A device for positioning profiled aerator body in a movement range that corresponds to the flow-rate range of the aerator, wherein the profiled body (12) includes a cylindrical member (30) having an axis parallel to the movement direction of the body relative to the holder, the holder (10) includes a cylindrical housing having a section complementary to that of the cylindrical member (30), and the device further includes an O ring (24) provided between the cylindrical member (30) and the cylindrical housing of the holder (10) and maintained on the holder (10) so that it permits a relative movement of the profiled body and of the holder by a sliding movement of the O ring (24) on the profiled body. The device can be used in automobiles.
DEVICE FOR POSITIONING A PROFILED BODY OF AN AERATOR, AND AN AERATOR COMPRISING SAID DEVICE

[0001] The present invention relates to a device for positioning a profiled body of an aerator in relation to a support within a flow-rate range of the aerator, and to an aerator provided with a positioning device of this type.

[0002] Document WO 2006/125915 describes an aerator with adjustment of the orientation and flow-rate, achieved by rotation of a profiled body. This aerator utilises the effect known by the name of the “Comuda effect”, and it substantially comprises a profiled body mounted in the centre of a conduit defining a spherical segment, against which can turn a ring which is fixed to the profiled body. In this way, the profiled body can pivot in all directions with a swivel movement. Furthermore, it can also adjust the flow-rate of the aerator by displacement in relation to the ring towards one end or other of the conduit.

[0003] The invention relates to this displacement of the profiled body in relation to the ring towards one end or other of the conduit.

[0004] In such an aerator it is desirable that the profiled body, once it has had its position adjusted, does not move out of its adjustment position, so that an adjustment position selected by a user is maintained. It is also desirable that, at the ends of its displacement path, the profiled body is held in a relatively fixed manner in a maximum open position and/or in a closed position.

[0005] For this positioning, it would be possible to use a resilient strip which is placed between a movable member and a fixed member and permits locking. Such a device is not agreeable to the user, in particular because it provides a series of spaced positions and not continuous adjustment.

[0006] The invention relates to a particular use of an O-ring or equivalent member which is held by one of the two components which are movable relative to one another, and slides on the other of these components.

[0007] In view of the particular conditions of use of an O-ring of this type for the application of a force for retaining a movable member on a fixed member, a particular device for locking is provided according to the invention.

[0008] More specifically, the invention relates to a device for positioning a profiled body of an aerator in relation to a support within a displacement range corresponding to a flow-rate range of the aerator. According to the invention, the profiled body has a cylindrical member with an axis which is parallel to the direction of displacement of the body in relation to the support, the support comprises a cylindrical receptacle with a cross-section complementary to that of the cylindrical member of the body, and the device additionally comprises an O-ring which is arranged between the cylindrical member of the profiled body and the cylindrical receptacle of the support and is held on a first of the components selected from the profiled body and the support in order to allow relative displacement of the profiled body and the support by means of the O-ring, which slides along the second of the components selected from the profiled body and the support.

[0009] Preferably, the O-ring is held on the support.

[0010] Preferably, the cylindrical member of the profiled body has a groove over at least member of its circumference in a position which corresponds to the position of the O-ring when the cylindrical member is at one end of the displacement range of the profiled body in relation to the support. For example, it comprises a groove at each of the two ends of the displacement range.

[0011] In this embodiment, the cylindrical member of the profiled body has a cross-section comprising a core and at least one wing, and the support is in the form of a tube having at least one longitudinal channel for receiving the wing, the thickness of the tube being less than the radial dimension of the wing.

[0012] Preferably, the support comprises a device for holding the O-ring, which device comprises a localised recess in the channel in its portion furthest away from the centre of the tube, the dimension of the recess in the direction of the displacement axis being in the order of magnitude of the width of the O-ring.

[0013] Preferably, the support has three channels and the profiled body has three wings.

[0014] Preferably, the groove at least in the cylindrical member of the profiled body is formed solely in the wing.

[0015] In one embodiment, the support is connected by arms to a ring in the form of a spherical segment.

