between the working medium 13 and the heat exchange medium 21 takes place firstly by virtue of the fact that when it flows in the working medium 13 comes into contact with the heat exchange fins 22 and secondly by virtue of the fact that the working medium 13 then remains within the chamber 10, and as a result is cooled in the form of free convection.

In the configuration of the invention shown in FIG. 1, the lines 20 are in the form of round tubes which are surrounded by heat exchange fins which are likewise of circular external contour and preferably lie in a plane running radially around the line 20, as illustrated by way of example in FIG. 5b.

FIG. 2 shows a variant of the configuration of an exhaust gas heat exchange device. The heat exchange devices 99 shown in FIGS. 1 and 2 substantially correspond to one another, and consequently only the differences between the two configurations are illustrated in FIG. 2. A rectangular outer contour was used for the design of the heat exchange fins 22 in FIG. 2, so that the heat exchange fins form an interrupted region of the chamber which is provided with heat exchange fins without any gaps. In addition, a separate reservoir 14, which has no heat exchange fins and forms the main storage volume of the chamber 10, is formed. Otherwise, the design of the heat exchange device 99 shown in FIG. 2 may be the same as that shown in FIG. 1. This design of the heat exchange fins firstly increases the heat exchange surface area and secondly improves the guidance of the working medium which flows in through the fanned region.

FIGS. 1 and 2 show cross sections through the structure of heat exchange devices 99 according to the invention. FIGS. 3 and 4, which are described below, show sections taken in the longitudinal direction of the chamber 10.

FIG. 3 shows a heat exchange device 99 with its chamber 10, which has a line 20 passing through it in the longitudinal direction. The line 20, on its outer side, has heat exchange fins projecting into the chamber 10, with the heat exchange medium 21 flowing through the line in the direction indicated by the arrows 23. In accordance with the illustration, the heat exchange fins 22 are oriented so as to protrude radially from the line 20. The working medium 13 flows through the inflow openings 11 into the working chamber 10. The inflow openings 11 are arranged next to one another in the longitudinal direction of the line 20, but they could also—contrary to what is illustrated in the drawing—be arranged offset in the vertical direction with respect to one another, so that they are not necessarily assigned to the same line 20. The working medium 13 which flows in initially passes into the region of the lines 20 and of the heat exchange fins 22, and flows through this region in the direction indicated by the flow arrows 16. Furthermore, the chamber 10 also has a reservoir region 14, into which no heat exchange fins 22 project and which stores the majority of the volume of the working medium 13. In this region, the working medium is conditioned by free convection, in which heat exchange between the working medium and the heat exchange medium continues to take place. All the illustrations of the conditioning of the working medium by heat exchange with the heat exchange medium may involve cooling or heating of the working medium. The type of conditioning is determined solely by the direction in which there is a temperature difference. The basic structure of the heat exchange device according to the invention is therefore not influenced irrespective of whether heating or cooling is being carried out.
FIG. 3 illustrates two arrangements of outflow openings 12 which can be used as alternatives or at the same time. One outflow opening 12 is arranged as an extension of the longitudinal arrangement of the inflow openings 11, whereas the other leads axially from the reservoir region. In the case of the first outflow opening 12 mentioned, the working medium 13 which flows out flows through the region comprising the at least one line 20 and the heat exchange fins 22 once again, whereas in the case of the second outflow opening mentioned the working medium flows through the outflow opening 12 directly from the reservoir region 14 without flowing directly past the heat exchange fins 22 and the line 20 again. At both outflow openings, it is possible to provide a valve 15 which can control the outgoing flow, it being possible for the valves of two outflow openings to be designed such that they can be actuated independently of one another.

FIG. 4 likewise shows a longitudinal section through the chamber 10 of a heat exchange device or of a pressurized radiator. Inflow openings 11 and outflow openings 12 are arranged alternately along a longitudinal side of the chamber 10. As seen in the inflow direction 16, an intermediate space 18 is formed first of all in the chamber 10. Separating webs 19, which separate regions of the intermediate space 18 which are assigned to inflow and outflow openings from one another, are arranged in the intermediate space 18.

Working medium which flows into the chamber 10 first of all flows through an inflow opening 11, as indicated by the flow arrows 16, and then, flowing through the intermediate space 18, passes firstly into the region which has the heat exchange fins 22. In the process, it also flows around the line 20. The working medium then passes into the overflow region 14. In this configuration of the invention, it is particularly expedient if the heat exchange fins 22 are oriented so as to protrude radially with respect to the longitudinal direction of the extent of the line 20, thereby producing a flow-guiding effect, while at the same time ensuring prolonged contact with the heat exchange fins 22 forming a heat exchange surface. Further conditioning of the working medium 13 takes place in the overflow region 14 through free convection. Conditioning of the working medium through free convection also takes place in the intermediate space 18. The working medium flows to the outflow openings 12 in the direction indicated by the flow arrows 17, once again flowing around or through the region of the line 20 and the heat exchange fins 22.

