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COLLECTOR FOR A DRAINED LIQUID FOR AN AIRCRAFT TURBINE ENGINE AND ASSOCIATED TURBINE ENGINE

Abstract

A collector for a drained liquid for an aircraft turbine engine includes an internal cavity having a first space for collecting the drained liquid and a second space for transferring the collected liquid to a recovery outlet; at least one inlet for the drained liquid, in fluid communication with the first space; and at least one recovery outlet, in fluid communication with the second space. The first space and the second space are separated from each other by a partition in which is arranged a means for restricting the passage of the drained liquid from the first space to the second space, the air in the first space being in communication with the air in the second space such that the air pressure in the first and second spaces is identical.

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Background/Summary

TECHNICAL FIELD

[0001] This disclosure relates to the field of collectors for a drained liquid for an aircraft turbine engine.

PRIOR ART

[0002] In a turbine engine, it is often necessary to drain liquids of different types, such as fuel or oil, to prevent these liquids from accumulating and disrupting the nominal operation of the turbine engine. For example, some engines require drainage operations that result in losses of these liquids.

[0003] In order to recover these liquids, it is known to provide the turbine engine with a collector for drained liquid. Such a collector comprises an internal cavity which receives the liquid drained from the different parts of the turbine engine. The collector further comprises an inlet for drained liquid, which connects the exterior of the collector to its internal cavity, and a recovery outlet for this liquid. The recovery outlet connects the internal cavity of the collector to other parts of the turbine engine, for example to a fuel tank.

[0004] The collector is often configured to direct the collected liquid to the recovery outlet as long as the amount of drained liquid reaching the internal cavity of the collector is not very high, which allows the drained liquid to be reused.

[0005] Conventionally, the recovery outlet is provided with a passage restriction means for restricting the passage of drained liquid, arranged at the interface between the interior of the collector and the exterior of the collector. The passage restriction means forms a nozzle which measures the flow rate of the drained liquid exiting the collector through the recovery outlet. The nozzle allows controlling the flow rate of drained liquid exiting the collector. In particular, the nozzle counters the flow resistance of the drained liquid which is dependent on the difference in pressure across the nozzle. Since the nozzle is arranged at the interface between the interior and exterior of the collector, the pressure difference across the nozzle is equivalent to a pressure difference between the interior and the exterior of the collector.

[0006] When the pressure difference across the nozzle increases sufficiently, the flow resistance of the nozzle is compensated for, and the drained liquid is able to flow through it.

[0007] The pressure difference across the nozzle turns out to depend solely on the amount of liquid collected in the internal cavity of the collector, so the flow rate of the liquid exiting through the nozzle is proportional to the amount of liquid in the collector. Thus, if the flow rate of the liquid exiting the nozzle is very high, this means that there is a very large amount of liquid in the collector, which can help in identifying a failure in the turbine engine.

[0008] However, it has been found that the operating conditions of the collector, such as the increase in air pressure in the internal cavity of the collector or the flow rate of drained liquid entering the internal cavity, as well as the installation conditions of the collector, for example the length of the pipes at the outlet of the collector, also have an impact on the pressure difference across the nozzle. Such parameters therefore modify the relationship between the amount of liquid drained into the internal cavity and the flow rate of drained liquid exiting through the recovery outlet, which can lead to erroneously detecting a failure of the turbine engine or not identifying an actual malfunction of the turbine engine.

[0009] Furthermore, when the nozzle is in service it tends to clog, which can harm its operation or even render it inoperative.

SUMMARY

[0010] This disclosure improves the situation.

[0011] To this end, a collector for a drained liquid for an aircraft turbine engine of a first type is proposed, the collector comprising: [0012] an internal cavity comprising a first space for collecting the drained liquid and a second space for transferring the collected liquid to a recovery outlet;

[0013] at least one inlet for the drained liquid, in fluid communication with the first space; and

[0014] at least one recovery outlet, in fluid communication with the second space;

wherein the first space and the second space are separated from each other by a liquid-tight partition in which is arranged a drained liquid passage restriction means which restricts the passage of the drained liquid from the first space to the second space, the air in the first space being in communication with the air in the second space such that the air pressure is identical in the first space and in the second space.

[0015] Since the air pressure is identical in the first space and in the second space, the pressure difference across the drained liquid passage restriction means depends solely on the height of the drained liquid collected in the first space. “Across the passage restriction means” is understood to mean the inlet into the restriction means and the outlet from the restriction means. More precisely, the inlet into the restriction means corresponds to the outlet from the first space, while the outlet from the restriction means corresponds to the inlet into the second space.

[0016] Due to the equalization of pressures in the first space and the second space, other variables, such as the increase in air pressure, the flow rate of the drained liquid into the internal cavity, or the increase in the lengths of the pipes at the outlet from the collector, do not impact the pressure difference across the drained liquid passage restriction means.