[0016] The invention also relates to an aerator with adjustment of the orientation and flow-rate of a flow of air, of the type comprising a conduit for the flow of air, having a chamber with a cross-section of which a portion of the inner surface forms a spherical segment, a profiled body, the majority of which is arranged in the chamber of the conduit and has a progressively increasing, then progressively decreasing cross-section, and a ring co-operating with the conduit and with the profiled body in order to support the profiled body in the conduit while permitting displacement of the profiled body in relation to the conduit, the ring having an outer surface forming a spherical portion which has practically the same radius as the spherical segment of the chamber. According to the invention, the profiled body is mounted on the ring by means of a positioning device according to any one of the preceding paragraphs.

[0017] A first advantage of the device according to the invention is that it permits continuous adjustment and thus ensures that the profiled body is held in any selected position. Furthermore, this device has the advantage of imparting a tactile effect to the ends of the displacement range of the profiled body, with the result that the user is informed of the fact that the profiled body has reached one end of this range.

[0018] Another advantage is that the device formed is inexpensive because it is formed entirely by the injection of plastics material and because the positioning of the O-ring is easy, contrary to the case in which an O-ring is accommodated in an inner groove of a tube.

[0019] In the present specification, the terms “cylinder” and “cylindrical” refer to a surface which is generated by a straight line displaced parallel to itself while lying against a closed curve and the cross-sections of which through parallel planes are equal.

[0020] Further features and advantages of the invention will be better understood on reading the following description of an embodiment with reference to the accompanying drawings, wherein:

[0021] FIG. 1 shows a section through a profiled body and a portion of its support in an aerator; and

[0022] FIG. 2 shows a perspective view of the central portion of the support of the profiled body, and of an O-ring.

[0023] FIG. 1 shows a support 10 and a profiled body 12. The support 10 comprises a tube 14 having, on its exterior,
three projections 16 which permit the formation of three longitudinal channels 18 in the interior of the tube 14.

[0024] The tube 14 is integral with three arms 22 which are fixed on the outside to a ring in the form of a spherical segment co-operating with an aerator conduit, as described in the aforementioned document.

[0025] A groove 26, formed in the projections 16 but not in the tube 14, is sufficiently deep to reach the channels 18, as indicated by the opening 20 in FIG. 2. An O-ring 24, described in further detail hereinbelow, is accommodated in the groove 26.

[0026] The profiled body 12 comprises a profiled skirt 28 which has slots 29 for the passage of the arms 22 of the support 10. The profiled body is integral with a cylindrical member 30 comprising an inner tube, the outer cross-section of which is complementary to the cross-section of the support.

[0027] More specifically, the cylindrical member 30 of the profiled body has a tubular portion with a radius corresponding to the inner radius of the tube 14, and wings 32 which correspond to the channels 18 and extend through the openings 20 formed in the support. Consequently, when the O-ring 24 is placed into the groove 26 in the projections 16 and onto the tube 14, portions of the O-ring come into contact with the outer ends of the wings 32 of the cylindrical member of the profiled body. Therefore, in this embodiment the O-ring 24 is only in contact with the cylindrical member at the ends of the wings.

[0028] FIG. 1 shows the position of the profiled body 12 on the support 10 at one end of the displacement range. In this position, a groove 34 has been formed in the wings 32 of the cylindrical member of the profiled body 12 so that the O-ring 24 can co-operate more intimately with the cylindrical member of the profiled body 12.

[0029] As the O-ring 24 is resilient, a traction force applied to the profiled body 12, towards the right in FIG. 1, expands the O-ring 24 along the inclined wall of the groove 34 so that, between the end position shown in FIG. 1 and the other end position corresponding to the other groove 36 in the wings of the cylindrical member, the O-ring is constantly in contact with the outer surface of the wings 32, on which it exerts a gripping and therefore a frictional force. Consequently, the profiled body 12 maintains the position in which the user releases it between the positions determined by the end grooves.

[0030] Naturally, these end grooves are not indispensable. For example, positioning can be achieved by simple sliding without grooves, or with grooves at only one end.

