A housing of a turbo charger has a turbine housing and a bearing housing. A cooling jacket is formed of at least one or more shell elements that are fixed to the outside of the housing and that form therewith a cavity into which a coolant can be introduced.
FIG 1
FIG 2
Section B-B
COOLED HOUSING CONSISTING OF A TURBINE HOUSING AND A BEARING HOUSING FOR A TURBOCHARGER

[0001] The invention relates to a cooled housing consisting of a turbine housing and a bearing housing for a turbocharger and a turbocharger with such a housing.

[0002] Turbochargers, as they are known from the prior art, generally have a turbine which is arranged in an exhaust gas stream. In operation, the turbine, driven by the exhaust gases from the engine, supplies the drive power for the compressor. The exhaust gas, which is here fed through an exhaust gas elbow into the turbine housing, drives the turbine wheel and this in turn a compressor wheel which is arranged on a shaft together with the turbine wheel. Here, the shaft is mounted on bearings in a bearing housing in the turbocharger. By the driving of the compressor via the turbine, the compressor raises the pressure in the engine's induction manifold, so that a larger quantity of air passes into the cylinder during the induction cycle. This means that more oxygen is available and a larger quantity of fuel can be burned.

[0003] As a consequence of the high temperatures of the exhaust gas stream which is fed through the turbocharger, the components of the turbocharger, in particular the turbine housing, are subjected to a heavy thermal load. It is here possible, for example, that in an automobile internal combustion engine the exhaust gas can reach temperatures of up to 1100°C. In particular when operating under full load or close to full load, this can result in substantial temperature stresses on the components of the turbocharger.

[0004] Until now, the prior art has essentially relied on a suitable choice of materials for the manufacture of the housing parts for the turbocharger. Here, the selection of materials is made from the point of view of adequate strength at high temperatures. This involves the use of materials which are highly heat-resistant, which in general have high proportions of very expensive alloying elements, such as for example nickel. The effect of a high proportion of nickel in the material is that cast materials can better withstand the high temperatures. However, nickel has the disadvantage that it is a relatively expensive material. In the state of the art therefore, efforts are made to use alternative materials, or combinations of materials, which are more reasonable in price, but are equally suitable for high component temperatures and, in particular, do not require high proportions of expensive alloying elements, such as nickel.

[0005] Furthermore, a known approach in the prior art is to provide a cast-in cooling water jacket in the turbine housing, to lower the component temperature appropriately. However, such a jacket has the disadvantage that it is difficult to manufacture for small turbochargers, such as those used in vehicles, because an appropriate core must be provided for it.

[0006] Here, a turbocharger for marine use is known from DE 203 11 703. In this case the turbocharger has a cooled turbine-housing and bearing-housing. The turbine-housing is here constructed with a double wall, and is cooled by means of seawater. Further, the bearing housing has its own additional cooling facility, by which the bearing housing is cooled by means of a coolant from the coolant circuit of a connected engine, rather than by seawater as in the case of the turbine housing.

[0007] In addition, a turbine housing for a turbocharger is known from DE 100 22 052. In this case the turbine housing has, for example, a triple-walled construction. Here, the outer housing consists of several shells together with a welded-on water inlet and outlet. The outer and middle walls here form a hollow space, through which a coolant is fed. The inner and middle walls also form a hollow space, which forms an insulating air gap, whereby a sliding joint is also arranged in this hollow space to permit thermally-dependent length compensation between the sheet components. Here, a wire cushion stabilizes the sliding joint.

[0008] However, the turbine housing has the disadvantage that it has a complicated construction, due to its triple-walled design. The result of this is that the turbine housing is expensive to manufacture and assemble. Apart from this, only the turbine housing is provided with cooling, but not the bearing housing. The disadvantage of this is that the functionality of the turbocharger bearings can be degraded after hot soak conditions.

[0009] Accordingly, it is the objective of the present invention to provide a housing for a turbocharger with an improved cooling facility.