[0017] This document also relates to a collector for a drained liquid for an aircraft turbine engine of a second type, the collector comprising: [0018] an internal cavity comprising a first space for collecting the drained liquid and a second space for transferring the collected liquid to a recovery outlet, the internal cavity extending longitudinally in a first direction between a first end closed off by a bottom wall of the collector and a second end closed off by a cover of the collector; [0019] at least one inlet for the drained liquid, in fluid communication with the first space; and [0020] at least one recovery outlet, in fluid communication with the second space;

wherein the first space and the second space are separated from each other by a liquid-tight partition in which is arranged a drained liquid passage restriction means which restricts the passage of the drained liquid from the first space to the second space,

wherein the drained liquid passage restriction means is mounted so as to be removable from the collector by moving the drained liquid passage restriction means along the first direction, in the directional sense that is from the bottom wall of the collector towards the cover of the collector.

[0021] Since the drained liquid passage restriction means is mounted so as to be removable relative to the collector, it is possible to extract it from the collector for easy cleaning as well as for checking it regularly for clogging.

[0022] Furthermore, since the restriction means is removed from the collector by moving it along the first direction in the directional sense that is from the bottom wall of the collector towards the cover of the collector, it is extracted through the second end of the internal cavity, which prevents the drained liquid from leaking through the bottom wall of the collector. This configuration also avoids the use of seals, for example made of elastomer, for ensuring liquid-tightness of the collector's bottom wall. The resistance of the collector to a fire in the engine floor is thus improved.

[0023] According to one aspect of the invention, the partition is a partition removably mounted in the internal cavity of the collector. Alternatively, the partition is a partition fixedly mounted in the internal cavity of the collector, or even formed as one piece with a wall of the internal cavity.

[0024] According to one aspect, the at least one recovery outlet is an outlet connected to a fuel tank

of the turbine engine. Alternatively, said at least one recovery outlet is an outlet connected to a recovery tank also called an “ecology” tank. This ecology tank is configured to store the drained liquids when they are not returned to the fuel tank. One will note that due to the identical air pressure in the first space and second space, the difference in fluid height between the collector and the fuel tank or ecology tank has no impact on the pressure difference across the drained liquid passage restriction means.
[0025] According to one aspect, the drained liquid passage restriction means is formed in the partition. For example, the passage restriction means comprises at least one orifice that traverses the partition. The partition orifice allows the drained liquid to flow from the first space to the second space.
[0026] Alternatively, the drained liquid passage restriction means may be an attached nozzle installed in an opening of the partition.
[0027] According to one aspect, the partition is thin-walled. “Thin-walled” is understood to mean that the thickness of the partition is less than 1.5 mm, preferably less than 1 mm.
[0028] According to one aspect, the orifice has a diameter of less than 1.5 mm, preferably less than 1 mm.
[0029] According to one aspect, the drained liquid passage restriction means comprises at least two orifices which traverse the partition. In this case, in order to preserve the same law governing the flow of drained liquid between the first and second spaces of the cavity as when the passage restriction means comprises only one orifice, the orifices of the partition preferably have a diameter that is less than the diameter of the partition orifice when there is only one.
[0030] According to one aspect, the drained liquid passage restriction means comprises at least two orifices which traverse the partition at different heights. In this case, the fill level of drained liquid at which the drained liquid traverses each orifice of the partition into the internal cavity is different, the orifices located at a lower height being traversed at a lower fill level than those located higher up.
[0031] According to one aspect, the collector further comprises a discharge outlet that is fluidly connected to an overflow channel, for example arranged in the first space of the internal cavity.
[0032] The discharge outlet is in communication with the exterior of the turbine engine. The overflow channel has a defined height which makes it possible to determine a fill level, in the internal cavity of the collector, above which the drained liquid flows through the discharge outlet.
[0033] According to one aspect, the overflow channel comprises an inlet port for the intake of liquid collected in the first space, said inlet port being arranged at a height that is greater than the height of the drained liquid passage restriction means.
[0034] Here, height is understood to mean the dimension measured in the longitudinal direction of the collector in its service position. Depending on the diameter of the orifice of the restriction means and the height of the inlet port of the overflow channel, it is possible to determine a detection threshold for drained liquid leakage from the turbine engine, beyond which the drained liquid flows through the discharge outlet. When this threshold is exceeded, the amount of drained liquid reaching the internal cavity is very large, which may indicate that there is a failure in the turbine engine.
[0035] According to one aspect, the partition forms a tube delimiting the second space.
[0036] According to the invention, the tube is arranged in the internal cavity, extending between a bottom wall of the collector and a cover of the collector. More specifically, the tube extends from the bottom wall of the collector towards the cover of the collector. The tube has, for example, a cylindrical shape with a circular cross-section.
[0037] Advantageously, the drained liquid recovery outlet is fluidly connected to the internal cavity of the collector, through the bottom wall of the collector.
[0038] According to one aspect, the tube extends in a longitudinal direction and comprises a first end part carrying the drained liquid passage restriction means and a second end part carrying at