[0031] An embodiment of the positioning device is shown in which the cylindrical member of the profiled body 12 has three wings accommodated in three channels 18 of the support. According to the invention, one wing and one channel are sufficient. However, it is preferable if a plurality of wings and a plurality of channels are distributed regularly over the periphery of the components for reasons of equilibrium of the forces.

[0032] The O-ring 24 can be formed in one piece by an elastomer seal. However, it can have other forms. For example, it can be formed by a covered spring or by blocks connected by springs, one block being arranged at the location of each wing.

[0033] Naturally, the slots 29 in the profiled body 12 have a length adapted to the displacement range of the profiled body 12 in relation to the support 10. It is also possible for these slots 29 to open into the rear of the profiled body.

[0034] The profiled body and the support, which comprises not only the central portion and the arms 22, but also the outer ring in the form of a spherical segment of the aerator, can each be formed by injection moulding. They are extremely simple to assemble. As the O-ring is held over almost its entire circumference by the support, it is possible to mount it on the tube 14 before introducing the cylindrical member 30 of the profiled body 12.

1. A device for positioning a profiled body of an aerator in relation to a support within a displacement range corresponding to a flow-rate range of the aerator, characterised in that the profiled body (12) has a cylindrical member (30) with an axis which is parallel to the direction of displacement of the body in relation to the support, the support (10) comprises a cylindrical receptacle with a cross-section complementary to that of the cylindrical member (30) of the body, and the device additionally comprises an O-ring (24) which is arranged between the cylindrical member of the profiled body (12) and the cylindrical receptacle of the support (10) and is held on a first of the components selected from the profiled body (12) and the support (10) in order to allow relative displacement of the profiled body and the support by means of the O-ring (24), which slides along the second of the components selected from the profiled body and the support.

2. A device according to claim 1, characterised in that the O-ring (24) is held on the support.

3. A device according to claim 2, characterised in that the cylindrical member (30) of the profiled body (12) has a groove (34, 36) over at least member of its circumference in a position which corresponds to the position of the O-ring (24) when the cylindrical member (30) is at one end of the displacement range of the profiled body (12) in relation to the support (10).

4. A device according to claim 3, characterised in that the cylindrical member (30) of the profiled body comprises a groove (34, 36) at each of the two ends of the displacement range.

5. A device according to claim 1, characterised in that the cylindrical member (30) of the profiled body (12) has a cross-section comprising a core and at least one wing (32), and the support (10) is in the form of a tube (14) having at least one longitudinal channel (18) for receiving the wing (32), the thickness of the tube being less than the radial dimension of the wing.

6. A device according to claim 5, characterised in that the support has three channels (18) and the profiled body has three wings (32).

7. A device according to claim 1, characterised in that the groove (34, 36) is at least in the cylindrical member of the profiled body (12) is formed solely in the wing (32).

8. A device according to claim 2, characterised in that the support (10) contains a device for holding the O-ring, which device comprises a localised recess (26) in the channel (18) in its portion furthest away from the centre of the tube, the dimension of the recess (26) in the direction of the displace-
ment axis being in the order of magnitude of the width of the O-ring (24).

9. A device according to claim 1, characterised in that the support (10) is connected by arms (22) to a ring in the form of a spherical segment.

10. An aerator with adjustment of the orientation and flow-rate of a flow of air, of the type comprising:
   a conduit for the flow of air, having a chamber with a cross-section of which a portion of the inner surface forms a spherical segment,
   a profiled body (12), the majority of which is arranged in the chamber of the conduit and has a progressively increasing, then progressively decreasing cross-section, and

   a ring co-operating with the conduit and with the profiled body (12) in order to support the profiled body (12) in the conduit while permitting displacement of the profiled body in relation to the conduit, the ring having an outer surface forming a spherical portion which has practically the same radius as the spherical segment of the chamber, characterised in that the profiled body (12) is mounted on the ring by means of a positioning device according to claim 1.

11. A device according to claim 6, characterised in that the groove (34, 36) at least in the cylindrical member of the profiled body (12) is formed solely in the wing (32).

* * * * *