Furthermore, it is also possible to provide an exit opening 12 which leads out directly from the overflow region 14. According to an alternative configuration, it is also possible for feed openings 11 to be arranged on the side only, in which case the intermediate space 18 between two inflow openings is then separated by separating webs 19, and the individual working medium flows which flow in only mix with one another in the overflow region 14. The outward flow then takes place through the single outflow opening 12 which leads away from the overflow region 14 and has previously been referred to as the additional outflow opening leading out of the chamber 10 in the longitudinal direction.

FIG. 5 shows fins 22 which protrude radially from the tube 20 and, for example, run around the tube in the form of circular disks. The use of fins 22 oriented in this manner is particularly advantageous if the incoming or outgoing flow of the working medium is perpendicular to the direction in which the tube 20 extends and the working medium 13, as it flows in or out, flows transversely to the flow through the tube 20. The heat exchange fins are in particular formed parallel to the direction of the force of gravity. It is preferable for the height of the fins to be between 1 mm and approx. 40 mm and for the distance between the fins to be between 0.1 and approx. 20 mm.

FIG. 6 illustrates a further exemplary embodiment of a heat exchange device 100 according to the present invention, which substantially corresponds to the embodiment shown in FIG. 1. Working medium 113 flows into a chamber 110 through an inflow opening 111. Lines 120, through which a heat exchange medium 121 can flow and which are surrounded by heat exchange fins 122, pass through the chamber 110. A further line 140 for the heat exchange medium 121 is provided in a wall 130 of the chamber 110, to effect additional heat exchange between the heat exchange medium 121 and the working medium 113, with the result that the chamber 110 is delimited by the line 140. The line 140 is in this case designed in such a manner that it surrounds at least part of the chamber 110. To increase the heat exchange surface area between the chamber 110 and the line 140, the wall 130 has heat exchange fins 150, which are heat exchange fins 150 which in the present exemplary embodiment are oriented parallel to the lines 120 passing through the chamber 110 and perpendicular to the heat exchange fins 122 of these lines.

FIG. 7 shows a heat exchange device 200 which differs from the heat exchange device 100 shown in FIG. 6 substantially by virtue of the fact that the heat exchange fins 222 of the lines 220 fill the cross section of the chamber 210 to an increased extent, which results in a further increase in the heat exchange surface area between the working medium 213 and the heat exchange medium 221. In a similar way to that achieved with the heat exchange device 99 illustrated in FIG. 2.

FIG. 8 shows a longitudinal section through a heat exchange device 300. The heat exchange device 300 substantially corresponds to the heat exchange device 100 shown in FIG. 6 and has inflow openings 311, a chamber 310 and outflow openings 312 for a working medium 313, as well as an inflow opening 324, lines 320, 340 and an outflow opening 325 for a heat exchange medium 321, the lines 320 and 340 being provided with heat exchange fins 322 and 350, respectively.

A flow of working medium 313 which enters the chamber 310 through the inlet openings 311 is guided from the heat exchange fins 322, in the direction indicated by arrow 355, to the heat exchange fins 350, then moves in the direction indicated by arrow 360 and passes through the heat exchange fins 322 again, for example in the direction indicated by the arrows 365, 366, before ultimately leaving the chamber 310 through the exit openings 312. As a result of being arranged in this way, the fins 322, 350 form means for guiding the flow of the working medium 313, thereby allowing increased and under certain circumstances controlled heat exchange between the working medium 313 and the heat exchange medium 321 which flows in the direction indicated by the arrows 370.

Since in the case of the heat exchange device 300 none of the inflow openings 311 are unambiguously
assigned to one of the outflow openings 312, working medium 313 can be fed to the chamber 310 through one or more inflow openings 311 as desired and/or removed from the chamber 310 through one or more outflow openings 312 as desired.

[0050] FIG. 9 shows a simplified design of the heat exchange device 300 shown in FIG. 8. The heat exchange device 400 has a chamber 410 with a line 420, which passes through the chamber 410 and is provided with fins 422, for a heat exchange medium 421, as well as a wall 430 with fins 450. The fins 450 in this case serve to increase the heat exchange between working medium 413 in the chamber 410 and the environment surrounding the heat exchange device 400. In an exemplary embodiment which is not shown, a further line for a heat exchange medium is arranged in the wall 430, in a similar way to in the embodiment shown in FIG. 8.

[0051] The fins 450 are in each case interrupted, with the interruptions preferably in each case formed in the region of an inflow or outflow opening 411, 412 for the working medium 413, in order to reduce the flow resistance to the working medium 413 in these regions, which advantageously results in a reduced pressure loss for the working medium in the chamber 410. Otherwise, the heat exchange device 400 functions in the same way as has been described with reference to FIG. 8.