[0010] This objective is achieved by a housing with the characteristics of claim 1.

[0011] Accordingly the invention makes available for a turbocharger a housing, consisting of a turbine housing and a bearing housing, where the housing has a cooling jacket which is formed of at least one, or several, shell element(s) which are affixed to the housing externally and together with it form a hollow space into which a coolant can be fed.

[0012] This cooled housing, consisting of a turbine housing and a bearing housing, has the advantage that it is simple and cost-effective to manufacture, unlike the triple-walled turbine housing conforming to the prior art which must be welded together from three sheet layers. Furthermore, the additional cooling of the bearing housing makes it possible to maintain the functionality of the shaft bearing even after hot soak conditions.

[0013] Advantageous forms of embodiment and developments of the invention derive from the subclaims and from the description which makes reference to the drawings.

[0014] In accordance with one embodiment of the invention, the turbine housing and the bearing housing of the combined housing are constructed as one piece or two pieces. The one-piece form of embodiment has the advantage that a sealed joint of the turbine housing to the bearing housing to form one housing can be eliminated.

[0015] In a further form of embodiment in accordance with the invention, the turbine housing and/or the bearing housing has an appropriate seat on which to accommodate the other housing part. This seat can here take any required form, for example as a depression or a projection onto which the other housing part is pushed. By means of this seat, the two housing parts can be simply aligned and adjusted relative to each other before they are permanently joined to each other.

[0016] In another form of embodiment of the invention the shell element concerned can, for the purpose of affixing it to the housing and to form the cooling jacket, be a sheet component or a pressure diecasting, for example. A sheet component has the advantage of a constant thickness, whereby it can be reformed in order to form the appropriate contour for the cooling jacket. A pressure diecasting on the other hand needs no reforming but can also, for example, be designed with a more complex contour.

[0017] In accordance with another form of embodiment of the invention, the cooling jacket has on it, for example, at least
one inlet connection for letting in a coolant and at least one outlet connection for letting out the coolant. The inlet and outlet connections can here be arranged adjacent to one another or on the same side of the housing, as appropriate. In this case, a separating wall element can optionally be arranged between the two connections. This has the advantage of preventing the fresh coolant which is fed into the cooling jacket from immediately flowing out again at the neighboring outlet before it has adequately flowed against the housing.

In another form of embodiment in accordance with the invention, the inlet and outlet connections are arranged some way apart from each other on the cooling jacket, for example on opposite sides. This has the advantage that no separating wall element is necessary between the two connections.

In a further form of embodiment in accordance with the invention, the shell element concerned can be attached to the housing by means, for example, of welding, soldering, bolting/screwing and/or gluing etc. The turbine housing and/or the bearing housing of the housing can as an option have appropriate attachment sections, to simplify the seating and attachment of the shell element concerned. The attachment section can here be of any desired design, for example in the form of a depression or a step, a groove or a slot etc., for suitably accommodating the shell element concerned. The attachment sections can here be in the same form or different.

In accordance with another inventive form of embodiment the coolant used is, for example, cooling water which is diverted off from an engine connected to the turbocharger in the housing. This has the advantage that a coolant circuit which is already present can be utilized.

In a further form of embodiment in accordance with the invention, the turbine housing, the bearing housing and/or the shell element concerned are at least partially or completely manufactured from plastic(s) and/or fiber-bonded material(s). By means of this the joint between the parts forms a suitable seal. Such plastics or fiber-bonded materials, as applicable, have the advantage that they are comparatively light, and thus the weight of the turbocharger can be reduced.

In another form of embodiment in accordance with the invention, the bearing housing has at least one or several feed lines in order to cool a part of, or essentially all of, the bearing arrangement which is mounted within the bearing housing. Through these feed lines, coolant is then fed into the region of the bearing arrangement and, as an option, the used or heated coolant is also fed off again through an appropriate feed line or return line, as applicable. This has the advantage that the coolant can be fed closer to the bearing arrangement, and it is possible thereby to achieve improved cooling.