least one pressure-balancing orifice which places the air of the first space in communication with the air of the second space.
[0039] According to the invention, the first end part is directly connected to the bottom wall of the collector. The drained liquid passage restriction means is therefore arranged near the bottom wall of the collector, such that the drained liquid flows between the first space and the second space at a low fill level of drained liquid in the first space.
[0040] The at least one pressure-balancing orifice allows placing the air of the first space in communication with the air of the second space, which allows equalizing the pressures between the first space and the second space. More precisely, the at least one pressure-balancing orifice is sized to ensure that the pressure in the second space is the same as in the first space. According to the invention, the diameter of the at least one pressure-balancing orifice is greater than 1.5 mm and less than 3 mm. For example, the diameter of the at least one pressure-balancing orifice is 2 mm.
[0041] According to one aspect, the second end part of the tube comprises at least two pressure-balancing orifices.
[0042] When several pressure-balancing orifices are provided, this facilitates the equalization of pressures between the first space and the second space of the internal cavity of the collector.
[0043] Advantageously, the tube comprises six pressure-balancing orifices distributed equidistantly around the longitudinal direction of the tube.
[0044] According to one aspect, the at least one pressure-balancing orifice has a diameter greater than the diameter of the drained liquid passage restriction means. This makes it possible to balance the pressures between the first and second spaces.
[0045] According to one aspect, the at least one pressure-balancing orifice is arranged at a height that is greater than the height of the inlet port for the intake of drained liquid into the overflow channel. This thus ensures that the drained liquid does not pass through the at least one pressure-balancing orifice since once the height of the inlet port for the intake of drained liquid into the overflow channel is reached, the drained liquid flows through this overflow channel towards the discharge outlet of the collector.
[0046] According to one aspect, the partition forms a tube mounted so as to be removable from the collector by moving the tube along the first direction, in the directional sense that is from the bottom wall of the collector towards the cover of the collector.
[0047] Since the tube is removably mounted, extraction of the drained liquid passage restriction means is thus facilitated.
[0048] Furthermore, since the tube is removably mounted, this facilitates its manufacture, even when its wall is thin. “Thin wall” is understood here to mean a wall with a thickness that is less than or equal to 2 mm, preferably less than 1 mm.
[0049] According to one aspect, the tube comprises a first end part directly connected to the bottom wall of the collector and a second end part connected to the cover of the collector.
[0050] The tube is thus held in position within the internal cavity of the collector.
[0051] According to another aspect, the drained liquid passage restriction means is comprised in the first end part of the tube, at a height located above the level of an inner face (**20**) of the bottom wall (**16**) of the collector. In particular, the passage restriction means is located at a height that is between the bottom wall of the collector and the cover of the collector.
[0052] Since the passage restriction means is comprised in the first end part of the tube, the drained liquid flows between the first space and the second space at a low fill level of drained liquid in the first space.
[0053] Since the passage restriction means is arranged at a height that is between the bottom wall of the collector and the cover of the collector, it is prevented from being arranged in an area where impurities accumulate in the collector. The areas where impurities accumulate are in particular those comprised in any housing or cavity provided in the bottom wall of the collector. This reduces the risk of clogging in the passage restriction means.

[0054] According to one aspect, the first end part of the tube comprises an insertion portion inserted into a housing in the bottom wall of the collector. The first end part of the tube is thus held in position in the bottom wall.
[0055] According to one aspect, the first end part comprises a stop member on the bottom wall, such as a flange, projecting radially outwards from the tube relative to the insertion portion, the stop member being arranged between the drained liquid passage restriction means and the insertion portion.
[0056] The insertion portion of the tube is thus inserted into the housing of the bottom wall of the collector until the stop member of the first end part of the tube abuts against the bottom wall of the collector. The arrangement of the tube in the internal cavity is thus guided and facilitated. In addition, since the stop member is arranged between the drained liquid passage restriction means and the insertion portion, this ensures that the restriction means is arranged at a height that is between the bottom wall and the cover of the collector, so as not to be arranged in an area where impurities accumulate.
[0057] According to one aspect, the insertion portion of the first end part of the tube comprises an annular groove in which is mounted a ring gasket that rests against an annular surface facing the housing.
[0058] Due to the annular groove and the ring gasket, the liquid-tightness of the connection between the bottom wall of the collector and the tube is improved.
[0059] According to one aspect, the second end part of the tube comprises at least one pressure-balancing orifice which traverses the tube between the first space and the second space of the internal cavity.
[0060] The at least one pressure-balancing orifice places the air of the first space in communication with the air of the second space, so that the air pressure is identical in the first space and second space.
[0061] According to one aspect, the second end part comprises a connecting pin for connecting the tube to the cover of the collector.
[0062] According to one aspect, the cover of the collector comprises a cap having a shape that is complementary to the shape of the connecting pin of the tube.
[0063] According to the invention, the length of the flow rate restriction means is such that it extends from the bottom wall to the cover of the collector. Since the cap has a shape that is complementary to the shape of the connecting pin of the tube, this ensures that the second end part is locked in the internal cavity of the collector. In particular, the cap is sized so as to compensate for play of the second end part, and more precisely so as to reduce the vibrations of the second end part of the tube which may be caused by the drained liquid collected in the first space of the internal cavity.
[0064] According to one aspect, the cover of the collector is removable. Extraction of the passage restriction means is thus facilitated.
[0065] According to one aspect, the collector further comprises a discharge outlet fluidly connected to an overflow pipe arranged in the first space of the internal cavity, wherein the overflow pipe forms, with the tube, an assembly that is removable by moving said assembly along the first direction, in the directional sense that is from the bottom wall of the collector towards the cover of the collector.
[0066] According to another aspect, the diameter of the passage restriction means is less than or equal to 1.5 mm, preferably less than 1 mm. The flow rate of drained liquid that can travel from the first space to the second space in order to go to the first outlet is thus limited.
[0067] According to another aspect, the thickness of the passage restriction means is less than or equal to 2 mm, preferably less than 1 mm. The nozzle is thus a thin-walled nozzle.
[0068] According to another aspect, a turbine engine such as a turbojet or turboprop engine is

