Disclosed is a valve seat lubrication oil coating device. More specifically, an oil pan is filled with lubrication oil and configured so that a valve seat partially soaks therein. An oil tank is equipped with a hydraulic pump, and an oil pan oil supplier supplies oil to the oil pan via the hydraulic pump from the oil tank. Additionally, a coating oil supplier coats an outer circumferential surface of a portion of the valve seat, which is not being soaked in the oil, with the oil from the oil tank.
VALVE SEAT LUBRICATION OIL COATING DEVICE

CROSS-REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] (a) Field of the Invention
[0003] The present invention relates to a valve seat lubrication oil coating device. More particularly, the present invention relates to a valve seat lubrication oil coating device that coats a valve seat with lubrication oil before the valve seat is assembled.

[0004] (b) Description of the Related Art
[0005] Valve seats are typically used in the assembly of an engine. These seats influence the performance/output of an engine, such as opening/closing of a valve. A valve seat and a valve guide are generally fitted into a cylinder head by a fitting shaft, under a load of about three tons. When the fitting load is insufficient, the valve seat or the valve guide is not fully fitted, or when the fitting load is too large, the valve seat or the valve guide may be broken.

[0006] In general, lubrication oil is typically sprayed onto the cylinder head by a spray nozzle to provide a smooth fit. However, when lubrication oil is sprayed onto the cylinder head by a spray nozzle, it is difficult to control the amount of spray applied and the spray nozzle may become clogged with foreign substances. Further, when the amount of sprayed oil is insufficient, the valve seat may be broken due to an excessive fitting load. In contrast, when the oil is sprayed too much, the oil may also be applied to other equipment that is not supposed to be coated with the lubrication oil and the equipment then becomes contaminated. Thus, it is necessary to install a pad for preventing contamination and cost increases due to excessively spraying oil.

[0007] The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY OF THE INVENTION

[0008] The present invention has been made in an effort to provide a valve seat lubrication oil coating device capable of coating a valve seat to be assembled with a cylinder head of an engine, with lubrication oil in advance.

[0009] According to an exemplary embodiment of the present invention, a valve seat lubrication oil coating device may include: an oil pan filled with lubrication oil and configured so that a valve seat partially soaks therein; an oil tank equipped with a hydraulic pump; an oil pan oil supplier configured to supply oil to the oil pan via the hydraulic pump from the oil tank; and a coating oil supplier configured to coat the outer circumferential surface of a portion of the valve seat, which is not being soaked in the oil, with the oil from the oil tank.

[0010] The oil pan may be formed in a semicircle in which the valve seat is placed. The oil pan oil supplier may include a plurality (e.g., two) oil pan oil supply lines configured to supply the oil to the oil pan from the oil tank and a plurality of oil exhaust lines (e.g., 2) configured to return the oil to the oil tank from the oil pan. The oil pan oil supply lines may be provided in a pair to communicate with both ends of the upper portion of the oil pan.

[0011] Regulators may be disposed in the oil pan oil supply lines to uniformly supply the oil. The coating oil supplier may include: an oil coating device configured to apply the oil onto the outer circumferential surface of the portion of the valve seat which is not being soaked in the oil; and a coating oil supply line configured to supply the oil to the oil coating device from the oil tank. The oil coating device may be equipped with a solenoid valve and may control the amount of oil that is applied to the outer circumferential surface of the valve seat. The coating oil supplier may further include a regulator disposed in the coating oil supply line to uniformly supply the oil to the oil coating device.

[0012] According to a valve seat lubrication oil coating device of an exemplary embodiment of the present invention, it is possible to coat a valve seat to be assembled with a cylinder head of an engine with lubrication oil in advance and to reduce the amount of oil wasted on portions other than the valve seat and the portion where the valve seat is fitted, such that it is possible to reduce the manufacturing costs involved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other features of the present invention will now be described in detail with reference to an exemplary embodiment thereof illustrated the accompanying drawings which are given hereinbelow by way of illustration only, and thus are not limitative of the present invention, and wherein:

[0014] FIG. 1 is a cross-sectional view of a valve seat lubrication oil coating device according to an exemplary embodiment of the present invention.