The invention is explained below in more detail by reference to the exemplary embodiments shown in the schematic figures in the drawing. These show:

FIG. 1 a perspective view of a cooled housing on a turbocharger, consisting of a turbine-housing and a bearing housing in accordance with one form of embodiment of the invention;

FIG. 2 a cross-sectional view at B-B of the cooled turbine-housing and bearing-housing shown in FIG. 1; and

FIG. 3 another cross-sectional view at C-C of the cooled turbine-housing and bearing-housing shown in FIG. 1, in which is shown a connection for letting in the coolant and a connection for letting out the coolant.

An example of a cooled turbocharger housing in accordance with the invention, consisting of a turbine-housing and bearing-housing, is explained below by reference to the figures. Such a turbocharger can be used, for example, in particular in an automobile or other vehicle.

The invention's approach is aimed, among other things, at the integration of the bearing housing and the turbine housing into one housing component or a casting, where the required cooling of the turbine housing material and of the bearing arrangement is effected by a cooling jacket. Here, the cooling jacket is formed of at least one, two, three or more shell element(s) attached around the combination housing consisting of the turbine-housing and bearing-housing, and thereby together with the housing forming a hollow space into which the coolant can be introduced.

The objective of the invention is a reduction in the component temperature for the turbine housing, in order to permit the use of cheaper materials. At the same time, the bearing housing should be integrated into the turbine housing and the cooling jacket extended to areas of the bearing housing which are to be cooled. By this means it is possible, for example, to maintain the functionality of the turbocharger bearings even after hot soak conditions.

The hollow space which is formed around the actual turbine-housing and bearing-housing part, in that at least one or several shell elements are attached to the housing, is then formed in such a way that it is suitable for a coolant to flow through it and can be extended over the bearing housing area by any required distance. For example, essentially over the entire bearing housing part or over a section of the bearing housing.

FIG. 1 shows a perspective view of the inventive housing 11 of a turbocharger, consisting of a turbine housing 10 and a bearing housing 13. Both regions of the housing 10, 13 are here provided with a cooling jacket 18. In the present case, the turbine housing section 10 has a facility for actuating a bypass duct 32. In principle, however, the inventively cooled combination housing 11, comprising the turbine-housing and bearing-housing 10, 13, is independent of any such facility for actuating a bypass duct 32. In principle, any type of turbocharger can be used with a turbine-housing and bearing-housing 10, 13.

The cooling jacket 18 in FIG. 1 is, for example, formed of two shell elements 14, 16. The shell element 14, 16 concerned can, for example, if the turbine-housing and bearing-housing 10, 13 is manufactured from an aluminum alloy or from steel, consist of example for a sheet which is attached to the turbine-housing and bearing-housing. To attach it, the shell element 14, 16 concerned can, for example, be welded or soldered onto the combination housing 11, or otherwise attached. Here, a shell element 14, 16 made of sheet material can, for example, have a thickness of 0.8 mm to 2 mm. However, the thickness of the sheet is not restricted to this range, but can also be chosen to be less or greater, depending on its function and intended use.

If the housing 11, consisting of the turbine-housing and bearing-housing 10, 13 is made of an aluminum alloy, for example, then the shell element 14, 16 concerned can be made from a pressure diecasting which can, for example, be welded or soldered with the aluminum alloy. In this case, the pressure diecasting can, for example, have a wall thickness in the range of 2 mm to 3 mm or 2.5 mm to 3 mm, as appropriate, where the wall thickness of the pressure diecasting is not restricted.
to this range, but can also chosen to be less or greater, depending on its function and intended use.

[0034] Depending on whether there is an essentially liquid coolant or, for example, even a gaseous coolant in the cooling jacket 18, the shell element 14, 16 concerned will be attached to the turbine-housing and bearing-housing 10, 13 in a liquid-tight or gas-tight way, for example welded and/or soldered, in order to provide a suitable hollow space 12 for the coolant. However, it is also possible to provide other types of attachment and seals, which are suitable for joining the shell elements 14, 16 to the housing 11 in a liquid-tight or gas-tight way, as appropriate.