provided, comprising at least one collector of the first type or of the second type as described above.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0069] Other features, details and advantages will become apparent from reading the detailed description below, and from analyzing the attached drawings, in which:

[0070] FIG. **1** shows a collector for a drained liquid for an aircraft turbine engine according to a first embodiment.

[0071] FIG. **2** shows a collector for a drained liquid for an aircraft turbine engine according to a second embodiment.

[0072] FIG. **3** shows a tube comprised in the collector of FIG. **2**.

[0073] FIG. **4** shows a first end part of the tube of FIG. **3**.

[0074] FIG. **5** shows a second end part of the tube of FIG. **3**.

[0075] FIG. **6** shows an exploded view of the collector of FIG. **2**.

DESCRIPTION OF EMBODIMENTS

[0076] FIGS. **1** and **2** show a collector **10** for a drained liquid for an aircraft turbine engine. Collector **10** comprises a body **12** and a cover **14**.

[0077] Body **12** has a cylindrical shape with a substantially vertical axis A**1**. In the following, “vertical” means along a direction Z that is substantially parallel to axis A**1**. In the figures, body **12** has a substantially circular cross-section, but it could also have a polygonal cross-section.

[0078] Body **12** comprises a bottom wall **16** and a side wall **18**.

[0079] Bottom wall **16** preferably has a cross-section whose shape and dimension are equivalent to the shape and dimension of the cross-section of body **12**. “Cross-section” is understood here to mean comprised within an X-Y plane perpendicular to axis A**1**. Bottom wall **16** comprises an inner face **20** and an outer face **22**.

[0080] Bottom wall **16** comprises at least a first cavity **24** and a second cavity **26**. In the non-limiting examples of FIGS. **1** and **2**, first cavity **24** passes substantially vertically through bottom wall **16** between its inner face **20** and its outer face **22**. In FIG. **1**, second cavity **26** extends substantially vertically from inner face **20** of bottom wall **16**, without passing through outer face **22**. In FIG. **2**, second cavity **26** has a shape that is substantially an L, with a first portion **26**A extending substantially vertically **26**, and a second portion **26**B extending substantially transversely.

[0081] First cavity **24** places the interior of collector **10** in communication with at least one first outlet **28**, referred to as the discharge outlet, while second cavity **26** places the interior of collector **10** in communication with at least one second outlet **30**, referred to as the recovery outlet. Discharge outlet **28** and recovery outlet **30** will be described below.

[0082] Side wall **18** extends substantially in vertical direction Z from inner face **20** of bottom wall **16**. Side wall **18** forms a closed surface extending around axis A**1** and comprising a radially inner face **32** and a radially outer face **34**. “Radially” here corresponds to any direction perpendicular to vertical direction Z. Preferably, side wall **18** is substantially cylindrical with a cross-section that is equal, in shape and dimension, to the cross-section of bottom wall **16**.

[0083] Side wall **18** comprises a first end part **18**A directly connected to bottom wall **16** and a second end part **18**B vertically opposite first end part **18**A. According to one non-limiting example, second end part **18**B of side wall **18** comprises a free end **19**. In other words, body **12** does not comprise any wall opposite to bottom wall **16** along direction Z. As can be seen in FIG. **6**, second end part **18**B of side wall **18** may comprise one or more portions **36** projecting transversely outward relative to the collector, from radially outer face **34** of side wall **18** of collector **10**. In the illustrated case, side wall **18** comprises three projecting portions **36**, without this being limiting. Each of portions **36** comprises a hole **38** shaped to receive a respective removable connection means **37** for connecting cover **14** to body **12**, as will be detailed below. Each removable connection means **37** is for example a screw or a rivet.

[0084] Cover **14** comprises a wall **40** intended to be vertically positioned so it faces bottom wall **16**. The external periphery of wall **40** is intended to come into contact with free end **19** of end part **18**B.