[0015] FIG. 2 is a view illustrating fitting a valve seat that the valve seat lubrication oil coating device according to an exemplary embodiment of the present invention has been applied to.

<Description of symbols>

10: Valve seat 20: Oil pan
30: Hydraulic pump 40: Oil tank
50: Oil pan oil supplier 52, 54: Oil pan oil supply line(s)
62, 64: Oil exhaust line(s) 72, 74, 84: Regulator(s)
80: Coating oil supplier 82: Coating oil supply line
90: Oil coating device 92: Solenoid valve
110: Fitting shaft

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] In the following detailed description, only certain exemplary embodiments of the present invention have been shown and described, simply by way of illustration.

[0017] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a," "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprising" and/or "comprising," when used in this specification, specify the
presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items.

[0018] As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present invention. The parts indicated by the same reference numerals are the same components throughout the specification.

[0019] In the drawings, the thickness of layers, films, panels, regions, etc., are exaggerated for clarity. When it is represented that each part such as a layer, a film, an area, a plate, or the like, is “on an upper portion of” or “above” another part is intended to include not only the case in which each part is “directly on an upper portion of” or “directly above” another part but also the case in which the other part is between each part and another part. In contrast, when an element is referred to as being “directly on” another element, there are no intervening elements present.

[0020] Throughout the specification, unless explicitly described to the contrary, the word “comprise” and variations such as “comprises” or “comprising,” will be understood to imply the inclusion of stated elements but not the exclusion of any other elements.

[0021] An exemplary embodiment of the present invention will hereinafter be described in detail with reference to the accompanying drawings.

[0022] FIG. 1 is a cross-sectional view of a valve seat lubrication oil coating device according to an exemplary embodiment of the present invention and FIG. 2 is a view illustrating fitting a valve seat that the valve seat lubrication oil coating device according to an exemplary embodiment of the present invention has been applied to.

[0023] Referring to FIGS. 1 and 2, a valve seat lubrication oil coating device according to an exemplary embodiment of the present invention includes an oil pan 20 filled with lubrication oil such that a valve seat 10 partially soaks therein, an oil tank 40 equipped with a hydraulic pump 30, an oil pan oil supplier 50 supplying oil to the oil pan 20 via the hydraulic pump 30 from the oil tank 40, and a coating oil supplier 80 configured and positioned to coat the outer circumferential surface of the portion of the valve seat 10, which is not being soaked in the oil, with the oil from the oil tank 40. The oil pan 20 may be formed in a semicircle in which the valve seat 10 is placed.

[0024] The oil pan oil supplier 50 may include a plurality oil pan oil supply lines 52 and 54 for supplying the oil to the oil pan 20 from the oil tank 40 and a plurality of oil exhaust lines 62 and 64 configured and positioned to return the oil to the oil tank 40 from the oil pan 20. The oil pan oil supply lines 52 and 54 may be provided in a pair to communicate with both ends of an upper portion of the oil pan 20. Furthermore, the oil pan 20 may be in the oil pan oil supply lines 52 and 54 respectively to uniformly supply the oil.

[0025] The coating oil supplier 80 may include an oil coating device 90 configured to apply the oil onto the outer circumferential surface of the portion of the valve seat 10 which is not being soaked in the oil and a coating oil supply line 82 configured to supply the oil to the oil coating device 90 from the oil tank. The oil coating device 90 is equipped with a solenoid valve 92, so that the oil coating device 90 can control the amount of oil that is applied to the outer circumferential surface of the valve seat 10. The coating oil supplier 80 may further include a regulator 84 disposed in the coating! oil supply line 82 to uniformly supply the oil to the oil coating device 90.

[0026] The operation of the valve seat lubrication oil coating device according to an exemplary embodiment of the present invention is described hereafter with reference to FIGS. 1 and 2.