[0035] The turbine-housing and bearing-housing 10, 13, as shown in FIG. 1, is for example a casting, for example made of an aluminum alloy or another suitable material or combination of materials, such as for example cast gray iron. The two shell elements 14, 16, which in the present example are attached to the turbine-housing and bearing-housing 10, 13, form the cooling jacket 18 or the hollow space 12, as applicable, into which the coolant is introduced. Here, the dimensions of the hollow space 12 are chosen such as to permit an adequate flow of coolant through it to cool the housing 11 suitably.

[0036] In the present case, as shown in FIG. 1, the two shell elements 14, 16 each consist of a sheet. Here, the sheet is reformed appropriately to form the contour of the cooling jacket 18. After this, the shell elements 14, 16 are attached to the housing 11, consisting of the turbine-housing and bearing-housing 10, 13.

[0037] As shown in FIG. 1, on the cooling jacket 18 is provided at least one connection 20 for an inlet and one connection 22 for an outlet for the coolant. One or both of these connections 20, 22 can here be formed on an appropriate shell element 14, 16 or can be attached to it as a separate part. As an alternative to a sheet component for the shell element 14, 16, an appropriate pressure diecasting can also be provided. The material for this is chosen so that it can be suitably attached to the housing 11 or to the turbine-housing and bearing-housing 10, 13, as appropriate. This means that the material of the shell elements 14, 16 is chosen such that it can, for example, be welded and/or soldered to the turbine-housing and bearing-housing 10, 13. This also applies correspondingly for the sheet component described above.

[0038] As shown in FIGS. 1-3, appropriate attachment sections 24 can be provided on the housing 11, or its turbine housing part 10 and bearing housing part 10, as appropriate, onto which the shell elements 14, 16 can be attached. In addition, the shell elements 14, 16 are joined to each other at their ends 26 (dotted line), for example again by welding and/or soldering, in order to form the hollow space 18 for the coolant.

[0039] As the coolant, which is fed into the cooling jacket 18 via the first connection 20, or the inlet connection, can here be made of cooling water or some other suitable coolant. Furthermore, it is possible for example to use as the cooling water cooling water from the engine, or diverted off from it, as appropriate, or cooling water can be provided in a separate circuit.

[0040] As shown in FIG. 1, the cooling jacket 18 has, for example, an inlet connection 20 for introducing the coolant, and an outlet connection 22 for letting out the coolant. In FIG. 1, the two connections 20, 22 are in this case arranged as far away from each other as possible. The connections 20, 22 are, for example, arranged to lie essentially opposite each other.

This has the advantage that the coolant initially flows into the cooling jacket 18 or the hollow space 12 formed by it, as applicable, through the inlet connection 20 on one side. The fresh coolant then flows around the housing 11, or the turbine-housing and bearing-housing 10, 13 as applicable, on both sides to cool it appropriately. Finally, the used coolant flows out again from the cooling jacket 18 or hollow space 12, as applicable, via the outlet connection 22, as indicated in FIG. 1 by the arrows.

[0041] Here, the connections 20, 22 can be arranged at the same height as shown again, for example in the next FIG. 3, or can be provided at different heights. Further, at least one, two or more inlet connections 20 and/or outlet connections 22 can be provided, where the connections 20, 22 can have any required positions relative to each other, preferably so that the coolant can flow against the housing 11 or the turbine-housing and bearing-housing 10, 13, as applicable, in a suitable way for cooling purposes, and can flow out of the cooling jacket 18 again. This applies for all the forms of embodiment of the invention.