[0085] Wall **40** preferably has a cross-section whose shape and dimension are advantageously equivalent to the shape and dimension of bottom wall **16**. In certain cases, the dimension of the cross-section of wall **40** is greater than the dimension of bottom wall **16**.

[0086] Wall **40** is traversed substantially vertically by at least one inlet **44** for the drained liquid. Three inlets **44** are shown in FIG. **6**, without this being limiting. Each inlet **44** comprises a connector **44**A for connecting a pipe (not shown) to respective inlet **44**, through which the drained liquid flows until it reaches collector **10**.

[0087] As is clear from FIG. **6**, wall **40** further comprises one or more portions **46** projecting transversely outward relative to the collector. Advantageously, the number of portions **46** of wall **40** is equal to the number of portions **36** of side wall **18** of body **12**. Portions **46** are arranged so that when cover **14** is placed on body **12**, each portion **46** of wall **40** is vertically positioned so it faces a respective portion **36** of side wall **18**. In FIG. **6**, wall **40** comprises three portions **46**, without this being limiting. Each of portions **46** comprises a hole **48** shaped to receive the respective removable connection means **37** for connecting cover **14** to body **12**, as will be detailed below.

[0088] An annular rim **42** intended to be radially facing end part **18**B of the side wall extends from wall **40**. In particular, annular rim **42** extends from wall **40** substantially perpendicularly to wall **40**. The annular rim preferably has a shape that is complementary to the cross-section of side wall **18** so that when cover **14** is arranged on body **12** of the collector, the annular rim is engaged with, for example fitted to, the interior of body **12**, in particular transversely next to second end part **18**B of side wall **18**. One will note that the term “annular” here does not assume a circular rim. On the contrary, the term “annular” here concerns any closed shape, regardless of its geometry.

[0089] Annular rim **42** comprises a radially outer edge **42**A which faces radially inner face **32** of side wall **18** of body **12**, and a radially inner edge **42**B.

[0090] In order to ensure the liquid-tightness of collector **10** when cover **14** is arranged on body **12**, annular rim **42** may comprise a groove **50** extending along its entire radially outer edge **42**A. Groove **50** is in particular shaped to receive a seal **52** having a shape complementary to the shape of groove **50**.

[0091] As indicated above, body **12** and cover **14** are connected by removable connection means **37**. Cover **14** is thus removable from body **12**.

[0092] When cover **14** is arranged on body **12**, an internal cavity **54** is formed in collector **10**. Internal cavity **54** is in particular delimited by inner face **20** of bottom wall **16**, radially inner face **32** of side wall **18**, and cover **14**. Internal cavity **54** therefore extends longitudinally along direction Z between a first end closed off by bottom wall **16** of collector **10** and a second end closed off by cover **14**.

[0093] Internal cavity **54** comprises a first space **54**A and a second space **54**B which are separated by a partition **56**. Partition **56**, which will be described in more detail below, is preferably thin-walled. “Thin-walled” is understood to mean that the thickness of partition **56** is less than 1.5 mm, preferably less than 1 mm.

[0094] As can be seen in FIGS. **1** and **2**, each inlet **44** of the collector is in fluid communication with first space **54**A. The drained liquid is thus initially collected in first space **54**A, which will also be referred below to as the collection space **54**A.

[0095] Second space **54**B is in fluid communication with recovery outlet **30**. In particular, second space **54**B transfers the liquid collected in collection space **54**A, to recovery outlet **30**. Also, in the