[0027] First, the valve seat 10 is placed into the oil pan 20 so that a portion of the oil seat 10, for example, the portion B in FIG. 2 is wet with the lubrication oil. Oil is supplied to the oil pan 20 through the hydraulic pump 30 and the oil pan oil supply lines 52 and 54 and the oil remaining in the oil pan 20 is returned to the oil tank 40 through the oil exhaust lines 62 and 64. The regulators 72 and 74 control the amount of supplied oil so that the oil is uniformly supplied such that the valve seat 10 is wetted with an appropriate amount of oil.

[0028] Oil is also applied to the outer circumferential surface of a portion of the valve seat 10, which is not being soaked in the oil, that is, the portion A in FIG. 2, via the oil coating device 90, and a small amount of oil flows onto and wets the outer circumferential surface of the portion of the valve seat 10, which is not being soaked in the oil, by the operation of the solenoid valve 92.

[0029] In this process, the regulator 84 controls the oil flow so that the amount of oil being supplied to the oil coating device 90 is uniform. The operation of the solenoid valve 92 is controlled by, e.g., an ECU (Electric Control Unit), such that the supplied oil wets the outer circumferential surface of a portion of the valve seat 10.

[0030] The valve seat 10 wetted with the oil is fitted into an insertion aperture 122 of a cylinder head 120 by a fitting shaft 110 connected to, e.g., a robot (not shown). The valve seat lubrication oil coating device according to an exemplary embodiment of the present invention allows the valve seat 10 to be smoothly fitted into the insertion aperture 122 by coating only valve seat 10 with oil rather than the cylinder head due to an excessive amount of oil and lack of spray control.

[0031] According to a valve seat lubrication oil coating device of an exemplary embodiment of the present invention, it is possible to reduce oil that is unnecessarily sprayed onto other equipment or parts in the work space, because the supplied oil in the present invention is not being sprayed onto the cylinder head. It is also possible to apply oil to only a portion of the valve seat 10, provide only a predetermined amount of oil, and reduce a waste of oil by returning the remaining oil to the oil tank.

[0032] While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

What is claimed is:

1. A valve seat lubrication oil coating device comprising: an oil pan filled with lubrication oil and configured so that a valve seat partially soaks therein; an oil tank equipped with a hydraulic pump; an oil pan oil supplier configured to supply oil to the oil pan via the hydraulic pump from the oil tank; and
a coating oil supplier configured to coat the outer circumferential surface of a portion of the valve seat, which is not being soaked in the oil, with the oil from the oil tank.

2. The device of claim 1, wherein the oil pan is formed in a semicircle in which the valve seat is placed.

3. The device of claim 2, wherein the oil pan oil supplier includes:
   - oil pan oil supply lines configured to supply the oil to the oil pan from the oil tank; and
   - oil exhaust lines configured to return the oil to the oil tank from the oil pan.

4. The device of claim 3, wherein the oil pan oil supply lines are provided in a pair to communicate with both ends of the upper portion of the oil pan.

5. The device of claim 3, wherein regulators are disposed in the oil pan oil supply lines to uniformly supply the oil.

6. The device of claim 3, wherein the coating oil supplier includes:
   - an oil coating device configured to apply the oil onto an outer circumferential surface of the portion of the valve seat which is not being soaked in the oil; and
   - a coating oil supply line configured to supply the oil to the oil coating device from the oil tank.

7. The device of claim 6, wherein the oil coating device is equipped with a solenoid valve and configured to control the amount of oil that is applied to an outer circumferential surface of the valve seat.

8. The device of claim 6, wherein the coating oil supplier further includes a regulator disposed in the coating oil supply line to uniformly supply the oil to the oil coating device.

9. The device of claim 1, wherein the coating oil supplier includes:
   - an oil coating device configured to apply oil to an outer circumferential surface of the portion of the valve seat which is not being soaked in the oil; and
   - a coating oil supply line configured to supply oil to the oil coating device from the oil tank.

10. The device of claim 9, wherein the oil coating device is equipped with a solenoid valve and configured to control the amount of oil that is applied to an outer circumferential surface of the valve seat.

11. The device of claim 9, wherein the coating oil supplier further includes a regulator disposed in the coating oil supply line to uniformly supply the oil to the oil coating device.