[0042] In an alternative form of embodiment, not illustrated, the inlet and outlet connections 20, 22 can also, for example, be arranged on the same side or directly alongside each other, or close to each other, where the two connections 20, 22 are in this case essentially separated from each other by, for example, a separating wall element (not illustrated). The separating wall element is in this case positioned in the cooling jacket 18 of the housing 11 in such a way that the coolant essentially flows via the inlet connection 20 initially into the cooling jacket 18 or its hollow space 12, and does not immediately flow away again through the neighboring outlet connection 22, but instead initially flows against the housing 11 or its turbine-housing and bearing-housing 10, 13, or at least flows partially or mostly around it, as applicable. When the coolant has mostly flowed around the turbine-housing and bearing-housing 10, 13, and has thereby for example absorbed heat from the hot or warm turbine-housing and bearing-housing 10, 13, it then flows out of the cooling jacket 18 again via the outlet connection 22. As previously described, the separating wall element serves the purpose of essentially preventing the fresh coolant from mixing with used or consumed coolant. In this case, the separating wall element can, for example, as appropriate be provided on or attached to the turbine-housing and bearing-housing 10 and/or an appropriate shell element 14, 16. The shell element can here be arranged and attached between the inlet and outlet connections 20, 22 in such a way that it separates them completely or at least partly from one another, in that the separating wall element is arranged, for example, between the two connections 20, 22 over the entire length of the housing 11, or at least over part of the length of the housing 11.

[0043] FIG. 2 illustrates a cross-sectional view at B-B of the cooled housing 11, consisting of the turbine-housing and bearing-housing 10, 13 shown in FIG. 1. The turbine housing 10 has, for example, a seat 15 in the form of a depression, with which it is pushed onto the bearing housing 13 in order to join the two housing parts together and adjust or align them, as applicable.

[0044] Further, FIG. 2 shows the two shell elements 14, 16. Each of the shell elements 14, 16, for example a sheet component after it has been suitably reformed, is attached to the turbine housing 10 and the bearing housing 13 of the combined housing 11. As an option, appropriate attachment sections 24 can be provided, for example in the form of depres-
sions or steps, as appropriate, into which the ends of the shell elements 14, 16 are inserted and are attached to the housing 11.

[0045] The attachment sections 24 on the turbine housing 10 are provided as appropriate, for example in the form of a depression 34 or a step in FIG. 2, into which the shell element 14, 16 concerned is inserted and is then, for example, welded and/or soldered to the turbine housing 10. In principle however, other types of attachment section 24 are also possible, for example the depression 34 can also be designed in the form of a groove or a slot, into which the shell element 14, 16 is introduced and, for example, welded. Furthermore, the attachment sections 24 concerned on the turbine housing 10 can be the same or different in form, depending on their function and intended use. This applies for all the forms of embodiment of the invention.

[0046] As shown in FIG. 2, the turbine housing 10 and the bearing housing 13 are initially designed as two separate or individual parts, for example as castings. The two housing parts 10, 13 are put together and attached to each other in such a way that there can be no unwanted penetration of coolant between them. Depending on whether the coolant is present in the cooling jacket as a liquid or at least partially in gaseous form, the two housing parts 10, 13 will be joined together to be liquid-tight or gas-tight, for example by means of welding, soldering and/or bolting/screwing, where in the case of bolting/screwing an additional suitable seal is provided between the housing parts 10, 13. Alternatively, the turbine housing 10 and the bearing housing 13 can also be designed in one piece, for example in the form of a unified casting (not shown). As in the case of the two housing parts 10, 13, the shell elements 14, 16 are also attached to the housing parts 10, 13 in a liquid-tight or gas-tight way, as previously described, depending for example on the state in which the coolant is present in the cooling jacket 18.

[0047] As an option, at least one, two or more additional flow elements 28 can be provided in the interior of the cooling jacket 18, for example to guide a liquid coolant. The two flow elements 28 can then each be constructed, for example, in the form of a rib which, for example, extends in an axial direction, as indicated in highly simplified form in FIG. 2 by a dashed line. In principle, the flow element 28 concerned can be constructed and oriented in any desired way for suitably directing the flow of coolant. The flow elements 28 can in this case be constructed on the turbine-housing and/or the bearing-housing, 10, 13, or for example can be included as part of their shaping or attached to them, as applicable, and/or provided on the inner side of the appropriate shell element 14, 16 or attached to it or formed on it, as appropriate. The provision of flow elements 28 is an optional feature. This applies for all the forms of embodiment of the invention.