following description, second space **54**B will also be referred to as transfer space **54**B. Recovery outlet **30** comprises a connector **30**A for connecting a pipe (not shown) to collector **10**, extending between the collector and another part of the turbine engine, such as the fuel tank or the "ecology" collection tank described above. The drained liquid may thus be recovered from collector **10** and sent to other parts of the turbine engine for storage or reuse.
[0096] Partition **56** is liquid-tight. To allow the liquid collected in collection space **54**A to travel to transfer space **54**B, partition **56** comprises drained liquid passage restriction means **58** which restrict the passage of the drained liquid from collection space **54**A to transfer space **54**B.
[0097] In the figures, restriction means **58** extends radially, without this being limiting. In particular, restriction means **58** may extend in any spatial direction provided that the inlet to restriction means **58** corresponds to an outlet from collection space **54**A and the outlet from restriction means **58** corresponds to an inlet to transfer space **54**B.
[0098] Restriction means **58** may comprise an orifice **58**A which traverses partition **58** between collection space **54**A and transfer space **54**B. The diameter of orifice **58**A is less than or equal to 1.5 mm, preferably less than 1 mm. This makes it possible to ensure that the passage of drained liquid from collection space **54**A to transfer space **54**B occurs in a controlled manner.
[0099] Alternatively, restriction means **58** may comprise a plurality of orifices which traverse partition **56** between collection space **54**A and transfer space **54**B. In this case, each orifice may have a diameter similar to the diameter of orifice **58**A. Alternatively, each orifice of partition **56** may have a diameter smaller than that of orifice **58**A in order to obtain a law governing the flow of drained liquid between collection space **54**A and transfer space **54**B that is similar to the law obtained when only orifice **58**A traverses partition **56**. "Law governing the flow of drained liquid" is understood here to mean the volume of drained liquid which is transferred, per unit of time, between collection space **54**A and transfer space **54**B.
[0100] When several orifices traverse partition **56**, these may be arranged at the same height relative to bottom wall **16** of collector **10** or at different heights. When each orifice of partition **56** is arranged at a different height, the law governing the flow of drained liquid between collection space **54**A and transfer space **54**B is different for each orifice. In particular, the further the orifice in partition **56** is from bottom wall **16** of collector **10**, the slower the flow of the drained liquid. Firstly, the further the orifice of the partition is from bottom wall **16**, the greater the amount of drained liquid collected in the collection space must be in order to initiate the flow of drained liquid through this orifice. Also, if other orifices are arranged closer to bottom wall **16**, the drained liquid preferentially flows through them.
[0101] According to an alternative embodiment, restriction means **58** could be an added nozzle (not shown) installed in an opening of the partition.
[0102] Advantageously, restriction means **58** is arranged vertically above bottom wall **16** of the collector. This avoids having restriction means **58** in an area where impurities accumulate, where the risk of clogging in restriction means **58** is increased.
[0103] One will note that restriction means **58** is preferably mounted so that it is removable from the collector by moving the drained liquid passage restriction means along direction Z, in the directional sense that is from bottom wall **16** of the collector towards cover **14** of the collector. This allows restriction means **58** to be extracted from the collector for regular cleaning, in order to reduce the risk of clogging in restriction means **58**. In addition, since restriction means **58** is extracted by its movement along the directional sense that is from bottom wall **16** towards cover **14** of the collector, the drained liquid collected in internal cavity **54** of the collector is not likely to escape through bottom wall **16** when restriction means **58** is extracted from collector **10**. Advantageously, when extracting restriction means **58**, cover **14** is removed from the collector. However, according to a variant that is not illustrated, cover **14** may comprise a through-opening in wall **40**, through which restriction means **58** may be extracted without needing to remove cover **14**.
[0104] Restriction means **58** may be moved along direction Z independently of partition **56** or

integrally with partition **56**, as will be detailed below.
[0105] In FIG. **1**, partition **56** forms a separating wall extending substantially vertically into internal cavity **54** from bottom wall **16** of the collector. Separating wall **56** may be attached to bottom wall **16**, either fixedly or removably. When separating wall **56** is removably mounted on the bottom wall, restriction means **58** may be extracted from collector **10** by vertically moving partition wall **56** along the directional sense that is from bottom wall **16** to cover **14**. Alternatively, partition wall **56** may be formed as one piece with bottom wall **16** of the collector.
[0106] Separating wall **56** comprises a main wall extending radially facing a portion of inner face **32** of side wall **18** of body **12**, and two secondary walls (not shown) which radially connect the ends of the main wall to inner face **32** of side wall **18**. Transfer space **54**B is then delimited between separating wall **56** and inner face **32** of side wall **18**. Separating wall **56** is arranged in internal cavity **54** such that the inlet into second cavity **26** is comprised in transfer space **54**B.
[0107] Advantageously, separating wall **56** does not extend as far as cover **14**, which allows the air in collection space **54**A to be in communication with the air in transfer space **54**B. The air pressure in collection space **54**A and in transfer space **54**B is therefore identical.
[0108] One will note that restriction means **58** is arranged on an end part of separating wall **56** which is connected at its end to bottom wall **16** of collector **10**.
[0109] In FIG. **2**, partition **56** forms a tube **60**. Reference is now made to FIGS. **3** to **5** in order to describe tube **60**.
[0110] As can be seen in FIG. **3**, tube **60** extends in a longitudinal direction L**1**. As can be seen in FIG. **2**, when tube **60** is arranged in internal cavity **54** of collector **10**, longitudinal direction L**1** is substantially parallel to axis A**1** of collector **10**.
[0111] Tube **60** is hollow and substantially cylindrical, with a circular or polygonal cross-section.
[0112] Tube **60** comprises a first end part **60**A and a second end part **60**B which are interconnected by an intermediate part **60**C.
[0113] First end part **60**A will now be described with reference to FIG. **4**.
[0114] First end part **60**A of tube **60** carries passage restriction means **58**. In the figures, passage restriction means **58** comprises a single orifice **58**A, but it could comprise several orifices or could be formed by a nozzle attached in an opening, as indicated above.
[0115] First end part **60**A of tube **60** comprises an insertion portion **62**. The insertion portion is shaped for insertion into a housing in the bottom wall of collector **16**, as can be seen in FIG. **2**.
[0116] The housing in the bottom wall is in fluid communication with recovery outlet **30**. In this case, the housing in bottom wall **16** corresponds to first portion **26**A of cavity **26**.
[0117] Insertion portion **62** is fitted into housing **26**A. Insertion portion **62** advantageously comprises a groove **64**, preferably annular, in which is mounted an annular gasket **66**, visible in FIG. **6**. Gasket **66** ensures the liquid-tightness of the tube **60** mounted in housing **26**A of bottom wall **16**. In particular, gasket **66** limits the flow of the drained liquid between the surface of housing **26**A and insertion portions **62**. Alternatively, the liquid-tightness of the mounting of the tube may be a faceseal via a gasket or via metal-metal contact.
[0118] Preferably, tube **60** is mounted in housing **26**A so as to be removable. This makes it possible to extract tube **60** from internal cavity **54** of collector **10** by moving it along direction Z in the directional sense that is from bottom wall **16** towards cover **14**, as indicated above. It is thus possible to clean passage restriction means **58** and to monitor that it is not clogged, as is also explained above.
[0119] First end part **60**A further comprises a stop member **68** for abutting against bottom wall **16**. Stop member **68** projects radially outward from tube **60** in relation to insertion portion **62**. Thus, when insertion portion **62** of tube **60** is inserted into housing **26**A, stop member **68** abuts against the inner face of bottom wall **16**. In the figures, stop member **68** is a flange, but any other shape projecting radially outward from tube **60** in relation to insertion portion **62** is conceivable.
[0120] Stop member **68** is arranged between passage restriction means **58** and insertion portion **62**.