1. A heat exchange device having a working medium and a heat exchange medium, the working medium, with a view to producing a desired working point, exchanging heat with the heat exchange medium via heat exchange surfaces, characterized in that a chamber is formed, working medium flowing into the chamber and the chamber having at least one line passing through it and/or being delimited, in particular surrounded, by at least one line, which line has heat exchange medium flowing through it.

2. The heat exchange device as claimed in claim 1, characterized in that the chamber has at least one line passing through it in the direction of its greatest longitudinal extent.

3. The heat exchange device as claimed in claim 1, characterized in that the at least one line has heat exchange fins.

4. The heat exchange device as claimed in claim 1, characterized in that the heat exchange fins are arranged on the outer side of the line and project into the chamber from the line.

5. The heat exchange device as claimed in claim 4, characterized in that the heat exchange fins are designed to be positioned perpendicularly, in particular to protrude radially, with respect to the direction in which the at least one line runs.

6. The heat exchange device as claimed in claim 4, characterized in that the heat exchange fins are designed to match the direction in which the working medium flows into the chamber.

7. The heat exchange device as claimed in claim 4, characterized in that the heat exchange fins are designed to match the direction in which the working medium flows out of the working chamber.

8. The heat exchange device as claimed in claim 1, characterized in that the at least one line is formed in the region of at least one inflow opening in the chamber.

9. The heat exchange device as claimed in claim 8, characterized in that a plurality of inflow openings are provided, with a line running in the region of each inflow opening.

10. The heat exchange device as claimed in claim 9, characterized in that in each case one common line is assigned to a plurality of inflow openings.

11. The heat exchange device as claimed in claim 9, characterized in that each inflow opening is assigned to a different line.

12. The heat exchange device as claimed in claim 1, characterized in that the at least one line is formed in the region of at least one outflow opening.

13. The heat exchange device as claimed in claim 12, characterized in that a plurality of outflow openings are provided, with a line running in the region of each outflow opening.

14. The heat exchange device as claimed in claim 13, characterized in that in each case one common line is assigned to a plurality of outflow openings.

15. The heat exchange device as claimed in claim 13, characterized in that each outflow opening is assigned a different line.

16. The heat exchange device as claimed in claim 1, characterized in that each line is assigned at least one inflow opening and at least one outflow opening, preferably at least one and in particular precisely one inflow opening and precisely one outflow opening.

17. The heat exchange device as claimed in claim 1, characterized in that at least one line which surrounds the chamber is arranged in a wall of the chamber, the wall in particular being provided with heat exchange fins.

18. The heat exchange device as claimed in claim 17, characterized in that heat exchange fins of the wall, together with heat exchange fins of a line passing through the chamber, form means for guiding the flow of the working medium.

19. The heat exchange device as claimed in claim 1, characterized in that the working medium flows through the region provided with heat exchange fins on the flow path from inflow opening to outflow opening.

20. The heat exchange device as claimed in claim 1, characterized in that the chamber forms a storage tank for working medium.

21. The heat exchange device as claimed in claim 20, characterized in that the chamber forms a pressurized reservoir.

22. The heat exchange device as claimed in claim 1, characterized in that the chamber is part of a functional component of a vehicle.

23. The heat exchange device as claimed in claim 22, characterized in that the chamber is an integral part of an engine component, in particular of the exhaust system of an engine, of an exhaust gas recirculation device, of a brake device or of a compressor.

24. The heat exchange device as claimed in claim 23, characterized in that the chamber is formed in the immediate vicinity of the engine block or forms part of the engine block.

25. The heat exchange device as claimed in claim 1, characterized in that the fin height is between 1 mm and approx. 40 mm, and the spacing between the fins is between 0.1 and approx. 20 mm.
26. A method for conditioning a working medium by means of a heat exchange medium, characterized in that the working medium flows into a chamber and the heat exchange medium flows through at least one line which passes through the chamber.

27. The method as claimed in claim 26, characterized in that the conditioning of the working medium in the chamber takes place at least partially through free convection.

28. The method as claimed in claim 26, characterized in that the working medium, at least when it is flowing into or out of the chamber, flows through a region provided with heat exchange fins.

29. The method as claimed in claim 28, characterized in that the heat exchange fins are oriented in the inflow and/or outflow direction of the working medium.

30. The method as claimed in claim 28, characterized in that the heat exchange fins are oriented in the direction of the profile of a convective flow in the chamber.

31. The method as claimed in claim 26, characterized in that the working medium is stored in the chamber, with the working medium being subjected to pressure in the chamber.

32. The method as claimed in claim 26, characterized in that the working medium is used for operation of an engine or of a brake device of a vehicle.

33. (canceled)