[0048] FIG. 3 shows a cross-sectional view at C-C of the housing 11 consisting of the turbine-housing and bearing-housing 10, 13 shown in FIG. 1, and shows both the inlet and the outlet connection 20, 22, for introducing and drawing off the coolant, which lie opposite each other.

[0049] In addition, the inlet connection 20 is, for example, provided on the second shell element 16. In principle however, it would be possible for only one of the connections 20, 22 to be attached to one of the shell elements 14, 16. The two connections 20, 22 are here, for example, attached separately to the shell element 14, 16 concerned, or formed into it, as applicable, and as shown in FIGS. 1 and 3 are provided, for example, with an additional connection element 36 or a connection cap, as appropriate.

[0050] For the purpose of cooling the bearing arrangement (not illustrated), arranged in the bearing housing 13, two infeed lines 38 are provided, for example, via which the coolant is fed into the region 40 of the bearing arrangement in order to cool it. In principle, the inventive cooling jacket 18 can be applied to any type of cooling of a bearing arrangement in a bearing housing 13 and to any type of infeed line 38 for the bearing arrangement coolant. The illustration in FIG. 3 is solely by way of example, and the invention is not restricted to it.

[0051] In the present case, as it is shown in FIGS. 1 to 3, the cooling jacket 18 extends over the turbine housing 10 and essentially over the entire bearing housing 13. In principle however, the cooling mantle can also extend over only a part of the turbine housing 10 and/or the bearing housing 13, depending on which part or section is to be additionally cooled.

[0052] The advantage of the inventive form of embodiment described above, in particular relative to a form of embodiment with a cast-in cooling jacket, is that the cooling jacket 18 can also be realized for very a small automobile turbine housing 10, because it does not require the use of core elements. Apart from this, it permits a reduction in the number of components in the turbocharger, the possible reduction to one coolant inflow and outflow for a cooled region of a turbine-housing and bearing-housing.

[0053] Although the present invention has been described above by reference to preferred exemplary embodiments, it is not restricted to them but can be modified in diverse ways. The forms of embodiment described above, in particular individual features of them, can here be combined with each other.

[0054] The coolant, such as for example cooling water for cooling the housing 11, can as already described be taken from a cooling circuit of an engine which is linked to the turbocharger. The cooling circuit here comprises, for example, an engine block, a thermostat, a radiator and a coolant pump. After cooling the housing 11, the coolant can be fed back to the cooling circuit. However, the invention is not restricted to this form of embodiment of a cooling circuit.

[0055] The provision of the cooling jacket 18 for cooling the housing 11 enables the latter to be made of less heat-resistant materials. For example, the housing 11 concerned can incorporate materials such as more lightly alloyed steels, aluminum, cast gray iron etc. By this means, it is possible to eliminate the use of expensive alloying elements such as for example nickel, or their proportions can at least be reduced. This has the further advantage that the manufacturing costs can be reduced.

[0056] Apart from this, it is possible to effect the engineering of the turbine housing 10, the bearing housing and/or the shell elements 14, 16 concerned not only in iron or non-ferrous metals, but also in plastic(s) and/or fiber-bonded material(s). In this case, the plastics or fiber-bonded materials, as applicable, are chosen such that they are suitable for the relevant temperatures which will arise in the turbine housing 10 or bearing housing 13 or shell elements 14, 16 constructed from them.

[0057] In this case, the turbine housing 10 or the bearing housing 13 and the shell elements 14, 16 concerned will be appropriately jointed, for example by means of welding, sol-
dering, bolting/screwing with a seal between the shell elements 14, 16 concerned and the housing 11, and/or gluing, to name just some methods of attachment. The shell elements 14, 16 can each be manufactured from the same material or a different material, depending on their function and intended use. The same applies for the turbine housing 10 and the bearing housing 13.