This allows ensuring that passage restriction means **58** is arranged at a height that is between bottom wall **16** of the collector and cover **14** of the collector, which prevents it, as indicated above, from being positioned in an area where impurities accumulate which would facilitate clogging. Second end part **60**B of tube **60** will now be described with reference to FIG. **5**.

[0121] Second end part **60**B carries at least one pressure-balancing orifice **70** which places the air in collection space **54**A in communication with the air in transfer space **54**B. In particular, pressure-balancing orifice **70** traverses tube **60**, between first space **54**A and second space **54**B of internal cavity **54**.

[0122] Preferably, the second end part carries a plurality of pressure-balancing orifices **70** distributed equidistantly around longitudinal direction L**1** of tube **60**. For example, the second end part of tube **60** carries six pressure-balancing orifices **70**.

[0123] Each pressure-balancing orifice is sized to allow the pressure in collection space **54**A to be identical to the pressure in transfer space **54**B. Advantageously, the diameter of each pressure-balancing orifice is greater than the diameter of passage restriction means **58**, in particular of orifice **58**A. For example, each pressure-balancing orifice has a diameter that is greater than 1.5 mm and less than 3 mm. Preferably, the diameter of each pressure-balancing orifice is between 1.7 mm and 2.5 mm. For example, the diameter of each pressure-balancing orifice is equal to 2 mm.

[0124] In order to avoid the vibratory movements to which second end part **60**B may be subjected due to the presence of the drained liquid in collection space **54**A, second end part **60**B of tube **60** is preferably connected to cover **14**. For this purpose, second end part **60**B comprises a connecting pin **72**, and cover **14** comprises a cap **74** which is visible in FIGS. **2** and **6**. As can be seen in FIG. **2**, pin **72** and cap **74** have complementary shapes, which allows locking pin **72** in cap **74**. In one variant, tube **60** could also traverse cover **14**, in particular wall **40** of cover. Tube **60** may thus be centered in and/or fixed on cover **14**.

[0125] As can be seen in **1**, **2** and **6**, collection space **54**A further comprises an overflow channel **76**. A first end of overflow channel **76** is connected to discharge outlet **28**. Overflow channel **76** therefore is in fluid communication with discharge outlet **28**. This discharge outlet comprises a connector **28**A which allows connecting a pipe (not illustrated) to collector **10**, placing collector **10** in communication with outside the turbine engine.

[0126] A second end of overflow channel **76** comprises an inlet port **78** for the intake of liquid collected in collection space **54**A. Inlet port **78** is arranged vertically at a height relative to bottom wall **16** of the collector that is between the height of restriction means **58** and that of pressure-balancing orifice(s) **70**. When restriction means **58** comprises several orifices as explained above, inlet port **78** is arranged vertically at a height that is between the orifice of restriction means **58** which is vertically furthest from bottom wall **16**, and pressure-balancing orifice(s) **70**. The height of inlet port **78** defines a level referred to as the “overflow level”.

[0127] In the figures, overflow channel **76** extends along direction Z, but any other shape of the overflow channel is possible provided that inlet port **78** is arranged in collection space **54**A and the first end of overflow channel **76** is fluidly connected to discharge outlet **28**.

[0128] The operation of collector **10** when in service will now be described.

[0129] Firstly, the drained liquid reaches collection space **54**A through one of inlets **54**A. The height of the drained liquid in collection space **54**A gradually increases. The height of the drained liquid is measured vertically relative to bottom wall **16** of collector **10**.

[0130] When the drained liquid reaches the height of restriction means **58**, the liquid begins to flow from collection space **54**A towards transfer space **54**B, through restriction means **58**. The drained liquid therefore begins to exit collector **10** via recovery outlet **30**.

[0131] If the flow rate of drained liquid arriving in collection space **54**A is greater than the flow rate of drained liquid flowing through restriction means **58**, the height of the drained liquid in the cavity exceeds the height of restriction means **58** and may reach the overflow level. In this case, the drained liquid also begins to flow through overflow channel **76** towards discharge outlet **28**. The

drained liquid is therefore discharged to outside the turbine engine, which may indicate a failure of the turbine engine.
[0132] The present invention also relates to a turbine engine, such as a turbojet or turboprop engine, comprising at least one collector **10** as described above.
[0133] One will note that due to the equalization of pressures between the collection space and the transfer space, in the collector described above, the pressure difference across the drained liquid passage restriction means depends solely on the height of drained liquid collected in collection space **54**A. The conditions for use of the collector, such as the increase in air pressure in internal cavity **54** of collector **10** or the flow rate of drained liquid entering internal cavity **54**, as well as the installation conditions of collector **10**, for example the length of the pipes at the outlet of the collector, therefore have no impact on the pressure difference across flow rate restriction means **58**.
[0134] Furthermore, since the pressure difference across flow rate restriction means **58** is independent of the installation conditions of collector **10** and the conditions for its use, in particular the air pressure in internal cavity **54**, it is possible to control the flow rate of drained liquid beyond which the liquid will overflow through overflow channel **76**. This therefore allows controlling a leakage flow rate threshold for the drained liquid, beyond which a failure of the turbine engine is detected due to the overflow of drained liquid through overflow channel **76**.
[0135] This disclosure is not limited to the collector examples described above solely as an example, but encompasses all variants conceivable to the person skilled in the art within the framework of the protection sought.

Claims

1. Collector (**10**) for a drained liquid for an aircraft turbine engine, the collector comprising: an internal cavity (**54**) comprising a first space (**54**A) for collecting the drained liquid and a second space (**54**B) for transferring the collected liquid to a recovery outlet (**30**); at least one inlet (**44**) for the drained liquid, in fluid communication with the first space (**54**A); and at least one recovery outlet (**30**), in fluid communication with the second space (**54**B); wherein the first space (**54**A) and the second space (**54**B) are separated from each other by a liquid-tight partition (**56**) in which is arranged a drained liquid passage restriction means (**58**) which restricts the passage of the drained liquid from the first space to the second space, the air in the first space (**54**A) being in communication with the air in the second space (**54**B) such that the air pressure is identical in the first space and in the second space.
2. The collector (**10**) according to claim 1, wherein the drained liquid passage restriction means (**58**) comprises at least one orifice (**58**A) traversing the partition (**56**).
3. The collecter (**10**) according to claim 1, wherein the drained liquid passage restriction means (**58**) comprises at least two orifices traversing the partition (**56**).
4. The collector (**10**) according to claim 1, wherein the drained liquid passage restriction means (**58**) comprises at least two orifices traversing the partition (**56**) at different heights.
5. The collector (**10**) according to claim 1, further comprising a discharge outlet (**28**) that is fluidly connected to an overflow channel (**76**), for example arranged in the first space (**54**A) of the internal cavity (**54**).
6. The collector (**10**) according to claim 5, wherein the overflow channel (**76**) comprises an inlet port (**78**) for the intake of liquid collected in the first space (**54**A), said inlet port (**78**) being arranged at a height that is greater than the height of the drained liquid passage restriction means (**58**).
7. The collector (**10**) according to claim 1, wherein the partition (**56**) forms a tube (**60**) delimiting the second space (**54**B).
8. The collector (**10**) according to claim 7, wherein the tube (**60**) extends in a longitudinal direction (L**1**) and comprises a first end part (**60**A) carrying the drained liquid passage restriction means (**58**)

and a second end part (**60**B) carrying at least one pressure-balancing orifice (**70**) which places the air of the first space in communication with the air of the second space.

9. The collector (**10**) according to claim 8, wherein the at least one pressure-balancing orifice (**70**) has a diameter that is greater than the diameter of the drained liquid passage restriction means (**58**).

10. The collector (**10**) according to claim **13**, wherein the at least one pressure-balancing orifice (**70**) is arranged at a height that is greater than the height of the inlet port (**78**) for the intake of drained liquid into the overflow channel (**76**).

11. Turbine engine, such as a turbojet or turboprop engine, comprising at least one collector (**10**) according to claim 1.

12. The collector (**10**) according to claim 6, wherein the partition (**56**) forms a tube (**60**) delimiting the second space (**54**B).

13. The collector (**10**) according to claim 12, wherein the tube (**60**) extends in a longitudinal direction (L**1**) and comprises a first end part (**60**A) carrying the drained liquid passage restriction means (**58**) and a second end part (**60**B) carrying at least one pressure-balancing orifice (**70**) which places the air of the first space in communication with the air of the second space.