Apart from the cooling function of the cooling jacket 18, by the introduction of the coolant, it is also possible for example to use the cooling jacket 18 for heating purposes, if for example the turbine housing 10 and bearing housing 13 should be warmed up or prewarmed to an operating state. In this case it is possible, for example, to use cooling water which has already been heated up by the engine, and introduce it into the cooling jacket 18.

1-20. (canceled)

21. A housing for a turbocharger, comprising:
a turbine housing part and a bearing housing part of the
turbocharger;
a cooling jacket formed of at least one or more shell elements
to an outside of said housing and forming
a hollow space together with said housing for receiving
therein a coolant.

22. The housing according to claim 21, wherein said turbine housing part and said bearing housing part of said housing are integrally formed in a one-piece part.

23. The housing according to claim 22, wherein said turbine housing part and said bearing housing part of the housing are formed in a one-piece casting selected from the group consisting of an aluminum casting, a gray iron casting, and a steel casting.

24. The housing according to claim 21, wherein said turbine housing part and said bearing housing part are two separate parts attached to one another.

25. The housing according to claim 23, wherein one of said turbine housing part and said bearing housing part is formed with a seat to be pushed up to the respectively other housing part in order to join together said housing parts.

26. The housing according to claim 22, wherein each of said turbine housing part and said bearing housing part is a separate casting selected from the group consisting of an aluminum casting, a gray iron casting, and a steel casting.

27. The housing according to claim 21, wherein shell element is a cast element.

28. The housing according to claim 27, wherein said shell element is selected from the group consisting of an aluminum casting, a gray iron casting, and a steel casting.

29. The housing according to claim 27, wherein said shell element is a pressure diecasting.

30. The housing according to claim 29, wherein said pressure diecasting has a thickness of between 2 mm and 3 mm.

31. The housing according to claim 21, wherein said shell element is a sheet component.

32. The housing according to claim 21, wherein said sheet component has a thickness of between 0.8 mm and 2 mm.

33. The housing according to claim 21, wherein said cooling jacket is formed with at least one inlet connection for coolant into said hollow space and at least one outlet connection for the coolant.

34. The housing according to claim 33, wherein said inlet and outlet connections are disposed adjacent one another or on a common side of the housing.

35. The housing according to claim 33, which comprises a separating wall element formed between said inlet and outlet connections.

36. The housing according to claim 33, wherein said inlet and outlet connections are formed substantially opposite one another on the housing.

37. The housing according to claim 21, wherein said shell element is attached to the housing by at least one of welding, soldering, bolting, screwing, and/or gluing, and wherein said turbine housing part and/or said bearing housing part are optionally formed with attachment sections for seating said shell element.

38. The housing according to claim 21, wherein said hollow space is formed to accommodate coolant in liquid form and/or gaseous form.

39. The housing according to claim 21, wherein said hollow space is formed for coolant in the form of cooling water from an engine connected to a turbocharger in the housing.

40. The housing according to claim 21, which comprises one or more flow elements disposed in said hollow space and formed on one of said housing or said shell element.

41. The housing according to claim 21, wherein said shell element is one of two or more shell elements forming an outer wall of said cooling jacket.

42. The housing according to claim 21, wherein said shell element is attached to the housing in a fluid-tight connection.

43. The housing according to claim 21, wherein at least one of said turbine housing part, said bearing housing part, and said shell element is formed of steel.

44. The housing according to claim 43, wherein said steel includes a lightly-alloyed steel.

45. The housing according to claim 21, wherein at least one of said turbine housing part, said bearing housing part, and said shell element contain or consist of one or more of plastic and fiber-bonded material.

46. The housing according to claim 21, wherein said bearing housing part is formed with one or more infeed lines for cooling a portion of or an entirety of a bearing assembly mounted in said bearing housing part.

47. A turbocharger, comprising a bearing assembly mounted in the housing part.

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